

Kristin Dalen, Hedda Flatø, Liu Jing  
and Zhang Huafeng

# Recovering from the Wenchuan Earthquake

Living Conditions and Development  
in Disaster Areas 2008–2011





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This report is based on three surveys conducted in the earthquake disaster areas in Sichuan province, China, between 2008 and 2011. The three surveys, which witnessed the entire reconstruction process of severely hit areas in Sichuan, were jointly undertaken by the Chinese Academy of Science and Technology for Development (CASTED) and Fafo, Institute of Applied International Studies in Norway. The three surveys were commissioned by the Chinese Ministry of Science and Technology, and funded by the Norwegian Ministry of Foreign Affairs and the Chinese Ministry of Science and Technology.

This report summarises the main findings of the three surveys, which tracked the period from immediately after the disaster until the completion of the post-disaster recovery efforts. Many people have been involved in making this important project possible. The authors would like to express their sincere gratitude to the professors and students from Mianyang Normal University, who in the fieldwork for the first survey made tremendous contributions under difficult conditions. Their efforts were central to ensuring the usefulness and success of the project. We would also like to thank Sichuan University and South-West Jiaotong University in Sichuan, which conducted the fieldwork for the second and third surveys respectively.

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## List of Abbreviations

BMISUE	Basic Medical Insurance for Urban Employees
BMISUR	Basic Medical Insurance for Urban Residents
CA	Correspondence Analysis
CASTED	Chinese Academy of Science and Technology for Development
CCP	Chinese Communist Party
CDC	Communicable Disease Centers
CPC	Communist Party of China
DALA	Damage and Loss Assessment
ECLAC	Economic Commission for Latin America and the Caribbean
IASC	Inter-Agency Standing Committee
MCA	Multiple Correspondence Analysis
MEDOW	Monitoring of Socio-Economic Development of Western China
MFA	Medical Financial Assistance
NDRC	National Disaster Reduction Center
NPC	National People's Congress
NRCMI	New Rural Cooperative Medical Insurance
NRCMS	New Rural Cooperative Medical Scheme
OCHA	Office for the Coordination of Humanitarian Affairs
PPS	Proportional Probability Sampling
PSU	Primary Sampling Unit
RSI	Randomly Selected Individual
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

## Foreword

The Wenchuan earthquake struck at 14:28 on Monday May 12, 2008 and turned the lives of millions of inhabitants of north-western Sichuan upside down. The confirmed death count stood at 68,000 and a further 17,000 people were missing. The number of houses that were destroyed or became unusable was comparable to the total housing stock of Norway, while schools and other public buildings were flattened, roads disappeared, rivers were blocked and numerous rockslides occurred. China had not witnessed a more devastating disaster since the Tangshan earthquake of 1976.

At the Chinese Academy of Science and Technology for Development (CASTED) researchers realised that the earthquake was also a test of whether social science could actually be applied. Could social scientists collect and disseminate information that would make a difference to the relief and reconstruction efforts?

The rapid needs assessment of the earthquake-stricken areas was born out of this question. Having secured the agreement of the Chinese Government, CASTED asked colleagues at Fafo for technical support, and the Ministry of Foreign Affairs in Norway was approached for funding to supplement that allocated by the Chinese Ministry of Science and Technology. The Deputy Minister at that time, Mr Raymond Johansen, responded swiftly and positively, and the needs assessment project was launched. Since the Chinese Government needed the reports by July 15, 2008 rapid deployment was vital to their usefulness and thereby to the project's success.

After conducting four thousand interviews with earthquake victims, the joint team of researchers from China and Norway met their deadline and delivered a report that in several aspects was different to similar needs assessments from other parts of the world. Due to the nature of the Chinese disaster response, and in particular the swift-ness of response at local government level, there was little need for a traditional disaster report outlining basic needs such as water, sanitation, infrastructure, nutrition etc. These needs were already well known at the places where this information was required.

Disaster governance was instead the focus of the study: given the diverse situations individuals and households encountered, how were responses to the disaster perceived and what were the needs beyond those of simple survival? How did households cope with the disaster, given their different life situations?

The focus on governance did not mean that traditional areas of disaster response such as housing, infrastructure and basic needs were ignored. For example, how houses should be rebuilt and how resources for rebuilding should be mobilised are among

the major issues of disaster governance. This report is therefore a thorough mapping of various aspects of life in the disaster zone.

A unique aspect of this study is that it is not only a single effort: the survey was repeated in 2009 and 2011. The follow-up studies were able to track the reconstruction effort and how the Chinese people responded to it.

The results were extensively used by the Chinese Government in planning the reconstruction effort and response to the earthquake. The Minister of Science and Technology, Mr Wang Gang, wrote a letter of thanks for the Norwegian assistance to the Norwegian Minister of Foreign Affairs, Mr Jonas Gahr Støre, and to the Minister of Development Cooperation and Environment, Mr Erik Solheim.

Fafo is proud to have been associated with this project. It belies the common presumption that social science reports are only put away in drawers, never to see the light of day. While the studies' initial reporting took the form of working documents intended for policy makers, this report summarises the findings for a more general audience.

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Head of Research  
Fafo-AIS





# 1 The Post-Wenchuan Earthquake Project

Hedda Flatø and Zhang Huafeng

## 1.1 Introduction

On May 12, 2008 the county of Wenchuan in China was hit by one of the strongest earthquakes in modern history. The earthquake caused severe destruction and countless deaths and injuries across an enormous area. China's Government was praised internationally for ensuring effective emergency relief for the affected population. However, another challenge remained: how to rebuild damaged communities and spur further development in the affected areas.

In order to provide an information basis for the Chinese Government's recovery policy formulation and implementation, the Chinese Academy of Science and Technology for Development (CASTED) and Fafo, Institute of Applied International Studies, undertook a research project in the earthquake disaster areas in the worst-hit province of Sichuan. The project encompassed three surveys: the first was conducted soon after the earthquake in 2008, the second a year later in the summer of 2009, and the third three years later in the summer of 2011.

The purpose of the surveys was to study how the affected population coped with the disaster, as well as the long-term consequences of the disaster and the reconstruction process for social and economic development in the area in question. What policy measures did the affected households need in order to recover from the earthquake? How did they view and experience the emergency and recovery measures? How did the earthquake and the reconstruction process affect people's lives?

The project started soon after the disaster, when China's Ministry of Science and Technology (MOST) and the Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction entrusted CASTED to conduct a rapid assessment of how people were coping with the disaster and what they needed in order to recover. Results from the assessment were used directly by central government in formulating their plan for the reconstruction and recovery of disaster areas. The Ministry also commissioned the institute to conduct two further studies – one during the reconstruction phase and one after it. The aim of the two later surveys was to assess the implementation of the

plan and the impact of the post-earthquake reconstruction on affected households. The Norwegian research institute Fafo provided technical advice, and the project was financed by Norway's Ministry of Foreign Affairs and MOST.

This report presents the results of all three surveys, the last of which was completed in August 2011. It provides a comprehensive overview of the consequences of the earthquake for those who were affected, of the disaster reduction and reconstruction policies implemented by the Chinese Government, and of how the area developed and people's living conditions changed during the reconstruction process.

## **1.2 The Wenchuan Earthquake**

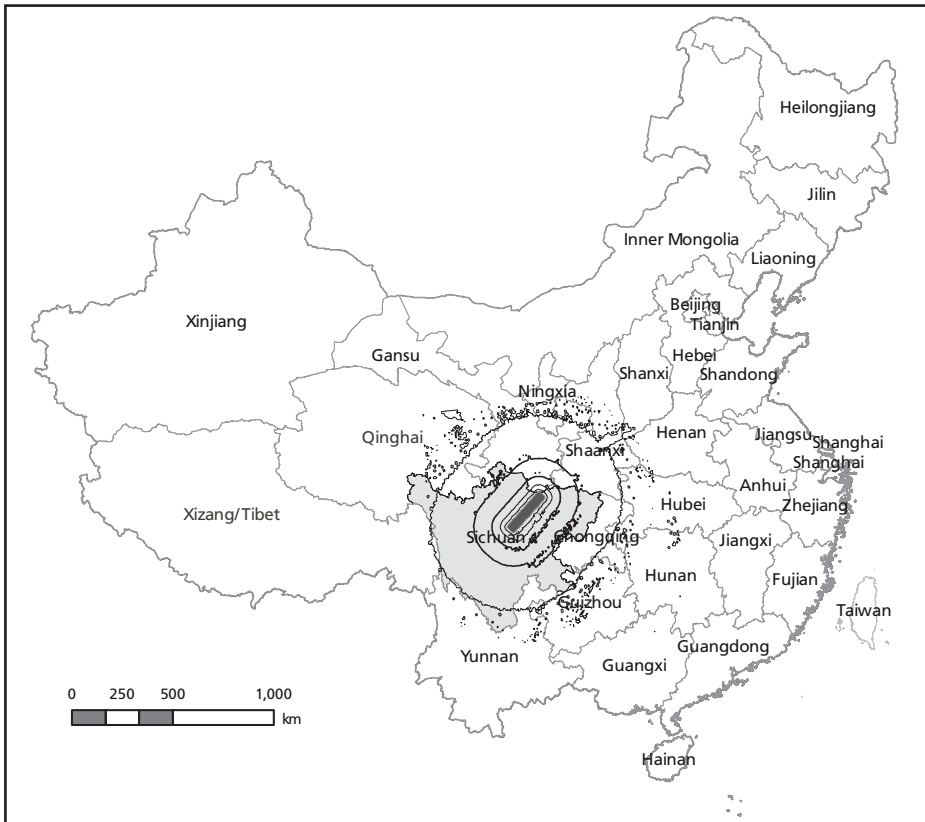
### **Earthquake impact in affected areas**

The Wenchuan earthquake struck China on May 12, 2008 with a strength of 8.0 on the Richter Scale. Its strength and deadly impact made it one of the most disastrous earthquakes in the world (U.S. Geological Survey 2008). The earthquake epicentre was located in Yingxiu in Wenchuan County, Sichuan province. Figure 1.1 (next page) shows the location of Sichuan province and the impact zone of Wenchuan earthquake. The area shaded dark grey is the most intense impact zone, while the semicircular lines surrounding it indicates boundaries between areas of progressively lesser intensity.

The Wenchuan earthquake caused destruction across 10 provinces in China, and its tremors were felt as far away as Thailand. Strong aftershocks, landslides, mud-rock flows, barrier lakes and other secondary disasters continued to threaten people's lives and property for many weeks and made the rescue work difficult. Altogether, more than 45.5 million people were affected by the earthquake. By August 25, 2008, 69,226 people were confirmed to have been killed in the disaster, while 17,923 were missing and 374,643 had been injured (U.S. Geological Survey 2008, p. 4). At least 15 million people were evacuated from their homes following the earthquake. In total, an estimated 5.36 million buildings collapsed and 21 million buildings were damaged (US Geological Survey 2008). The direct economic loss from the earthquake was more than CNY 800 billion, most of it due to loss of infrastructure and buildings (China State Council Information Office, 2008). It is estimated that around 1.2 million people had lost their jobs by the end of July 2008 (China Ministry of Human Resources and Social Security, 2008).

While large parts of the country can be said to have been affected by the Wenchuan earthquake, efforts were made to delimit the areas that had received the heaviest direct impact and were thus in most need of help. In what has been the Government's official

Figure 1.1 Sichuan and the impact zone of the Wenchuan earthquake



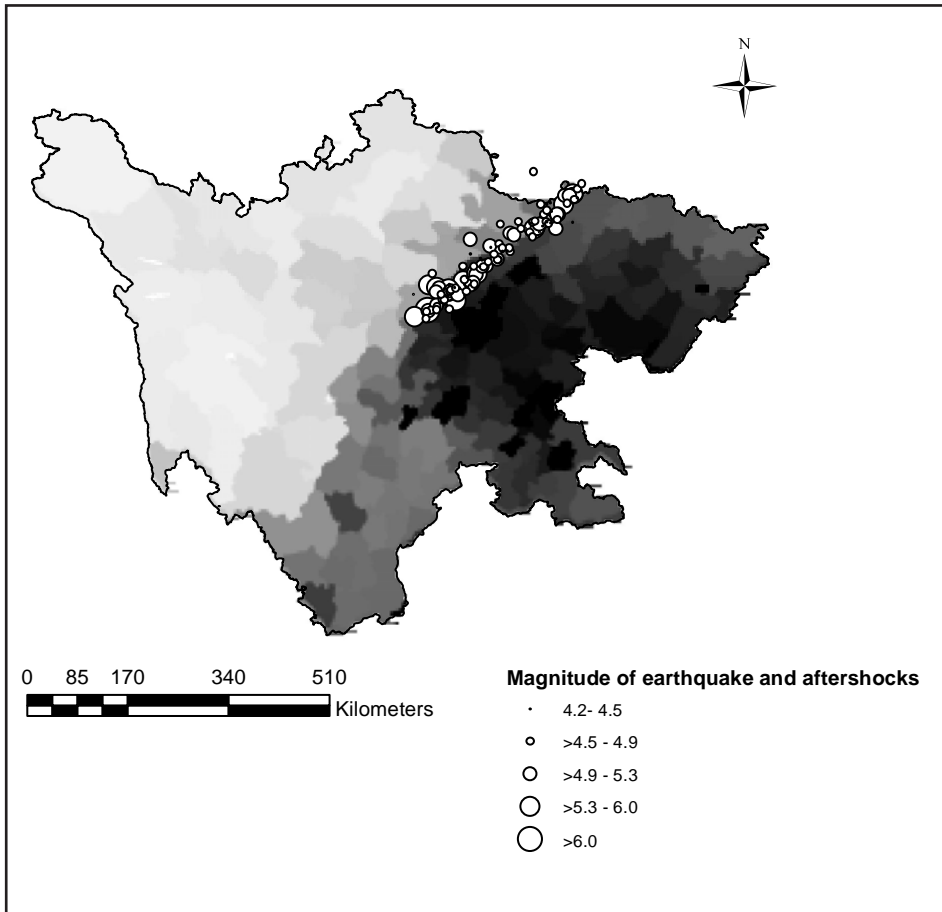
Source: Earthquake Geospatial Research Portal (2008A)

classification since August 2008, 51 counties were eventually officially defined as “seriously” (重灾区) or “very seriously” (极重灾区) affected by the Wenchuan earthquake. Decisions about which counties should be considered “seriously” or “very seriously” affected were political ones based on a review of what was known about the situation in the various counties at the time, rather than on strict scientific criteria. Most of the counties that were “very seriously” affected faced near-complete devastation.

At the time of the earthquake disaster, the total population of the 51 seriously and very seriously affected counties was 19,867 million people,<sup>1</sup> of which approximately four million were living in very seriously affected areas (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008, p. 2). Covering an area of more than 130,000 square kilometres, these counties are spread across Sichuan, Gansu and Shaanxi provinces. Most are located in Sichuan, including all the counties classified as the most seriously affected.

<sup>1</sup>This was the official population count at the end of 2007.

Figure 1.2 Population density in Sichuan and location of the Wenchuan earthquake



Population Density source: Earthquake Geospatial Research Portal (2008B)

The large majority of people in the earthquake-affected areas were rural residents who were relatively underprivileged compared to those in other parts of China. The Wenchuan earthquake and its aftershocks were centered just north of the most densely populated areas in Sichuan (figure 1.2). The North-west part of the impact area is sparsely populated, while the south-east area is densely populated. There are large differences between the North-west and the south-East with regard to resources, ecology and economic development. The plain area in the east, with Sichuan's capital Chengdu at its centre, is a fertile, well-irrigated agricultural region. The area was developed as an industrial base during the Mao era, and its level of industrialisation remains comparatively high, including industries in the fields of mechanical equipment, electronics,

energy, chemicals, steel and biopharmaceuticals. Many of these local industries were seriously damaged in the earthquake.

By contrast, the mountainous western region is geographically isolated, scarce in resources and population, and home to many of China's ethnic minorities. It is relatively isolated and economically underdeveloped, with a vulnerable ecology and limited in industrial development. Most of the heavily-hit zones are located in these western mountains and valleys, which are difficult to access under normal circumstances and were extremely difficult to reach for rescuers facing destroyed or blocked roads as well as secondary disasters (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008, pp. 2-3).

### **The Government's Recovery Plan**

As soon as the immediate post-earthquake emergency had passed, the Government started planning longer-term post-disaster reconstruction. From the beginning, the Government did not merely aim for full recovery. Instead, it aimed for reconstruction to contribute to political processes initiated with the 1999 "Development of the West" policy, and to the Hu Jintao administration's heavily promoted "scientific development" approach (科学发展观), which seeks to pursue a "harmonious society" by addressing inequities that have arisen with China's economic growth.<sup>2</sup>

The General Office of the State Council announced "The State Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction" (汶川地震灾后恢复重建总体规划) (henceforth referred to as the "Overall Reconstruction Plan") on September 23, 2008 (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008). The Plan served as a long list of guiding principles for the process of reconstruction. Although the Plan stated that the main priority was to reconstruct residential houses and public facilities within a period of three years, it also encouraged local authorities to consider the reconstruction process as a development opportunity, and it explicitly stated that one of the objectives for recovery and future development in Sichuan was to contribute to existing strategies of economic and rural development.

There is a strong focus on rural development, continued economic growth and market reform throughout the policy document. It states that "We shall promptly restore the public facilities and infrastructures, earnestly expand employment, and increase the residents' income (...)". Urban and rural spatial layout, population distribution, industrial structure and productivity layout were to be readjusted "so as to promote

<sup>2</sup>Christina Smikop's (2010) MA thesis, which was part of the post-earthquake project, provides a detailed analysis of how post-earthquake rebuilding was inspired by and contributed to these political development goals.

the harmony between man and nature”. The Plan calls for using reconstruction to spur development and self-sufficiency, particularly in poverty-stricken and ethnic minority areas. Future development was to be ensured by furthering industrialisation and urbanisation as well as by constructing new rural areas. The Plan underlined that such processes should be conducted in an environmentally friendly manner, with strict protection of farmland.

CNY 1,000 billion was allocated in the Plan for restoration work in the 51 counties classified in the Plan as seriously and very seriously affected in the provinces of Sichuan, Gansu and Shanxi. Local governments at all levels were given a predominant role, and the Plan introduces diverse and collaborative funding arrangements including “counterpart assistance” from provinces in other parts of China to designated earthquake counties.

In order to reach the overriding goals, the Plan stipulates six specific objectives which were to be attained by the end of the three-year reconstruction period:

1. To complete the restoration and reconstruction of urban and rural residences, making it possible for the disaster-affected population to live in safe, economical, practical and land-saving houses.
2. To ensure that at least one member in each family has a stable job, and that urban household per capita disposable income and rural household per capita net income surpass the pre-disaster levels.
3. To ensure that everyone in the disaster-affected population enjoys basic social security and has access to fundamental public services such as compulsory education, public sanitation and basic medical treatment in addition to public culture and sports, social welfare etc.
4. To completely restore infrastructure functions such as transportation, communications, energy, water conservancy etc. to meet or surpass pre-disaster levels.
5. To develop the economy, improving and expanding industries with special advantages, optimising industry structure, and enhancing capacity for scientific development.
6. To gradually restore ecological functions, improve environmental quality and ensure visible improvement in disaster prevention and mitigation ability.

## 1.3 Studying Post-Earthquake Needs and Recovery

### Purposes of the Post-Wenchuan Earthquake Surveys

The overriding purposes of the post-Wenchuan earthquake surveys were to assist the Chinese Government in its initial and mid-term recovery planning, and to assess post-earthquake policies by measuring developments during and after reconstruction. The first of the three post-Wenchuan earthquake surveys was conducted before the Government's Overall Reconstruction Plan had been formulated, and results from the survey fed into the development of the Plan. The second and third surveys were used to measure and analyse the implementation and effects of the Plan.

Much literature exists concerning pre- and post-disaster recovery planning (for an overview see Smith & Wenger, 2007). It is not within the scope of this report to conduct analyses of the Plan itself or of reasons for its successes and failures. What this report will provide is an assessment of the extent to which the ambitions of the Plan were achieved. Given the close interrelationship between the Overall Reconstruction Plan and national development objectives, this assessment will not only consider achievements related to the specific outcome objectives listed in the Plan, but will also include analyses of broader social developments in the area.

Due to their purpose of monitoring overall reconstruction needs and developments, the post-earthquake surveys were not designed to measure casualty or mortality rates accurately, or to conduct in-depth studies of minorities or other relatively small population groups. Moreover, it should be noted that the post-earthquake reconstruction was not the only factor that had an impact on people's lives during the years that have passed since the earthquake. For example, China's Government implemented and strengthened a number of important reforms of the health and education sectors in the same period, and the worldwide financial crisis in 2008 also had severe consequences for the Chinese labour market and economy, particularly for migrant workers of whom there are many in Sichuan's earthquake areas. Thus, many of the changes measured in the surveys are not necessarily specifically due to the earthquake.

### Disaster Recovery

Recovery can be understood as the period of time after a disaster "where deliberate actions are undertaken to routinize everyday activities of those individuals and groups whose daily routines have been disrupted. These activities may restore old patterns

and/or institute new ones" (Quarantelli, 1999).<sup>3</sup> Haas, Kates and Bowden were the first to specifically address disaster recovery in academic work (Haas, Kates, & Bowden, 1977). Focusing on physical reconstruction, they identified four post-disaster phases: the first is emergency responses including debris removal, provision of temporary housing, and search and rescue; the second is the restoration of public services in the days or weeks after the disaster in order to make the community functional as quickly as possible; the third is replacing or reconstructing "capital stock to pre-disaster levels", which includes returning the appearance of the affected community to "normal" and can last from months to several years after the disaster; the fourth is "betterment and developmental reconstruction" with an emphasis on promoting future economic growth and development.

Later research has taken the perspective of seeing recovery not merely as an outcome of a linear sequence of phases, but rather as a dynamic social process with no clear endpoint. This sociological notion of recovery assumes that social groups will experience the recovery process differently.

Natural disasters do not affect people equally as if by an arbitrary stroke of nature. Instead, the disaster impact is contingent on the vulnerability of affected people, which can and often does systematically differ across economic class, ethnicity, gender and other factors (Neumayer & Plümper, 2007)

Some researchers have found that for a brief period of time following the disaster event, social group barriers can be lowered and supportive and altruistic norms can emerge and enable a collective response to victims (Fritz, 1961), (Barton, 1969). Yet it has also frequently been evidenced that these periods are usually very short-lived, that community conflict replaces altruism in the relief and long-term recovery phases of a disaster, and that inter-group dynamics and relationships rarely change significantly after recovery (Nigg, 1995).

Using post-disaster reconstruction as an opportunity to spur development has become an important principle for disaster management (Asgary, Badri, Mojtaba, & Hajinejad, 2006) (McEntire, 2004). We know from existing literature that although natural disasters create massive destruction, restoration and reconstruction processes can present windows of opportunity for strengthening affected communities' ability for economic, social and physical development as well as their resistance to hazards long after the disaster (Berke, Kartez, & Wenger, 1993). Moreover, by bringing socio-economic inequalities into the limelight in a strongly emotional context, disasters create pressure for social change (Lyons, 2009).

<sup>3</sup>For an overview of disaster recovery research, see e.g. Berke, Kartez, & Wenger, 1993



However, experience indicates that although governments and relief agencies can take advantage of the opportunity for social change that arises from earthquakes and other disasters, hopes for social development should not be set too high (Provention Consortium & Alnap, 2008). What occurs in the recovery period usually reflects the social system that existed before the disaster (Quarantelli, 1998). A large body of research has shown that disasters and reconstruction tend to reproduce and may even exacerbate inequalities and vulnerabilities (Smith & Wenger, 2007). Market-based processes of recovery have been found to be particularly liable to increasing the level of inequity since underprivileged groups tend to lack access to the resources they need to attain full recovery and reduce vulnerability (Smith & Wenger, 2007, p. 235).

The objective of the post-Wenchuan earthquake project was to empirically identify what actually resulted from the recovery process at various points in time after the disaster; thus, the emphasis was on the outcomes rather than on the process of recovery. The project incorporated both the physical reconstruction perspective and the social process perspective on recovery. Issues related to many of the aspects outlined above were investigated throughout the project, including how the disaster recovery impacted on households' and communities' ability to cope, reconstruct and develop, its effect on patterns of social inequality, participation, social capital and social cohesion in earthquake areas, and the extent to which the window of opportunity was used for spurring further development in the long term.

While the classic division of recovery into phases may be simplistic, it was clearly used in practice in the Chinese decision makers' planning and implementation of recovery policies and measures: benchmarks spelled out objectives that were to have been achieved within the first few months of the earthquake, within one year of it, and within two years of it. It therefore makes sense to see the first of the three post-earthquake surveys as measuring what happened in the emergency and restoration phases, the second survey as a study of the "replacement reconstruction" phase, and the third survey as having taken place during the "betterment and developmental reconstruction" phase.

### **Analytical Framework**

In investigating the issues outlined above, the post-Wenchuan earthquake surveys took a multi-dimensional, Nordic approach to living conditions surveys (NOU, 1993). This concept of living conditions includes health, working conditions, knowledge, family relations etc. in addition to income and other economic resources.

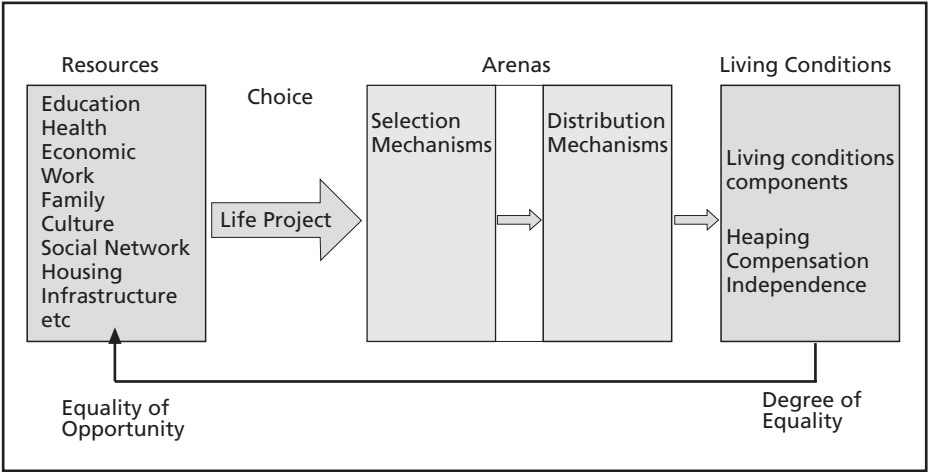
The approach is based on the assumption that people can make their own choices and take individual responsibility, but only within the framework of available *resources* and *arenas* (NOU, 1993). Given that two people have the same access to resources, they exploit those resources according to their own aspirations. However, even if people

have the same resources, they may have different opportunities to use them because resources must be invested in order to be transformed into living conditions. For example, education can be transformed into income on condition that the existing labour market offers career opportunities based on education (as opposed to opportunities based on gender, wealth etc.).

“Arenas” where resources can be invested – such as the labour market – can be designed in a way that makes it easy for some groups to access them while presenting barriers to others. The outcomes of resources and arenas are conceptualised as various living conditions components, such as housing, education, income etc. Such outcomes may be related in three ways (Hanssen-Bauer & Kharabsheh, 1998). Firstly, they may be linked in a way that creates heaping or clustering, i.e. poor conditions along one component are linked with poor conditions along another, or all good things come together. Secondly, they may be linked in a way that compensates one for another. Thirdly, the components may be independent of each other.

In summary, according to this approach, differences in living conditions (i.e. in outcomes) can be explained by differences in how people choose to live their lives, or by differences in access to resources or access to arenas. The outcome, i.e. the current standard of living, in turn reconstitutes people’s resources and thereby affects their opportunity to further change their living conditions.

Figure 1.3 Measures of living conditions surveys



Source: Hanssen-Bauer and Karabsheh, 1998

The Wenchuan earthquake can be seen as an immense disturbance or shock to the process that creates and recreates living conditions. The tasks of the three post-earthquake surveys were therefore to discover how this shock affected and disturbed the

production and distribution of living conditions in the affected areas, and to measure the effect of efforts to restore or improve it.

The main unit of analysis in the post-Wenchuan earthquake surveys is households. Since many of our conditions of life are influenced by or mediated through the household or family, it is natural to measure living conditions both at the individual and at the household level (Hanssen-Bauer & Kharabsheh, 1998, p. 36). Households are also the focus of most research conducted on disaster recovery. In disaster recovery literature, family recovery is seen as the outcome of a sequence of activities in which families utilise resources to recover to pre-disaster or a desired level (Nigg, 1995, s. 7). The resources that can be utilised include all those available to the household – not only their own resources, but also help from government or aid organisations. In the analytical framework employed here, how a household recovers depends on its access to resources – including resources provided by government or aid agencies – and on the arenas that determine which resources can be used for obtaining various living conditions components and how.

Seen in light of this analytical framework, recovery policies and measures can affect the production and distribution of living conditions either through how and to whom resources are provided, or by changing the mechanisms for selecting and distributing goods.

## **1.4 Methods**

### **Survey Design**

The design of the assessments as three relatively large household surveys followed as a consequence of the surveys' particular objectives and of the theoretical framework: in order to reliably assess household living conditions, attitudes and opinions over such a large area and in a population of 13 million people, there was little choice other than attempting to select a probability sample that could be used to make statistical generalisations.

The main objective of the first of the three surveys was to map out the needs for policy interventions among the affected population in a very short period of time, while the second and third surveys were aimed at assessing later developments in the area. Based on these different objectives, the first survey was designed as a rapid needs assessment, while the design of the second two was more similar to ordinary living conditions surveys.

Needs assessment methodology is used in a novel way in this project. Many rapid-need assessment tools have been developed and implemented in post-disaster situations; most are immediate or ongoing initial assessments conducted in the early phase (usually a few weeks) after the onset of the disaster, with a focus on immediate humanitarian assistance needs such as the provision of food, water, shelter, health services etc. (Dalen, Zhang and Zhao, Forthcoming).<sup>4,5</sup> However, there have been increasingly strong calls for conducting needs assessments and analyses in all phases after disasters in order to cater for information requirements related to longer-term post-disaster assistance and/or reconstruction (OCHA, Assessment and Classification of Emergencies (ACE) Project--Mapping of Key Emergency Needs Assessment and Analysis Initiatives, 2009).<sup>6</sup> There are few comprehensive needs assessments; most target a particular group of people or a specific concern.<sup>7</sup>

The most widely used methods for carrying out needs assessments are reviews of existing literature, field observation, focus group discussions and key informant interviews. Household surveys have been more widely used in complex and slow-onset disasters (Kamp, et al., 2006) However, some household surveys with a cluster design have also been applied in humanitarian emergencies such as in the aftermath of the 1993 Hurricane Andrew in South Florida (Hlady, et al., 1994). After the tropical cyclone Nargis struck Myanmar in May 2008, an assessment jointly conducted by ASEAN, the UN and the Burmese Government took a more systematic approach: firstly, a Village Tract Assessment was carried out, followed by a Damage and Loss Assessment (DALA) within two months of the disaster and thereafter by Periodic Review Monitoring Assessments and Social Impact Monitoring Studies for two years after the disaster.

The design of the post-Wenchuan earthquake surveys – particularly the first one – built on and contributed to this existing literature on post-disaster needs assessments.

<sup>4</sup> These include, among others, the HNTS (Health and Nutrition Tracking Service) (HNTS, 2009), SMART (Standardized Monitoring and Assessment of Relief and Transitions) (Smart, April 2006) and SPHERE standards (The Sphere Project, 2011).

<sup>5</sup> For example, the USAID's Disaster Assessment Needs Analysis (DANA) focuses on emergency and response immediately after disasters. UNDAC's Disaster Initial Assessment and IASC's Initial Rapid Assessment both focus on gathering information during the initial phase of an emergency (USAID/ OFDA Project, 2007; IASC, June 2009).

<sup>6</sup> For example, the Economic Commission for Latin America and the Caribbean (ECLAC) post-disaster Damage and Loss Assessment (DALA) provides information on long-term rehabilitation (World Bank, 2010).

<sup>7</sup> However, since inadequate coordination within the field of needs assessments was discussed at the 68th Inter-Agency Standing Committee (IASC) Group meeting in June 2007, the IASC developed a more comprehensive rapid needs assessment tool called the Multi-cluster Initial Assessment (MIRA) and a Multi-cluster Rapid Assessment Mechanism (McRAM) was thereafter developed and applied in Pakistan in 2008 (IASC, June 2009).

They faced somewhat varying policy demands compared to other post-disaster assessments and are therefore different from traditional needs assessments in that they are policy-oriented, have a long-term outlook, and are comprehensive yet targeted in scope, content and methodology (Dalen, Zhang and Zhao, Forthcoming).

Firstly, the surveys were not designed to explore the direct humanitarian needs in the immediate aftermath of the earthquake. This was partly because the fieldwork for the first survey started two months after the earthquake, and partly because the Chinese Government managed to obtain relevant information on humanitarian needs and to reconstruct the local public administrative system fairly rapidly after the earthquake. Secondly, the surveys were not aimed at covering all planning needs; macro-economic impacts or large-scale effects on major infrastructure were not included. Thus, they were not damage-based assessments in the sense of the ECLAC manual (ECLAC, 2003). **Thirdly, the surveys were designed to assess not only the situation in the immediate aftermath of the earthquake but also the long-term, post-earthquake reconstruction and related developments.** Fourthly, in addition to focusing on material and other direct deprivation following the earthquake, the surveys also attempted to ask people about how they perceived the aid effort and what they expected in the future. Fifthly, the surveys aimed to cover a very large geographical area and a correspondingly large population. Finally, the three surveys can also function as a tool for monitoring and evaluating reconstruction work in earthquake areas.

### **Questionnaire Design**

The questionnaires developed for the surveys focused on basic resources available to the population in the affected area, and people's perception of the situation and their hopes for the future. There were three main questionnaires: firstly, a household questionnaire divided into one part for the household as a whole and one part for each member; secondly, a randomly-selected individual answered a questionnaire focusing on attitudes, opinions and other questions that could only be answered individually; and thirdly, there was a community questionnaire to be answered by community leaders. The questionnaires were developed with input from the stakeholders in the survey, particularly the State Council's Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction and the provincial authorities. During the work on the questionnaires, interviews were conducted with key informants as well as with ordinary households in the area. The 2009 and 2011 questionnaires were adjusted in light of the experience from previous surveys and in accordance with emerging policy issues and developments in the area. Nevertheless, questions that needed to be compared over time were formulated similarly in each survey.

The questionnaire construction also benefited from the fact that the research group had previously carried out a large-scale living conditions survey of the western regions

of China<sup>8</sup> which also included Sichuan and the earthquake-affected areas. The 2004 survey, called MEDOW, provided rich data from Sichuan province which could be compared to the situation after the earthquake. The earthquake-affected counties can be separated out from the MEDOW data and thereby provide baseline data on the situation in 2004, which can be compared to post-earthquake survey data. Therefore, to the extent possible, the questions in the post-earthquake questionnaires were made compatible with those of the 2004 survey.

## Sampling

The sampling design was aimed at targeting all victims of the earthquake who at the time of the survey resided within the earthquake-affected areas. Prior to August 2008, when the first survey started, several classifications regarding degree of earthquake damage in various affected areas existed, including classifications defined by the Ministry of Civil Affairs, the NDRC (National Disaster Reduction Centre), and the Wenchuan earthquake expert committee (NDRC, 2008). In August 2008 the “Assessment on the scope of the Wenchuan Earthquake” (汶川地震灾害范围评估结果) was formally released jointly by several government departments, and this became the official classification (Government of the People's Republic of China, 2008).

The official classification had not yet been published when samples for the rapid needs assessment had to be drawn in June 2008; thus, the classification used for the survey was the one published by the Wenchuan earthquake expert committee, which was the one mainly used before August 2011 (NDRC, 2008).<sup>9</sup> The same classification has been used in all three surveys for the purpose of comparison. The classification consists of three categories: extremely seriously affected, very seriously affected and

<sup>8</sup>The Monitoring Social and Economic Development of the Western Regions of China (MEDOW) survey was an earlier cooperation between the Chinese Academy of Science and Technology for Development (CASTED) and the Fafo Institute for Applied International Studies. The study was a comprehensive multi-topic survey, collecting data on population, infrastructure, education, health, the labour market, household economy, agriculture and the environment, as well as a number of other issues. The survey covered 11 provinces in Western China, with around 4,000 households in each province.

<sup>9</sup>There are two standards that have been used to classify earthquake-affected areas in terms of the damage caused by the Wenchuan earthquake. Both are defined by the Chinese government. The first one was mainly used before August 2008, and defines 11 counties as very or extremely seriously affected (NDRC, 2008). The second classification, from the “Assessment Report of the Range of Wenchuan Earthquake” (汶川地震灾害范围评估结果), has been formally used since August 2008, and includes 10 very seriously affected counties; all are the same as in the first classification, but in the second one Lixian is not classified as very seriously affected (Government of the People's Republic of China, 2008). According to both classifications, around four million people lived in the most heavily affected areas.

seriously affected.<sup>10</sup> Each county in the earthquake area was scored according to whether or not it encompassed areas with each of the three classifications. In the construction of the sampling frame, the project team simplified the classification into very seriously affected areas and seriously affected areas, the very seriously affected counties being found along the Longmen Mountains' fault line.<sup>11</sup>

Some seriously affected counties were not included because they were either remote or sparsely populated. None of the counties located in the Aba prefecture were included in the first two surveys, although they were included in the third one. In the first survey in 2008, two sampled counties proved to be impossible to reach. Therefore, the 2008 survey covered 24 counties (eight very seriously affected counties)<sup>12</sup> and 144 clusters. A total of 4,526 households were randomly sampled, and interviews were completed with 3,652 of them. The 2009 survey covered 26 counties<sup>13</sup> (nine very seriously affected counties) and 171 clusters. In all, 5,549 households were randomly sampled, of which 4,015 households completed interviews. The last survey in 2011 covered 30 counties<sup>14</sup> (11 very seriously affected counties), 198 clusters and 4,951 households, with 3,841 completed interviews.

Both the first and second surveys used independent samples from communities and camps. The second survey in 2009 of communities was a panel survey of the households interviewed in 2008, i.e. the households interviewed in the 2008 survey in communities were revisited in 2009. However, a new sample was drawn in camps

<sup>10</sup> In real terms, an extremely seriously affected area would have practically no houses left standing, while very seriously affected areas would have damaged and destroyed houses, but not generalised destruction. Eleven counties were defined as very seriously affected in the classification used for sampling in the three surveys, namely Wenchuan, Beichuan, Mianzhu, Shifang, Qingchuan, Maoxian, Lixian, Anxian, Pingwu, Pengzhou, Jiangyou. Altogether 22 counties were defined as seriously affected areas, comprising Jiuzhaigou, Songpan, Jinchuan, Heishui, Dayi, Chongzhou, Zhongjiang, Guanghan, Jingyang, Luojiang, Yuanba, Lizhou, Jiange, Chaotian, Santai, Zitong, Fucheng, Youxian, Yanting, Cangxi, Wangcang and Dujiangyan.

<sup>11</sup> The classification used is broadly consistent with that of the China Earthquake Administration (中国地震局).

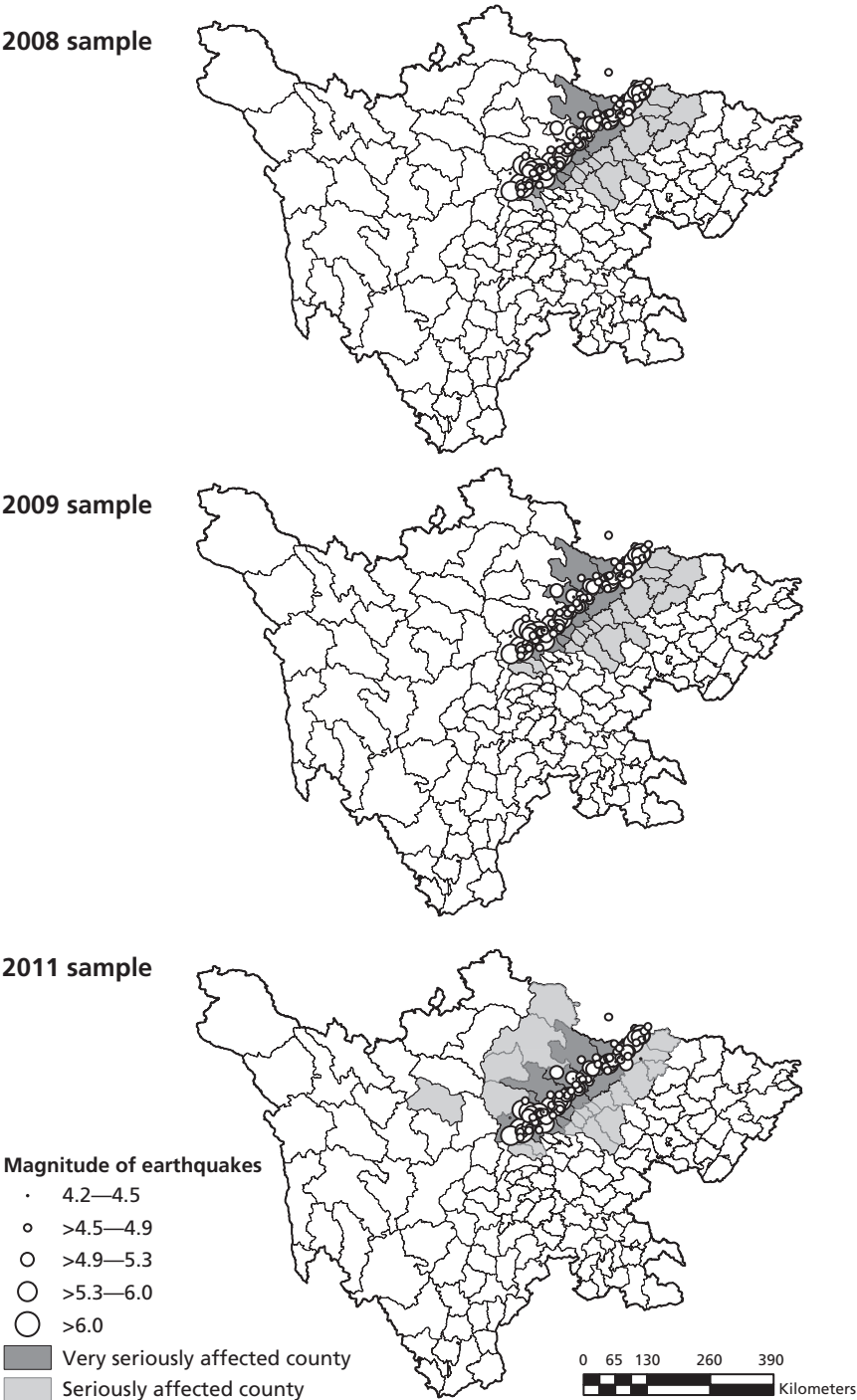
<sup>12</sup> The 24 counties consisted of eight very seriously affected counties, namely Shifang, Anxian, Pingwu, Dujiangyan, Pengzhou, Mianzhu, Jiangyou and Qingchuan, and 16 seriously affected counties, namely Chongzhou, Jingyang, Zhongjiang, Luojiang, Guanghan, Fucheng, Youxian, Zitong, Yanting, Santai, Lizhou, Chaotian, Yuanba, Jiange, Cangxi and Wangcang.

<sup>13</sup> The 26 counties were nine very seriously affected counties, namely Shifang, Anxian, Pingwu, Dujiangyan, Pengzhou, Mianzhu, Beichuan, Jiangyou and Qingchuan, and 17 seriously affected counties, namely Chongzhou, Jingyang, Zhongjiang, Luojiang, Guanghan, Fucheng, Youxian, Zitong, Yanting, Santai, Lizhou, Chaotian, Yuanba, Jiange, Cangxi, Dayi and Wangcang.

<sup>14</sup> The 30 counties were 11 very seriously affected counties namely Shifang, Anxian, Pingwu, Dujiangyan, Pengzhou, Mianzhu, Beichuan, Wenchuan, Maoxian, Jiangyou and Qingchuan, and 19 seriously affected counties namely Chongzhou, Jingyang, Zhongjiang, Luojiang, Guanghan, Fucheng, Youxian, Zitong, Santai, Lizhou, Chaotian, Yuanba, Jiange, Dayi, Jiuzhaigou, Songpan, Lixian, Jinchuan and Heishui.



Figure 1.4 Location of the sampled counties in 2008, 2009 and 2011 Surveys



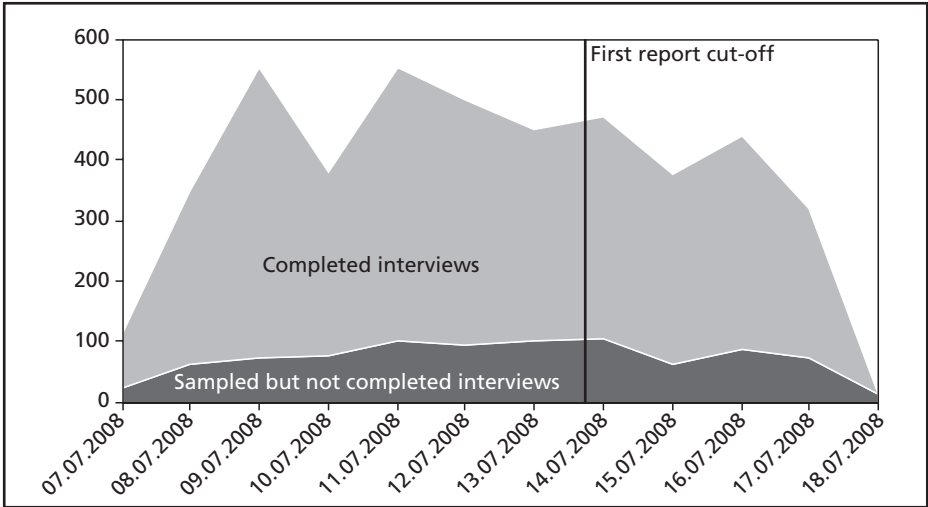


in the 2009 survey because many camps in 2009 had not been constructed in 2008, and some camps from 2008 had been dismantled by the time of the second survey. The third survey in 2011 was a new sample with a larger number of clusters. Figure 1.4 shows the location of all the sampled counties in the three follow-up surveys. The areas shaded dark grey are the very seriously affected counties, and the areas shaded light grey are the seriously affected counties.

### Fieldwork

The fieldwork for the initial assessment was carried out from July 7 to July 18, 2008. The research team had to work under very strict time limits in order to provide information to the Chinese Government in time for the preparation of the Overall Reconstruction Plan. In 2008, 80 interviewers completed an average of 5.2 interviews per day, resulting in a total of around 400-500 interviews daily (Figure 1.3). The initial report of the first survey had to be delivered by July 15, 2008, therefore the initial report only used data collected up to July 14. A total of 80 interviewers and supervisors, most of whom were students from Mianyang Normal University, participated in the first survey. The fieldwork for the second survey was carried out from July 17 to August 2, 2009 while the third survey took place from July 14 to August 8, 2011. Both later surveys followed the design of the first survey in most respects. In the second survey in 2009, the field work was carried out by students from Sichuan University, while in the third survey in 2011 students from North-west Jiaotong University in Sichuan were recruited. In all three surveys, 80 interviewers were recruited and attended a five-day training course before the field work started.

Figure 1.5 Number of attempted and completed interviews by survey date in 2008.



A team of samplers were recruited in addition to the interviewers in all surveys; they were responsible for the final stage sampling of households in each selected community, village or camp. In the second survey, sampling was only needed in camps, while the samples in communities and villages were the same households as those interviewed in the first survey. In the third survey, a new sample was drawn and the sampling frame was based on the 2010 census of China.

In all three surveys, each interviewer was equipped with an Asus Eee PC sub-notebook computer running Windows XP and using Blaise 4.8 as a computer-aided interviewing data entry tool (Statistics Netherlands, 2002). The use of sub-notebook computer-aided interviewing had the great advantage that the programming of the data entry application could use standard, well-tested and robust software. Computer-aided interviewing was on the whole very successful. Perhaps most importantly the computer-aided interviewing allowed for continuous tabulation and quality control while the survey was taking place. Moreover, the source code for the production of the tabulation report could be developed as the survey progressed, taking account of real data.

The interviewers, samplers and supervisors received five days' training before they were deployed in the field. During fieldwork, interviewers were divided into groups consisting of one supervisor and a few interviewers. A number of samplers were responsible for conducting sampling work. The samplers arrived in the selected communities before the interviewers, established contact with local authorities, conducted community questionnaires, requested household lists for sampling and evaluated the lists. If the list was found to be reliable, the sampler drew a sample from the list. If the list was not reliable, other sampling methods such as mapping and random walks were applied. When the interviewer team arrived, they would start interviewing selected households according to the list provided by the sampler.

## **1.5 The Report**

This report presents the overall results of the three Sichuan surveys. It seeks to answer questions such as: How were people's livelihoods affected by the earthquake? How do affected people perceive and experience post-earthquake developments, and what are their opinions? How have their lives and the situation in earthquake areas developed during the four years that have passed? How were recovery and reconstruction measures implemented, and what were their effects?

In order to address these questions, the report presents and discusses results on disaster impact, recovery policies and post-earthquake developments with regard to a number of key recovery issues. Chapter 2 concerns the recovery of housing and

infrastructure. It describes the specific measures implemented by central and local government to repair and rebuild the massively damaged infrastructure in earthquake areas, and shows how this was dealt with and experienced by households. Chapter 3 presents results on post-earthquake changes in the labour force, the distribution of work opportunities and working conditions. Chapter 4 looks at the earthquake's impact on health and local healthcare systems. It also analyses affected people's access to necessary healthcare services in the immediate emergency period as well as during and after the recovery process, in light of both earthquake-specific policies and the national health system reforms undertaken during the same period. Chapter 5 describes the earthquake's impact on schools and education as well as the general education situation in earthquake areas. It also discusses the effect of education subsidies and preferential policies for earthquake-affected children. Chapter 6 describes and analyses the economic situation for earthquake-affected households. Chapter 7 concerns how people viewed and experienced the post-earthquake reconstruction process. It also describes results concerning how trust and satisfaction have changed since the earthquake. The concluding Chapter 8 provides an overall assessment of the recovery process based on the previous chapters. It discusses how reconstruction has fared with regard to the objectives outlined in the Government's Overall Reconstruction Plan and in light of previous literature and the analytical framework.



## 2 Housing and Infrastructure

Zhang Huafeng

### 2.1 Introduction

The Wenchuan earthquake affected large areas and caused huge losses. Large amounts of both urban and rural residential housing were destroyed, and some towns and villages – such as Beichuan, Wenchuan and Yingxiu – were almost razed to the ground. The basic infrastructure, transportation, electricity, communications, and water and gas supply systems were seriously damaged or even paralysed in many areas.

Following the earthquake millions of houses needed to be repaired or reinforced. As described in Chapter 1, the Overall Reconstruction Plan promulgated by the State Council in September 2008 guided the disaster recovery and reconstruction work. The Plan defined the objectives, principles and specific requirements of the reconstruction work with the aim of helping households in earthquake areas to rebuild their homes. In the Overall Reconstruction Plan, the State Council estimated the reconstruction costs to be CNY 1 trillion. In March 2009, the Second Session of the Eleventh National People's Congress proposed to strive to complete the reconstruction in earthquake areas within two years (China.net, 2009 March 5); thus, the housing reconstruction was to be mostly completed by September 2010 (NDRC, 2009 May 8).

The devastating earthquake damage to housing and infrastructure had a huge impact on people's living conditions in the earthquake-affected area. Evaluating the standard of the houses to be repaired, reinforced or rebuilt, and discovering people's own evaluations and their needs for improvements and reconstruction, would provide the policy makers with important information during the formulation and implementation of the Overall Reconstruction Plan. Furthermore, evaluating the housing and infrastructure situation in the disaster area during and after the reconstruction would also help to monitor the implementation of the reconstruction work, and would provide the policy makers with relevant information in the various stages of reconstruction.

This chapter first discusses the policies made and implemented by the Chinese Government in the earthquake-affected areas. Section 2.1 reviews the policies on the evaluation of housing damage, the methods of reconstruction and restoration of the

damaged houses, and subsidies and preferential policies to households whose homes were damaged during the earthquake. Section 2.2 illustrates the households' evaluation of the damage by the earthquake to their houses, the reconstruction process of the houses during the various periods, and the reinforcement of houses against earthquakes during the reconstruction. Furthermore, the sources of funding for the housing reparation and rebuilding and the location of the new houses are also addressed. In Section 2.3 the evaluation of the infrastructure development in temporary and permanent houses is discussed during the various periods of reconstruction. Finally, the households' level of satisfaction with the reconstruction work is reviewed in Section 2.4.

## 2.2 Policy on the Housing Reconstruction

Three weeks after the earthquake, the State Council published the Wenchuan Earthquake Restoration and Reconstruction Regulations, and provided legal guidance for the formulation of the Overall Reconstruction Plan. The Overall Reconstruction Plan attached great importance to restoring residential housing, and pointed out that the restoration of urban and rural residential housing should address the differing urban and rural characteristics. The Overall Reconstruction Plan provided guidelines for the post-disaster reconstruction work in earthquake areas.

In June 2009, immediately prior to the second survey, the Construction Department of Sichuan province issued notice of carrying out an evaluation of earthquake proofing and of the reparation and reinforcement of damaged houses in the Sichuan earthquake area (Construction Department of Sichuan Province, July 2008). Other relevant policies and technical specification and regulations were published to guide the evaluation work of the damaged houses in the disaster areas.

Based on the Restoration and Reconstruction Regulations, in June 2008 the Sichuan provincial government formulated the "Sichuan Rural Housing Reconstruction Plan" (Civil affairs department in Sichuan province, June 2008) and the "Sichuan Rural Housing Repair and Reinforcement Plan" (Central government of China, Dec 2008). The "Urban Housing Reconstruction Plan" was published in September 2008 (Sichuan Provincial Government, Oct 2008).

According to the plans, there were six methods for reconstructing or replacing houses that were damaged in the earthquake: reinforcing the house, rebuilding the house on the original land, rebuilding the house on replacement land, renting a low-cost house, buying a low-cost house, and rebuilding the house organised by workplaces. In urban areas, people also had the options of buying a low-cost house, renting public housing or receiving a cash subsidy. In many places in rural areas, large numbers of houses were rebuilt on different land from where they were originally located; in such

cases, town and village governments could choose to rebuild the houses collectively, with each household contributing a share.

The rural housing reconstruction plan targeted rural households whose homes had collapsed or been damaged to such an extent that the households could not live there. Households were entitled to a cash subsidy of on average CNY 20,000 per household to rebuild their house, with the exact size of the subsidy depending on the household's size and economic situation. In principle, households with the worst economic situation and the largest size were supposed to get a higher cash subsidy. Households that found a place to live themselves before their permanent house was rebuilt would receive a subsidy of CNY 2,000.

The Sichuan rural housing repair and reinforcement plan aimed at helping rural households whose houses had been damaged and were still inhabitable following repair and reinforcement. The homes of most households in earthquake areas were evaluated by the Chinese Government and the extent of damage divided into five categories: no damage, minor damage, medium damage, serious damage and collapse. Apart from houses that had collapsed or had sustained no damage, households in each category would receive a cash subsidy of CNY 1,000-2,000, CNY 2,000-4,000 or CNY 4,000-5,000 respectively.

The Sichuan urban housing reconstruction plan targeted urban households whose houses had collapsed or been damaged. Urban households whose houses had collapsed or were inhabitable could receive a cash subsidy, a housing tax exemption or reduction, and preferential low-cost housing. The average cash subsidy was CNY 25,000 depending on the household's size and economic status. Similar to rural areas, urban households whose houses were habitable after repair and reinforcement could receive a cash subsidy depending on the three categories of damage, being respectively CNY 1,000-2,000, CNY 2,000-4,000 or CNY 4,000-5,000,.

In October 2008, based on the Overall Reconstruction Plan, the Sichuan government announced various preferential loan policies for households to rebuild their house or buy a new house. According to Sichuan's post-earthquake urban housing reconstruction plan, for households taking out a bank loan to purchase a new house, the minimum interest rate was adjusted to 0.6 of the benchmark lending interest rate, and the minimum down payment was reduced to 10 per cent. According to the preferential policies of the housing provident fund, households that obtained a loan from the housing provident fund to rebuild, buy or reinforce their house received a one percentage point discount on their interest rate (Construction Department of Sichuan Province, Oct 2008).

## 2.3 Housing

### Damage Evaluation

It was estimated that following the earthquake over five million buildings collapsed and 21 million buildings were damaged (US Geological Survey 2008). People's Daily Online (People's Daily, 2008 June 3) estimated that around six million houses were seriously damaged in earthquake areas, i.e. over 10 million people became homeless following the earthquake. According to the construction department of Sichuan province, over 1,000 housing evaluation experts from all over the country were to be sent by the Chinese Government to assess all the houses in areas that were damaged in the Sichuan earthquake-affected areas. Up to the end of May 2008, houses covering over 100 million square metres had been evaluated by these experts (CCTV, 2008 May 28).

The government evaluation of the damage to the houses in earthquake areas was carried out in accordance with the "Dangerous housing evaluation standard (危险房屋鉴定标准)", the "Construction seismic evaluation standards (建筑抗震鉴定标准)" and other related national standards for buildings with varying structural features (CCTV, 2008 May 28). These government evaluations provided important references for government compensation for those affected.

Table 2.1 Households' own evaluation of house damage in 2011 (percentages)

		Collapsed	Serious damage	Medium damage	Slight damage	No damage	Sample size
Seriously affected area	Chengdu	6	17	20	41	16	304
	Deyang	10	21	25	36	9	506
	Mianyang	11	28	26	28	8	470
	Guangyuan	14	36	24	24	3	285
	Aba	14	27	37	18	4	86
Very seriously affected area	Chengdu	15	29	25	24	8	438
	Deyang	44	27	11	14	4	514
	Mianyang	22	31	18	26	4	805
	Guangyuan	50	31	16	2	1	128
	Aba	33	18	18	24	6	97
	Rural	20	29	22	25	5	2842
	Urban	5	14	23	40	18	791
<b>Total</b>		<b>16</b>	<b>26</b>	<b>22</b>	<b>28</b>	<b>8</b>	<b>100</b>

Note: Based on the 2011 survey, all the households that self-evaluated the damage to their houses from the earthquake.



In the 2009 survey, households were asked whether their houses had been evaluated by the Government and about their own perception of the damage to their houses. Around 71 per cent of the households in the survey area reported that their houses had been evaluated. In 2009, almost half of the households living in camps had not yet had their houses evaluated by the Government (in total 29 per cent of rural houses and 22 per cent of urban houses). The 2009 survey indicated that there were only minor differences between the Government evaluations reported by the households and the households' self-evaluation of the damage one year after the earthquake.

The 2011 survey only addressed households' self-evaluation of the house damage. Table 2.1 shows that in the survey area 20 per cent of rural households reported that their houses had collapsed and 29 per cent of the rural houses were seriously damaged. As the most severe damage in general occurred in the mountains, urban houses were not damaged as seriously as those in rural areas, although as many as 20 per cent of urban houses had collapsed or were seriously damaged, and another 20 per cent had sustained medium damage. Only eight per cent of the houses in the survey area were not affected at all. The extent of house damage varied considerably between the areas, with houses in the very seriously affected regions sustaining more serious damage. In the very seriously affected area of the Guangyuan district half of the houses had collapsed, while almost 60 per cent of the houses in the seriously affected area in the Chengdu district were not affected or had sustained only slight damage. The surveys indicated that residential housing in the survey areas had sustained the most serious damage, and thus residential housing reconstruction was of the utmost importance for these households following the disaster.

### **Housing Reconstruction**

One of the most significant impacts of the earthquake was the devastating damage caused to the houses in the earthquake-affected area. Millions of people were made homeless after the earthquake. **The reconstruction of houses in the area was important** to the success of the general reconstruction work. The three follow-up surveys provided information on the households' housing condition and the status of the housing reconstruction in various periods following the earthquake. The first survey in 2008 found that 33 per cent of households in the survey area reported that their houses were uninhabitable following the earthquake. Therefore, some households were forced to live for a period in temporary self-built shelters, tents or prefabricated houses provided by the government.



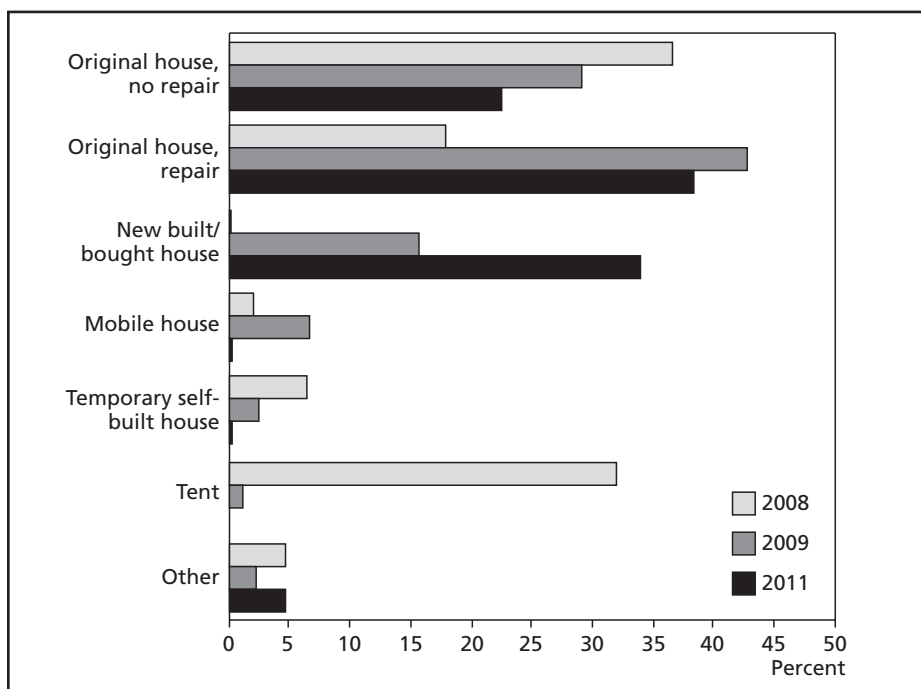
Temporary housing: The pictures show different types of temporary post-earthquake housing. Picture number 1 (left) shows a temporary self-built shelter. Picture number 2 (middle) shows a tent provided by the government. Picture number 3 (right) shows one camp with prefabricated houses built by government.

The pictures below show different types of temporary housing. The temporary self-built shelters (left picture) were built by the affected households and in most cases were constructed from the waste materials or ruins from the collapsed houses. Tents (middle picture) were either bought by the households or more commonly provided by the Government immediately after the earthquake as they were easy and quick to erect. Prefabricated houses are a particular type of dwelling, manufactured off-site in advance and consisting of components that can be easily transported and assembled on site. The prefabricated houses built in the earthquake areas (right picture) were mainly provided by the Chinese Government and included necessary supporting facilities such as electricity, public tap water, public flushing toilets, kitchens and so on.

After the earthquake, China's Government immediately ordered and sent 1.58 million tents to the disaster areas. Within one month of the earthquake, over a million tents had been sent to earthquake areas in Sichuan, and 107,500 prefabricated houses had been built (Xinhua News Agency, 2008 June 13). Moreover, in total 677,000 prefabricated temporary houses were erected in the first four months following the earthquake (Xinhua News Agency, 2008 Sep 11). By July 5, 2008, when the first survey started, all 1.58 million tents had been sent to earthquake areas, and over 400,000 prefabricated houses had been built (Xinhua News Agency, 2008 July 5). Tents were still the main source of temporary housing at the time of the first survey as accommodating the households in the newly-built prefabricated houses took time, and most prefabricated houses were still under construction.

Two months after the disaster, if their homes had not been very seriously damaged, some households had already been able to repair and move back into their original house, although few other households had been able to move into other houses. Figure 2.1 shows the type of dwellings people were living in at various periods after the earthquake.

Figure 2.1 Type of houses people were inhabiting after the earthquake<sup>15</sup>



Note: Based on the 2008 survey (sample size=3,649), the 2009 survey (sample size=4,006) and the 2011 survey (sample size=3,786), all the households reported having current houses.

The survey indicates that many households moved into temporary houses after the earthquake. **Figure 2.1 shows that two months after the earthquake in 2008, approximately 32 per cent of households lived in tents, seven per cent lived in temporary self-built houses, two per cent lived in prefabricated houses and five per cent lived in other houses.** At that time, of the households that did not live in their original house, over 70 per cent lived in tents. Only 54 per cent of households in the survey area still lived in their original house, and of the surveyed households 18 per cent had repaired their house while 37 per cent had not yet carried out any house repairs.

In July 2009, most households lived in permanent houses. People had either repaired or moved back into their old houses or had moved into new houses. In the survey area, 72 per cent of households lived in the original houses, and 43 per cent of households had repaired and moved back into their original house. Furthermore, 16 per cent of households had already moved into new houses – of these 96 per cent had rebuilt their own new houses and only four per cent had bought one. Only approximately 10

<sup>15</sup> Other includes households that lived in other people's houses both before and after the earthquake, and households that used other ways of finding new houses.

per cent of households still had no permanent housing, living instead in temporary houses, tents or prefabricated houses. During the second survey period most of these had moved into prefabricated houses built by the Government. Only one per cent of households still lived in tents, and two per cent in temporary self-built houses.

Households having to rebuild or buy a new house, rent a low-cost house or get a new replacement house had to wait longer before being able to move into their new homes. These households accounted for most of those who did not have permanent houses one year after the disaster. Households that were getting a low-rent house or a replacement permanent house had to wait for longer than other households. One year after the earthquake, almost no households had moved into new permanent replacement housing; however, by then the house reinforcement and repair programme had almost been completed, and only 0.5 per cent of households were still in the process of repairing their house.

Table 2.2 Current residence by damage to the house the families lived during the earthquake (percentages)

	Current residence	Previous house, no repair	Previous house, repaired	Newly built/bought house	Other's house	Tent	Temporary self-built dwelling	Prefabricated house	Sample size
Damage to the house during earthquake, reported in 2009	Collapsed	-	-	53	4	6	14	23	745
	Serious damage	17	26	24	3	2	5	23	1243
	Medium damage	29	56	5	1	1	1	9	784
	Slight damage	36	57	1	2	-	0	3	852
	No damage	62	27	1	1	-	1	9	168
	<b>Total</b>	<b>23</b>	<b>35</b>	<b>19</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>15</b>	<b>3792</b>
Damage to the house during earthquake, reported in 2011	Collapsed	-	-	96	4		0	1	737
	Serious damage	8	30	58	3		1	0	994
	Medium damage	22	66	10	2		0	0	744
	Slight damage	37	58	4	1		-	0	909
	No damage	80	15	3	1		-	-	239
	<b>Total</b>	<b>23</b>	<b>40</b>	<b>34</b>	<b>2</b>		<b>0</b>	<b>0</b>	<b>3623</b>

Note: Based on the 2009 and 2011 surveys, all the households that reported having a current house and evaluated the damage to the house they lived in at the time of the earthquake.

One year after the earthquake, many households whose homes had collapsed or had been seriously damaged were still in a difficult situation. Almost half of the households whose houses collapsed still lived in tents, prefabricated houses, temporary self-built dwellings or other people's houses (Table 2.2). As indicated before, most of those living in temporary homes would get a new house through rebuilding, purchasing or replacement. However, in 2009, one year after the disaster, approximately 10 per cent of the households that were still living in temporary houses did not know how they were to get a new house, and had no option but to continue to live in their temporary house for a longer period. During the 2009 survey, among the households whose houses were

seriously damaged, 25 per cent had repaired their house, another 25 per cent had moved into a new house, approximately 30 per cent were still living in temporary housing, and 17 per cent were living in their original house without having repaired or reinforced it.

The 2011 survey found that most households had moved into new houses. Although very few households still lived in temporary housing, some had to live in damaged houses without repairing them. Almost all the households whose houses had collapsed and more than half of the households whose houses were seriously damaged had moved into newly built or bought houses. However, around eight per cent of households with seriously damaged houses and 22 per cent of those whose houses had sustained medium damage still lived in the damaged house and had not repaired their houses.

In July 2011, when the third survey was conducted, the reconstruction work had been completed. More than one third of the households in the survey area reported that they lived in newly built or bought houses, 40 per cent lived in repaired houses, and 23 per cent lived in their original house without any reparations. Only 0.6 per cent of the households still lived in temporary houses or tents. Of those who rebuilt or bought new houses, 66 per cent rebuilt their houses themselves, 14 per cent had houses rebuilt by the government, and 11 per cent rebuilt their houses in compliance with the Overall Reconstruction Plan. Another five per cent of the households received replacement new houses and three per cent bought new houses.

While most rural households rebuilt their houses either by themselves or with Government guidance, urban households were more likely to receive a new house by replacement or purchase. Almost no rural households decided to buy new houses – 70 per cent rebuilt their houses by themselves and 16 per cent were rebuilt by the Government or through the Government's Plan – while 50 per cent of the urban households rebuilt their houses, 33 per cent bought new houses and 14 per cent received new replacement houses. The Government's role was different in rural and urban areas: great efforts were made to help rural households to rebuild their houses, while in urban areas low-cost housing was mainly provided. Half of the urban households that bought new houses purchased low-cost houses provided by the Government.

### **Funding of House Reconstruction**

Households financed rebuilding, reconstruction and repairs in various ways. The 2011 survey indicated that 95 per cent of households that repaired their old house, or who obtained a new one through rebuilding, purchasing or replacement, **had to pay for doing so**. The sources of funding included Government subsidies, other subsidies, own savings, bank loans and borrowing from relatives. Among the households that had to repair their house or obtain a new house, as many as 80 per cent received Government subsidies for doing so; in addition to or instead of this, 75 per cent of households spent

their own savings, 27 per cent obtained a bank loan, 45 per cent borrowed money or got assistances from relatives, and two per cent received other subsidies.

In the 2011 survey, households in earthquake-affected areas were asked about the cost of rebuilding, repairing or reinforcing their house. The various sources of funding were calculated as the percentage of total funding for repairing the old house and rebuilding or buying a new one. Among the total funding for house repairing and rebuilding, 43 per cent was from households' own savings, 32 per cent was Government subsidies, 18 per cent was borrowed from relatives and nine per cent was bank loans.

For households that needed to repair their house, the total repair cost was not significantly different between urban and rural households, regardless of the source of funding. Considering the higher costs for housing repairs in urban areas, it is likely that the damage to houses was less serious in urban areas than in rural areas. However, if urban households had to rebuild or buy a new house, this cost much more in urban areas than in rural areas. The median cost of rebuilding or buying a new house in urban areas was approximately CNY 200,000 compared to 90,000 in rural areas.

Table 2.3 Proportion of funding from various sources for repairing, rebuilding or buying a house (percentages)

		Mean cost (CNY 1,000)	Govern- ment funding	Social support	Bank loans	Assistances or loans from friends or relatives	Own savings	Other funding	Sample size
<b>Repaired house</b>	Rural	21	40	0	4	14	44	0	955
	Urban	13	41	0	3	10	48	-	377
	Total	19	40	0	4	14	45	0	1332
<b>Rebuilt/ bought house</b>	Rural	102	26	1	14	22	40	1	1366
	Urban	183	12	0	17	24	49	2	133
	Total	109	25	1	14	22	41	1	1499
<b>Total</b>		<b>62</b>	<b>32</b>	<b>1</b>	<b>9</b>	<b>18</b>	<b>43</b>	<b>1</b>	<b>2831</b>

Note: Based on the 2011 survey, all the households that repaired or rebuilt/bought houses.

Government subsidies represented one of the most important sources of funding for households reconstructing their houses in earthquake areas and played different roles for varying types of households. Table 2.3 shows that Government assistance accounted for around 40 per cent of the cost for households that repaired their house in both urban and rural areas, **while for households that had to rebuild or buy a new house it accounted for only 26 per cent for rural households and 12 per cent for urban households.** However, bank loans and loans from informal channels played more important roles

for those who rebuilt or bought a new house. Own savings accounted for almost 50 per cent of the cost in all the different circumstances.

Prior to the disaster bank loans had not been an important source of funding for housing in earthquake areas; informal loans from others were the most important sources of funding. The 2008 survey indicated that only 22 per cent of households in the survey area had obtained a bank loan when they built or bought their house before the earthquake, of which 14 per cent of the households had already repaid the bank loan at the time of the survey. In contrast, 70 per cent of households had borrowed money from relatives to build or buy their pre-earthquake house, and more than 20 per cent of households still owed their relatives for that funding. Rural households had greater loan needs, both with regard to bank loans and relatives.

Table 2.4 Various loans for repairing, rebuilding or buying the house before or after the earthquake by loan purposes (percentages)

		Rural		Urban		Total	
		Bank loan	Loan from friends or relatives	Bank loan	Loan from friends or relatives	Bank loan	Loan from friends or relatives
<b>Before the earthquake<sup>1</sup></b>	Borrowed and paid back	15	52	8	33	14	49
	Still had a loan	8	22	8	19	8	21
	Repaid the old house	8	19	3	11	7	18
<b>One year after the earthquake<sup>2</sup></b>	Rebuilt the house	61	75	50	64	60	74
	Bought a new house	45	78	38	58	43	73
	Replaced the house	32	40	25	32	30	38
	Repaid the old house	9	28	4	14	8	25
<b>Three years after the earthquake<sup>3</sup></b>	Rebuilt the house	51	69	36	72	50	70
	Bought a new house	100	100	62	55	63	56
	Replaced the house	32	40	15	24	28	36
	Repaid the old house	9	28	4	14	8	25

Notes: <sup>1</sup> Based on only the households that owned or built the houses before the earthquake (sample size=3,400).

<sup>2</sup> Based on only the households that had repaired, built, bought or replaced houses in July 2009 (sample size=2,540).

<sup>3</sup> Based on only the households that had repaired, built, bought or replaced houses in July 2011 (sample size=2,862).

<sup>4</sup> Only two rural households had bought a new house.

Both the 2009 and 2011 surveys found that loans from various channels all played very important roles in the reconstruction work (Table 2.4). There was no significant difference between the 2009 and 2011 surveys. Bank loans had played a much more important role in the house-building after the earthquake than before it. More than half of the households that rebuilt or bought their houses after the disaster obtained a loan from the bank. Compared to the normal levels before the earthquake, the preferential loan policies were an important factor for households in getting a new house. Loans from friends and relatives were also important funding sources, and most



households that bought or rebuilt houses received help from relatives and friends. More rural households got loans from banks or relatives than urban households. Finally, the households that repaired their old house did not have high loan needs – only seven to eight per cent of them obtained a bank loan and approximately 20 per cent were loaned funds from friends or relatives.

However, bank loans may be a burden for some households in earthquake areas, which remains to be seen in the future. One year after the earthquake, around 54 per cent of households were fairly certain they would be able to pay back the bank loan in time, 40 per cent said they would need an extension for paying back the bank loan, while six per cent thought that they would never afford to pay back the loan.

### **Location of Houses after the Earthquake**

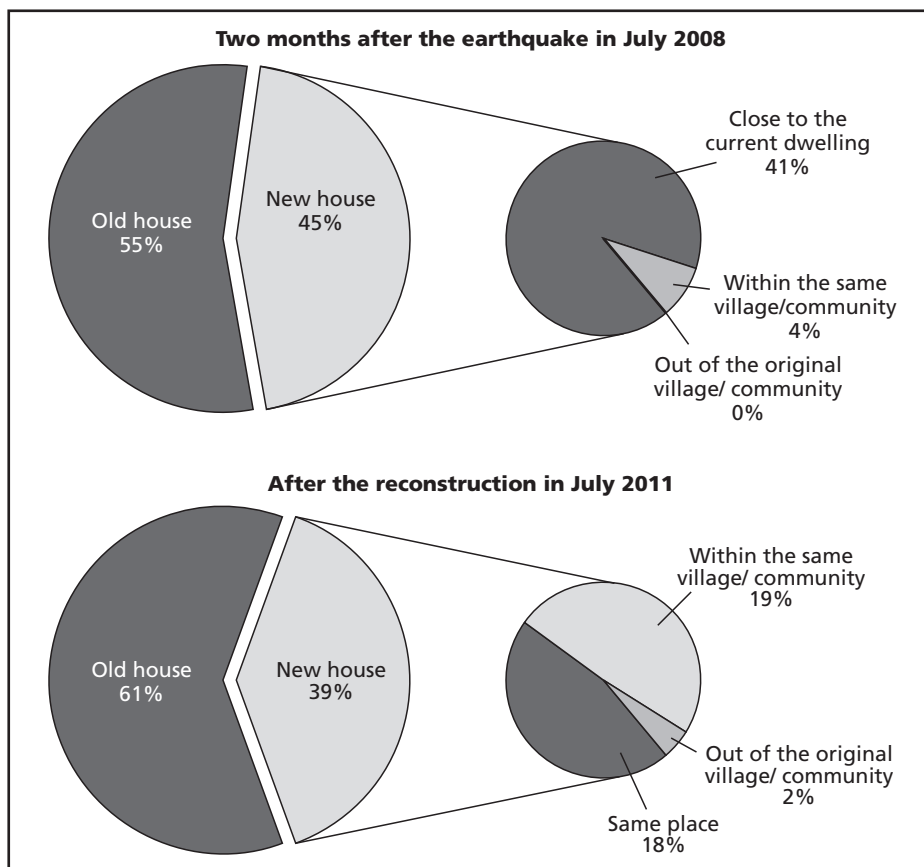
The Government encouraged households whose homes had collapsed or were seriously damaged and who needed to rebuild their houses to rebuild them in the close vicinity. According to the survey two months after the disaster, 88 per cent of households did not plan to move out of the community or village they lived in before the earthquake. When asked for their opinion should the Government decide to move the whole community or village, around 30 per cent of households were firmly opposed to it and another 20 per cent were very unwilling.

The Chinese Government had to a large extent complied with the local households' wishes regarding the location of new houses. Based on the findings of the 2008 survey, Sichuan's rural housing reconstruction plan proposed that households be encouraged to rebuild their house on the site of the original house. Only households whose land was seriously damaged by the earthquake or was located in a disaster area or within part of city planning would be able to rebuild their house on other land nearby or to buy a new house.

During the first survey in July 2008, two months after the earthquake, almost half of the households did not live in their original house, either because it had collapsed or was seriously damaged, or because the households considered it unsafe to live there. Figure 2.2 shows that even though these households did not live in their old houses, 90 per cent of them lived in tents or temporary houses close to their original house, nine per cent lived in the same village or community although not close to their old house, and only 0.6 per cent moved away from their village or community. Two months after the earthquake, the households found places to accommodate themselves in the vicinity of their original homes.



Figure 2.2 Location of the households after the earthquake in July 2008 and July 2011<sup>16</sup>



Note: Based on the 2008 survey (sample size=3,486) and the 2011 survey (sample size=3,786).

Three years after the earthquake, when the reconstruction was completed, the 2011 survey (Figure 2.2) found that almost half of the households had rebuilt new houses in the same location as their previous houses, while the other half had moved to other locations within the same community or village. Only a few households had moved away from their original home areas. In the survey area, around 40 per cent of the households moved into new houses. Among those who moved into new houses, 46 per cent lived in the same place as before the earthquake, 48 per cent lived in a different location but within the same village or community, and only six per cent of the households that moved into new houses (or two per cent of all the households in the survey area) moved away from their original village or community.

<sup>16</sup> Other includes households that rented a house, lived with relatives for the long term, had not yet been able to obtain permanent housing etc.

Table 2.5 Location of new houses by means of obtaining the new houses (percentages)

	Same place	Same village/ community	Same town/ neighbourhood	Same county	Out of the original county	Sample size
Rebuilt by the Government	10	80	7	2	0	246
Self-rebuilt with Government's design	44	52	4			157
Self-rebuilt	59	40	1	0		971
Received replacement house	13	71	12	4		70
Bought the house	1	9	10	29	52	34
Rural	46	51	2	1	0	1353
Urban	31	25	17	11	16	125
<b>Total</b>	<b>46</b>	<b>48</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1478</b>

Note: Based on the 2011 survey, all the households that had rebuilt, bought or replaced new houses (sample size=3,486).

Households that had their new houses rebuilt by the Government were more likely to have moved to a new place than those who rebuilt the houses themselves. The households that decided to buy a house were mainly those who moved out of the area, as half of them moved away from their original county. Table 2.5 also shows that 59 per cent of the households that rebuilt their own houses had rebuilt the houses in the same place as before the earthquake, compared to only 10 per cent of the Government-rebuilt houses. Very few households that rebuilt their own houses had moved away from their village/community, while four per cent of those rebuilt with the Government's house rebuilding design and nine per cent of the Government-rebuilt houses were located away from the original village/community. The households that received their new houses by replacement were more likely to move out of the original village/community, while 90 per cent of households that bought a new house had moved away from their local village/community.

The Government implemented various strategies in urban and rural areas – helping rural households to rebuild new houses in the local area and providing low-cost houses to urban households. Therefore, during the reconstruction, urban households were more likely to move than rural households: while only three per cent of rural households moved away from their village, almost half of the urban households in seriously affected areas moved to different communities.

### Reinforcing Houses to Prepare for Future Earthquakes

During the reconstruction, the Sichuan provincial government adopted various policies, and required that all affected houses should be evaluated and should undertake earthquake-proof measures during reparation and rebuilding. The Sichuan provincial government published the “Technical Guidance on the Seismic Design

of the Rural Residential Buildings in Sichuan Earthquake Area” (Construction Department of Sichuan Province, June 2008) and the “Guidance on the Assessment, Reparation, Reinforcement and Demolishment of the Damaged Urban Houses in Sichuan Earthquake Area” (Sichuan Provincial Government, Aug 2008). According to the guidance for urban and rural houses, houses in earthquake areas needed to be reinforced for seismic strengthening, in accordance with the compulsory construction criteria.

Table 2.6 Houses reinforced against earthquakes by type of house (percentages)

Type of house	Reinforced against earthquake	Sample size
Previous house, no repair	7	732
Previous house, repaired	40	1335
Newly built/bought house	73	1500
Other's house	36	187
All houses	43	3754

Note: Based on the 2011 survey

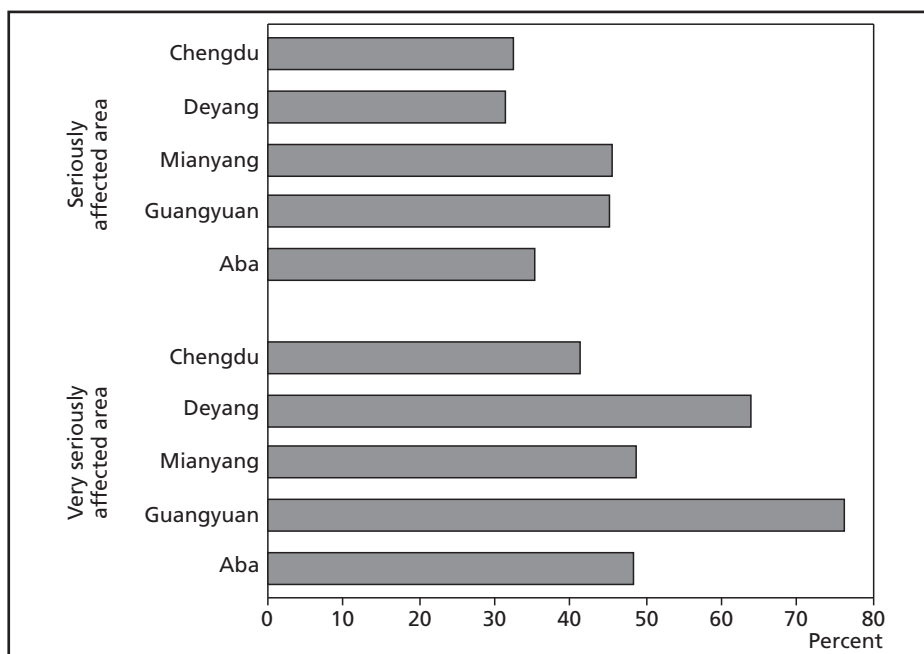
Table 2.7 Old houses reinforced against earthquakes by the extent of damage to the houses (percentages)

The extent of damage to the old house <sup>1</sup>	Reinforced against earthquake	Sample size
Serious damage	40	359
Medium damage	37	636
Slight damage	22	844
No damage	10	222
All previous houses	28	2061

Note: Based on the 2011 survey, all the old houses that households had inhabited before the earthquake.

In 2011, once the reconstruction work was completed, the survey found that fewer than half (43 per cent) of households in the survey area lived in a house reinforced with earthquake-proof measures (Table 2.6). Table 2.6 and Table 2.7 indicate that fewer old houses (28 per cent) had been reinforced compared to new ones (73 per cent). Houses with more serious damage were more likely to be reinforced than houses with less damage, although only 40 per cent of the houses seriously damaged during the earthquake had been reinforced. Newly-built or bought houses complied more with the construction criteria for earthquake areas in Sichuan – approximately 75 per cent of new houses had been built in accordance with the seismic standards.

Figure 2.3 House reinforcement against earthquakes in different areas



Note: Based on the 2011 survey (sample size=3,803).

House reinforcement work also showed a certain amount of variation in different areas: more houses had been reinforced in the very seriously affected areas than in the seriously affected areas. Over 75 per cent of the houses were reinforced against earthquakes in the very seriously affected area of Guangyuan and more than 60 per cent in the very seriously affected area of Deyang, while only 30 per cent of the houses were reinforced in the seriously affected areas of Chengdu district and Deyang district. More rural houses (46 per cent) were reinforced than urban ones (33 per cent), probably because houses in rural areas were relatively more seriously affected by the earthquake – areas with more serious effects from the earthquake therefore had more houses to be reinforced. However, there were still a large number of houses without proper seismic measures in earthquake areas, which indicated a high potential vulnerability of houses in future earthquake disasters.

## 2.4 Infrastructure

Following the earthquake, **China's Government placed great emphasis on the reconstruction of infrastructure.** Many Government documents underlined the need to guarantee households' access to basic infrastructure such as water and electricity. In Sichuan, infrastructure was fairly rapidly rebuilt after the earthquake – one week after the earthquake, Li Chengyun, the vice president of Sichuan province, reported that of the 1,307 towns and 10,457 villages that had lost their electricity supply due to the earthquake, electricity had already been restored in 1,302 towns and 10,028 villages (china.org, 2008 May 23).

The post-earthquake surveys provide data on the situation with regard to basic infrastructure in the affected areas of Sichuan after the earthquake, during the reconstruction period and once reconstruction was said to be completed. The MEDOW survey in 2004 provides a good basis for comparing households' access to infrastructure before and after the earthquake. Much of the infrastructure in earthquake areas was destroyed or seriously damaged by the disaster. For a period after the earthquake some households had to live in temporary houses, tents or prefabricated houses. The condition of the infrastructure in the temporary houses was quite different from that of the permanent houses. The findings of the surveys in the various periods after the earthquake reflected the reconstruction of the infrastructure in the permanent houses and the situation of the temporary houses during the period of reconstruction.

### **Infrastructure in the Temporary Houses during the Reconstruction**

The earthquake destroyed many houses and much infrastructure in the earthquake areas, and a large number of households had to live in temporary houses and tents for a period of time. Immediately after the earthquake, living conditions in both temporary and permanent houses were similar except that access to electricity was much lower in temporary houses. As many as 42 per cent of those living in tents and 32 per cent of those living in temporary self-built houses did not have access to electricity. However, the lack of basic infrastructure was still a problem in prefabricated houses and temporary houses, particularly for households living in tents or self-built temporary houses (Table 2.8).

Electricity was restored fairly rapidly after the earthquake. One year after the disaster, households' access to electricity had risen to a level close to that of 2004. Around five per cent of households living in tents or self-built temporary houses and two per cent of those living in prefabricated houses still did not have electricity. Immediately after the earthquake, the Chinese Government gave priority to restoring important infrastructure such as water and electricity. **Establishing a system for measuring consumption and for payment** was not the focus of the relief work. As a result, one year after

the earthquake, 98 per cent of households living in Government-built prefabricated houses had access to electricity, but 55 per cent of them had not started to pay for its use. Around 80 per cent of these households felt it would be reasonable to pay for it.

Table 2.8 Infrastructure in different types of house in earthquake areas (percentages)

		2008		2009
		2004	Temporary house	Tent/self-built temporary house Prefabricated house
Access to electricity		99.6	62	95
<b>Source of drinking water</b>	Tap water in the house		16	7
	Tap water from public facility	16	7	3
	Well	68	62	66
	Bottled or barrelled	1	6	3
	River, stream, spring etc.	15	9	21
<b>Type of toilet</b>	Flush toilet	34	24	10
	Covered pit latrine	8	10	10
	Open pit latrine	56	57	65
	No pit	1	2	4
	Other	0	1	11
	No toilet at all		6	
	Private toilet	89		69
	Shared private toilet	7		11
	Public toilet	2		6
	Other	1		13
<b>Type of kitchen</b>	Private indoor kitchen	88		48
	Shared indoor kitchen	3		3
	Outdoor kitchen	5		24
	No designated kitchen	4		24
	Do not cook	1		1
<b>Waste disposal</b>	Closed container	2		2
	Open container	2		6
	Collection place for waste	14		10
	Household burns waste	6		15
	Household buries waste	2		2
	Dumps waste in open air dump	19		29
	Dumps waste wherever	47		35
	Other	8		2
Shared room with others		3	19	5
Sample size		852	2125	242

Note: In 2008, immediately after the earthquake, very few households had moved into prefabricated houses, therefore tents, self-built houses and prefabricated houses were all classified as temporary houses.

Immediately after the earthquake, access to tap water had not significantly changed, while access to flush toilets was worse in the temporary houses than in 2004. One year after the earthquake, tap water coverage was 87 per cent in prefabricated houses, while

in tents or self-built temporary houses access to tap water was fairly low. Furthermore, around 21 per cent of households living in tents or self-built temporary houses had to drink water from rivers, streams, springs and other sources, a higher percentage than that for 2004.

Households living in prefabricated houses had good access to waste disposal and flush toilets even though most were public toilets; however, households living in self-built temporary houses or tents had poor access to basic amenities. In 2004, 89 per cent of households already owned a private toilet, while one year after the earthquake 82 per cent of the households living in prefabricated houses used a flush toilet and 96 per cent of them used public toilets. Households living in self-built temporary houses or tents had very low access to flush toilets (10 per cent), while some had no proper toilets at all.

Households in various kinds of temporary houses had generally lower access to proper kitchens. In 2004, as many as 88 per cent of the households in earthquake areas already owned a private kitchen, yet one year after the earthquake more than 50 per cent of those living in prefabricated houses used a public kitchen and 28 per cent had no designated kitchen, while almost half of those living in tents or self-built temporary houses only had an outdoor kitchen or no designated kitchen. Households with no designated kitchen or an outdoor kitchen also had no proper cooking equipment. Finally, waste disposal was much better organised in prefabricated houses, while dumping waste in the open air was the only option for the households living in tents or self-built temporary houses during reconstruction.

Two months after the earthquake, around 19 per cent of the households in temporary houses had to share living quarters with other households. One year later, this figure dropped to pre-earthquake levels of five per cent in the self-built temporary houses and one per cent in the prefabricated houses compared to three per cent in 2004. During this period more households living in permanent or temporary houses had to share with other people. When people had to live with other households, they mainly lived with their relatives: of the households living with other households one year after the earthquake, over 90 per cent lived with relatives. Most people still lived in familiar neighbourhoods – in both surveys we found that around 94 per cent of households knew all the people living in their neighbourhood.

### **Amenities in the Permanent Houses**

Immediately after the earthquake, households' access to amenities was slightly worse in the survey area compared to 2004. One year later, however, the restoration of amenities in permanent houses had progressed well, as indicated in Table 2.9. Within one year of the earthquake the amenities of permanent houses had basically recovered to

pre-earthquake levels, and by 2011 following the reconstruction work it was greatly improved.

Table 2.9 Amenities in the permanent houses in earthquake areas<sup>17</sup> (percentages)

		2004	2008	2009	2011
Access to electricity		100	98	99	100
<b>Source of drinking water</b>	Tap water in the house	16	20	21	32
	Tap water from public facility		1	1	2
	Well	68	71	66	54
	Bottled or barrelled	1	3	2	5
	River, stream, spring etc.	15	6	10	7
<b>Type of toilet</b>	Flush toilet	34	30	35	57
	Covered pit latrine	8	15	12	8
	Open pit latrine	56	53	50	32
	No pit	1	1	2	1
	Other	0	0	1	1
	No toilet at all		2		
	Private toilet	89		92	94
	Shared private toilet	7		4	3
	Public toilet	2		2	2
	Other	1		2	2
<b>Type of kitchen</b>	Private indoor kitchen	88		88	91
	Shared indoor kitchen	3		2	1
	Outdoor kitchen	5		4	2
	No designated kitchen	4		5	6
	Do not cook	1		0	1
<b>Waste disposal</b>	Closed container	2		5	12
	Open container	2		4	13
	Collection place for waste	14		14	34
	Household burns waste	6		14	11
	Household buries waste	2		4	3
	Dumps waste in open air dump	19		32	11
	Dumps waste wherever	47		25	15
	Other	8		3	1
Shared room with others		3	13	7	
<i>Sample size</i>		<i>852</i>	<i>1526</i>	<i>3106</i>	<i>3808</i>

In 2004, MEDOW found that 99.6 per cent of households in earthquake areas had electricity and 34 per cent had a flush toilet (Table 2.9). The first post-earthquake survey, which was carried out within two months of the earthquake, found that a

<sup>17</sup> In 2008, immediately after the earthquake, very few households had moved into prefabricated houses, therefore tents, self-built houses and prefabricated houses were all classified as temporary houses.



slightly lower percentage of households in permanent houses had access to electricity and flush toilets. Access to tap water was slightly higher after the earthquake than in 2004 in the Sichuan earthquake area. After the earthquake, the Chinese Government prioritised the restoration of important amenities such as water and electricity. Thus, comparing households' access to basic amenities in earthquake areas two months after the disaster with the situation in 2004 shows that the infrastructure did not seem to have changed. As there are no data on the situation immediately prior to the earthquake, the amenities had most likely improved since 2004 but had deteriorated slightly after the disaster back to the level of 2004.

**Although the infrastructure had not been badly affected, the survey found that immediately after the earthquake more households had to share living space with other households.** Around 13 per cent of households reported sharing space with other households, while this was reported by only three per cent of households in 2004. However, this problem was temporary and one year later, in 2009, it had already been alleviated to a large extent as only seven per cent of households reported living with other households, although this was still higher than in 2004.

In 2011, three years after the earthquake, the post-earthquake reconstruction had actually greatly improved the amenities in earthquake areas. Households' access to tap water increased to 34 per cent, and more than half of the households had a flush toilet. Over 90 per cent of households had a private toilet and a private indoor kitchen. Waste disposal was greatly improved following reconstruction: 25 per cent of the households could dispose of waste in closed or open containers, while only 25 per cent dumped waste in the open air or anywhere outside compared to 66 per cent of the households in 2004 and 50 per cent one year after the earthquake.

The Government's work on improving the infrastructure was in line with its long-term plans; the earthquake played an important role as a compelling force of the Government's development plan. The Western China Development Strategy (Xinhua News Agency, 2010) was introduced in 1999, including 12 provinces<sup>18</sup> in western China, Sichuan being among them. In 2009, the Western Development Strategy planned 18 new key projects with an investment of CNY 468.9 billion, and in 2010, the Strategy planned 23 new key projects with an investment of CNY 682.2 billion. Since reform, China's urbanisation policy has changed and actively developed so as to rapidly urbanise rural areas into small towns. The earthquake and post-earthquake reconstruction work provided an opportunity for the Government to combine the reconstruction work with these long-term development strategies and therefore, to some extent, to accelerate the development of housing, infrastructure and other aspects in earthquake areas.

<sup>18</sup> The 12 western provinces in the western development strategy were Chongqing, Sichuan, Guizhou, Yunnan, Xizang, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang, Neimenggu and Guangxi.

## 2.5 Satisfaction with the Reconstruction Work

The surveys asked the households how convenient they found their current housing location with regard to shopping, work, traffic, medical care and entertainment compared to the conditions before the earthquake. Most households were very satisfied with the level of convenience they enjoyed following the earthquake – one year after the earthquake, most households had adapted well to their new life. When asked whether it was convenient to live in the place they were living, around 60-70 per cent of households thought that it was very or rather convenient for shopping, going to work, or receiving medical care. In general, when compared to life before the earthquake, 65 per cent of households thought that it was about the same as before the earthquake, 14 per cent felt that life was more convenient after the earthquake, and 21 per cent claimed that it was less convenient after the earthquake.

Once reconstruction was completed, three years after the earthquake, most households were very satisfied with their new homes. In contrast, the households that had moved out of the local area were relatively more dissatisfied. Among those living in the same community or village, only around five per cent of households reported it being less convenient to live in their new area. Indeed, many households reported it being more convenient in the new areas than before the earthquake regarding shopping, working, traffic, medical care and entertainment. The percentage of households reporting it as more convenient in various aspects ranged from 26 to 54 per cent. However, of the households that moved away from their original village/community, a higher number of households reported that it was less convenient for shopping (25 per cent) and for work (31 per cent).

## 2.6 Conclusions

The surveys reveal very impressive results regarding the rapid reconstruction and restoration work in earthquake areas following the **Wenchuan earthquake**. The reconstruction work of the earthquake areas was in line with the long-term Western China Development Strategies and with the accelerated urbanisation policies. The earthquake became a compelling force for the long-term policies of the Chinese Government for rapidly improving the development of earthquake areas. The Chinese Government responded quickly after the earthquake, and therefore the amenities of permanent houses had basically recovered to the normal level one year after the earthquake. Three years later, the construction of new houses was impressive and the improvement of the basic amenities was significant in the earthquake areas.

During the reconstruction period, the living conditions were relatively poor in the privately-built temporary houses. Electricity restoration work was rapid – most households had access to electricity two months after the earthquake. However, during reconstruction the basic infrastructure of tents or self-built temporary houses was much worse than that of Government-built prefabricated houses. Households living in prefabricated houses had good access to safe water and public flush toilets, but very few had access to private indoor kitchens. Although households living in tents or self-built temporary houses had fairly poor access to the most basic infrastructure, during reconstruction they lived in these tents or temporary houses for only a very limited period.

Most of the houses people still inhabited in earthquake areas were evaluated by the Government. Households' self-evaluations of the damage to their houses were fairly close to the Government's evaluations. In summary, over 10 per cent of the houses in the survey area collapsed, almost 50 per cent of the houses sustained serious or medium damage, and only seven per cent of households sustained no damage.

The Chinese Government delivered a large number of tents to earthquake areas immediately after the disaster. Two months after the survey, tents were the most common form of temporary housing in the earthquake areas. The reparation and rebuilding of the houses were rapid: one year later most households had already moved into repaired or new houses. By July 2009 only around 10 per cent of households still lived in temporary houses, tents or prefabricated houses. Most were waiting to move into a repaired house or a new house, although one per cent of households in earthquake areas had not yet found a way to obtain a new house and would have to stay in temporary houses for a longer period. Furthermore, some households were still living in damaged houses and had not repaired their house.

Households utilised various sources of funding for repairing, rebuilding or buying their houses. Government subsidies and preferential loans for houses played important roles in facilitating households' rebuilding and reparation during reconstruction. Government subsidies were the most important source of funding, while loans from both banks and relatives were important supplementary sources for households that had to completely rebuild or buy a house.

The first survey, two months after the earthquake, found that most households were unwilling to move away from their local area. Therefore, the Chinese Government decided to conduct housing reconstruction in the local area to the greatest extent possible. Once reconstruction was completed, the survey found that most households that had moved had not moved away from the community or village they lived in before. Finally, most households in earthquake areas found the current situation of their new houses to be fairly convenient, even much more convenient than before the earthquake. However, households that had moved away from their previous community or village were relatively dissatisfied with the situation of their new houses.

Although the Chinese Government had implemented housing and infrastructure reconstruction very efficiently, housing reinforcements against earthquakes were only carried out on less than half the houses in the earthquake area. The Chinese Government's regulations on housing reinforcement were relatively effective on newly-built houses, but not on houses that had sustained minor damage.

## 3 Labour Force and Employment

Liu Jing

### 3.1 Introduction

The Wenchuan earthquake, primarily concentrated in Sichuan, severely damaged the economy and the labour market. The direct economic loss from the earthquake was around CNY 845 billion, mostly due to the loss of infrastructure and of houses or buildings (State Council Information Office of China, 2008). This included damage to businesses, as well as to the ability of businesses to conduct their activities.

The damage and post-earthquake construction also influenced the labour market in the earthquake-affected areas. According to the 2008 survey, the immediate drop in employment was approximately 10 per cent (from 81 to 71 per cent) compared to 2004, while the Ministry of Human Resources and Social Security estimated that around 1.2 million people had lost their jobs by the end of July 2008 (Ministry of Human Resources and Social Security of China, 2008).

The large-scale reconstruction and infrastructure development, funded by both the central government and counterpart provinces, led to increased work opportunities and higher wages for residents of the earthquake-affected area. Nevertheless, local labour force participation in the earthquake-affected area did not increase – more people of working age chose to drop out of the labour market than was the case in 2004. Furthermore, the increase in working opportunities open to local residents did not prevent labour mobility – labour migration remained common in the earthquake-affected areas. However, it should be noted that the labour market in the regions affected by the earthquake was not only affected by the Wenchuan earthquake; the global financial crisis that started in 2008 also influenced China. Therefore, changes in the labour market in the earthquake-affected area are a result of effects of both the financial crisis and the Wenchuan earthquake.

This chapter profiles the labour force in the areas affected by the Wenchuan earthquake and identifies some of the demographic and social factors underlying the adaptations of the labour market. It starts with a brief description of the market policies of the Chinese Government. The second part describes the characteristics of

the population of the affected areas, as a means of providing background information to help to understand the labour supply. The final part considers the changes in the labour market following the earthquake, and discusses the adaptations made by the employed, the unemployed and those who stayed out of the labour market.

### 3.2 Labour Market Policies after the Earthquake

The labour market in the Wenchuan earthquake-affected area has to be seen in the context of the general labour market liberalisation in China. Since 1949 China has had radically different urban and rural labour market policies. In particular, migration between rural and urban areas was severely restricted. During the “reform and opening up”, starting in the 1980s, these differences have been reduced and the barriers to labour mobility have been almost destroyed (Drury, 2001). There is currently a political focus on improving labour conditions in both urban and rural areas, and on offering migrant workers welfare services that are close to those enjoyed by locals.

Labour market policies are a key focus of the Central Government’s **Overall Reconstruction Plan** as well as of the assistance agreements between the earthquake-affected area and counterpart provinces<sup>19</sup> (Xinhua News Agency, 2008 July; Xinhua News Agency, 2008 June; Xinhua News Agency, 2008 September). **The policies are primarily specified in three documents issued by Central Government<sup>20</sup> and four documents issued by the Sichuan government.<sup>21</sup>**

<sup>19</sup> Counterpart provinces are the provinces assigned by the Chinese Government to provide assistance to designated earthquake-affected areas.

<sup>20</sup> Advices from the State Council on Policy Measures Post-Wenchuan Earthquake Restoration and Reconstruction (国务院关于支持汶川地震灾后重建政策措施的意见) (State Council of China, 2008), The State Overall Planning for Post-Wenchuan Earthquake Restoration and Reconstruction(汶川地震灾后恢复重建总体规划) (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008), and Plan on Public Services and Facilities in Post-earthquake Restoration and Reconstruction (汶川地震灾后恢复重建公共服务设施建设专项规划) (Ministry of Human Resources and Social Security of China, 2008).

<sup>21</sup> Advices from Sichuan Government on Recommending Work Programmes for the Registered Unemployed with Benefits (Workfare) in Post-earthquake Reconstruction (四川省人民政府关于在地震灾后恢复重建中推行以工代赈方式的意见) (Provincial People’s Government of Sichuan, 2009), Plan of the Sichuan Government on Promoting Employment in Five Focus Groups (四川省劳动保障厅等部门关于促进五类重点群体就业工作方案) (Provincial Peoples’ Government of Sichuan, 2009), Advices from the Sichuan Government on Work Related to Rural Employment in the Seriously Affected Area (四川省人民政府办公厅关于做好地震重灾区农村劳动力就业和相关工作的意见) (Provincial People’s Government of Sichuan, 2010) and Advices from the Sichuan Government on Promoting Employment in the Seriously Affected Area (中共四川省委办公厅、四川省人民政府办公厅关于促进汶川地震重灾区群众就业的意见) (Provincial People’s Government of Sichuan, 2011).

Special subsidies, insurances, loans, the reduction or removal of administrative fees and other supporting financial measures were offered to those who experienced difficulties in employment or with self-employment, as well as to enterprises offering opportunities to the unemployed. The employment assistance projects included vocational training, targeted recruitment and training, labour export and self-employment. The Plan aimed to create approximately one million job opportunities for the affected population.

Fifty-one employment offices and 1,855 “platforms for labour and social security”<sup>22</sup> were planned to be set up in Sichuan, Gansu and Shaanxi according to the Overall Reconstruction Plan of June 2008 (Table 3.1). In the special plan on public services and facilities of July 2008, the number of labour force related projects increased to 4,490, needing an investment of around CNY 4.5 billion. The new plan included the offices and platforms but added two new types of projects – employment information systems<sup>23</sup> and vocational training schools.<sup>24</sup>

Table 3.1 Plan on employment offices in the Overall Reconstruction Plan

	Sichuan	Gansu	Shaanxi	Total
Employment and social security offices at county level <sup>25</sup>	39	8	4	51
Platform for labour and social security	1507	217	131	1855

Both the central and provincial governments emphasised the importance of at least one member of the affected households being employed. In the Overall Reconstruction Plan particular support was to be given to the rural labour who had lost their land in the earthquake. It was emphasised in the policies that the local labour in the affected area should have priority in seeking opportunities from infrastructure reconstruction as well as from other projects supported by counterpart provinces, and that displaced labour should benefit from the same welfare support as local labour. **The Government** also supported the migration of workers both within the affected area and to the 20 counterpart provinces. Special opportunities, subsidies and “green channels for vocational training”<sup>26</sup> were offered to labour from the Wenchuan earthquake-affected area in the counterpart provinces.

<sup>22</sup> Platform for labour and social security (基层劳动保障工作平台) is the employment and social security office at township or community level.

<sup>23</sup> Employment information system (就业和社会保障公共服务信息系统建设项目).

<sup>24</sup> Vocational training school (技工院校建设项目).

<sup>25</sup> Employment and social security offices at county level (县级就业和社会保障综合服务机构).

<sup>26</sup> “Green channels for vocational training” refers to immediate admittance to vocational training.

Work programmes for the registered unemployed with benefits (workfare) were recommended in the plans, in order to involve the affected population in the reconstruction projects. Workfare was funded by the central and provincial government for cleaning ruins and repairing small-scale agricultural or rural infrastructure etc. Workfare was also recommended to counterpart provinces for organising supporting projects. In order to reduce their financial burden, Local government below provincial level were **not required to provide funds matching those provided by central government** for carrying out workfare projects.

### 3.3 Population

#### Population Structure

The population structure is a key to the vulnerability and resilience of the labour force in the context of disasters since it determines the composition of the current labour force and the pattern of labour supply in the future. The Chinese Government reported that approximately 45.5 million people were living in areas directly affected by the Wenchuan earthquake, mainly composed of three provinces: Sichuan, Gansu and Shaanxi. Around 17.7 million<sup>27</sup> people lived in the central area hit by the Wenchuan earthquake, which included 39 counties of Sichuan province (National Center of Disaster Reduction of Ministry of Civil Affairs of China, 2008). Most of the affected population lived in what the Chinese Government termed “seriously-affected areas”, while only four million of the population lived in “very seriously affected areas” (National Center of Disaster Reduction of Ministry of Civil Affairs of China, 2008).

The surveys on “residents” restoration and reconstruction in the Wenchuan earthquake-affected areas” in 2008, 2009 and 2011 were carried out in the 10 worst-affected counties/cities/districts, and 23 of the seriously affected counties/cities/districts, with a representative sample of around 15.5 million affected population, approximately four million of whom lived in the very seriously affected areas and 11 million lived in the

<sup>27</sup> The population size of the 39 counties in 2008 is estimated from the Sichuan statistics yearbook 2009. Data are available on the website: <http://www.sc.stats.gov.cn/sctj/Default.htm?status=Main&menu=5&sub=5,false>



seriously affected areas. Eighty per cent of the affected population<sup>28</sup> lived in rural areas, leaving only 20 per cent of the population as urban dwellers (Table 3.2).

Table 3.2 Geographic distribution of the affected population in the sample areas (percentages)

	2008	2009	2011
Urban	22	18	21
Rural	78	82	79
<i>Sample size</i>	<i>12707</i>	<i>14149</i>	<i>13819</i>

Slightly more women than men lived in the earthquake-affected area (Table 3.3). The 2004 MEDOW<sup>29</sup> survey found the sex ratio of the population in the earthquake area to be 98 males to 100 females in 2004, while the average sex ratio in the whole Sichuan region was approximately 101 males to 100 females.

The sex ratio was fairly stable after the earthquake, being around 95:100 (Table 3.3). There was no significant change in the sex ratio for children aged 0-4, taking sampling error into consideration. The sex ratio of young people aged 5-19 indicates that there were more male young people than female living in the earthquake-affected area. However, there were more women than men aged 20-49. The sex ratios were generally more than 100 among those aged 50-74, similar to those below 20. This was most likely due to a gender difference in migration in the earthquake-affected area, i.e. more men than women migrated out of the area. In addition, the decreasing sex ratio (from 110 to 97) for the age group 50-74 implies that more men aged 50-74 migrated out in 2011 than in the period between 2004 and 2009.

<sup>28</sup> In order to exclude emigrants and avoid duplicates, only the information on those who lived with the sampled households or lived in the same village/community are used to estimate the population structure in the Wenchuan earthquake-affected area.

<sup>29</sup> MEDOW, the survey of Monitoring Social and Economic Development in Western China carried out by the National Research Center for Science and Technology for Development and the Fafo Institute for Applied International Studies in 2004.

Table 3.3 Sex ratio of population<sup>30</sup>

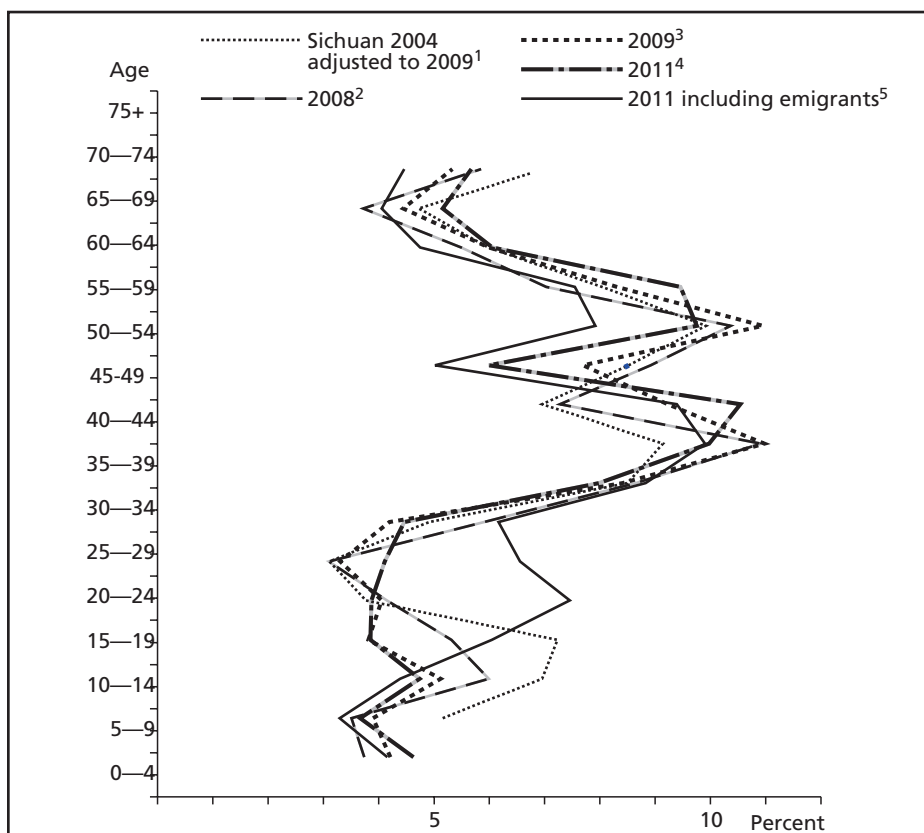
Age	2004 Sichuan <sup>31</sup>	2008	2009	2011
0-4	116	110	115	121
5-19	119	120	133	108
20-39	87	75	75	79
40-49	89	92	86	90
50-74	110	104	104	97
75+	78	83	87	93
Total	101	96	96	94
<i>Sample size</i>	<i>10647</i>	<i>10248</i>	<i>11117</i>	<i>10535</i>

The age distribution of local residents in the affected area after the earthquake was generally similar to that of the Sichuan population in 2004, taking into account the shift of each age group in 2004 to the following one (Figure 3.1). The productive population (15-64) comprised approximately 75 per cent of all reported household members in the earthquake-affected area in 2011, while the percentage of productive population was lower by 10 percentage points among local residents living with the main households in the sample or living in the same village/community. This indicates that young people were migrating out of the earthquake-affected area.

<sup>30</sup> The sex ratio refers to women as 100.

<sup>31</sup> The MEDOW included seven communities and 47 villages which were affected by the Wenchuan earthquake in 2008. The variance of estimates based on data only for the earthquake-affected area in 2004 may be high due to the small sample. Estimates for the whole of Sichuan are used in this chapter as the reference for 2004

Figure 3.1 Population age distribution by year<sup>32</sup>



Notes: <sup>1</sup>sample size for 2004 Sichuan adjusted to 2009 is 10,674,

<sup>2</sup>sample size for 2008 is 10,248,

<sup>3</sup>sample size for 2009 is 11,117,

<sup>4</sup>sample size for 2011 is 10,535,

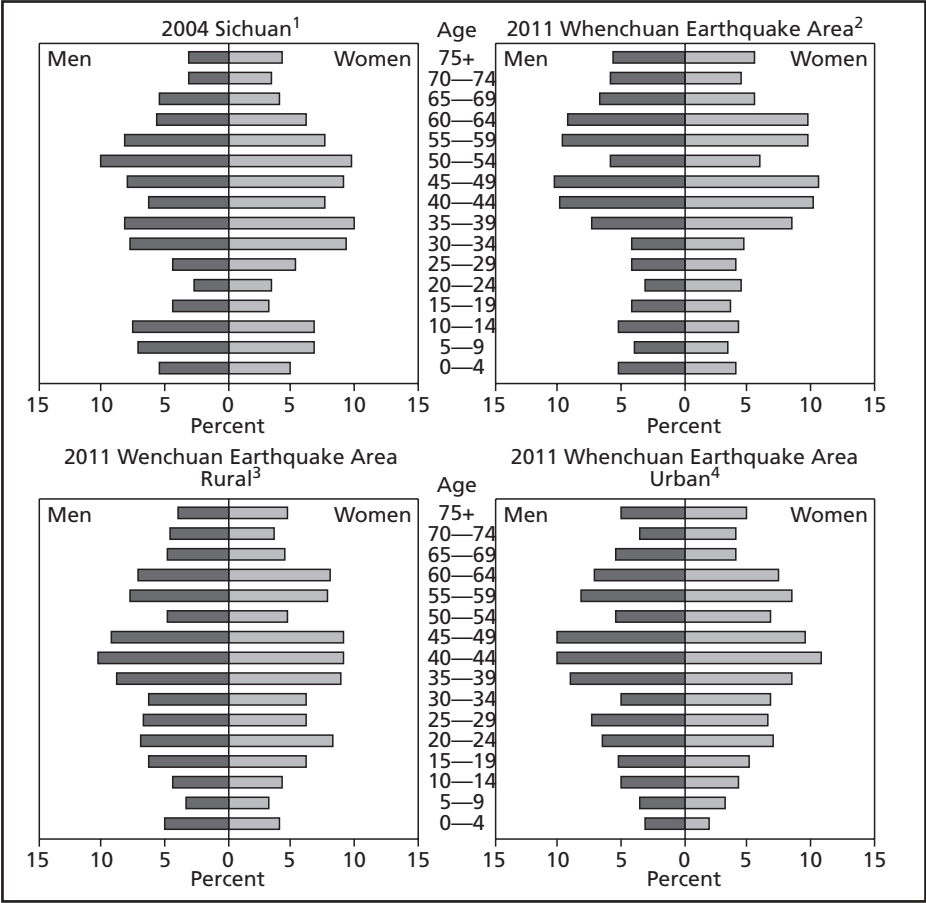
<sup>5</sup>sample size for 2011 with out-migrated members is 13,819.

The 2011 population pyramid in the Wenchuan earthquake-affected area differs from that of Sichuan in 2004. The pyramid (Figure 3.2) for Sichuan in 2004 presents a gourd style of age distribution with a significantly reduced population size in the age groups 15-29 compared to the age groups below 15 years. Although this is fewer than those currently active in the labour market, those below 15 may secure Sichuan against a sudden shortage of labour supply in the immediate future, assuming little migration.

<sup>32</sup> “Sichuan 2004 adjusted to 2009” shifted one age group upwards; “2008”, “2009” and “2011” present the age distribution of people living with the main household or in the same village/community in the sample; “2011 including emigrants” presents the age distribution of all the reported household members in the sample.

In contrast, the age pyramid for the earthquake-affected area in 2011 presents a fairly stable decreasing population with a rectangular style of distribution among age groups below 35. However, the current population pyramid implies a decreasing labour supply in the earthquake-affected area in the foreseeable future. The decrease in the number of children was more significant in urban areas than in rural areas. Thus, rural labour will need to satisfy the demand from both the urban labour market and the rural one.

Figure 3.2 Population pyramid



Notes: <sup>1</sup>sample size for 2004 Sichuan is 10,647,  
<sup>2</sup>sample size for 2011 Wenchuan Earthquake Area is 10,535,  
<sup>3</sup>sample size for 2011 Wenchuan Earthquake Area Rural is 8,018,  
<sup>4</sup>sample size for 2011 Wenchuan Earthquake Area Urban is 2,517.

The productive population (aged 15-64) in China makes up 75 per cent of the total population (National Bureau of Statistics of China, 2011). The percentage among the local permanent residents<sup>33</sup> in the earthquake-affected area also is around 70 per cent. Retirement starts at 50 years of age in China (women in urban areas) but varies across gender and occupations<sup>34</sup>. Moreover, China does not have a unified social security system – retirement is generally considered to be relevant for urban labour, while rural workers and peasants are usually still in the labour market due to the general absence of a pension system. Education is compulsory for primary and secondary school, i.e. among young people aged 6-15. Therefore, theoretically the majority of the labour force in China should consist of the population aged 15-49 years in urban areas, while in rural areas the age range should extend beyond 50.

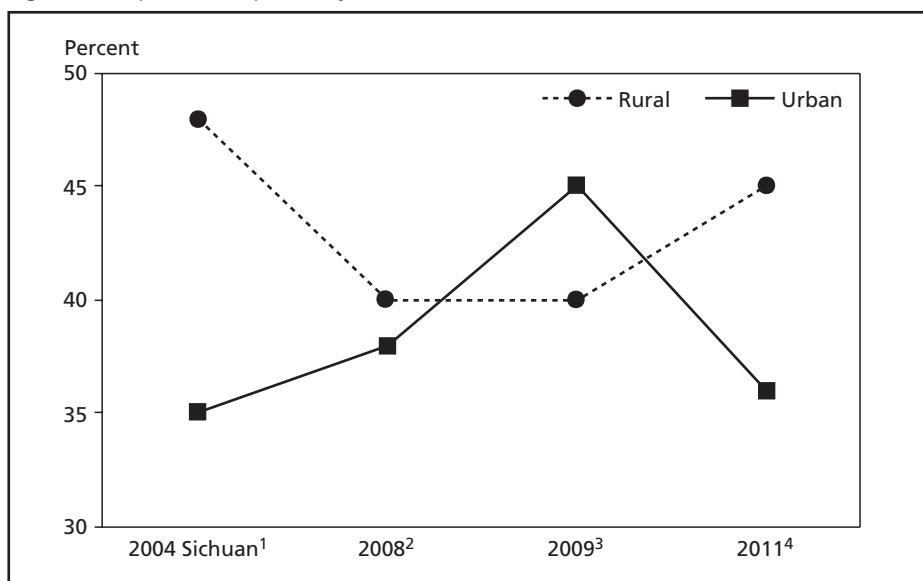
Both the urban and rural population dependency ratios<sup>35</sup> are comparatively low at 40. Thus, the population aged 15-64 comprised a larger share of the population in the earthquake-affected area (Figure 3.3). The dependency ratio did not stay constant between 2004 and 2011, and it also changed in different ways in urban and rural areas. In urban areas it rose to a peak in 2009 (45), and then returned to the same level as that of 2004 (around 35). In rural areas the dependency burden dropped from 48 in 2004 to 40 in 2008 and 2009 and then increased to 45 in 2011. In other words, the difference in the ratio between urban and rural areas narrowed after the earthquake, and appeared to expand again in 2011. The ratio change in rural areas was mainly caused by an increasing percentage of rural population aged 40 to 64 (from around 40 per cent in 2004 to 49 per cent in 2009). The ratio change in urban areas was more led by the decreasing percentage of population aged 15-39 (from 37 per cent in 2004 to 28 per cent in 2009).

<sup>33</sup> The local permanent resident indicates that the individual either lives with the main household in the sample or in the same village/community as the main household.

<sup>34</sup> Among urban women, the age for retirement starts at 50 years old and normally is no later than 60; among urban men, the age for retirement starts at 55 and is normally no later than 65.

<sup>35</sup> The population dependency ratio is expressed as the sum of surveyed people aged 0-14 and people aged 65 and over as a percentage of the sum of people aged 15-64. The sum of people aged 0-14 and people aged 65 and over are termed the dependent population, while the sum of people aged 15-64 are termed the productive population.

Figure 3.3 Population dependency ratio



Notes: <sup>1</sup>sample size for 2004 Sichuan is 10,647,

<sup>2</sup>sample size for 2008 Wenchuan Earthquake Area is 10,248,

<sup>3</sup>sample size for 2009 Wenchuan Earthquake Area is 11,117,

<sup>4</sup>sample size for 2011 Wenchuan Earthquake Area is 10,535.

## Households

Households in the earthquake-affected area are small, as are Chinese households generally. Nevertheless, with an average of 3.6 members per household in 2011, the affected area had larger households than the national average of 3.1 in 2010. The average household size in China was reported to be 3.4 in the 2005 intercensal survey and 3.1 in the 2010 census (National Bureau of Statistics of China, 2011). The MEDOW survey found that the average household size in Sichuan in 2004 was 3.6.

The household dependency ratio<sup>36</sup> indicates the burden of a household in terms of the number of children (aged below 15) and the elderly (aged 65 and above) compared to the number of household members aged from 15 to 64. The average household dependency ratio in Sichuan in 2004 was found by MEDOW to be 41 with a visible distinction between rural (44) and urban (33) households (Table 3.4). The ratio for the earthquake-affected area after 2008 was around 35, which was similar to that of Sichuan in 2004. However, the difference between rural and urban household dependency

<sup>36</sup> The household dependency ratio is the ratio of the number of household members aged 0-14 and household members aged 65 and over to the total number of household members within each household.

ratios in 2004 has disappeared due to a decreasing rural ratio and a fairly stable urban ratio. As shown above, the decreasing rural ratio was primarily due to a reduction in the population below the age of 15. This change implies that rural households in the earthquake-affected area were attaining a burden equivalent to that of urban ones, meaning that both rural and urban households in the earthquake-affected area would be faced with the problem of an increasing share of aged household members in about 25 years.

Table 3.4 Average household size and household dependency ratio

Year	Household Size	Household Dep. Ratio	Urban Household Dep. Ratio	Rural Household Dep. Ratio	Percentage of households with only dependents	Sample size
2004 Sichuan <sup>37</sup>	3.64	41	33	44	6	3885
2008	3.57	35	38	34	7	3647
2009	3.70	32	34	32	8	4026
2011	3.62	35	33	35	9	3840

The percentage of households consisting only of dependent household members, generally elderly people, increased to nine per cent after the earthquake, while it was six per cent in Sichuan in 2004. The increasing percentage of households with only dependent household members as well as the decreasing household dependency ratio predicts an aging population in the earthquake-affected area.

## Migration

Migration is one of the most important factors shaping the labour market in China following the opening up. Urban areas in China are more developed than rural areas, as is east China compared to west China. The rapid economic growth in China has created a very high labour demand in the more developed areas. Migration contributes to economic growth by making labour markets more flexible in meeting labour demand; however, it also brings some social problems, such as changing household structures in the labour exporting areas and a lack of welfare support for migrant workers.

Migrants are defined in the survey as household members not living with the main household in the sample nor living in the same village or community. It was found both in the MEDOW and in the three earthquake surveys that many households in west China included household members not living in the main household residence. According to the MEDOW survey, in Sichuan in 2004 50 per cent of the households

<sup>37</sup> Based on all the households in Sichuan in the MEDOW survey.

generally reported one or more emigrated household members,<sup>38</sup> and 23 per cent of the reported household members were emigrants. The percentage of household emigrants was the same in the earthquake-affected area in 2004.

There was a small drop in the percentage of emigrated household members immediately after the earthquake. In 2008, 44 per cent of households reported at least one member neither living with the household nor living in the same village or community, corresponding to 21 per cent of the population in the earthquake-affected area. The surveys in 2009 and 2011 found that the percentage of emigrants had increased to reach the level of 2004. In the sample, which comprised approximately 50 per cent of the households in the earthquake-affected area, around 25 per cent of the affected population had migrated out of the main household. Approximately 70 per cent of emigrants belonged to the age group 15-39, which may be an indication that a substantial labour migration continued from the earthquake-affected area following the earthquake (Table 3.5).

Table 3.5 Age distribution of household members migrated out (percentages)

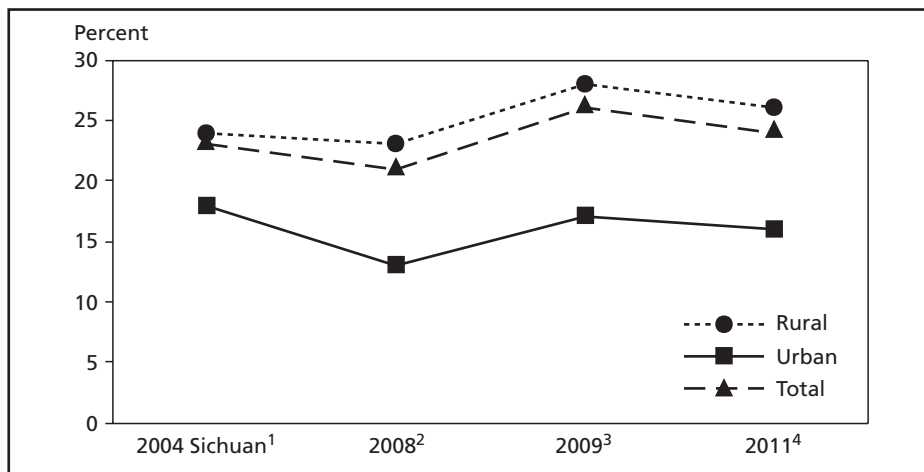
Age	2004 Sichuan	2008	2009	2011
0-14	14	8	10	8
15-39	75	72	73	69
40+	12	20	18	23
Total	100	100	100	100
Sample size	3434	2454	3021	3284

Households with emigrated members were particularly common in rural earthquake-affected areas in terms of the percentages of both the migrated population and households with at least one migrated member (Figure 3.4 and Figure 3.5). The percentage of households in rural areas with at least one member migrated out was higher than that for urban areas by around 20 percentage points. Similarly, the percentage of household members not residing in the main dwelling was on average higher by 10 percentage points in rural areas than in urban areas. Although there were slightly fewer emigrants immediately following the earthquake both in urban areas and in rural areas than in 2009 and 2011, the difference between the areas remained unchanged.

<sup>38</sup> Household members who lived neither with the sampled households nor in the same village or community.



Figure 3.4 Percentage of emigrated population



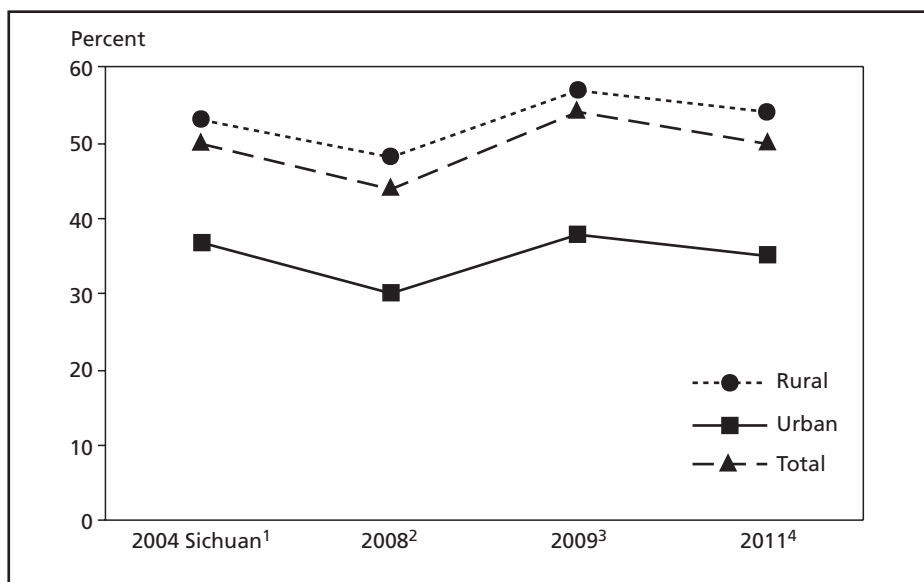
Note: <sup>1</sup>sample size for 2004 Sichuan is 14,081,

<sup>2</sup>sample size for 2008 Wenchuan Earthquake Area is 12,702,

<sup>3</sup>sample size for 2009 Wenchuan Earthquake Area is 14,138,

<sup>4</sup>sample size for 2011 Wenchuan Earthquake Area is 13,819.

Figure 3.5 Percentage of households with emigrants



Note: <sup>1</sup>sample size for 2004 Sichuan is 3,885,

<sup>2</sup>sample size for 2008 Wenchuan Earthquake Area is 3,647,

<sup>3</sup>sample size for 2009 Wenchuan Earthquake Area is 4,026,

<sup>4</sup>sample size for 2011 Wenchuan Earthquake Area is 3,840.

### 3.4 Labour Force

#### Framework for Measuring the Labour Force

Not all the population of working age are active in the labour market, i.e. are members of the labour force. The labour force participation, how those in labour force are distributed and the characteristics of the labour market in disaster-affected areas are important aspects for post-disaster reconstruction and rehabilitation.

The ILO framework, as defined by the International Labour Organization, was used to classify the working age population (Table 3.6). To be consistent with the Labour Act of China<sup>39</sup>, the minimum age for a household member who was asked about his/her labour situation in the earthquake survey was 16. Thus, the working age of the affected population is defined as 16 and above, and there is no upper limit for the analysis of the labour force in this section. The reference period is seven days prior to the day of interview. Based on the activities during the reference period, all household members of working age are classified into three categories: employed, unemployed, and out of the labour force.

The employed are those who carried out paid work<sup>40</sup> during the reference period or were temporarily absent from work (because of sickness, vacation etc.). The unemployed are those who did not work at all for payment but were actively seeking work and ready to work if work became available during the reference period. The remainder of those in the working-age population are defined as being out of the labour force.

Table 3.6 Framework for labour force analysis

Population				
Working age population				Below 16 years of age
Labour force			Out of labour force	
Employed		Unemployed		
Currently working	Temporarily absent			

<sup>39</sup> The Labour Act of China (中华人民共和国劳动法)

<sup>40</sup> Paid work refers to any kind of work that will lead to any payment in cash or in kind, or to any agricultural-related work, as long as the work is longer than one hour.

## Labour Force Participation

The labour force participation rate<sup>41</sup> of the residents in the earthquake-affected area is around 70 per cent, which is high compared to other countries.<sup>42</sup> However, the rate decreased by around 10 percentage points in comparison to the rate in 2004, with this participation drop being more important in rural areas. The rural rate dropped 12 percentage points (from 87 per cent to approximately 75 per cent), while the urban rate decreased by around 7 percentage points after the earthquake (from 63 per cent to around 56 per cent).

The labour force is composed of both the employed and the unemployed. The percentage of unemployed has always been low in China, and the earthquake-affected area is no exception (around 1.5 per cent). Unemployment slightly increased immediately after the earthquake, but by 2009 it had dropped back to the 2004 level (Table 3.7). The main change in the labour market was that the labour force participation rate dropped at the same time as the unemployment rate remained stable.

Overall, both genders contributed to the decrease in labour force participation in the earthquake-affected area, but the main decrease was among women. In 2004, the difference between the male and female labour force participation rate was six percentage points, similar to that immediately after the Wenchuan earthquake. By 2009, the difference had doubled (Table 3.7). Thus, women in the earthquake-affected area were more likely than men to function as a reserve army in the labour market.

Table 3.7 Labour force status of the population of working age (percentages)

	2004 Sichuan			2008			2009			2011		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Employed	84	78	81	74	68	71	74	62	68	78	67	72
Unemployed	1.3	1.1	1.2	2.0	1.8	1.9	1.2	1.5	1.4	1.4	1.2	1.3
Out of labour force	14	21	18	24	31	27	24	37	31	21	32	27
Sample size	4169	4293	8462	4217	4580	8797	4648	4962	9610	4292	4730	9022

<sup>41</sup> The labour force participation rate is a measure of the proportion of working age population that engages actively in the labour market, either by working or seeking work. It is calculated by expressing the number of persons in the labour force as a percentage of the population of working age. The labour force, also termed the economically active population, is the sum of the number of persons employed and the number unemployed. The working-age population is the population above a certain age. The definition of working-age population may vary across countries in order to match the labour laws of that country. It is standardised as aged 15 and above in ILO estimates. However, in the earthquake survey, the starting age for the labour force section is 16 (International Labour Organization, 2011).

<sup>42</sup> Data of the national labour force participation are available on the International Labour Organization website. <http://kilm.ilo.org/kilmnet/>

Retirement and education remained the two main causes for the working-age population to stay out of the labour force in the earthquake-affected area in 2011. This was similar to the situation in some other cities in China, demonstrated by a survey of the Chinese labour force in Beijing, Wuxi and Zhuhai (Drury, 2001). Students and the retired made up around 60 per cent of those in the earthquake-affected areas who were not in the labour market.

The retired comprised approximately 46 per cent of the people who were out of the labour force in the earthquake-affected area in 2011 (Table 3.8). Retirement is an official status for urban workers. The retirement system is better established in urban China than in rural areas – retired urban workers receive some form of monetary payment from the public pension system or their former work unit, but rural labour depends on savings or family support. Therefore, the percentage being out of the labour force in the rural areas (39 per cent) was 19 percentage points lower than that in urban areas (58 per cent).

The 1999 plan for enrolment expansion in higher education<sup>43</sup> increased the opportunities for young people to continue their education but at the same time removed them from the labour force. Students made up 15 per cent of those who were out of the labour force.

After retirement and studies, disability (14 per cent) was the most important reason for being outside the labour force (Table 3.8). Disability was a commonly-given reason in rural areas in particular, comprising approximately 18 per cent. A lack of job opportunities was seldom used as a reason for dropping out of the labour force in the earthquake-affected areas (Table 3.8). Around nine per cent in 2008 and in 2009 reported difficulties in finding jobs, although this had dropped to four per cent by 2011.

Women's behaviour in the labour market was more influenced by housework than men's behaviour. The surveys found that housework was a major reason for women staying out of the labour market but not for men. Twenty per cent of women who were out of the labour market were busy with housework or taking care of family members, but only one per cent of men out of the labour force cited housework as the reason (Table 3.8).

<sup>43</sup> The plan of enrolment expansion in higher education (高校扩招计划) was first proposed in the Action plan of Education Revitalization in the 21st Century (面向21世纪教育振兴行动计划) in 1999. Link for the Action plan of Education Revitalization in the 21st Century: <http://www.google.com.hk/url?sa=t&rct=j&q=%E9%9D%A2%E5%90%9121%E4%B8%96%E7%BA%AA%E6%95%99%E8%82%B2%E6%8C%AF%E5%85%B4%E8%A1%8C%E5%8A%A8%E8%AE%A1%E5%88%92&source=web&cd=2&ved=0CDkQFjAB&url=http%3A%2F%2Fwww.fync.edu.cn%2Fch2%2Fhtml%2F1838.doc&ei=drT5TrS9BZCwiQfV1pikAQ&usq=AFQjCNGwsZsN1CGzFkdFhehjs-tFLD-Xqw>

Table 3.8 Reason for being out of the labour force in 2011 (percentages)

	Location		Gender		Total
	Rural	Urban	Male	Female	
Got job not started yet	1	0	1	0	0
Can't find the ideal job	1	1	1	0	1
Can't find a job that suits my qualifications	1	2	2	2	2
Lost hope of finding a job	2	2	2	2	2
In school	17	11	20	12	15
Housework, taking care of family members	14	11	1	20	13
No need/economically independent	1	1	0	1	1
Disabled	18	8	14	14	14
Retired	39	58	51	43	46
Training or study	1	2	3	0	1
Other	4	5	6	4	4
<i>Sample size</i>	<i>1798</i>	<i>1079</i>	<i>1105</i>	<i>1772</i>	<i>2877</i>

Labour migration is a key to understanding labour force participation in the earthquake-affected area. The working-age population in the affected area can be divided into two groups in terms of residence. One group is the population including only household members of working age and those who were living with the interviewed household or in the same village or community of the main household. The second is the population consisting of working-age people reported as household members but who were not living with the interviewed household or in the same village or community as the household. In this chapter the former will be referred to as the local residents and the latter as emigrated residents.

Large-scale reconstruction of housing and infrastructure took place during the three years following the earthquake. According to the National Development and Reform Commission of China, the investment reached CNY 885 billion (National Development and Reform Commission of China, 2011). The reconstruction projects created a strong labour demand in the earthquake-affected area. This demand coexisted with 27 per cent of the working-age population being out of the labour market as well as with around 25 per cent of the working-age population migrating out. The policy measures supported the local labour force pursuing jobs both locally and in the counterpart provinces; therefore, there is no reason to believe that the labour demand in the earthquake area was lower than that outside it. However, the local labour force participation rate was around 10 percentage points lower than the rate among the emigrated residents.

Although the local employment rate dropped in the earthquake-affected area, unemployment did not increase. The unemployment percentage remained as low as

around one per cent regardless of the migration status (Table 3.9). In 2004, the labour force participation rate was around 80 per cent among both local and emigrated residents. Following the Wenchuan earthquake the labour force participation rate of local residents dropped by 10 percentage points to around 70 per cent, while the rate for the emigrated residents remained stable at around 80 per cent.

Table 3.9 Labour force status of local and emigrated residents of working age

	2004 Sichuan		2008		2009		2011	
	Emi-grated <sup>44</sup>	Local	Emi-grated	Local	Emi-grated	Local	Emi-grated	Local
Employed	77	81	81	71	82	68	84	72
Unemployed <sup>45</sup>	0.7	1.2	1.1	1.9	1.3	1.4	0.8	1.3
Out of labour force	22	18	17	27	17	31	16	27
Sample size	2878	8462	2222	8797	2662	9611	2942	9022

The distribution of working-age population was different in terms of age, gender and education between the local residents and the emigrated residents: the percentages of people aged 20-39, of men and of the educated were higher for emigrants than for locals.

Approximately 60 per cent of the emigrants of working age were 20-39 years old compared to around 30 per cent for the local residents. Men made up the majority of the emigrants above 15 years old, while more than 50 per cent of the local residents were women. Around 70 per cent of the emigrants of working age had an educational background of secondary school or above, and only around 10 per cent of them had no education. Approximately 40 per cent of the local working-age people were illiterate, with only around 40 per cent of them having an educational background of secondary school or above.

The persistent pattern of emigration indicates that employment assistance projects carried out in the earthquake-affected areas as well as the projects offered in the counterpart provinces did little to affect workers' propensity to migrate.

Workers from the earthquake-affected area did not show particular interest in seeking jobs locally. Half of those who emigrated were staying in another city in Sichuan or outside Sichuan. It can be deduced from the decreasing local labour force participation rate and the persistent migration pattern that migrants from outside the earthquake-

<sup>44</sup> "Local" indicates information from household members in the sample of working age who were living with the main household or in the same village or community to the main household; "emigrated" refers to information from household members in the sample of working age who were not living with the main household or living in the same village or community.

<sup>45</sup> Unemployed is calculated as a percentage of working age population.

affected area in Sichuan or other provinces made a substantial contribution to the infrastructure reconstruction and development.<sup>46</sup>

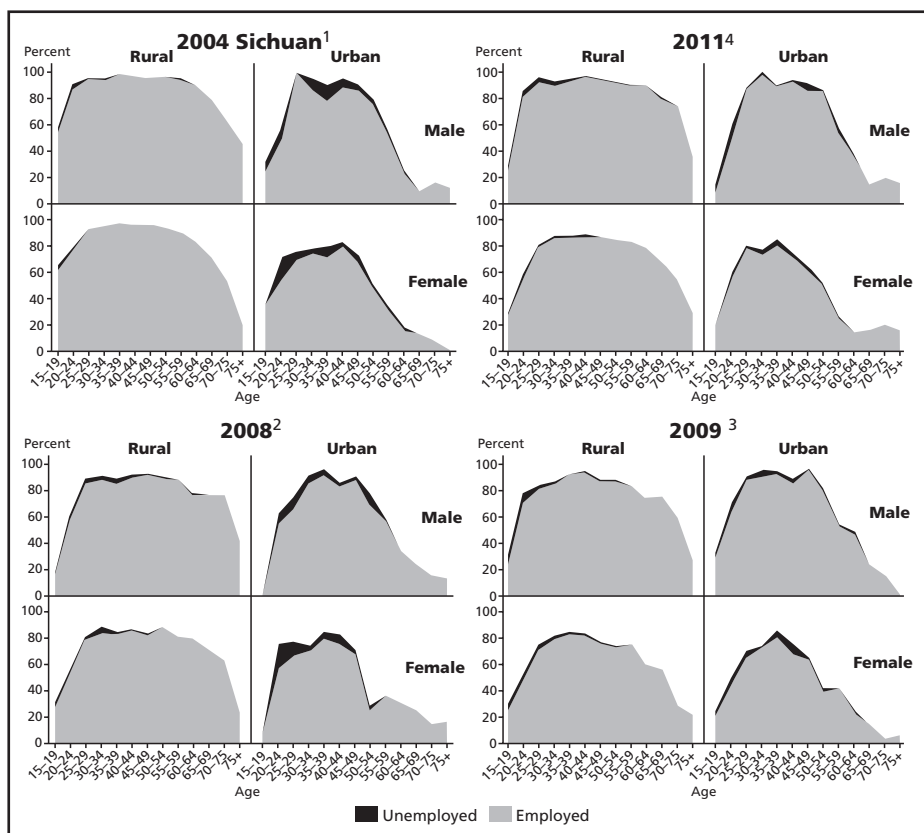
### **Labour Force Structure**

The earthquake did not lead to any major changes in the overall pattern of labour force status, in terms of residence (rural or urban), age and gender (Figure 3.6). The rural labour force participation rate remained higher than the urban one both before and after the earthquake. In rural areas people continued working into old age, while in urban areas they stopped early due to the retirement and pension system in urban areas. Women had lower participation rates than men in both urban and rural areas.

Labour force participation in some age groups dropped due to the earthquake, particularly among urban women in 2008 and 2009, but this effect was reduced by 2011 (Figure 3.6). In rural areas, labour force participation dropped but maintained similar age patterns for both men and women after the earthquake compared to 2004. Urban labour force participation was more stable for men than for women. After the earthquake, urban women dropped out of the labour force much earlier and more significantly than men. In 2008, the drop in the participation rate among women aged 50-54 was the most important. In 2009, the drop in the female participation rate in both urban and rural areas was more important than that for men. Men had a smaller drop in employment than women immediately following the earthquake. By 2011, the age pattern of employed women in urban areas became similar to that of men, with an increasing labour force participation for the population aged 65 and above. At the same time, the rate for young people aged 16-19 in the rural area dropped, perhaps because of the increasing engagement in school (Table 3. 10).

<sup>46</sup> Support with investment and labour resource (人力、物力) is explicitly mentioned in the agreements between the earthquake-affected area and the counterpart provinces (Xinhua News Agency, 2008).

Figure 3.6 Labour force participation rate and employment status



Notes: <sup>1</sup>sample size for 2004 Sichuan is 8,462,

<sup>2</sup>sample size for 2008 is 8,797,

<sup>3</sup>sample size for 2009 is 9,611,

<sup>4</sup>sample size for 2011 is 9,022.

Table 3.10 Enrolment in school (percentage of young people aged 16-19 years)

	Enrolled	Sample size
2004 Sichuan	38	279
2008	60	388
2009	56	335
2011	66	314



While there was no relation between labour force participation and education in 2004, such a relation had developed by 2008 (Table 3.11). In 2004, local residents had a similar labour force participation rate (around 82 per cent) regardless of their educational background. By 2008, the labour force participation rate of the local illiterates and those not having completed any schooling dropped to around 70 per cent, around seven percentage points lower than the rate of the locals with education.

The drop in participation for those lacking education is probably not specifically related to the earthquake but rather to a general development of the economy leading to a drop in the demand for unskilled labour. However, the combined effects of the financial crisis and the earthquake in Sichuan may have strengthened this development. The percentage of those with education among the employed increased slightly between 2002 and 2010 both in Sichuan and generally in China (Figure 3.7), while the difference in the labour force participation rate in the earthquake-affected area between the educated and the non-educated was around 10 per cent by 2009.

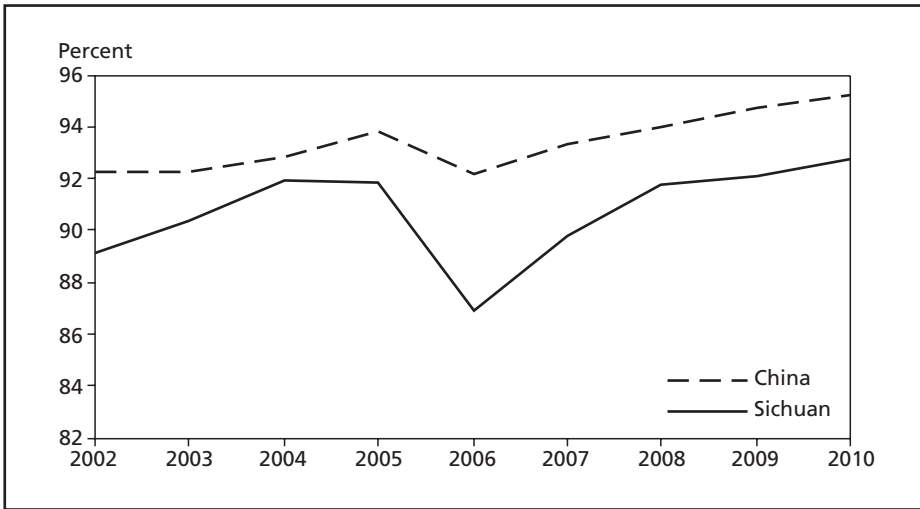
Table 3.11 Labour force status and education among those not currently enrolled (percentages)

		<b>Highest completed education of labour population<sup>47</sup></b>					<b>Total</b>
		Illiterate/Not completed any schooling	Primary school	Junior secondary school	Senior secondary school and above	Other type of schools <sup>48</sup>	
<b>2004</b>	Employed	82	86	82	82	61	82
	Unemployed	0.4	1.4	2.7	3.0		1.2
	Out of labour force	18	13	15	15	39	16
	<i>Sample size</i>	<i>4628</i>	<i>1339</i>	<i>1673</i>	<i>559</i>	<i>67</i>	<i>8266</i>
	Employed	69	75	73	66	42	71
<b>2008</b>	Unemployed	0.3	2.3	2.9	3.4	6.1	1.9
	Out of labour force	30	23	24	31	52	27
	<i>Sample size</i>	<i>2886</i>	<i>2258</i>	<i>2551</i>	<i>1016</i>	<i>11</i>	<i>8722</i>
	Employed	62	76	76	76		69
	Unemployed	0.5	1.3	2.3	3.1		1.3
<b>2009</b>	Out of labour force	38	23	22	21		29
	<i>Sample size</i>	<i>3917</i>	<i>1914</i>	<i>2633</i>	<i>670</i>		<i>9134</i>
	Employed	69	76	79	77	39	74
	Unemployed	0.5	0.9	2.0	2.8		1.3
	Out of labour force	31	23	20	20	61	25
<b>2011</b>	<i>Sample size</i>	<i>3209</i>	<i>2128</i>	<i>2236</i>	<i>1123</i>	<i>16</i>	<i>8712</i>

<sup>47</sup> The students currently enrolled are not included

<sup>48</sup> The sample for this category is fairly small and the estimates have high standard errors.

Figure 3.7 Percentage of the employed<sup>49</sup> with education (percentage of total employed)



## Employment

The “work unit” (Danwei, 单位) refers to any type of organisation that people work for. Being employed by a work unit carries both constraints and benefits supported by the Labour Act as well as by other labour policies in China. Self-employed individuals are not registered in work units – thus, they are less controlled by the labour market but also cannot enjoy the social welfare benefits provided through work units in China. Unregistered individual self-employment mainly comprises peasants and workers in individual enterprises, odd jobs or freelance employment.

Most of those employed in the earthquake-affected area were self-employed, making up around 80 per cent of the employed (Table 3.12). The percentage of self-employment among the emigrated labour force was significantly lower than among the local labor force by around 35 percentage points. This difference was caused by the fact that the majority (around 55 per cent) of locally employed workers in the earthquake-affected area worked in agriculture – i.e. they were self-employed peasants without work units – while this was not the case among those who had migrated out.

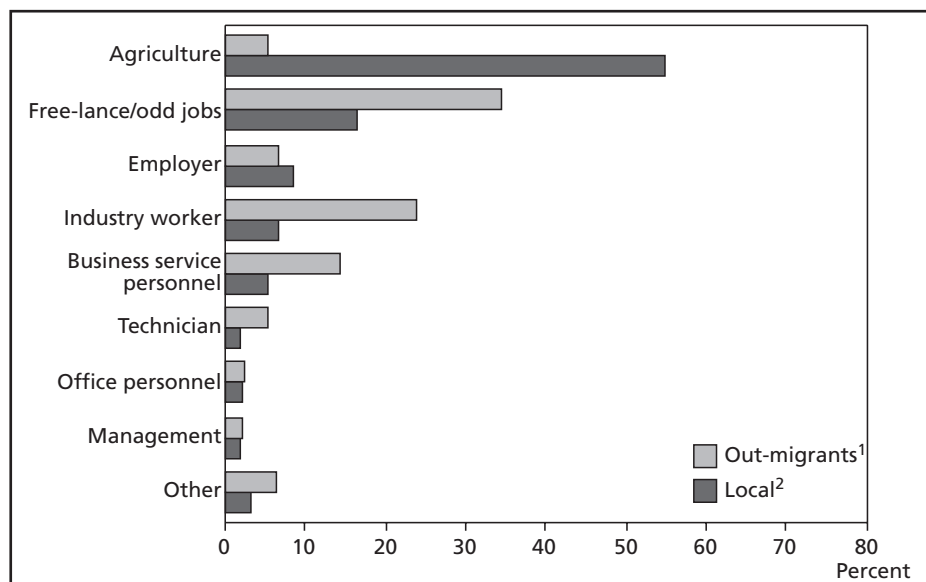
<sup>49</sup> The definition of employment from the Chinese Government is different from that of the ILO. The definition of employment used in the China Labour Statistical Yearbooks refers to the “total number of persons engaged in social economic activities that generate income. Including: total formal employees; reemployed retirees; employers in urban private enterprises; urban individual labourers; employment in urban private enterprises and individual households; employment in township and village enterprises; rural labourers and other social labourers (servicemen included)” (Department of Population and Employment Statistics of National Bureau of Statistics, 2010).

Table 3.12 Self-employment (percentage of the employed)

	2004 Sichuan			2008			2009			2011		
	Emi-grated	Local	Total	Emi-grated	Local	Total	Emi-grated	Local	Total	Emi-grated	Local	Total
Self-employed	11	77	63	28	77	64	48	83	72	46	80	70
Sample size	1976	6841	8817	1627	5455	7082	2044	6286	8330	2404	6447	8851

Changes in professions were established by 2011<sup>50</sup>. The percentage of people working in freelance or odd jobs increased significantly by 2011, from approximately four per cent to 20 per cent (Figure 3.8 and Figure 3.9). The increase was significant among both the local residents in the earthquake-affected area and those who had migrated out, but was larger among the emigrated. In addition, this large increase in freelance or odd jobs contributed to an important change in the distribution of professions following the Wenchuan earthquake – the percentage of self-employment among the emigrated increased from 11 per cent in 2004 to around 45 per cent in 2011. As a corollary, the percentage of industry workers decreased from 58 per cent in 2004 to 24 per cent in 2011.

Figure 3.8 Distribution of professions in 2011

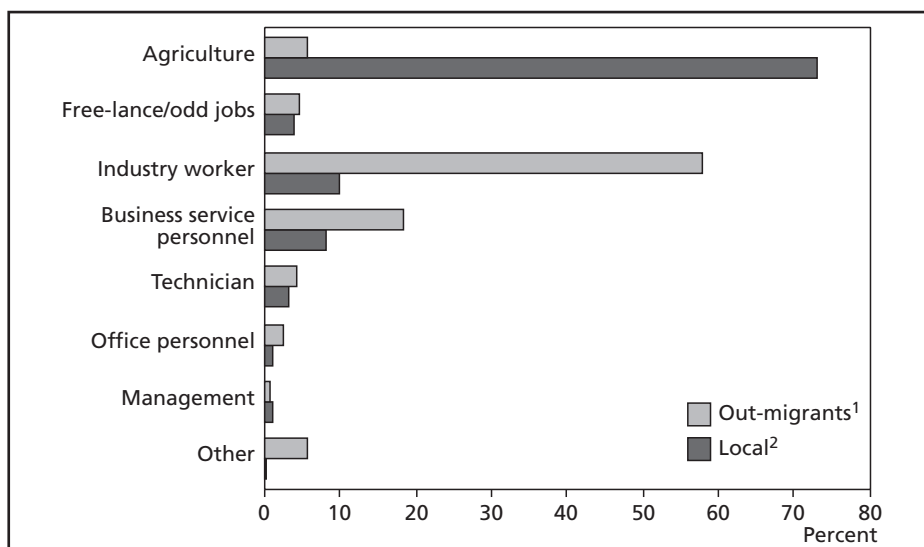


Notes: <sup>1</sup>sample size for Out-migrants is 2,390,

<sup>2</sup>sample size for Local is 6,444.

<sup>50</sup>The coding of professions in MEDOW 2004 is different from that for the earthquake survey. "Freelance or odd jobs" does exist as a separate option in the earthquake survey but not in MEDOW 2004. The profession for 2004 is recoded, and people working as "business service personnel", "industry workers" or "other", or who were self-employed with no work unit, are recoded as "freelance or odd jobs".

Figure 3.9 Distribution of professions in 2004



Note: <sup>1</sup>sample size for Out-migrants is 2,280,

<sup>2</sup>sample size for Local is 6,880.

Despite the increase in self-employment, most people did not change their employment status or profession following the earthquake, particularly among the labour force that had migrated out<sup>51</sup>. Around 90 per cent of those who were employed locally before the earthquake were also employed in 2011, while the corresponding percentage was around 96 per cent for the emigrants (Table 3.13). Moreover, among those who were employed both before the earthquake and in 2011, around 90 per cent maintained their professions in 2011, the exception being the emigrants who had worked in agriculture locally before the earthquake. Fifty per cent of the emigrants in 2011 who had been working in agriculture before the earthquake were no longer doing so as they had moved out of their households and had no right to the land they lived on. By 2011 around 29 per cent of the emigrants who were working in agriculture before the earthquake had odd jobs or were freelancing.

Before the earthquake and in 2011 approximately eight per cent of the working-age population were retired. After the earthquake, among those who did not retire business services personnel were the most likely to drop out of the labour force. On average, around eight per cent of those who were employed before the earthquake were out of the labour market by 2011 (Table 3.13). Moreover, only around five per cent of those who were peasants and technicians before the earthquake dropped out of the labour

<sup>51</sup> Migration status is classified according to the location of residence in 2011.

market after it, but around 16 per cent of those employed in business services before the earthquake had ceased their employment by 2011.

Local workers were more likely to change their profession after the earthquake. Twenty-seven per cent of those who worked in industry before the earthquake were no longer working in industry in 2011 – around 10 per cent of the workers were in agriculture and around eight per cent had freelance or odd jobs.

Workers within the affected area rarely changed the location of their workplace across regions. The 2011 survey found that among those who were working both before and after the earthquake and who had been working in their local community or village around 95 per cent were still doing so in 2011. Of those who worked in other villages or communities of the same township, 89 per cent also did so in 2011. However, the survey only covered households with at least one member present in the earthquake-affected area at the time of the survey.

Table 3.13 Employment status in 2011 and before the earthquake (percentages)

			Employment status before the earthquake <sup>52</sup>				Total
			Em- ployed	Unemployed/ household work	Re- tired	School- ing	
<b>Migrated out</b>	Employment status in 2011	Employed	96	64	16	54	84
		Unemployed	0.3	1.5		2.3	0.8
		Out of the labour force	4	35	84	44	15
	Total		100	100	100	100	100
	Sample size		2057	151	34	679	2921
<b>Local</b>	Employment status in 2011	Employed	90	26	2	29	72
		Unemployed	1.1	3.2		4.9	1.3
		Out of the labour force	9	71	98	66	27
	Total		100	100	100	100	100
	Sample size		6849	670	1065	409	8993
<b>Total</b>	Employment status in 2011	Employed	92	33	3	45	75
		Unemployed	0.9	2.9		3.3	1.2
		Out of the labour force	8	64	98	52	24
	Total		100	100	100	100	100
	Sample size		8906	821	1099	1088	11914

<sup>52</sup>The measure for employment status before the Sichuan earthquake is different from that for the current status. The measure for employment status before the earthquake is not based on the ILO framework but on the classification of respondents.

The average individual income<sup>53</sup> per month<sup>54</sup> among the local labour force in the earthquake-affected area increased compared to 2004, except for immediately following the earthquake in 2008. Wages rose in general by around 13 per cent per year between 2008 and 2011. The post-earthquake average individual income in 2008 slightly dropped by around seven percentage points compared to that before the earthquake (Table 3.14). The increase in individual income also matched the perception of local residents: approximately 49 per cent of those with an individual income in 2011 agreed that their income had increased compared to before the earthquake, while 24 per cent perceived it to be the same.

Compared to 2004, the average individual income before the earthquake in 2008 had increased in rural areas (around 43 per cent) but decreased in urban areas (around 11 per cent) (Table 3.14). After the earthquake in 2008, the average individual income in general decreased compared to the level before the earthquake (eight per cent in rural areas and two per cent in urban areas). The average individual income has been increasing since 2009. In 2009, the rise in individual income was mainly caused by the increasing income among male labour in rural areas (around 16 per cent, referring to post-earthquake in 2008), while in 2011 the rise was mainly caused by the significant increase in urban areas (around 70 per cent, referring to 2009).

Table 3.14 Individual income with imputation (CNY per month)

	Rural			Urban			Total			Sample size
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
Sichuan 2004	552	456	531	1065	841	968	746	696	730	1392
Pre-earthquake 2008 <sup>55</sup>	833	583	758	983	720	863	876	643	794	3500
Post- earthquake 2008	761	552	696	933	728	849	805	613	740	2357
2009	883	566	785	1023	790	926	911	630	817	3511
2011	1067	744	951	1785	1318	1582	1244	923	1122	3372
Trend 2004-2011 <sup>56</sup>										

<sup>53</sup> The individual income was defined in the three surveys as all kinds of income for a specific household member, e.g. wage, bonus. **Income from agricultural activities or family businesses is not counted as individual income** because it is considered as income for all household members rather than for a specific person. In 2004, 77 per cent of the employed in the earthquake-affected area were rural peasants, according to the ILO standard, and did not report any individual income. In 2011, this percentage was reduced to 46 per cent.

<sup>54</sup> Average individual income per month is imputed by using the hot deck method. The records are first sorted by location, gender, age and education. Then the income records are imputed under two conditions: first, more than 0 and less than 100; second, more than 10,000.

<sup>55</sup> Individual income per month before the Wenchuan earthquake was addressed in each of the three earthquake surveys. The figure reported here is calculated based on the data in 2008.

<sup>56</sup> Trends 2004-2011 are made in sparkline graphs.

The increase in average individual income was higher among local men than women. In 2011, compared to the individual income immediately following the earthquake, male income in rural areas had increased by 40 per cent, while female income had increased by 35 per cent. In urban areas, male income had increased by 91 per cent, around 10 percentage points higher than the increase in female income.

The higher increase in male individual income led to a greater gender difference in individual income in the earthquake-affected area. In 2004, the ratio of male to female individual income<sup>57</sup> was 1.07, while it was around 1.35 after the earthquake (Table 3.15). The individual income ratio by gender increased to 1.45 in 2009, mainly caused by the difference in rural areas (1.56). By 2011, it had returned to the level before the earthquake.

In 2004, individual income gender disparity in Sichuan was higher in urban areas than in rural areas, although before the earthquake the higher ratio by gender had already switched to rural labour (at 1.43, with the urban ratio at 1.37). Individual income gender ratio was generally 10 per cent higher in rural areas than urban areas after the earthquake, except in 2009. The individual income ratio was relatively stable in urban areas compared to the change in rural areas.

Table 3.15 Individual income gender ratio

	<b>Rural</b>	<b>Urban</b>	<b>Total</b>	<b>Sample size</b>
Sichuan 2004	1.21	1.27	1.07	1392
Pre-earthquake 2008	1.43	1.37	1.36	3500
Post-earthquake 2008	1.38	1.28	1.31	2357
2009	1.56	1.29	1.45	3511
2011	1.43	1.35	1.35	3372

## Unemployment

Unemployment was not significant in the earthquake-affected area, with the unemployment rate<sup>58</sup> being as low as around 1.7 among the local labour force (Table 3.16). The unemployment rate increased immediately following the earthquake in 2008 compared to the situation in 2004, but dropped afterwards.

Rural rates were relatively stable after the earthquake compared to urban rates (Table 3.16). The unemployment rate among the rural labour force was around 1.5 per cent. In contrast, the urban unemployment rate was considerably higher, but was nearly halved between 2004 and 2011 (from seven per cent to around four per cent). The reduction










<sup>57</sup> The ratio of male to female individual income refers to women's individual income as 1.

<sup>58</sup> The unemployment rate is calculated as a percentage by dividing the number of unemployed individuals by all the individuals currently in the labour force.

<http://laborsta.ilo.org/applv8/data/c3e.html>

in the unemployment rate among both urban men and urban women was around 40 per cent, and there was no significant gender difference in the unemployment rates.

Table 3.16 Unemployment rate among the economically active population

	Urban			Rural			Total			Sample size
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
Sichuan 2004	7	7.7	7.3	0.5	0.3	0.4	1.5	1.4	1.5	9211
2008	5.2	7.4	6.3	2	1.6	1.8	2.6	2.6	2.6	8148
2009	2.7	5.6	4.1	1.4	1.8	1.6	1.6	2.4	2	8625
2011	3.3	4.2	3.7	1.4	1.3	1.3	1.7	1.8	1.7	9045
Trends 2004-2011 <sup>59</sup>										

## Profile of the Labour Market in 2011

The very seriously affected areas experienced a sharper drop in labour force participation following the earthquake than the seriously affected areas, but this returned to near its former level in 2011 (Table 3.17). By 2011 there was no longer any significant difference in labour force participation between the two areas. However, as mentioned previously, up to August 2011 labour force participation among local residents in the earthquake-affected area (approximately 73 per cent) had not recovered to the level of 2004 (around 82 per cent). This, however, is also likely to be a function of a general trend towards lower participation in China (Figure 3.10).

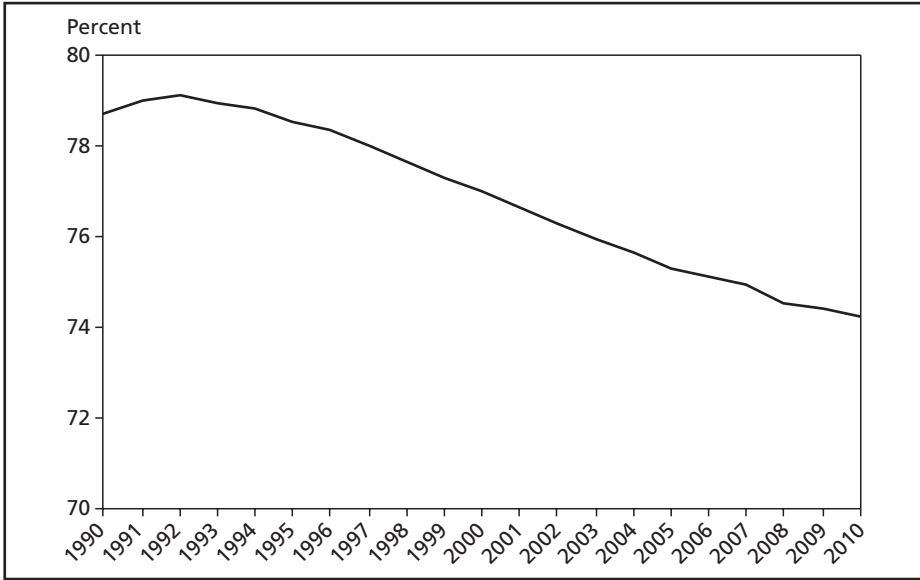
Table 3.17 Labour force status of working-age population in the earthquake-affected area (percentages)

	2008			2009			2011	
	Very seriously affected	Seriously affected	Camps	Very seriously affected	Seriously affected	Camps	Very seriously affected	Seriously affected
Employed	66	73	51	67	74	53	71	73
Unemployed	3	2	6	2	1	4	2	1
Out of the workforce	31	26	43	31	25	43	27	26
Sample size	4268	3956	573	5451	5353	1470	4908	4114

<sup>59</sup>Trends 2004-2011 are made in sparkline graphs.



Figure 3.10 Labour force participation rates of China (ILO estimates)<sup>60</sup>



The 2011 sample covered a population of around 14 million<sup>61</sup>. Eighty-seven per cent of household members were of working age, with a labour force participation rate generally at 76 per cent. Of the working-age population 24.7 per cent were emigrants, and within that group 84.4 per cent were in the labour force. In 2011, there were approximately 9.3 million people in the labour force in the Wenchuan earthquake-affected area, but of these around 2.5 million workers had emigrated from the village or community where their main household was located. There were around 6.6 million people locally employed, comprising 3.4 million men and 3.2 million women. Approximately 0.12 million were unemployed, divided equally between the genders, and 2.4 million (of which 1.5 million were women) were outside the labour force.

The Overall Reconstruction Plan emphasised the importance of at least one household member having a stable job in every affected households. Between 2008 and 2011 at least one member was employed in approximately 92 per cent of households in the earthquake-affected area. The percentage could scarcely have been much higher since some households consist of only retired members. Nevertheless, in only half of the

<sup>60</sup> Labour force participation rates (ILO estimates), data available on website: <http://kilm.ilo.org/kilmnet/>

<sup>61</sup> Population size of the 30 counties in the 2011 sample is estimated according to the Sichuan statistics yearbook 2010. The population size for the 30 counties in 2009 was 13.7 million according to the yearbook 2010. Data are available on the website: <http://www.sc.stats.gov.cn/sctj/Default.htm?status=Main&menu=5&sub=5,false>

households with employed members was there someone working in a work unit. This indicates that around 50 per cent of the households only had self-employed members. In addition, the proportion of households with only self-employed members increased by six percentage points between 2008 and 2011.

Table 3.18 Employment status of household members (percentages of all households)

	Households with at least one employed member	Households with at least one member with work unit	Sample size
<b>2008</b>	92	54	3647
<b>2009</b>	91	49	4026
<b>2011</b>	93	48	3840

Trends 2008-2011<sup>62</sup>

By 2011, perhaps as a partial consequence of the employment assistance projects carried out in the earthquake-affected area, the labour market in the area had returned to normal. Labour force participation was around 72 per cent, which is consistent with the general level in China. The unemployed made up as little as one per cent of the working-age population.

In 2011, 80 per cent of those employed in the earthquake-affected area were satisfied with their current work. Moreover, by 2011 there was a moderate demand for vocational training – 22 per cent of the employed reported **needing vocational training**. The demand for training among industry workers, business services personnel and people working freelance or on odd jobs was twice as high as the average demand. Educated workers had a higher demand (27 per cent) for vocational training than those with no education (12 per cent).

## 3.5 Conclusions

The labour market was influenced by the Wenchuan earthquake, the 2008 global financial crisis and the general development of the Chinese economy. The Chinese Government's response to the earthquake was integrated into their stimulus package to counter the financial crisis and into their general development strategies. Therefore, it is difficult to distinguish the effects of the various factors shaping the labour market in the earthquake-affected area.

Thus, while clear changes in the labour market can be discerned after the earthquake, as well as surprising stability, one should be wary of simple statements of cause. Nev-

<sup>62</sup> Trends 2008-2011 are made in sparkline graphs.

ertheless, the discussion in this chapter has highlighted the following characteristics of the development of the post-Wenchuan earthquake labour market:

The labour force participation rate immediately following the earthquake was approximately 10 percentage points lower than in 2004, and by 2011 had still not reached its former levels. However, this is also likely to be a result of the general slow decline in Chinese labour force participation rates.

In 2008, the drop in labour force participation was partly associated with rural women aged 50-54, while in 2009 the change was due to a general drop in female participation, both urban and rural. By 2011, the overall pattern had recovered, although at a lower level of participation than in 2004. Another factor in the reduced participation rates is the fact that school enrolment in the age 16-19 year age group has increased dramatically since 2004.

Associated with the drop in female participation was a large increase in individual income disparately in favour of men, although individual income rose in general by around 13 per cent per year. By 2011, the overall income increase in urban areas was twice as high as that in rural areas.

Despite the fact that participation levels remained relatively high in the affected area and that unemployment was negligible, the internal structure of the labour force changed in two important ways compared to 2004. Firstly, education had little influence on labour force participation in 2004. However, after the earthquake, education was associated with increased participation rates, a trend that became stronger as time went by. Secondly, employment shifted towards self-employment. Moreover, peasants – who technically are self-employed – moved from tilling their own land to taking odd jobs and freelancing. Thus, the economy became more informal than before.

The shift towards an informal economy may be related to infrastructure development and employment assistance projects carried out in the earthquake-affected area. Infrastructure projects would often hire people as contractors, as is usual with temporary labour employed for specific projects.

Migration remained high after the earthquake. Around half of the households had at least one emigrant member making up 23 per cent of the registered household population. There appears to have been no large-scale return of workers after the earthquake. Thus, while the exact number of jobs created by earthquake reconstruction is not known for the survey area, it is clear that migrants from outside the earthquake-affected area made an important contribution to reconstruction and development.



## 4 Health

Hedda Flatø and Zhang Huafeng

### 4.1 Introduction

The Wenchuan earthquake had a severe impact on the physical and mental health of the people living in earthquake areas. Shortly after the disaster, Vice Minister of Health Gao Qiang declared that the Government should take responsibility for ensuring that earthquake victims receive the necessary medical treatment. However, he also warned that “the public healthcare system in China is insufficient” (Ang, 2008 May 15). Even under normal circumstances many people in China cannot afford medical care or are thrown into poverty due to medical expenses, and in rural areas health facilities are often few and far between and of poor quality. Moreover, most of the earthquake-affected areas were rural, underdeveloped districts where health service provision was typically dismal compared to richer, urban districts (Tang, Meng, Chen, Bekedam, Evans, & Whitehead, 2008). Thus, there were many reasons for concern that China’s existing healthcare system would not be capable of fulfilling post-earthquake health needs.

From a more optimistic perspective, post-earthquake rebuilding provided an opportunity for a leap in development of the local health sector. At the time of the earthquake, China had recently embarked on major health system reforms aimed at reducing social inequalities in health. The Vice Head of Sichuan’s provincial Health Department encouraged viewing the post-earthquake reconstruction as an opportunity to build an improved healthcare system in accordance with the new health system reforms (Wang, 2008). Officials from the provincial Office of Civil Affairs called for adjusting the Medical Financial Assistance system in order to help earthquake victims to afford long-term follow-up and recovery treatment (San, Zhao, Xiao, Chen, & Yao, 2009).

This study therefore pays considerable attention to the health aspect of post-earthquake needs, living conditions and development. The three large-scale surveys in 2008, 2009 and 2011 included modules on health, health infrastructure, insurance and utilisation of medical services. In addition, in 2009 we conducted a qualitative study of access to healthcare services in one earthquake-affected village.

This chapter describes the impact of the Wenchuan earthquake on the health infrastructure and health needs of the affected population. It then moves on to introduce the history and recent reforms of China's healthcare system before presenting results on developments in access to the healthcare system in earthquake areas. The chapter concludes that post-earthquake health policies were largely successful, but that the post-earthquake experiences serve to underline the need to take measures against financial barriers to healthcare services and to pay more attention to the needs of patients with chronic health issues, disabilities and/or mental health problems.

## **4.2 The Earthquake's Impact on Health**

### **Earthquake Injuries**

The health infrastructure was seriously damaged by the Wenchuan earthquake and its secondary disasters. In the first survey in 2008, 96 of the 144 communities visited reported having hospitals or clinics in the community. Of these, only 21 communities reported no damage to hospitals or clinics; 45 communities reported repairable damage to some hospitals or clinics, 15 reported very serious damage which was difficult to repair, and 15 reported that hospitals or clinics had completely collapsed. Many people were in need of health services from this severely damaged system. In addition to the increase in patients represented by all those injured by the disaster, the number of patients was higher than normal in the weeks following the earthquake because heavy rain and high temperatures coupled with poor living conditions caused many to become sick (Interview notes; Watts, 2008; Chan, 2008.)

In the survey conducted two months after the earthquake, 1.4 per cent of family members in the households interviewed were reported to have been injured by the disaster. It should be noted that the actual number of injured people in earthquake-affected areas was probably higher than the estimates from the survey data. As fieldworkers were not able to reach the most severely affected communities in 2008, and because the hardest-hit households within each community were probably more difficult to reach, households whose members had been injured or died in the earthquake are likely to be underrepresented. Most of those whom the interviewers did reach had been hurt because the earthquake made them fall (56 per cent) or because of house collapse (33 per cent). Almost half of those injured suffered slight flesh wounds, while nearly 30 per cent had sustained sprains, fractures or broken bones (for more details, see Table 4.1).

Table 4.1 Type of injury (percentages of the injured population)

Type of injury	Percentage
Minor flesh wound	52
Sprains	17
Fractures	13
Head injuries	4
Heavy bleeding	4
Burns	2
Internal organs	1
Other	8

Note: Based on those who were reported to have been injured in the earthquake in the 2008 survey. Sample size=274.

Those who were injured were generally older and had lower incomes than those who were unharmed. The median age among the injured was 46 compared to 40 years among the unharmed, and the median per capita annual income among the injured was CNY 10,800 compared to CNY 15,600 among others. Most of those who were injured were rural residents with little education, reflecting the general population characteristics of the area. There were no significant gender differences with regard to earthquake injuries.

For many of those who were injured, the earthquake would cause lasting health problems. The 2008 survey found that for around 20 per cent of the injured, the injury had caused physical disability. Approximately the same proportion of the injured had partly or completely lost their ability to work. In all three surveys, respondents were asked about whether their household members suffered from chronic diseases or disabilities which affected normal life and work. Before the earthquake in 2008, 21 per cent were reported to have suffered chronic disease. By 2009 and 2011, around 26 per cent were reported to suffer from chronic disease. Around three to four per cent were reported to have a disability, both before and after the earthquake. In both 2009 and 2011, around 10 per cent of people with chronic disease or disability reported the earthquake as being the cause.

While the focus on post-disaster emergency health provision tends to be on the treatment of injuries, several recent studies have shown that chronic health needs are also important after natural disasters. Studying chronic health needs among patients at an emergency triage clinic in Sichuan during the first two weeks after the Wenchuan earthquake, Chan and Kim (2011) found that chronic health needs constituted a significant proportion of emergency care during the acute phase. Seventy-seven per cent of 132 evacuees treated at the centre had underlying, chronic non-communicable medical conditions, and both patients and medical facilities were ill-prepared for fulfilling chronic medical needs during the emergency phase, as both stocks of tetanus vaccines and of chronic health medication were low.

The 2008 rapid needs assessment undertaken two months after the earthquake confirmed that people with disability and chronic disease were overrepresented among those injured by the earthquake. The risk of injury was nearly four times as high for those who suffered from disabilities before the earthquake – 4.7 per cent of the disabled had been injured compared to 1.3 per cent among others.<sup>63</sup> The risk was nearly twice as high for people suffering from chronic disease – two per cent of those with chronic diseases were injured compared to 1.2 per cent among others.<sup>64</sup>

### **Psychological Health Impact**

Psychological health problems are an important long-term post-disaster issue. In our surveys, the rate of self-reported mental illness in the households interviewed was very low. The earthquake reportedly caused mental disability for 1.7 per cent of those injured. In the 2008 survey, 0.3 per cent (45 persons) was reported to have suffered from psychological problems before the earthquake. In the 2009 survey, the number was 0.4 per cent (77 persons). The earthquake was identified as the cause of the psychological health problems for more than half of those reported to have medical afflictions in 2009 and 2011. In 2011, only 26 individuals (0.2 per cent) were reported to suffer from mental health problems, and only four of these identified the earthquake as the cause.

It should be noted that the statistics regarding mental health are likely to be under-reported. In 2011, the general impression among fieldworkers was that mental health problems were more prevalent than before; however, the surveys do not provide sufficient data for investigating this more thoroughly. In 17 cases where interviewers noted reasons for non-response, they had not been able to complete interviews concerning household members with mental disability or illness because of communication problems and because no other household members were available for interviews. Moreover, social taboos about psychological problems are likely to have contributed to the non-reporting of mental health problems in all three surveys.

Indicators that seek to measure psychological risks through the presence of symptoms rather than self-reporting show that such symptoms were widespread in earthquake areas. In the 2009 and 2011 surveys, one randomly-selected adult individual in each household was interviewed about his/her mental health condition. Based on the Chinese translation of the General Health Questionnaire (GHQ-12), these

<sup>63</sup>  $p < 0.01$ .

<sup>64</sup>  $p < 0.05$ .



respondents were asked to what extent they experienced various symptoms of risk of mental problems (Cheng & Williams, 1986).<sup>65</sup>

A score of four or more symptoms indicates a risk of psychological impediments. Under normal circumstances, the risk ratio is approximately 20 per cent (Yang, Wu, & Huang, 2003). In the 2008, 2009 and 2011 surveys, the proportion with a CHQ-12 score of four or more was 58, 48 and 45 per cent respectively. The risk of mental health problems was higher for women, the elderly and those with little education. Fifty-three per cent of women displayed symptoms of mental health problems compared to 36 per cent of men. The rate in the age group 56-64 years was 53 compared to 29 per cent among the age group 16-25. The rate for respondents who had primary education or less was 50 per cent while the proportion at risk among those with senior secondary school education and above was 27 per cent.

The 2009 survey also included questions on whether the randomly-selected individuals had obtained psychological treatment. Only 2.3 per cent of the respondents reported that they had participated in psychological consultations after the earthquake. Of those who had done so, 30 per cent found the consultation to be very useful, 60 per cent considered it to have helped somewhat, and 10 per cent did not feel that it was useful; none felt that the consultation had had a negative impact.

### **Post-Earthquake Emergency Health Policies**

When the Wenchuan earthquake struck, China's Government quickly ordered measures to ensure the provision of emergency health services and epidemic prevention in affected areas. Within hours of the earthquake, local Communicable Disease Centres (CDCs) had become involved in disaster relief and epidemic prevention, and the national CDC network, which had been built up as a response to SARS, was used to bring in public health help from CDCs across the country (Chan, 2008). Central Government departments ordered health facilities to provide free treatment for earthquake victims, and a system was set up for transferring the most seriously injured patients to higher-level facilities within or outside the province (Xiang & others, 2010). Mobile medical teams were quickly dispatched to provide services in disaster areas; 45,000 doctors and nurses were mobilised from around the country (Watts, 2008, p. 1825), and China's Government also actively welcomed assistance from the international community (OCHA, 2008). Thus, for the first few months after the earthquake, a large number of national and international medical teams offered free services to the affected population.

<sup>65</sup> The questions on mental health conditions include a personal assessment of general health condition during the previous two weeks as well as the following symptoms: headache, increased heartbeat, feeling of chest pressure, trembling, bad sleep, little hope for the future, feeling heavily burdened, rarely or never getting along well with friends and family, lack of self-confidence, nervousness and irritability, concerns about family or friends, and feelings of hopelessness.

On May 30, 2008, the health department of Sichuan province issued “An Urgent Notice on Establishing Temporary Health Care Facilities in the Seriously Affected Earthquake Areas”, which stipulated the rapid establishment of temporary healthcare facilities which would be used until permanent health facilities could be built to replace the damaged infrastructure (Xinhua News Agency, 2008 June 3). The longer-term reparation and reconstruction of permanent health facilities was guided by the Chinese Government’s three-year Overall Plan for reconstruction (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008). In the 39 seriously affected counties in Sichuan province, the Plan included the reconstruction of 1,738 medical services institutions including 137 hospitals, 1,263 township health clinics, 63 centres for disease control, 52 women and child healthcare institutions and more than 200 family planning and other facilities.

In order to deal with the mental traumas of the earthquake, at the end of 2008, Sichuan’s provincial government published its “Notice on Improving the Psychological Services in the Earthquake Area”, in order to improve the coverage of psychological services. A year later, in 2010, it published its “Implementation Plan for Psychological Services Programme in the Sichuan Earthquake Area” and dispatched expert teams to schools (Sichuan Education and Science Institute 2010).

## **4.3 The Health System in Earthquake Areas**

### **A Brief History of China’s Healthcare System**

The Wenchuan earthquake occurred at a time when the Government had recently embarked on a massive effort to reform the country’s severely troubled healthcare system. This section offers an overview of the development of China’s healthcare system in order to help to understand both the immediate and the longer-term implications of the earthquake and post-earthquake recovery for the healthcare system.

After the establishment of the People’s Republic of China in 1949, two separate healthcare systems were established, one for urban areas and one for rural areas. In urban areas, a medical insurance system set up in the 1950s had provided free healthcare to urban workers for more than 40 years. Workers’ family members were partly covered by the healthcare system, but other urban residents (i.e. the very few who were not government employees or working in state-owned companies) were not (Wagstaff, Yip, Lindelow, & Hsiao, 2009). China’s rural healthcare system has always been considerably less generous than its urban one. During the 1950s, a three-tier rural health network was set up consisting of village clinics, township public health centres and county

hospitals. A cooperative medical security system was established, primarily financed by the communes' collective welfare funds in addition to small individual premiums and subsidies from higher-level government structures (Yip & Hsiao, 2008). "Barefoot doctors" who were part-time farmers with a few months' medical training became the most important primary healthcare providers in rural areas during the 1960s to 1980s (Gong & Chao, 1982). By the mid-1970s, over 90 per cent of rural people were covered by the rural cooperative medical system (Saich, 2008).

After China embarked on "Reform and Opening" in the late 1970s, both the urban and the rural healthcare systems faced many challenges. The Government's role in financing health services diminished, financing was decentralised to local governments, and all medical facilities – including Government-owned ones and even facilities providing public health services – had to seek profit to survive, resulting in a *de facto* marketisation and privatisation (Saich, 2008). Numerous problems arose: the allocation and provision of medical resources was not efficient, Government funding was insufficient for maintaining the system, and benefits declined and out-of-pocket payments increased. The number of people enrolled in the urban health insurance system was dramatically reduced as more and more people were employed in private enterprises not covered by the schemes (Project Team of DRC, 2005). In rural areas, with the collapse of the commune system in the early 1980s, the traditional rural cooperative medical system was largely dismantled and most of the rural population was left completely uninsured. In rural areas the situation was dismal: in 2003 only 9.5 per cent of the rural population was enrolled in rural cooperative medical insurance, and as many as 79.1 per cent of the rural population had no health insurance at all (Ministry of Health, 2004). Access to healthcare services became a source of massive social discontent as opportunities to obtain medical treatment became dependent on financial resources and poor, rural areas were drained of high-quality medical staff and facilities.

### **China's Health System Reforms**

During the past decade, China's Government has introduced numerous reforms aimed at improving the efficiency and equity of the healthcare system.

A basic medical insurance system covering all urban workers in China, in both the private and the public sector, was introduced in 1998 (Central Government of the People's Republic of China, 2005). However, this system only included registered urban residents who were employed, and not their children or parents, the unemployed or migrant workers. In 2006, the sixth Plenary Session of the Sixteenth CPC Central Committee proposed establishing a medical insurance system for those urban residents not covered by the existing system (Xinhua News Agency, 2006). This resulted in a new Urban Residents' Basic Medical Insurance system aimed at "primary and secondary school students who are not covered by the urban employee medical insurance system,

young children, and other unemployed urban residents” (State Council Document no. 20, 2007). Urban health insurance coverage has improved dramatically since then. By the end of October 2010, around 424 million urban residents were covered by either the basic medical insurance for urban workers or the basic medical insurance for urban residents (Xinhua News Agency, 2010).

A major push for reforms of the rural healthcare system was initiated with the “Decision on Further Strengthening Rural Health Work” in 2002, which stipulated the establishment of a new rural cooperative medical system. The following year saw the start of local pilot projects on a New Cooperative Medical Scheme (NRCMS), which aimed at providing risk-pooling for major illnesses and reducing the risk of rural dwellers falling into poverty due to illness. An annual insurance contribution per person is paid partly by the individual enrollee and partly by local and central government. By 2006, when the Ministry of Health published its “Notice on Promoting the Establishment of the New Rural Cooperative Medical System”, over 40 per cent of China’s counties were included in pilot reform, and by 2008, 95 per cent of the country’s counties had enrolled (Chen and Wang 2007). By the end of 2010, 835 hundred million farmers were covered by the new rural cooperative medical system, accounting for 95 per cent of the population in rural areas.

In addition to the New Rural Cooperative Medical Scheme, a Medical Financial Assistance (MFA) programme has also been implemented in order to provide further support for the very poorest households. The Rural MFA is designed to complement the NRCMS by paying insurance fees and providing financial assistance to those who need more support than that offered by the insurance, either because they are too poor or because they are facing unusually large medical bills (Wagstaff, Yip, Lindelow, & Hsiao, 2009, p. 34). In 2003, only 130 counties had MFA programmes up and running, but by the end of 2006, the majority of counties and cities had implemented the programme (Wagstaff, Yip, Lindelow, & Hsiao, 2009, p. 38). According to official statistics, in 2004, 1,211,000 persons benefited from MFA; by 2008, the number had increased to 7,595,000 (Ministry of Health, Center for Statistics Information, 2009).

In parallel with the measures described above, China’s Government was working on formulating comprehensive national reform guidelines. The final reform plan was unveiled in April 2009 (Ministry of Health, Center for Statistics Information, 2009). It pledges Government investment in health of around CNY 850 billion in the years 2009-2011, doubling the average annual governmental expenditure compared to 2008. The aim of the Government’s healthcare reforms is to ensure universal access to basic medical and health services. In order to achieve this goal, the Government has pledged to take a stronger role in health care. The data from the post-Wenchuan earthquake surveys provide an opportunity to investigate the effects of the policies enacted by the Government – both the national reforms and the direct political response to

the earthquake – by studying how access to healthcare services developed during the post-earthquake period.

## 4.4 Post-earthquake Access to the Healthcare System

### Use of Emergency Health Services

China's Government won international praise for rapidly ensuring emergency medical treatment and epidemic prevention in the face of the enormous challenges brought about by the earthquake (Chan, 2008); (Watts, 2008). The 2008 survey conducted two months after the earthquake confirms that emergency medical provision was successful in providing care for most of those who were injured. The survey found that approximately 70 per cent of those injured during the earthquake obtained treatment from a healthcare facility. Most of those who did not seek treatment or were self-treated had minor flesh wounds, burns or sprains.

Among those injured in the earthquake, 30 per cent had obtained treatment from township clinics and 15 per cent had been to a county-level hospital (Table 4.2). Mobile medical teams, community hospitals and army hospitals also played important roles, treating nine per cent, seven per cent and five per cent of the injured population respectively.

Table 4.2 Type of treatment of injuries (percentages of the injured population)

Treatment	Percent
No treatment	12
Self-treatment	20
County/city hospital	15
Township clinic	31
Community clinic	7
Mobile medical team	9
Army hospital	5
Other provider	9

Note: Based on those who were reported to have been injured in the earthquake in the 2008 survey. Sample size=273

The rapid needs assessment indicates that emergency medical service provision was well-targeted. The chance of having been offered help was more than twice as high for those living in camps, who are likely to have had more needs (55 per cent). Those living in the most seriously affected areas were offered the most help – 39 per cent of respondents living in very seriously affected areas reported that someone had offered their household medical treatment after the earthquake, while 16 per cent of those living in seriously affected areas reported the same (Table 4.3).

Table 4.3 People who reported that they or their household members had been offered medical treatment, by type of living area (percentages)

	Had been offered treatment	Sample size
Camp area	55	801
Non-camp area	21	11874
Very seriously affected area	39	6577
Seriously affected area	16	6098
Total	21	12707

Volunteers and NGOs as well as army medical teams were channelled to the most severely affected districts and people. Volunteers/NGOs had offered medical services to 22 per cent of those in the most severely affected districts who had been offered help, compared to only two per cent of those who had been offered help in the seriously affected area as a whole. The army offered medical treatment to 16 per cent of those in very seriously affected areas who had been offered help, but to practically no one in seriously affected areas, and to twice as many of those living in camps compared to those not living in camps (Table 4.4).

Table 4.4 Sources of medical treatment offered, by type of living area (percentages)

	Government organisation	Volunteers/ NGO	Army/ police	Relatives	Work unit	Others	Sample size
Camp	72	16	14	2	2	5	500
Non-camp	80	10	7	1	2	3	3269
Very seriously affected	63	22	16	1	2	3	2592
Seriously affected	93	2	0	1	1	3	1177
Total	80	11	7	1	2	3	3769

## Use of Healthcare Services During and After Reconstruction

The emergency health service policies described above were in effect until December 31, 2008. By the time of the second round of post-earthquake surveys in the summer of 2009, emergency medical teams had left the area. The qualitative study of one of the affected villages found that although many health facilities were still in the process of being reconstructed, villagers considered the health service delivery system to be running more or less as before the earthquake in 2009, and found the services offered and skills of doctors at various types of health facilities to be the same as before. Most of the reconstruction work had already been completed within two years of the earthquake. According to a 2010 Sichuan government work report, by the end of 2010, the local government had completed 90.2 per cent of the hospitals' and clinics' reconstruction work in the earthquake area (Xinhua News Agency, Jan 2011).

Among the total population in earthquake-affected areas, 33 per cent had used some form of health services during the previous month in 2009. The total utilisation rate dropped to 22 per cent in 2011 – around the same level as in 2004 when 21 per cent had used some form of health services during the previous month. The higher utilisation rates in 2009 correlate with higher levels of need reported in 2009 than in 2011 – in 2009, 20 per cent reported being injured or sick during the previous month while in 2011 this was down to 15 per cent.

Table 4.5 Household members who had been sick or injured in the previous 30 days and who refrained from seeking medical help (percentages)

	<b>2004</b>	<i>Sample size</i>	<b>2009</b>	<i>Sample size</i>	<b>2011</b>	<i>Sample size</i>
Had been sick or injured in the previous 30 days	12	3038	20	13715	14	13487
Had not obtained medical treatment	12	378	7	2724	11	1927

Fewer people refrained from seeking medical services when sick in 2009 compared to data from the earthquake-affected districts in 2004 (Table 4.5). However, in 2011, the number of people who refrained from going to a doctor returned to the 2004 levels. In the 2004 survey, in earthquake-affected areas around 12 per cent of the respondents who reported having been sick did not seek any medical treatment. One year after the earthquake, around 20 per cent of household members had been injured or sick within 30 days before the survey, and only seven per cent had not sought any medical care.

However, the figures from 2011 give less ground for optimism – 12 per cent of those who had been sick during the previous 30 days had not sought any form of medical care.

Table 4.6 Household members who had used healthcare services during the previous 30 days, by socio-economic variables (percentages)

		Had used healthcare services past 30 days			
		2009	Sample size	2011	Sample size
<b>Acute illness</b>	Had been sick or injured	93	2713	89	1907
	Had not been sick or injured	13	10771	11	11367
<b>Other health problems</b>	Has chronic disease or disability	50	4109	41	3790
	Has no chronic disease or disability	21	9387	15	9507
<b>Age</b>	Children (<5)	43	538	29	653
	Age 6-60	26	10674	19	10194
	Elderly (>60)	42	2304	33	2462
<b>Income</b>	Low	27	4610	25	4491
	Medium	29	4585	32	4407
	High	32	4323	32	4411
<b>Residence registration</b>	Rural	30	11052	23	10422
	Urban	27	2451	21	2874
<b>Degree of damage</b>	Very seriously affected	29	7268	23	7101
	Seriously affected	30	6250	23	6208
Total		29	13518	23	13309

Healthcare distribution is considered to be equitable if use of services depends on need rather than on income, location etc. (Andersen, 1995, p. 4). From the numbers of people who had used healthcare services in the past month, it seems that health needs was the main determinant. Table 4.6 shows the percentage who had used healthcare services in the previous month among various social groups in 2009 and 2011. There were small differences in utilisation rates across districts with varying levels of earthquake damage or recovery, of rural or urban residency, and of household income groups. The major differences were found across groups with varying health needs: small children and the elderly were more likely to have used healthcare services, as were those with chronic diseases and/or disability and those who had been sick or injured during the previous month (Table 4.6).

Those suffering from long-term consequences of earthquake injuries were even more likely to have used medical services than others. Approximately 60 per cent of those who suffered from chronic diseases or handicaps caused by the Wenchuan earthquake had sought medical services during the previous month in 2009 and around 50 per



cent in 2011; the figures were about ten percentage points less among those suffering chronic illness or disabilities not caused by the earthquake (around 50 per cent in 2009 and around 40 per cent in 2011). This may reflect more need among those whose health problems were earthquake-induced, or it may have to do with special schemes for ensuring long-term medical follow-up for earthquake victims.

Table 4.7 Type of health service provider used among household members who had sought healthcare services during the previous 30 days in 2011 (percentages)

		Village doctor	Township/commu-nity clinic	County hospital	Capital city hos-pital	Private clinic/ hospital	Sample size
<b>Earthquake damage</b>	Very seriously affected	16	31	35	3	14	1565
	Seriously affected	15	32	33	3	17	1349
<b>Residence registration</b>	Rural	17	34	30	3	16	2347
	Urban	9	20	50	5	15	566
<b>Household income</b>	1/3 lowest income	19	34	32	2	16	1060
	1/3 middle income	14	33	32	4	17	968
	1/3 highest income	13	27	38	4	16	886
<b>Age</b>	0-5	15	36	41	4	11	178
	6-60	13	30	36	3	17	1908
	Over 60	21	34	28	2	16	828
<b>Highest education completed</b>	No schooling	20	34	22	1	23	500
	Currently or not yet in school	12	35	35	4	16	389
	Primary or junior school	17	33	33	3	15	1658
	Senior secondary school	9	22	42	4	15	133
	Vocational school	4	17	60	2	10	111
	Higher education	4	8	65	7	7	96
<b>Health status</b>	Sick or injured in past month	16	32	33	4	2	1709
	Not sick or injured	16	31	36	3	11	1198
	Chronic disease or disability	16	32	34	4	17	1519
	No chronic disease or disability	16	31	34	2	15	1392
<b>Total</b>		16	31	34	3	3	2914

Questions about whether or not people used healthcare services provide only limited information about their access to needed healthcare. Another issue is the type of services they use: there is a large difference between the services provided by village doctors, many of whom do not have higher education, and high-level hospitals. Table

4.7 shows data on the type of healthcare services those who had been to a doctor during the previous month had used. The numbers reveal inequalities that were not evident from the total utilisation rates.

The numbers from 2011 show that village doctors were used by 16 per cent of those who had sought medical services during the previous month. Township clinics in rural areas and community health centres in urban areas had been used by 31 per cent, while as many as 34 per cent of those who had been to a doctor had attended a county-level hospital. The data show that by 2011 mobile medical teams were no longer much in use in earthquake areas – only 1.4 per cent of those who had been to a doctor had seen a mobile medical team. Hospitals or clinics run by work units, which were major health service providers before the economic reforms, served only 1.1 of those who had been to a doctor in the previous month.

The biggest inequalities in the type of utilisation are found between urban and rural residents. Not unexpectedly, the proportion of those who had seen village doctors was twice as high among those with a rural residence registration than among those with an urban one. Health centres in rural townships and urban community districts have been promoted by the Government in order to improve efficiency by reducing the reliance on high-level services. These have been widely used by the rural population for a long time but are more recent in urban communities. More than 30 per cent of rural residents who had sought medical services had been to such clinics, compared to approximately 20 per cent of urban residents. Utilisation rates for county-level hospitals are high overall but particularly so in urban areas. Such hospitals had been used by 50 per cent of urban residents who had sought medical help and 30 per cent of rural residents. Capital city hospitals, which offer highly advanced services, were used by twice as many urban than rural residents: five per cent of urban residents who had sought services had been to capital city hospitals, versus 2.5 per cent of rural ones.

Differences between income groups are less pronounced, and as rural residents mostly have lower income than urban residents this can also be assumed to be affected by geographic location. Households with the lowest one-third income use village doctors and health centres more, while a somewhat higher proportion of households belonging to higher income quintiles had been to a hospital. There are considerable differences across education levels, which in turn are closely related to both residency and income. The proportion who had seen village doctors or been to health centres decreases with higher education levels, while the proportion who had been to higher-level hospitals increases.

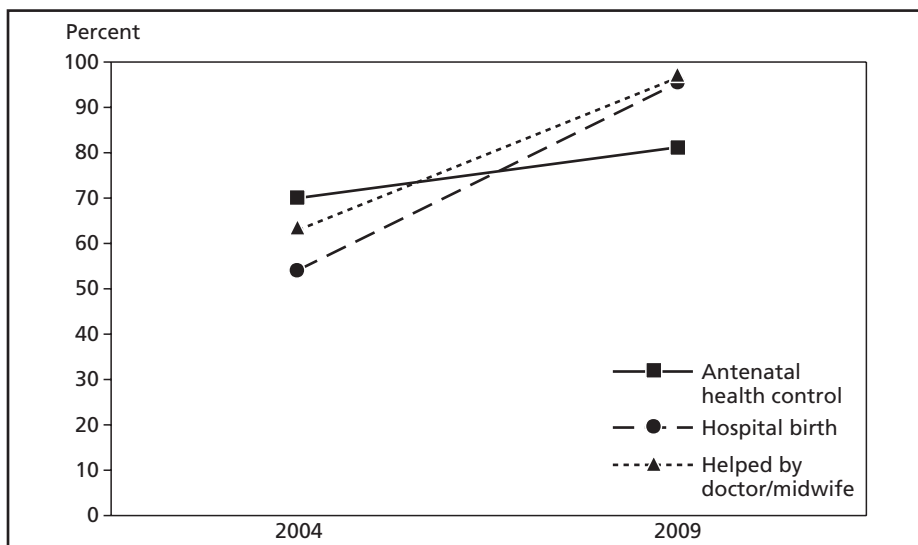
Adults of working age were less likely to seek services but more likely go to higher-level hospitals when they did seek help. Although elderly people can be expected to have more frequent and more serious health needs, they are less likely to seek services from hospitals and more likely than younger people to go to a health centre or village

doctor. Those with a chronic disease or disability can be assumed to have more serious health needs, yet there are no large differences between those suffering from such conditions and others when it comes to the type of facility used during the previous 30 days.

### Women and Child Care

Healthcare for women and children is considered to be of particular importance in evaluations of post-disaster health service provision and reconstruction. When it comes to gender differences, the rapid needs assessment in 2008 showed no significant differences with regard to injuries or medical treatment. During and after reconstruction, women were slightly more likely than men to have obtained medical care – around 25 per cent of female household members had seen a doctor during the previous month compared to around 21 per cent of males. This is in line with studies from developed countries which have consistently shown that women tend to use more healthcare services than men (Bertakis, Azari, Helms, Callahan, & Robbins, 2000). There are no significant differences between genders with regard to the type of health facility used. Regarding child healthcare, as mentioned above, young children were more likely to have been taken to a doctor during the previous month than older children and working-age adults. Many public healthcare services specifically target children; the proportion who had been taken to private facilities was considerably lower among the youngest.

Figure 4.1 Use of reproductive health services, 2004-2009



The 2009 survey included a set of questions about reproductive health. This was of particular interest since many children died during the earthquake. Estimates of the number of children who died in the disaster vary from 5,000 to 19,000 (China Daily 2009; New York Times 2008). Due to the one-child policy in China, most of these children were the only ones in the household. A survey by Jiang et al. carried out three months after the earthquake found that 95 per cent of parents who had lost their child in the disaster planned to have another child (Jiang, et al., 2009).

The utilisation of reproductive healthcare in earthquake-affected areas was remarkably higher in 2009 compared to five years earlier. The second Sichuan post-earthquake survey in 2009 found that during the first year after the earthquake two per cent of women aged 15-54 had been pregnant and four per cent had already given birth to a child. Among those women who had been pregnant or given birth after the earthquake, 81 per cent had been to antenatal health controls, 95 per cent gave birth in a hospital, and 96 per cent were helped by a doctor or midwife. In contrast, during the five-year period 1999-2004, the MEDOW survey found that around 33 per cent of the women in the same area did not have any prenatal checks during pregnancy, and only 54 per cent of women gave birth in the hospital, while 63 per cent were helped by a doctor or midwife.

Other studies of reproductive healthcare services in China have similarly found large increases in reproductive healthcare coverage; this is attributed to government policies that strengthen facilities and encourage antenatal checks and hospital births. A recent study found that neonatal mortality decreased by 62 per cent between the introduction of such policies in 1996 and 2008; however, children born in hospitals in poor, rural counties were almost four times more likely to die than those born in urban hospitals (Feng, et al., 2011).

### **Medical Insurance and Social Security Coverage**

There has been an extraordinary increase in medical insurance coverage from 2004 to 2011. In 2004, as many as 80 per cent of the population in the surveyed area had no insurance; in 2009 and 2011 the number of uninsured had dropped to only six per cent (Table 4.8, next page). This is similar to the national coverage rates (Table 4.9, next page).

The rise in insurance coverage can to a large extent be attributed to the New Rural Cooperative Medical Scheme. While this scheme had not yet been introduced in the surveyed area in 2004, by 2009 and 2011 it covered around 80 per cent of surveyed households. The new urban insurance schemes were less widespread in the survey area; in 2009 and 2011 less than 12 per cent were enrolled in either the Basic Medical Insurance for Urban Employees or the Basic Medical Insurance for Urban Residents. The proportion enrolled in commercial or other insurance schemes was less than 15

Table 4.8 Health insurance in 2009 and 2011 (percentages)

	Urban		Rural		Total	
	2009	2011	2009	2011	2009	2011
New Rural Cooperative Medical Insurance	15	21	93	90	82	76
Basic Medical Insurance for Urban Residents	22	27	0	1	3	6
Basic Medical Insurance for Urban Employees	23	22	0	1	4	5
Medical Financial Assistance	-	1	-	0	-	0
Old public health insurance	5	4	0	0	1	1
Commercial or other medical insurance	24	9	13	5	14	6
No medical insurance	21	14	4	4	6	6
Total insurance rate	79	86	96	96	94	94
Sample size	2468	2795	11484	11011	13952	13806

Table 4.9 Results of the third and fourth national health services surveys (percentages)

	Urban		Rural		Total	
	2003	2008	2003	2008	2003	2008
Basic Medical Insurance for Urban Employees	30	44	2	2	9	13
Basic Medical Insurance for Urban Residents	4	3	0	0	1	1
Public free medical care	---	13	---	1	---	4
New rural cooperative medical insurance	---	10	---	90	---	69
Old cooperative medical care	7	---	10	---	9	---
Other social medical insurance	9	3	1	0	3	1
No social medical insurance	50	28	87	8	78	13

Source: Ministry of Health 2010

per cent. The old free public health insurance system for state employees no longer played an important role; less than one per cent of household members in the 2009 and 2011 surveys were covered by the free public health insurance. The coverage of the Medical Financial Assistance scheme, which targets only the very poorest, was very low: as few as 40 household members out of nearly 14,000 surveyed were reported to have benefited from the MFA scheme in 2011.

As there are separate insurance systems for urban and rural populations in China, the insurance coverage and type varies considerably between urban and rural areas. Among those with a rural residence registration, around 90 per cent were enrolled in the NRCMS in 2009 and 2011. Because of the wide coverage rate of the NRCMS, less than five per cent of the rural population was completely uninsured. Thirteen per cent in 2009 and around 10 per cent in 2011 had commercial or other health insurances instead of or in addition to the NRCMS.

In urban earthquake areas, health insurance coverage was lower and types of insurance enrolment varied more than in rural areas. Approximately 20 per cent of household members with an urban residence registration did not have any type of health insurance in 2009, while this number was down to approximately 14 per cent in 2011. Contrary to rural areas, in the urban earthquake districts there was not one dominant type of

health insurance. Approximately 20 per cent of the population in urban earthquake areas were enrolled in the Basic Medical Insurance for Urban Employees (BMISUE), and another 20 per cent were enrolled in the Basic Medical Insurance for Urban Residents (BMISUR); the coverage of the BMISUR was slightly higher than the one reserved for employees, and had increased between the first and second surveys. Around four per cent benefited from free public healthcare. In 2009, 23 per cent held commercial or other types of insurance in 2009, decreasing to approximately 16 per cent in 2011. Although the NRCMS is intended for the rural population, as many as 21 per cent of the urban earthquake-affected population was enrolled in this scheme in 2011. This was a considerable increase compared to two years earlier, when 14 per cent of urban residents were enrolled in the NRCMS.

When comparing these results to national data from the 2008 Fourth National Health Services Survey, the coverage of the New Rural Cooperative Health insurance appears to be at about the same level in earthquake-affected areas as the national rate (around 90 per cent). The performance is more mixed for urban earthquake areas. The Basic Medical Insurance for Urban Residents was established nationwide between 2008 and 2010; therefore, it was not surprising to find much higher coverage of the BMISUR among urban residents in 2009 and 2011 than the national level reported in 2008 (the coverage was 23 per cent among urban residents in 2009 compared to only three per cent in the national survey from 2008). However, in urban earthquake areas, the coverage of the older and already well-established Basic Medical Insurance for Urban Employees was much lower in 2009 than the national level – less than 24 per cent of the urban population was covered by this insurance in earthquake areas in 2009 and 2011, compared to a national rate of 44 per cent in 2008. The coverage of the commercial and other types of health insurance was considerably higher in earthquake areas than the national rate.

Table 4.10 (next page) shows insurance enrolment across income quintiles among rural residents and urban residents. There are no large differences across income groups or other social groups when it comes to the risk of being uninsured; thus, the new schemes appear to have been successful in ensuring some form of insurance for all. However, there are noteworthy differences in the types of insurance obtained. The rural/urban divide in type of health insurance has already been noted. Furthermore, the richer population groups are considerably more likely than others to benefit from the Basic Medical Insurance for Urban Employees, commercial or other healthcare insurances, or the old free public health scheme. The New Rural Cooperative Medical Scheme is more common among the lower income groups – 87 per cent of the poorest quintile had this type of insurance in 2011 compared to 63 per cent among the highest income quintile.

Table 4.10 Insurance by income quintile (lowest to highest) and residency, 2011 (percentages)

	<b>Urban</b>					<b>Rural</b>					<b>Total</b>				
	Income quintile					Income quintile					Income quintile				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
New Rural Cooperative Medical Insurance	31	18	25	14	17	92	92	89	88	86	86	83	78	71	62
Basic Medical Insurance for Urban Residents	31	35	25	14	29	0	1	1	1	2	3	6	6	7	9
Basic Medical Insurance for Urban Employees	10	17	21	34	29	0	0	1	1	2	1	2	3	7	12
Medical Financial Assistance	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Old public health insurance	1	2	4	6	7	0	0	0	0	0	0	0	0	1	2
Commercial or other medical insurance	8	8	10	13	7	3	4	5	6	7	4	4	6	8	8
No medical insurance	17	18	13	17	7	5	3	4	5	5	6	5	6	8	6
Total insurance rate	83	82	87	83	93	95	97	96	95	95	94	95	94	92	94
<i>Sample size</i>	2848					10766					13627				

While insurance coverage has clearly improved in earthquake areas after the new insurance schemes were introduced, another issue is whether the schemes actually help. The data from 2011 indicate that there are considerable differences between insurance types, with some providing only very limited help to a very few people.

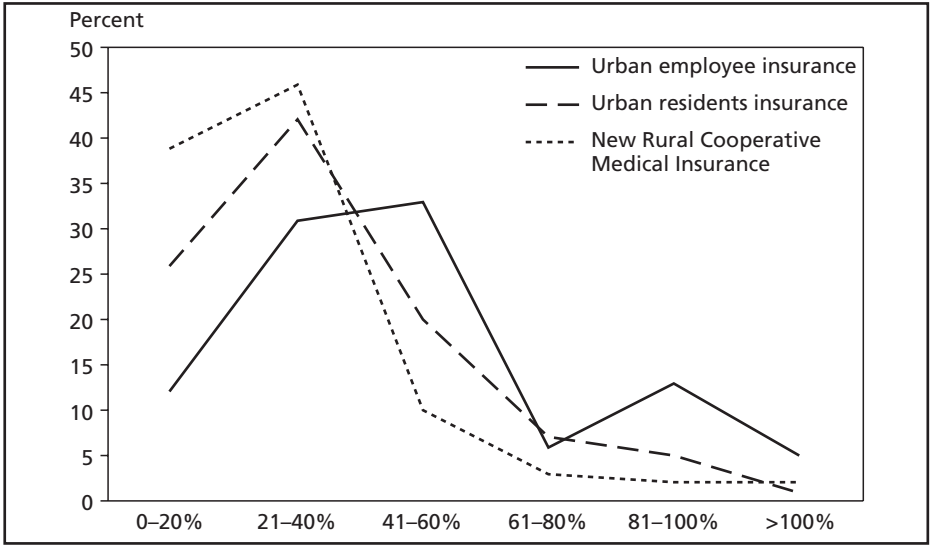
Of all household members who had medical expenses in 2010, as many as 87 per cent reported by the summer of 2011 that they had not received any form of refund from their insurance company. As can be seen from Table 4.11, those enrolled in the New Rural Cooperative Medical Scheme were considerably more likely than those enrolled in the Basic Medical Insurance for Urban Employees to not yet have received reimbursement.

Table 4.11 People that had not received insurance reimbursement for medical expenses incurred in 2010, by insurance type (percentages of those who had expenses in 2010)

	Not received reimbursement (per cent)	<i>Sample size</i>
New Rural Cooperative Medical Insurance	87	8785
Basic Medical Insurance for Urban Residents	85	793
Basic Medical Insurance for Urban Employees	78	630
Medical Financial Assistance	95	36
Old public health insurance	67	106
Commercial or other medical insurance	89	661
Total	87	10946

Among those who had received insurance reimbursement, most still had to cover a large proportion of medical expenses out of their own pockets (Figure 4.2). For 29 per cent of those who had received reimbursement, the insurance covered less than 10 per cent of their expenses; only 15 per cent had reimbursements that covered more than half of the household's total medical expenses. Rural residents saw somewhat lower reimbursement rates than urban ones. Those who had high medical expenses also had to pay a larger proportion out of their own pocket – 65 per cent of those with the highest medical expenses got less than 20 per cent of the expenses covered by insurance compared to 32 per cent among those in the lowest medical expense group. Insurance benefits for the NRCMS are less generous than others; for 44 per cent of the NRCMS enrollees who had received insurance reimbursement, less than 20 per cent of medical expenses were reimbursed, while less than 35 per cent of those enrolled in the Basic Medical Insurance for Urban Workers or Urban Residents had similarly low reimbursement rates.

Figure 4.2 Percentage of total medical costs covered by insurance reimbursement for those enrolled in the three major types of health insurance schemes



Note: Based on surveyed household members that had received insurance reimbursement in 2011 who were enrolled in the Basic Medical Insurance for Urban Employees (sample size=103), the Basic Medical Insurance for Urban Residents (sample size=94) and the New Rural Cooperative Medical Insurance (sample size=1006)



Table 4.12 Health service utilisation by insurance, 2011 (percentages)

	Village doctor	Township/ community clinic	County hospital	Capital city hospital	Private clinic/ hospital	Total	Sample size
No insurance	10	27	40	3	21	20	163
New Rural Cooperative Medical Insurance	18	34	29	3	16	23	2213
Basic Medical Insurance for Urban Residents	8	20	52	5	18	21	170
Basic Medical Insurance for Urban Employees	2	7	70	6	10	23	171
Commercial or other insurance	12	28	41	4	19	25	171
Total	16	32	33	3	16	23	2727

The effect of insurance on the utilisation of medical services in earthquake areas also appears to be mixed. The 2009 and 2011 data show no statistically significant differences in overall use between the insured and the uninsured. However, among those who had seen medical personnel, those enrolled in the New Rural Cooperative Medical Scheme were more likely to have visited village doctors or health centres and less likely to have attended a higher-level hospital, both when compared to those who had other insurances and those who had no health insurance at all. While as many as 73 per cent of those with Basic Medical Insurance for Urban Employees who had used services had visited a county-level hospital, the number was 30 per cent for those enrolled in the New Rural Cooperative Medical Insurance and 40 per cent for the uninsured.

### Medical Impoverishment after the Earthquake

The distribution of healthcare services should ideally be based on a person's health needs rather than on their economic resources or other characteristics<sup>66</sup>. A particular concern in China is that the distribution of healthcare services is organised in a way that creates barriers for those who lack economic resources. The post-earthquake studies found that immediately after the earthquake, some such financial barriers were reduced. However, this failed to benefit some of the most vulnerable groups, and in the reconstruction period financial barriers were restored.

During the first months after the earthquake, the provision of free medical services meant that many financial barriers to medical care were suspended. In qualitative interviews, villagers said they did not find the devastation of infrastructure or increase in

<sup>66</sup> One of the most influential arguments in favour of this view is Amartya Sen's statement that "what is particularly serious as an injustice is the lack of opportunity that some may have to achieve good health because of inadequate social arrangements, as opposed to, say, a personal decision not to worry about health in particular" (Sen, 2006, p. 660).

patients to have made it more difficult than before to obtain medical services immediately after the earthquake. In fact, some considered the opportunity to obtain services to have been better in the emergency period than normal because services were provided for free, and because they believed the external health workers to be more skilled and therefore to provide higher-quality services than local providers. Other scholars have also found that financial access to many types of healthcare services improved during the emergency rescue phase – some even argue that that free health check-ups and treatment of minor conditions were excessively generous, leading to unnecessary use and inefficient distribution of medical resources (Xiang & others, 2010, s. 68).

However, some particularly vulnerable groups benefited less from the emergency medical provision measures than others, particularly those with chronic diseases or disabilities that were not caused by the earthquake. The free treatment policy for hospitals and clinics during the emergency rescue period did not include treatment for conditions that were not caused by the earthquake, and the free treatment offered by mobile medical teams was very basic and could only help minor health needs. Thus, patients suffering from chronic conditions or other health problems that were too serious to be treated by mobile medical teams but were not caused by the earthquake had to pay for treatment during the first months after the earthquake. In qualitative interviews, respondents who were in need of treatment for relatively serious conditions which were not caused by the earthquake and therefore not provided for free in the emergency period said they had to cut down on or postpone their treatment due to the earthquake.

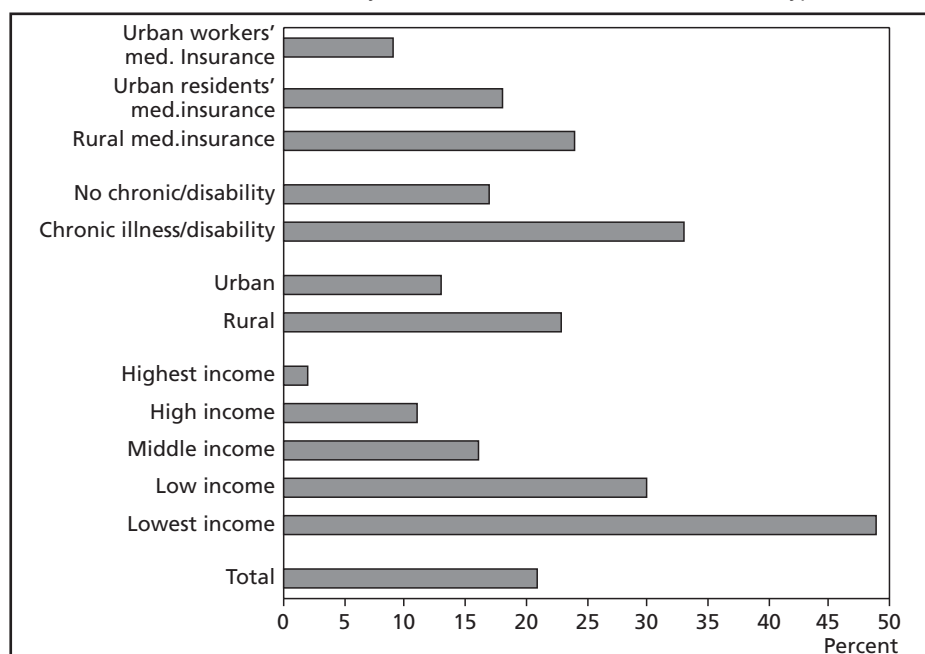
Once the special emergency health service policies were lifted on January 1, 2009, patients again had to finance medical expenses through insurance reimbursements and out-of-pocket payments. In the qualitative study one year after the earthquake, when the healthcare system was running more or less as usual, many villagers said that it was more difficult to afford healthcare services than before because they had to pay for rebuilding or repairing their houses and therefore had less money available for medical expenses. In the quantitative survey from 2009, among those who did not seek medical treatment when sick, 29 per cent reported that the main reason why they did not go to the doctor was that they could not afford to pay; in 2011, the number was 23 per cent. This represents no significant decrease compared to the 2004 living conditions survey in earthquake areas, despite the numerous health reform measures that have been introduced since then.

The 2011 survey includes detailed questions on healthcare expenditures. One in four households had spent no money on healthcare services during 2010. As may be expected, healthcare expenses rise with income in earthquake areas. However, when medical expenses are compared to household income, another pattern emerges.

Altogether 22 per cent of interviewed households faced medical expenses that exceeded 40 per cent of their income in 2010. As illustrated in Figure 4.3, the poorer

groups face much larger healthcare costs relative to income. In 2010, while as many as 49 per cent of those belonging to the poorest households had total household medical expenses that exceeded 40 per cent of total household income, the same was the case for only approximately two per cent of those belonging to the highest income group. Furthermore, those with a rural residence registration were more prone to facing high medical expenditures; 23 per cent of rural households had medical expenses that exceeded 40 per cent of their income, compared to 13 per cent of urban households. People with chronic health problems and disabilities did not only benefit less than others from the reduction in financial barriers during the emergency period – the 2011 survey shows that they also ran a higher risk of medical impoverishment once the healthcare system had been restored. One-third of those suffering from such conditions belonged to households that faced medical expenses exceeding 40 per cent of household income in 2010.

Figure 4.3 Percentage of households whose total medical expenses in 2010 exceeded 40 per cent of annual household income, by socio-economic variables and insurance type



Note: Based on 2011 survey. Sample size=10,973.

China's new insurance schemes are meant to reduce financial barriers by helping people to afford treatment for serious diseases and to prevent medical impoverishment. In the qualitative interviews conducted in 2009, some respondents said they were less

worried about the financial consequences of serious disease and hospitalisation after they enrolled in the new rural insurance scheme. However, all said that insurance reimbursements did not make a big difference to their medical expenses because the reimbursement rates were low. Furthermore, the New Rural Cooperative Medical Insurance mainly covered expenses incurred during hospitalisation; thus, those with chronic diseases or other conditions that required costly outpatient treatment did not benefit much from the schemes.

For most insurance types, enrolment was associated with a smaller risk of facing medical expenditure exceeding 40 per cent of household income. However, the New Rural Medical Scheme, which is the most widespread form of insurance and covers the underprivileged rural population, is an exception: among NRCMI enrollees, 24 per cent of those who had medical expenses in 2010 had medical expenses that exceeded 40 per cent of income compared to only nine per cent for those who have the Basic Medical Insurance for Urban Workers, and 18 per cent among those enrolled in the Basic Medical Insurance for Urban Residents.

## 4.5 Conclusions

The health-related survey data confirm that China's healthcare system was relatively successful in dealing with the post-disaster challenges. In the emergency rescue period, the affected population did to a large extent obtain the healthcare services they needed despite the massive destruction of health infrastructure and equipment.

During and after the recovery and reconstruction phase, the national health reform schemes which had been initiated shortly before the earthquake were not disrupted. Indeed, the utilisation of reproductive healthcare services in particular seems to have increased dramatically. The coverage of the New Rural Cooperative Medical Insurance and Basic Medical Insurance for Urban Residents in earthquake-affected areas is higher than national statistics; however, the Basic Medical Insurance for Urban Employees lagged behind the national average.

Yet financial access to healthcare services remains a serious problem in earthquake-affected areas. Rural residents and poor population groups continue to have more limited opportunities for obtaining high-level care than others, and insurance reimbursements – particularly for the rural residents' insurance scheme – are low. The proportion who refrained from seeking care when sick had not decreased compared to 2004, despite the post-earthquake reconstruction and health system reforms. More than 20 per cent of the residents faced household medical expenses higher than 40 per cent of household income; most of these belonged to poor, rural households. Moreover, the post-earthquake surveys indicate that those suffering from chronic disease, disability

or mental disorders are particularly vulnerable and benefit less than others from the post-disaster emergency health policies and that China's new health insurance schemes are not well-suited to fulfilling their needs.



## 5 Education

Zhang Huafeng

### 5.1 Introduction

As one of the western provinces of China, the population of Sichuan has an average educational level that is lower than the national level (National Bureau of Statistics of China, 2009). The Wenchuan earthquake damaged many school buildings and hindered the normal operation of schools in the disaster areas immediately after the earthquake. However, the post-disaster reconstruction offered an opportunity for improving the educational situation and system in the area.

This chapter starts by outlining China's educational system and recent reforms as well as pointing to general challenges in gaining access to education. It goes on to discuss the damage caused by the earthquake to school buildings and how the earthquake affected the existing school system, and the restoration and reconstruction of school buildings and the school system in the earthquake-affected areas of Sichuan. This is followed by a discussion on educational subsidies and preferential policies for the disaster-affected school children implemented by the Chinese Government. Finally, the current educational level, the literacy rate and children's school enrolment within the affected population of Sichuan are addressed.

### 5.2 China's Educational System

#### A Brief Overview

China's educational system includes education at the levels of pre-school, primary, junior secondary, senior secondary, vocational secondary, university and college, and graduate college. The adult education category overlaps all these levels, and provides both basic and higher education for adults.

In 1986, the Chinese Government introduced nine years' compulsory education. Students are required to complete six years of primary education and three years of

junior secondary school education. Thereafter, students who pass the appropriate entrance examinations can progress to academic senior secondary schools or vocational secondary schools, which vary from three to five years in duration. Students who graduate from academic senior secondary school may then take the national college entrance exam which allows access to higher education, offered at universities, colleges, institutes and vocational colleges.

During the Cultural Revolution, almost all higher education schools or institutes were closed, including technical and vocational schools. In 1976 after the Cultural Revolution, technical and vocational schools reopened with a renewed emphasis on technical training, and their enrolments increased rapidly. In 1980 the proportion of secondary vocational education school students in total senior secondary education was only 19 per cent in 1980, but by 2001 this number had increased to 45.3 per cent (Chinese Ministry of Education, Oct 2006). During the economic reforms there was a growing need for technical workers for the rapidly expanding economy; thus, in the 1980s and 1990s expanding and improving vocational secondary education was the most important way to meet this growing need.

In 1977, the national college entrance examination system was re-implemented. In 1980, approximately 280,000 students were enrolled in higher education, and this enrolment has grown steadily (National Bureau of Statistics of China, 2009). On June 16, 1999, the former State Development Planning Commission and the Chinese Ministry of Education jointly decided to increase China's higher education enrolment by 42 per cent. In 1998, around one million students were enrolled in higher education, and by 2005 this number was over five million (Chinanews, 2010 Feb 10). This rapid expansion of mass higher education is controversial, and has resulted in a strain on teaching resources. Furthermore, several years after the higher education expansion, higher unemployment among these graduates has become one of the most serious social problems of recent years.

This education at different levels was mainly provided by state schools; however, private schools are allowed in China and have been an important element in the Chinese educational system. In the early 1980s the Chinese Government started to allow the establishment of the first private schools and since then the Government has supported private educational organisations. In December 2002, the National People's Congress passed the first law on private education, the "Law on the Promotion of the Private Education", which came into effect on September 1, 2003.

### **Nine-year Compulsory Education**

On April 12, 1986, the fourth meeting of the Sixth National People's Congress adopted the "Law on Nine-Year Compulsory Education" (中华人民共和国义务教



育法), which stipulated that governments at all levels should implement a free and compulsory nine-year basic education for all school-age children in China. The nine-year compulsory education comprises six years of primary education and three years of junior secondary education.

The enrolment of school-age children in basic education has increased dramatically, although in the early years of the 21<sup>st</sup> century it was still relatively low in the western rural areas of China. In 2005, the State Council issued a “notice on the reform of the mechanism on ensuring the funding for rural compulsory education” which set up a new mechanism for central and local government to share the responsibility proportionally for ensuring the funding for rural compulsory education (State Council of China, Feb 2006). On June 29, 2006, the NPC Standing Committee adopted a new Law on Compulsory Education, which took effect from September 1, 2006 (Chinese Central Government, June 2006). This new education law stipulated that funding for compulsory education should be fully covered by government finance, shared by all levels of government. It would to a large extent ensure the implementation of the free nine-year compulsory education, particularly in rural areas.

In 2004, China implemented a programme (2004-2007) to provide compulsory education universally to all children, and to eliminate illiteracy among young people (“Liang Ji”). By the end of 2002, the areas in western China which met the “Liang Ji” standard covered only 77 per cent of the western population compared to 91 per cent at national level. Once the programme was implemented, the population coverage in the western area increased to 98 per cent (National People’s Congress UNESCO committee, Feb 2009). On September 26, 2010, the State Council Information Office published the 2009 China White Paper on the progress of China’s human rights (Xinhua News Agency, 2010 Sep 26). This stated that by the end of 2009, the nine-year compulsory education covered 99.5 per cent of counties and 99.7 per cent of school-age children.

In 2005, the central and local governments allocated more than CNY 7 billion to a total of 34 million students from poor families in central and western China (National Student Loan Management Center, Jan 2007), in order to achieve the goal of “two exemptions and one subsidy” (free tuition, free textbooks and a living expenses subsidy) (Ye, 2007). Since the spring semester of 2007, all 150 million rural students have been exempt from paying tuition and incidental fees for compulsory education (Chinadaily, 2006 Dec 13). Starting from September 1, 2008, the tuition and incidental fees were further exempt for all 28 million students in urban areas for their nine-year compulsory education. Since then, China has implemented free nine-year education in all urban and rural areas (Xinhua NewsAgency, 2008 Sep1).

However, as students are required to pay for textbooks and other fees, the cost of education is still a point of dispute in China. Furthermore, although migrant children living in cities should be exempt from tuition fees, for various reasons they could not

easily be enrolled in the cities' state schools (Wu, 2007; Dong, 2010). Therefore, there are still marginal children who cannot be enrolled in the compulsory nine-year education or who leave school before completing junior secondary school.

### 5.3 New Schools after the Earthquake

After the earthquake in 2008, many schools in Sichuan collapsed or were seriously damaged. The quality of the school buildings became a focus of attention after the earthquake, not only because a large number of students were killed when the schools collapsed during the earthquake but also because, compared to other public buildings, school buildings were much more seriously damaged. The official statistics on the number of students who died during the earthquake in Sichuan was 5,335 (Chinadaily, 2009 May 8). However, this figure is controversial, and many believe that the number could be much higher than that reported by the Chinese Government (Guardian, May 2009; Asianews, 2009 May 7).

Our 2009 earthquake survey included questions on earthquake damage to school buildings in the community questionnaire. Among 52 communities reported to have schools in the 2009 survey, seven communities reported school buildings having collapsed, 23 communities reported school buildings seriously damaged and impossible to repair, 16 communities reported school buildings damaged but repairable, and only six communities had no damage to school buildings. Furthermore, our 2011 survey reported that approximately 42 per cent of school buildings had collapsed or been seriously damaged.

According to statistics from the Sichuan education department, 13,768 schools were damaged in Sichuan (4,675 schools in the seriously damaged area), and 11,687 schools needed reconstruction (3,339 schools in the seriously damaged area) (Information office of Sichuan Government, 2008). One report (Research Group of Tsinghua University, 2008) by a research group from the universities of Tsinghua, Xinan Jiaotong and Beijing Jiaotong found that 57 per cent of the schools the team investigated were very seriously damaged and could still collapse compared to 87 per cent of other Government buildings which could continue to be used with or without reconstruction.<sup>67</sup> Many reasons for this were reported, such as the low seismic standards for school buildings, the high earthquake intensity and the poor quality of the school buildings (China Economic Weekly, 2009). Although the head of the construction department

<sup>67</sup> The degree of damage to buildings is classified in the paper into four categories: might collapse and must be rebuilt, very seriously damaged and should not be used, damaged but can be used once repaired, and very little damage and can continue to be used.

in Sichuan province announced in May 2009 that none of the school buildings had collapsed due to building quality (Caijing News, 2009 May 7), improving the quality and seismic standards of the school buildings became a key issue of the schools reconstruction policy by the Chinese Government.

In September 2008, the State Council published the Overall Reconstruction Plan (The State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction, 2008), guiding the disaster recovery and reconstruction work. According to the Overall Reconstruction Plan, the reconstruction of schools, hospitals and other public service facilities should be given priority, and the building standards should be strictly enforced. In addition, shortly after the earthquake the “Construction standards of ordinary primary and secondary schools in rural areas” was modified (Chinese Ministry of Education, May 2009). The new standard was published on September 3, 2008 and took effect on December 1, 2008. This new standard emphasised that the construction of primary and secondary schools in rural areas should ensure the safety of students and teachers, and that school buildings should be built to a higher standard so that they could be used as emergency shelters for the surrounding areas during disasters. New rules also dealt with provisions on the location of school buildings, the building structure and many other aspects of security in accordance with the new “Classification of Seismic Construction Standards” published in July 2008 and other relevant national standards.

After the Wenchuan earthquake, the Chinese Government endeavoured to re-open the schools in the earthquake areas by the autumn semester of 2008. Central and local governments allocated CNY 2.3 billion to reconstruct school buildings, build prefabricated school buildings and purchase teaching equipment. Several thousand teachers were recruited or deployed from other cities in Sichuan or other provinces into the earthquake-affected areas of Sichuan. On September 1, 2008, three and half months after the earthquake, all 3.39 million primary and secondary school students in earthquake-affected areas returned to school for the autumn semester (People’s Daily, 2009 Aug 31).

In order to support earthquake-affected areas and to provide schooling for all primary and secondary school students in these areas, schools outside these areas accepted some students from the very seriously damaged earthquake area who were difficult to place in local schools. Around 20,000 students from earthquake-affected areas were accepted by schools in other cities in Sichuan or other provinces and would study in these schools until permanent new schools were built in their original location (Sichuan online, 2009 Sep 1). The Chinese Ministry of Education intended permanent buildings to be ready for most schools and kindergartens by September 1, 2009, and this had been achieved by September 1, 2010, for all schools and kindergartens (Chinese Ministry of Education, July 2008).

According to the Sichuan government, on September 1, 2008, all students went back to school. Of the primary and secondary school students in the Sichuan earthquake areas, 33 per cent restarted school in their original undamaged school buildings, 38 per cent in reinforced buildings, 28.4 per cent in prefabricated buildings, tents or other kinds of temporary buildings, and 0.6 per cent went to schools outside the earthquake-affected areas (People's Daily, 2009 Aug 31).

The 2009 survey found that by the summer of that year most students in the seriously damaged earthquake area in Sichuan had returned to school but more than one-third still studied in prefabricated or temporary houses. The level of school enrolment for basic education had not significantly changed in 2009 compared to that reported in the 2008 survey before the earthquake, i.e. most students were back at school after the earthquake.

In the 2009 survey, all household members who were in pre-school/kindergarten and primary, junior secondary, senior secondary and technical schools were asked about their school situation. As many as 34.5 per cent of the students reported that their school buildings were prefabricated, and 2.4 per cent were in temporary transitional houses. In addition, 4.3 per cent students were in totally-rebuilt permanent school buildings, 7.1 per cent in partly-rebuilt permanent school buildings, 24.8 per cent in repaired permanent school building, and 26.9 per cent in the original unrepaired school building.<sup>68</sup> Moreover, 4.6 per cent of students in the survey area had changed school, either because the original school was completely destroyed or because it had been integrated with another school due to the earthquake.

By 2011 the school reconstruction was almost complete and 8,323 schools had been reconstructed or rebuilt in 142 disaster-stricken counties. The new schools were generally of a better quality and had higher capacities and improved school facilities (Sichuan Daily News, 2011 May 17). In the 2009 survey, the interviewed households reported a much better quality of school facilities in the completely reconstructed permanent schools, while they reported a worse quality of the facilities in the camp and prefabricated schools. The 2009 survey also asked the interviewed households to evaluate the quality of their school. Approximately two-thirds of the households whose children were in a school with a prefabricated or temporary transitional building reported the school facilities to be worse than before the earthquake, while 70 per cent of households whose children were in schools in a totally reconstructed building reported a better or much better quality of school facilities. Schools with partly reconstructed, repaired or unrepaired school buildings had similar percentages of households that evaluated the quality of the school facility as having improved or deteriorated (Table 5.1).

<sup>68</sup> The 2009 survey found higher percentages of students in schools with prefabricated buildings than the official report of September 2008 did. This may be due to the fact that the survey covered the seriously and very seriously damaged areas and not other slightly damaged areas.

Table 5.1 Evaluation of school facility quality and teaching quality by type of school buildings (percentages)

	Type of school building	Much better	Better	No difference	Worse	Much worse	Sample size
<b>Quality of the school building and equipment</b>	Prefabricated building	1	17	14	33	36	818
	Temporary transitional building	3	2	34	32	30	44
	Reconstructed permanent building	36	33	21	2	8	91
	Partly reconstructed permanent building	10	29	28	21	13	100
	Repaired permanent building	2	25	44	24	6	325
	Same permanent building	1	19	64	14	3	337
	<b>Total</b>	<b>4</b>	<b>21</b>	<b>35</b>	<b>23</b>	<b>17</b>	<b>1715</b>
<b>Teaching quality</b>	Prefabricated building	1	19	65	10	6	818
	Temporary transitional building	3	3	73	15	7	44
	Reconstructed permanent building	18	27	47	3	6	91
	Partly reconstructed permanent building	4	13	71	11	2	100
	Repaired permanent building	1	24	62	10	3	325
	Same permanent building	1	23	68	7	1	337
	<b>Total</b>	<b>2</b>	<b>21</b>	<b>64</b>	<b>9</b>	<b>4</b>	<b>1715</b>

Note: Based on the 2009 survey, all the household members in primary, junior and senior secondary schools in the interviewed households.

However, most households, except those with children in the temporary schools, reported a better teaching quality. The households with children in the schools with completely reconstructed permanent buildings had the best evaluation of the teaching quality – 45 per cent thought the teaching quality was better or much better than before the earthquake – while 22 per cent of households with children in temporary schools evaluated the teaching quality as worse or much worse and only six per cent reported a better teaching quality. Although only two per cent (44 cases in the survey) of the students in school were located in a temporary transitional building, the quality of these schools was quite low at that time. The general quality of school facilities and teaching in earthquake-affected areas was expected to improve considerably compared to the quality before the earthquake.

## 5.4 Educational Policies after the Earthquake

After the earthquake, the Chinese Government provided various subsidies and preferential policies for victims in earthquake areas so as to keep its promise that no students would have to stop school because of the disaster. This was in autumn 2008 when all students in the nine-year compulsory education in China were to be exempt from pay-

ing school tuition and fees, and this exemption of tuition and fees was implemented in the Sichuan earthquake-affected areas as in other areas. Furthermore, free textbooks were given to poor students in affected areas, and subsidies provided for boarding students from poor families.

Living allowances were provided by governments at various levels for poor primary and secondary students from earthquake-affected areas. For students who started school in another province, the local government where the students were accepted provided living allowances; for students who attended schools in different cities in Sichuan, the Sichuan government provided special funding for students' subsidies, while for students attending schools in their original city, the local government provided allowances (Education department in Sichuan, 2008).

Many measures were also implemented for students in higher education. On May 18, 2008, immediately after the earthquake, the Chinese Ministry of Education announced that the national college entrance exam would be postponed for a month in 40 seriously affected counties in Sichuan (Chinese Ministry of Education, May 2008). Many universities and colleges in different provinces offered preferential policies and subsidies to students from earthquake areas. Some students were exempt from tuition and fees in higher education.

The 2009 survey found that almost half of the students in the survey area received various subsidies or benefited from preferential policies following the disaster. Table 5.2 shows that of all students in school, 35 per cent were offered one kind of subsidy or preferential policy, while 12 per cent enjoyed two or three different kinds of subsidies or preferential policies. Around 25 per cent were relieved of school accommodation fees or other fees, another 25 per cent received living cost subsidies, three per cent received student grants and eight per cent enjoyed other preferential policies or subsidies such as free schooling in other provinces, priority for higher education etc. Subsidies and preferential policies covered students from primary school to higher education, but were not extended much to pre-school children or students in other special schools. Senior secondary and vocational school students received more living cost subsidies, while college and university students got more remission of tuition, fees and student grants.

Table 5.2 Preferential policies or subsidies to students by education level in earthquake-affected areas (percentages)<sup>69</sup>

	Pre-school/ kindergarten	Primary and junior secondary	Senior secondary and vocational school	College and university	Other	Total
None	86	53	31	27	93	53
Tuition/Fees/Accommodation costs remission	2	26	28	43	1	24
Living cost subsidies	5	25	43	35	4	26
Student grants		1	5	28		3
Other	8	7	11	5	2	8
<i>Sample size</i>	<i>282</i>	<i>1212</i>	<i>348</i>	<i>176</i>	<i>16</i>	<i>2034</i>

Note: Based on the 2009 survey, all the household members in school in the interviewed households.

After the Wenchuan earthquake, the Overall Reconstruction Plan proposed to allocate schools reasonably at different levels, and to increase the proportion of boarding schools and boarding students. Thus, in the 1990s primary and secondary boarding schools in rural areas started to open. Due to both the one-child policy and urbanisation, the number of primary-school-age children in rural areas reduced dramatically in the 1990s, leading to many schools closing and being integrated with other schools. In the 2011 survey, among the 186 communities who answered the questions about schools in the community, 79 communities reported having had primary schools before the earthquake but only 50 communities still had such schools in 2011. Furthermore, 34 communities reported having had a junior secondary school before the earthquake, while 33 communities still had such a school after the earthquake.

With fewer schools in rural areas, boarding schools became one of the solutions to providing schools for all children. In 2001, the State Council published its “Decision on Basic Education Reform and Development” to promote boarding schools (Ye & Pan, 2008). Since then promoting boarding schools in rural areas has been an important policy in improving basic education in poor areas. After the earthquake, to ensure that all students returned to school, building more boarding schools and increasing the proportion of boarding students became important policies of the educational system.

Thus, the first earthquake survey included questions about the family’s opinion on sending their children to boarding school in order to provide the Chinese Government with important information on households’ willingness to send children to boarding schools. In the 2008 survey, immediately after the earthquake, most households reported that they were willing to send their children to boarding school. All the interviewed households with children in primary or secondary school (including junior secondary, senior secondary and vocational secondary) were asked for their opinions on

<sup>69</sup> Each student can enjoy various preferential policies or subsidies at the same time, therefore the percentages can add up to more than 100.



sending their children to boarding school, and over 80 per cent of households expressed willingness to do this. Reasons for households not being willing to send their children to boarding school were worries about the higher cost (22 per cent), the children not getting used to it (27 per cent), poor conditions at the schools (12 per cent) and being unwilling to be parted from the children (15 per cent).

## 5.5 Educational Level and Literacy in Earthquake Areas

School enrolments at the various stages of education were not affected by the disaster. Many schools were temporarily closed immediately after the earthquake but managed to resume normal operations soon afterwards, although many students had to attend classes in temporary school buildings. Therefore, three months after the earthquake, the first survey did not find children's enrolment in schools seriously affected by the disaster. However, there was also no significant change in general school enrolments when people reported on the relatively better equipment and improved quality of the newly-built schools.

### Educational Levels

According to the Chinese statistics bureau (National Bureau of Statistics of China, 2009), around 10 per cent of adults<sup>70</sup> in Sichuan province have never attended school (higher than the national level of 7.5 per cent), while in 2011 the earthquake survey found that this figure was 13 per cent in earthquake-affected areas. However, the number of adults who had attained an education level of junior secondary school or higher was approximately 49 per cent in earthquake areas, very close to the Sichuan provincial level (50 per cent) but lower than the national level (61 per cent). Compared to the provincial level, the low adult education level in earthquake areas mainly resulted from the high percentage of adults who had never been to school. The education level was much higher among the young people (15-24) than among those older than 24. Around 85 per cent of the young people in earthquake-affected areas had completed their nine-year compulsory education. However, the 2011 survey also found that there was still around one per cent of the young people in earthquake areas who had never attended school, and approximately nine per cent had left school before completing their nine-year compulsory education.

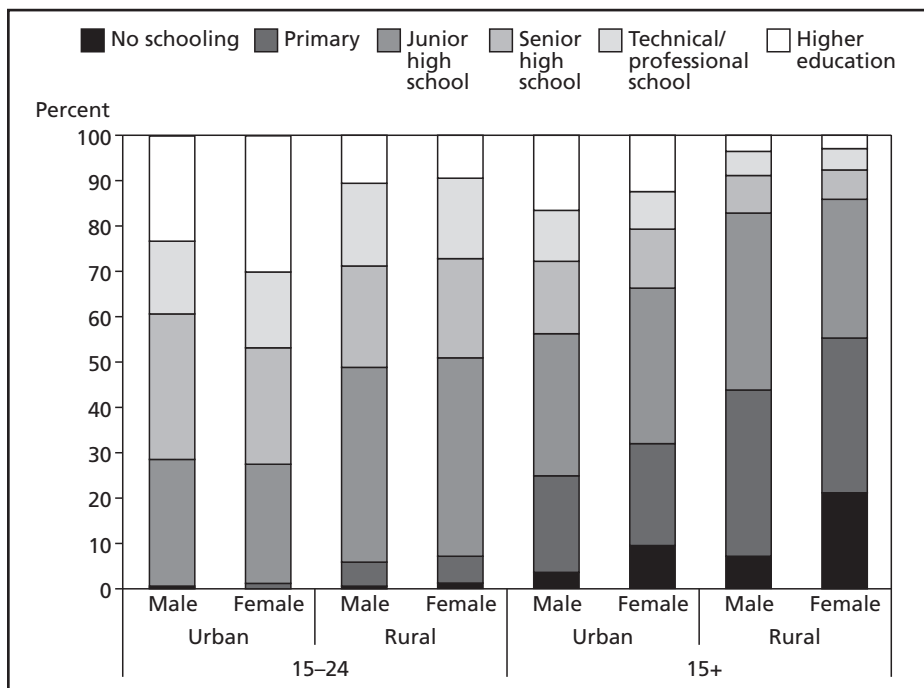
The gender gap in the education level was also considerable, and was particularly striking at the basic level (Figure 5.1): the percentage of adult women who had never

<sup>70</sup> Adults are defined as household members aged 15 or older.



attended school was three times that of adult men. There was also a gender gap among the young people but this was not so apparent – among those aged 15-24 only a slightly higher percentage of girls (10 per cent) than boys (9 per cent) had left school without completing the nine-year compulsory education. Furthermore, in this age group the gender gap did not expand further after the basic educational level.

Figure 5.1 Educational level by residence and gender for different age groups in 2011



Note: Based on the 2011 survey, all the household members in the interviewed households (sample size=11,151).

However, in the disaster area the urban-rural disparity of educational levels was a more important issue than gender disparity. This urban-rural disparity was not only striking among adults aged 15 and above but also among young people. While in rural areas only half of the young people aged 15-24 had the opportunity to continue school after the nine-year basic education, in urban areas over 70 per cent of the young people continued school after compulsory education, and over 25 per cent of the young people had access to higher education. Rural households that included a young people with higher education who had moved to an urban area and enrolled in an urban school reported the young people as a family member in a rural area. The survey indicates that rural young people had far fewer chances of being enrolled in higher education.

## **Literacy Rates**

Prior to 1949, China had a population of nearly 500 million, 80 per cent of whom were illiterate. In 1996, the illiteracy rate for adults (15 and above) in China had fallen to 17.82 per cent (10.12 per cent for men and 25.54 per cent for women) (National Bureau of Statistics of China 1997), while in 2008 the illiteracy rate further decreased to 7.77 per cent (4.02 per cent for men and 11.52 per cent for women) (National Bureau of Statistics of China 2009). Furthermore, in 2006 the illiteracy rate for those aged 15-50 was reported at 3.58 per cent (National Center for Education Development Research, 2008).

Although the illiteracy rate has reduced dramatically over the past decades, it still varies a lot among the various regions and groups of people. In western China and rural areas there are still many illiterate people. Women generally have a much higher illiteracy rate than men all over China. According to the 2009 Statistical Yearbook, in 2008, of the 31 provinces/municipalities (National Bureau of Statistics of China, 2009), Beijing had the lowest illiteracy rate at 3.1 per cent among adults aged 15 and above, and Tibet had the highest adult illiteracy rate at 37.7 per cent. The adult illiteracy rate in Sichuan province in 2008 was 10.2 per cent (5.8 per cent for men and 14.7 per cent for women), the eighth highest among all the provinces/municipalities.

In the first survey of earthquake-affected areas, 17.3 per cent of adult household members (15 and above) were reported as illiterate or semi-illiterate. The illiteracy rate in earthquake areas was much higher than the provincial level rate, i.e. earthquake areas covered the relatively poor areas in Sichuan. Again, the gender gap of the illiteracy rate was huge – the 2008 survey found that in earthquake areas the adult illiteracy rate among men was 9.6 per cent and among women was 25.1 per cent. The urban-rural disparity was also large, with an adult illiteracy rate in rural areas (19 per cent) nearly twice that of urban areas (10.6 per cent). The illiteracy rate among young people aged 15-24 was much lower at approximately two per cent; while the youth illiteracy did not display the same rural-urban disparity, the gender difference was still fairly clear – the female youth illiteracy rate was 2.8 per cent while the male youth illiteracy rate was 0.9 per cent.

## **Enrolment Rates**

The official age for starting school in China is six years old. Children who are six when school starts each year (i.e. on September 1) are entitled to be enrolled. However, according to the Chinese Compulsory Education Law, in underdeveloped areas children can start school at seven years old. In practice, children from poor households may be enrolled late in school. The three earthquake surveys were all carried out before the school autumn semester, i.e. before the new school year started. Therefore, households were asked whether any household member had been enrolled in school during the past school year and, if so, the school level of the person enrolled, i.e. children aged

six at the time of the interview were supposed to be enrolled in school the following school year, and children aged seven and above should have started school in the year before the interview.

Table 5.3 Crude school enrolment in earthquake areas by age group in 2011 (percentages)

	7-12		13-15		16-18		19-22		23-25		7-25	
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Pre-school	2	5									1	1
Primary	92	90	16	13							23	19
Junior secondary	4	4	75	81	19	18					15	15
Senior secondary/ technical			5	4	41	48	9	7			10	10
Higher education					1	1	16	15	5	2	5	5
Not enrolled and completed nine-year education			1	0	31	25	66	67	82	83	39	42
Not enrolled and not completed nine-year education	1	1	4	1	8	7	9	8	13	15	7	7
Never attended school	1	0	1	1	1	1	1	2	1		1	1
Sample size	350	294	221	213	281	253	331	365	327	374	1510	1499
Total	100	100	100	100	100	100	100	100	100	100	100	100

Note: Based on the 2011 survey, all the household members aged 7-25 in the interviewed households.

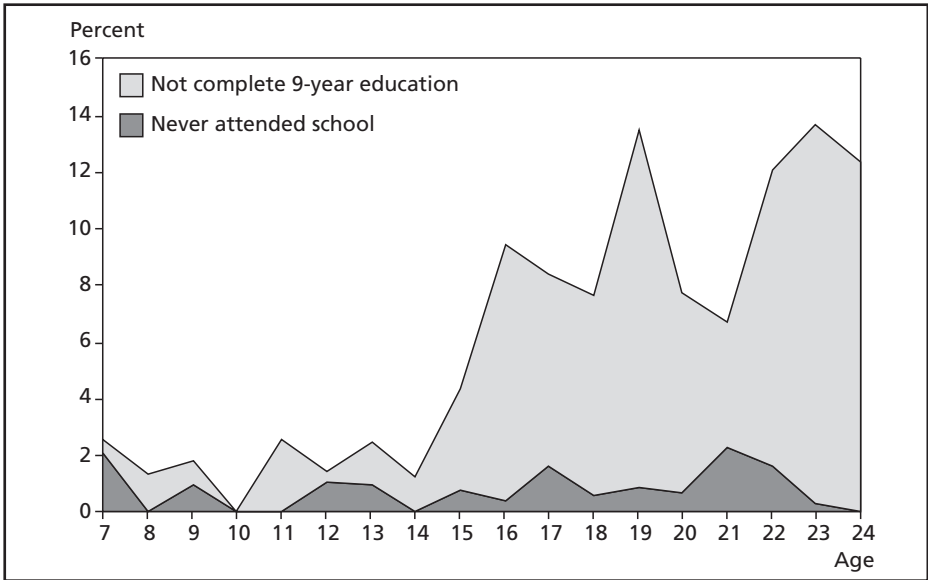
The 2011 survey found that in earthquake-affected areas the net enrolment<sup>71</sup> in primary school was around 90 per cent and in junior secondary school was 78 per cent. The gross enrolment was 102 per cent for primary level and 107 per cent for junior secondary school level. Table 5.3 shows that approximately 92 per cent of boys and 90 per cent of girls of primary-school age (7-12) had been enrolled in primary school. At same time, around 16 per cent of boys and 13 per cent of girls aged 13-15 who were supposed to have completed primary school were still at primary school.

The nine-year compulsory education has not yet been fully implemented in earthquake areas. Although most children had attended school at some point, many of them had dropped out without completing their nine years of basic education. As indicated before, in the past few years many education policies have been implemented to improve access for children in poor families to basic education. School children have been exempt from all school tuition and fees for compulsory education in rural areas since the spring semester of 2007 and in urban areas since the autumn semester of 2008.

<sup>71</sup> The net enrolments here may be underestimated. The interview periods were the second half of July and beginning of August, while the new semester started on September 1. Those who reached the age of 13 between the interview period and September 1 would have been reported to be 12 years old during the interview and supposed to be enrolled in junior secondary school in the previous school year.

Nevertheless, there were still some school-age children in earthquake-affected areas who had never been to school (Figure 5.2). The 2011 survey also found that among household members aged 7-24, approximately one per cent had never attended school, while seven per cent had dropped out of school and not completed their compulsory nine-year education. Most children had access to schools, so dropping out was the major reason for children of all age groups in earthquake areas not completing their nine-year compulsory education. The drop-out percentage was much higher for those older than 15 and lower among younger students.

Figure 5.2 School attendance and drop-out rates in basic education among household members aged 5-24 in 2011



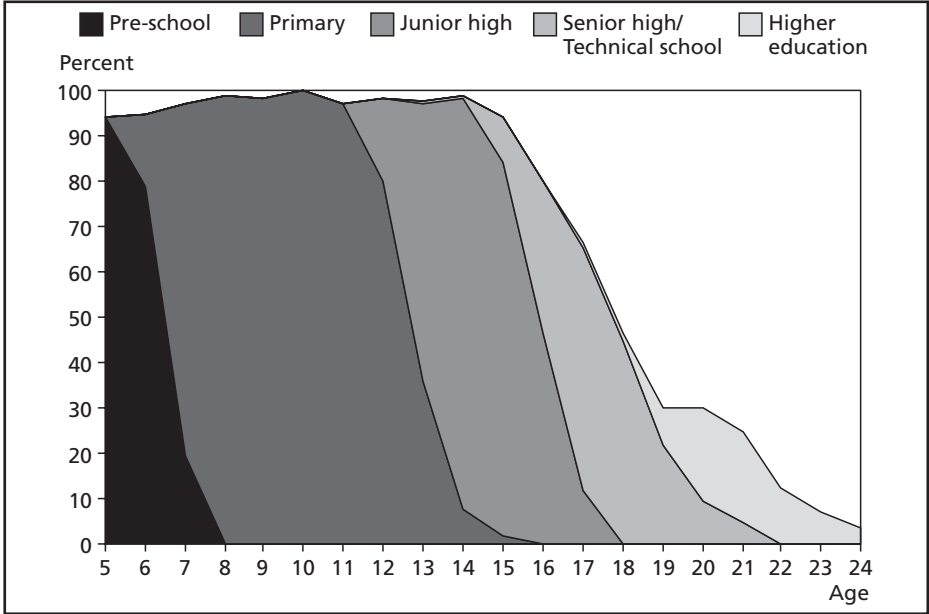
Note: Based on the 2011 survey, all the household members aged 5-24 in the interviewed households (sample size=2,920).

The free-tuition policy in basic education in China has reduced the drop-out rate and increased enrolment. The drop-out rate for children aged 7-15 in earthquake-affected areas in 2009 was 4.0 per cent among boys and 3.6 per cent among girls. In 2011, the drop-out rate in earthquake areas decreased significantly to 1.5 per cent for children aged 7-15. However, the percentage of school-age children who had never been to school had not significantly changed. The free-tuition policy did not succeed in helping children who could not attend school, but it did greatly reduce the drop-out rate among the children who had the opportunity to be enrolled in school. Finally, pre-school was fairly popular in earthquake areas, as over 90 per cent of children aged 5-7 who had not started school did attend pre-school.

As indicated before, there was an apparent gender gap in school enrolment among adults (aged 15 and above) in earthquake-affected areas. The number of adult women who had never been to school was three times that of adult men in the survey area. However, Table 5.3 also illustrates that this gender gap had been diminishing among the younger generations and was not a serious social problem in earthquake areas. Furthermore, the levels of school enrolment at various levels were not significantly different between boys and girls, i.e. girls were apparently not discriminated against in school admission as they had been in the previous few decades.

Late enrolment was very common in many poor areas in Sichuan, and children started school when they were much older than the official Chinese school age. The 2011 survey found that among children aged 7-15, 34 per cent were enrolled in a school level lower than official requirements,<sup>72</sup> and two per cent had never been enrolled in school at all. Figure 5.3 shows that over 20 per cent of children aged seven did not start school in the school year before the interview, while almost half of those aged 15 enrolled late. Both the late enrolment rate and the proportion of children who had never attended school were higher among the higher-age children.

Figure 5.3 Late enrolment in earthquake areas for household members aged 7-15 in 2011



Note: Based on the 2011 survey, all the household members aged 7-15 in the interviewed households (sample size=1,081).

<sup>72</sup> The late enrolment rate calculated here also included those who repeated school. The questionnaire design of the survey did not provide sufficient information to differentiate between late enrolment and repeated schooling.

The 2011 survey found that in earthquake areas children in poor rural areas or in poor households were more likely to start school later than their peers (Table 5.4). Late enrolment was much higher in rural areas (37 per cent) than in urban areas (20 per cent). Household income was also an important factor in sending children to school – the late enrolment rate was 22 per cent in the highest-income households and 43 per cent in the lowest-income households. Furthermore, three per cent of children in the poorest group of households had never been to school, while this figure was one per cent in the highest-income group.

Table 5.4 Children with late enrolment aged 7-15, by rural-urban and income group in earthquake areas in 2011 (percentages)

	Lowest income	Low income	Medium income	High income	Highest income	Rural	Urban	Total
Not late enrolment	54	64	57	74	77	60	79	64
Late enrolment	43	33	41	24	22	37	20	34
Never attended school	3	3	2	2	1	2	2	2
<b>Sample size</b>	<b>203</b>	<b>248</b>	<b>279</b>	<b>193</b>	<b>158</b>	<b>852</b>	<b>229</b>	<b>1081</b>

Note: Based on the 2011 survey, all the household members aged 7-15 in the interviewed households.

Private school has been an important supplement to the public education system in China, particularly in pre-school education. According to the 2009 statistical bulletin of national educational development (Chinese Ministry of Education, Aug 2010), most private schools were pre-schools – of 138,200 pre-schools in China, 89,000 were private with 11.34 million children enrolled. However, private schools at other levels were relatively few. The findings from the 2009 survey were consistent with national statistics: around half of the children in pre-school were enrolled in private schools. In addition, private schools also played important roles in technical and vocational education. In earthquake areas as many as 22 per cent of technical and vocational school students attended private schools. However, state schools were the main provider of the nine-year compulsory education and of senior secondary education. The 2009 survey found that only 3.1 per cent of primary school students, 2.1 per cent of junior secondary school students and 3.4 per cent of senior secondary school students were enrolled in private schools in the earthquake-affected areas.

## 5.6 Conclusions

The Wenchuan earthquake in May 2008 seriously damaged and destroyed thousands of school buildings in disaster areas, which affected the existing school system in these areas. After the earthquake, improving the quality and seismic standards of school buildings became a key issue of the Chinese Government's schools reconstruction policy. New construction standards of school buildings were published after the earthquake, so that the safety of students and teachers could be ensured and the schools could also be used as emergency shelters for the surrounding areas. The Chinese Government made great efforts to reopen all schools at the beginning of the autumn semester on September 1, 2008. New teachers were recruited or deployed from other cities into earthquake areas, temporary or prefabricated school buildings were constructed, and students in very badly affected areas were accepted into schools outside the earthquake areas.

After the earthquake, all the students recommenced school in the autumn semester of 2008, although many students had to study in prefabricated or temporary schools. The 2009 survey found that one year after the earthquake over one-third of the students were still in schools with temporary or prefabricated buildings. By 2011 the schools reconstruction was almost complete, with many schools having been rebuilt in 142 affected counties in Sichuan. The teaching quality and general quality of school facilities were much higher in the rebuilt schools.

After the earthquake various subsidies and preferential policies were provided to school children at differing levels. Most poor school children in earthquake-affected areas received a remission of tuition, fees and accommodation costs, living cost subsidies and student grants. The Overall Reconstruction Plan also proposed allocating schools more reasonably at various levels, and increasing the number of boarding schools.

However, the rate of school enrolment had not significantly changed after the earthquake. The education level gender gap among adults (aged 15 and above) in earthquake areas was striking – the number of women who had never attended school was three times that of adult men in the survey areas. However, the school access gender gap was greatly reduced among younger generations, and school enrolment rates at various school levels were not significantly different between boys and girls. However, the urban-rural disparity in education levels was still a challenge in the earthquake-affected areas of Sichuan. While the illiteracy rate has reduced dramatically in the past decades in China, the adult illiteracy rate was still fairly high in earthquake areas, with a particularly high illiteracy rate among adult women. The youth illiteracy rate was much lower, but a gender disparity nevertheless still existed.

School enrolment in earthquake areas was high, although the school drop-out rates remained a problem. The free-tuition policy implemented in 2007 and 2008 effectively reduced the drop-out rates in earthquake areas, but did not produce positive effects

on improving children's access to school for those who had never been to school. Late enrolment was also common and was a particularly serious problem in rural areas and among poor families.



## **6 Household Income and Wealth**

Zhang Huafeng

### **6.1 Introduction**

After the Wenchuan earthquake, both agriculture and industry in Sichuan suffered damage and economic losses. Rural roads, water infrastructure, farmland and forest land were seriously damaged, large agricultural production facilities were destroyed, local industries were seriously damaged, and thousands of enterprises had to close temporarily or permanently due to damage to their plants, equipment, inventories and employees. In the same period, the international financial and economic crisis brought extra burdens, particularly on industrial development in the Sichuan earthquake-affected areas. The production of various products declined to varying extents, and the price of raw materials and international energy fluctuated greatly during the crisis. Export enterprises faced tremendous difficulties in the international market, while some enterprises were seriously affected due to the structural adjustment of the industry in eastern China during the economic crisis. Households' economic activities were influenced directly or indirectly by both the disaster damage and the international economic crisis. However, the large investment by the Chinese Government in reconstructing the disaster areas also provided opportunities for the local economy.

### **6.2 Policy on Economic Recovery after the Earthquake**

To support and accelerate the economic recovery in earthquake areas, the Chinese Government formulated and published the Overall Planning for Post-Wenchuan Earthquake Industrial Restoration and Reconstruction. It emphasised the importance of restoring agriculture, forestry, and animal husbandry production, of industrial restructuring, and of establishing industrial zones. After the earthquake the State Council published its Guidance on the Production Restoration. Various policies

were implemented to provide subsidies to the earthquake-affected households and to promote agricultural and industrial production in earthquake areas.

### **Policy on the Livelihood Subsidies**

Immediately after the earthquake, the Chinese Government formulated a rapid emergency response policy. On May 17, 2008, five days after the earthquake, Prime Minister Wen Jiabao chaired the State Council's earthquake relief headquarters' meeting and provided guidance on the disaster rescue work and emergency response policies on livelihood subsidies to all households in the seriously affected areas (China Radio Network, 2008 May 29). The meeting issued important instructions for food, bottled water and other living materials to be transported to the disaster areas. Households in cities were to be mobilised to donate clothes, while emergency clothing and blankets were to be purchased and transported to the disaster areas. Shops and temporary kiosks were to open as soon as possible so as to provide commodities for the households and to keep market prices stable. The State Council also made decisions about providing rations and cash hand-outs to affected households in the earthquake areas. For three months following the earthquake, everyone in earthquake-affected areas was to receive half a kilogramme of food and CNY 10 for living expenses per day. Orphans, single old people and the disabled were given CNY 600 for basic living expenses per month per person, and the families of each person killed in the earthquake were paid compensation of CNY 5,000.

### **Policy on Agricultural Production**

Some years before the earthquake, the Chinese Government had started to implement new agricultural policies to improve households' income in rural areas. In 2006, as a milestone of the new agricultural policy, the agricultural tax was abolished in all rural areas in China. Furthermore, improvement continued in the implementation of the policies on grain subsidies<sup>73</sup> and general agricultural direct subsidies<sup>74</sup> (Ministry of Finance etc., 2005), which had been implemented for some years. After the earthquake, the Chinese Government continued to implement various policies to increase the profit of grain production farmers in the affected areas. According to the

<sup>73</sup> Grain subsidies are the state's financial subsidies to grain farmers, according to certain standards and the actual planting area of grain. The purpose of the grain subsidy is to promote food production, to protect the grain production capacity, and to mobilise farmers' enthusiasm for growing grain and increase their income.

<sup>74</sup> The general agricultural direct subsidy is a comprehensive policy of direct subsidies to grain farmers, defined on the basis of the existing grain subsidies, to compensate for the price increase of diesel oil, fertiliser, pesticides and other agricultural production materials. The scale of the subsidies is based on the size of grain production land in the previous year.

earthquake post-disaster reconstruction policy of the State Council (Chinese State Council, June 2008), grain subsidies and general agricultural direct subsidies were to be further strengthened in the affected areas to promote food production and rural income. Furthermore, in order to help agricultural production to recover in earthquake areas, the Government was to provide appropriate support via investment subsidies and loans with reduced interest rates. Central government also increased the funds for poverty-alleviation discount loans.

In the 2009 survey, households that conducted agricultural activities were asked about the agricultural support they received and most needed from the Government. **Most agricultural households had received food subsidies for one year after the earthquake**, and agricultural subsidies were the most preferred agricultural support (Table 6.1). In the year after the earthquake, 76 per cent of agricultural households received food subsidies, 21 per cent received general agricultural direct subsidies, 10 per cent received free agricultural production material, a few households benefited from free agricultural technical support, free agricultural services or low-interest loans, and 15 per cent received no beneficial subsidies or support.

Table 6.1 Households' received and desired agricultural support one year after the earthquake (percentages)

<b>Agricultural support received since earthquake</b>		<b>Agricultural support most needed</b>	
Food product subsidies	76	General agricultural direct subsidies	43
General agricultural direct subsidies	21	Agricultural technical support	18
Free agricultural production material	10	Low interest loans	6
Free agricultural technical support	2	Marketing channels	4
Free agricultural services	1	Information on agricultural production market	2
Low interest loans	1		
Other	3	Other	9
None	15	Do not need any help	18
<i>Sample size</i>	<i>2674</i>	<i>Sample size</i>	<i>2674</i>

Note: Based on the 2009 survey, all the households that conducted agricultural activities from July 2008 to July 2009.

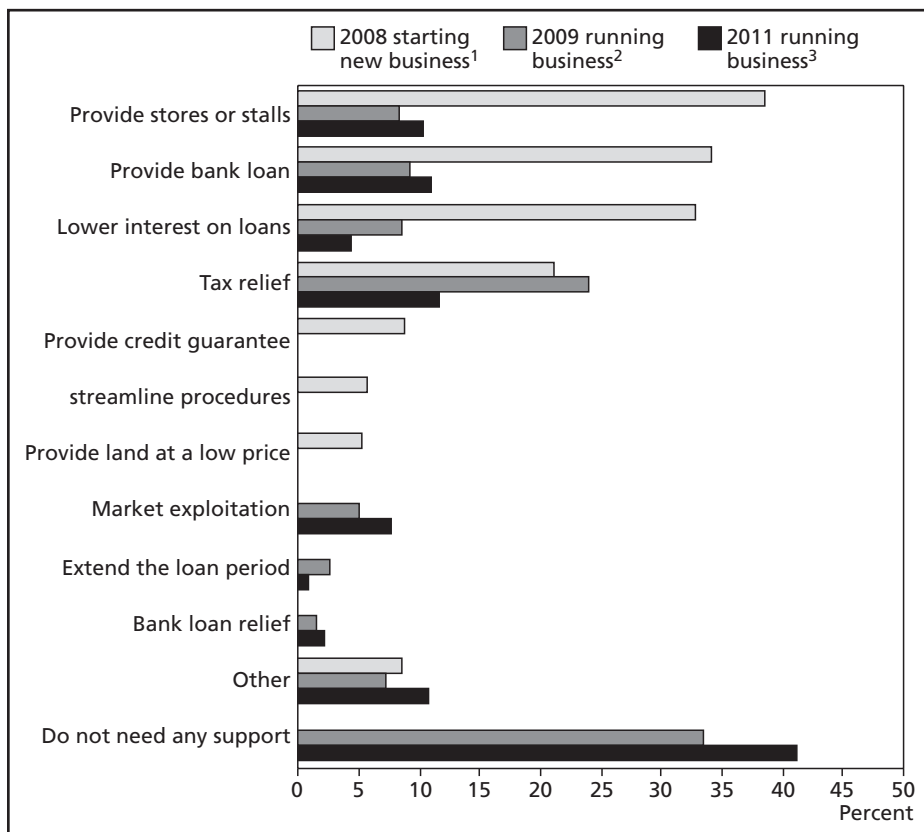
When asked about the most needed policy for agricultural households, the general agricultural direct subsidy was the most preferred policy. Technical support was also needed, particularly compared to the current low access of agricultural technical support for agricultural households. There was also more need for low-interest loans, marketing channels and information on the agricultural production market.

### 6.2.3 Policy on Family Businesses

Since the economic reform in China the private economy has grown steadily and non-agricultural family business income has also become an important income source for both urban and rural households. According to the National Bureau of Statistics of China, family business income in Sichuan makes up close to nine per cent of the total income for urban households, while agricultural income and non-agricultural family business income account for almost half of rural households' income (National Bureau of Statistics of China, 2010). The proportion of non-agricultural income has been steadily increasing in rural households' family business income in recent years (Zhang & Wang, 2004). **Following the earthquake, the Chinese Government encouraged** households in the affected area to establish a family business or self-employed business. The Chinese Government implemented a tax relief policy, provided low-interest loans to households that wanted to run family businesses and implemented other financial measures.

The survey addressed the households' needs for assistance from the Government for running their family business in different periods after the earthquake. In the first survey in 2008, some households reported they would like to start a family business in the near future. Table 6.1 illustrates the needs for assistance of the households that planned to start a family business. The households that planned to start a new family business needed more preferential policies and assistance from the Government, particularly regarding the availability of stores or stalls, loans and tax preferential policies. Immediately after the earthquake, 10 per cent of households reported that they would like to start a new business in the future. Close to 40 per cent of them needed stores or stalls, 34 needed a bank loan, 33 per cent needed a beneficial low-interest policy and 21 per cent needed tax relief. Other policy needs for households starting new businesses were credit guarantees (nine per cent), simplified procedures (six per cent) and low-cost land (five per cent). One-quarter wanted tax relief on their business, while one-third did not report any need for Government support. Households that were running a non-farming business needed a more liberal investment environment.

Figure 6.1 Households' desired policy measures for running a family business or starting a new business



Notes: <sup>1</sup> Based on the 2008 survey, all the households that planned to start new family business were asked to list all the policies needed, therefore more than one policy can be listed and percentages may add up to more than 100 (sample size=349).

<sup>2</sup> Based on the 2009 survey, all the households that were running a family business were asked to list only the most important policy for running their family business (sample size=407).

<sup>3</sup> Based on the 2011 survey, all the households that were running a family business were asked to list only the most important policy for running their family business (sample size=495).

In the 2009 survey, when asked about the policies households needed for running their family business, as many as 35 per cent of households did not need any support, while the most-needed policy was still tax relief. One year after the earthquake, 25 per cent of households had already benefited from the preferential tax policy, and 11 per cent had benefited from the preferential loan policy. Approximately 25 per cent of households thought that the tax relief policy was the most needed policy in the future, nine per cent needed a bank loan and another nine per cent needed a lower interest rate on loans. Three years after the earthquake in the 2011 survey, over 40 per cent of

households did not need any Government help. Around 10 per cent of households needed assistance in the way of tax relief, a bank loan or the provision of a store.

## 6.3 Household Income Sources

The three surveys asked the households about their household members' individual income, agricultural income, non-agricultural family business income and subsidies received before and after the earthquake. They provided data to illustrate the recovery of the household economic situation after the large-scale natural disaster in the Sichuan earthquake area in China. Households in the affected area had access to different income sources, which may have been affected to varying extents following the earthquake. The recovery of different income resources was also a critical part of the reconstruction work after the disaster.

### Individual Income<sup>75</sup>

Even before the earthquake individual income – as opposed to shared household income from farms or family enterprises – was the most important income source for all the households, both in urban and rural areas. For rural households, the proportion of the wage income to the total household income increased from 20 per cent in the 1990s to 40 per cent in 2009 (National Bureau of Statistics of China, 2010). The extent to which the earthquake had affected households' individual income would to a large extent determine how the households' economic situation had been affected by the disaster. **Table 6.2 illustrates both urban and rural households' access to individual income during different periods.** In the survey area, 82 per cent of households received individual income before the earthquake. Immediately after the earthquake, many companies were forced to suspend their operations temporarily or to close down permanently. Therefore, some households lost their individual income in both urban and rural areas – approximately 76 per cent of households received individual income immediately after the earthquake. Nevertheless, this negative impact on households' access to individual income did not last for very long; one year later, households' access to individual income rose to 87 per cent, a figure did not change significantly in the three years after the earthquake.

<sup>75</sup> In this report, household individual income includes wages, pensions and unemployment benefits from all household members.

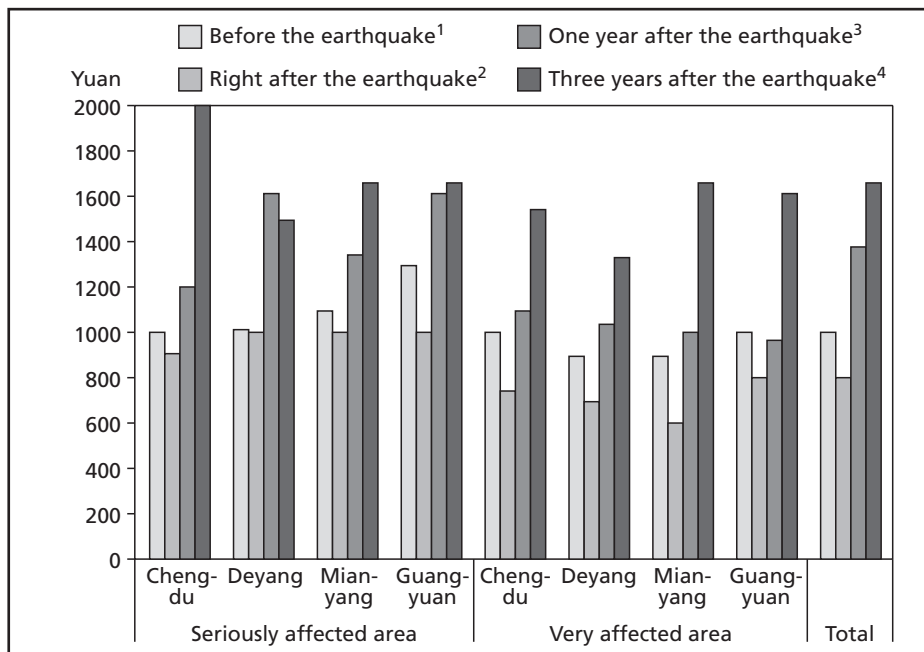
Table 6.2 Households' access to individual income before and after the earthquake (percentages)

	Rural	Sample size	Urban	Sample size	Total	Sample size
Before the earthquake <sup>1</sup>	79	2787	92	858	82	3645
Two months after the earthquake <sup>2</sup>	73	2787	87	858	76	3645
One year after the earthquake <sup>3</sup>	85	2906	94	1114	87	4020
Three years after the earthquake <sup>4</sup>	85	2936	93	906	87	3842

The earthquake affected the households' individual income to varying extents, depending on the areas where the households lived. The disaster had an apparently negative impact on reducing households' individual income, while the rapid reconstruction after the earthquake helped households to recover. Households' economic recovery in various earthquake areas with different degrees of damage varied to a large extent. Figure 6.2 (next page) shows the changes in household monthly individual income after the earthquake in shorter and longer time periods.<sup>76</sup> In general, households' median monthly income decreased immediately after the disaster, but started to increase one year after the earthquake.

<sup>76</sup>In the first survey, households were asked about their monthly individual income before the earthquake and the monthly income during the survey period, i.e. two months after the earthquake. In the second survey, households were asked about their monthly individual income during the survey period, i.e. one year after the earthquake. In the third survey, households were asked about their individual income in the previous year before the survey. Individual income includes all work-related income, pensions, unemployment benefits and assistances, but excludes agricultural income, family business income and assistance received due to the disaster. The household individual income was calculated by adding up all the household members' individual income for each interviewed household.

Figure 6.2 Median monthly individual income immediately before, immediately after, one year after and three years after the earthquake



Notes: <sup>1</sup> Based on the 2008 survey, all the interviewed households' total individual income before the earthquake (sample size=3,645).

<sup>2</sup> Based on the 2008 survey, all the interviewed households' total individual income during the survey (sample size=3,645).

<sup>3</sup> Based on the 2009 survey, all the interviewed households' total individual income during the survey (sample size=4,020).

<sup>4</sup> Based on the 2011 survey, all the interviewed households' total individual income during the survey (sample size=3,837).

In the seriously affected areas, households' individual income was not affected as much as it was in the very seriously affected area. The negative impact was more apparent in the very seriously affected area in all regions, particularly in the Guangyuan district. Nevertheless, probably due to the Government's rapid reconstruction work, the economic recovery was very smooth in all the earthquake-affected regions. Households in most areas had higher individual incomes one year after the earthquake, except for those in the very seriously affected area in the Guangyuan district. Three years after the earthquake, the household individual income had greatly improved in all the areas, particularly in the very seriously affected area. Although it took a longer time for the areas affected more seriously by the earthquake to recover than for the less seriously affected ones, the median individual income in all earthquake areas had fully recovered from the disaster and by 2011 was much higher than before the earthquake.



## **Agricultural Income**

Primary industries are one of the important economic activities in Sichuan. In 2007, agricultural production accounted for 15.8 per cent of the GDP in Sichuan province, higher than the national average of 10.3 per cent (National Bureau of Statistics of China, 2010). Furthermore, earthquake areas covered large, poor, rural and mountainous areas. The economic development level was low in the earthquake areas, with a relatively high concentration of poor population. The impact of the earthquake on agriculture was disastrous for the low-income farmers, whose main source of income was agricultural production.

Part of the completely destroyed area was not accessible after the earthquake, so these areas and other very remote and sparsely-populated rural areas were not covered by the survey. Therefore, the proportion of rural households covered by the survey may be slightly lower than the actual proportion in the Sichuan earthquake area. In the survey area, around 70 per cent of the households conducted agricultural production before the earthquake. One year after the earthquake, 93 per cent of these households still carried out agricultural activity.

Although most households conducted agricultural activities (the agricultural households),<sup>77</sup> this was not the main income source for most agricultural households. Among all the households that conducted agricultural activities before the earthquake, only 62 per cent had actually earned money from agricultural activities before the earthquake. This figure dropped to 55 per cent of those conducting agricultural activities one year after the earthquake. As illustrated in Table 6.3, apart from the seriously affected area in the Guangyuan district, in almost all regions more agricultural households reported earning no money from their agricultural activities after the earthquake. Three years after the earthquake, the households that reported a positive income from agriculture had slightly increased, but the increase was not statistically significant. Furthermore, even among households with an agricultural income, one year after the earthquake their income was lower than before the earthquake. The mean agricultural net income was CNY 2,976 for all households that had an agricultural income before the earthquake, while it was only CNY 2,681 during the year following the earthquake.

<sup>77</sup> The agricultural households in this report refer to all the households that conducted agricultural activities in the survey area.

Table 6.3 Households that had a positive net agricultural income before and after the earthquake among the households that conducted agricultural activities (percentages)

		Before the earthquake	One year after the earthquake	Three years after the earthquake
<b>Seriously affected area</b>	Chengdu	51	37	46
	Deyang	67	61	61
	Mianyang	61	52	61
	Guangyuan	59	63	64
	Aba	-	-	31
<b>Very seriously affected area</b>	Chengdu	62	56	65
	Deyang	66	46	59
	Mianyang	64	52	53
	Guangyuan	44	34	42
	Aba	-	-	50
<i>Sample size</i>		2397	2599	2642
<b>Total</b>		<b>62</b>	<b>55</b>	<b>57</b>

Note: Based on all the households that conducted agricultural activities one year before the survey.

Although the Overall Reconstruction Plan emphasised the importance of implementing beneficial agricultural policies, the deterioration in agricultural income for farmers was still one of the most important negative impacts on households' economic situation immediately after the earthquake. Altogether 2,030 households were interviewed in the first and second surveys, and they reported their annual agricultural income before and after the earthquake. Among the households that were interviewed in both surveys, 48 per cent had a lower agricultural income one year after the earthquake than before, while 30 per cent had a higher agricultural income after the earthquake. Households were very pessimistic in evaluating their agricultural production – only seven per cent thought that their agricultural production was better than before the earthquake (Table 6.4).

Table 6.4 Households' agricultural and family business income before and after the earthquake (percentages)

	<b>Agricultural income</b>		<b>Family business income</b>	
	Self –evaluation <sup>1</sup>	Income changes <sup>2</sup>	Self- evaluation <sup>3</sup>	Income changes <sup>4</sup>
Better	7	30	13	57
No change	51	23	38	11
Worse	42	48	49	33
<i>Sample size</i>	2683	1260	337	115

Note: <sup>1</sup> Based on the 2009 survey, all the households that conducted agricultural activities between July 2008 and July 2009.

<sup>2</sup> Based on the 2008 and 2009 surveys, all the households interviewed in both surveys that conducted agricultural activities both before and after the earthquake.

<sup>3</sup> Based on the 2009 survey, all the households that conducted a family business between July 2008 and July 2009.

<sup>4</sup> Based on the 2008 and 2009 surveys, all the households interviewed in both surveys that conducted a family business both before and after the earthquake.

Compared to various agricultural policies to promote agricultural income, the loss of farmland was one of the main reasons for agricultural households obtaining lower agricultural income. Farmland was destroyed due to landslides, flooding subsidence and other reasons. According to the agricultural department of Sichuan province (Sichuan Provincial Department of Agriculture, 2008), around 168.8 million mu<sup>78</sup> of farmland was damaged in 75 counties in Sichuan province, including 14.26 million mu of farmland that was completely lost accounting for 8.45 per cent of the total damage.

In the survey one year after the earthquake, agricultural households that had carried out agricultural activities during the one-year period before the survey were asked about their land losses. Agricultural households were asked whether they had lost any farmland, forest land or fish pond after the earthquake. Most agricultural households (97 per cent) reported to have had cultivated land before the earthquake. Table 6.5 shows that among those who had cultivated land, 22 per cent had lost part of their cultivated land, including four per cent who lost all their land. Furthermore, 41 per cent of agricultural households had forest land and seven per cent had fish ponds before the earthquake. Of these, 15 per cent had lost part or all of their forest land and 23 per cent had lost part or all of their fish ponds.

Table 6.5 Agricultural households that had lost land and the reason for the land losses in 2009 (percentages)

		Cultivated land	Forest land	Fish pond
<b>All the households</b>	Had land or fish pond	97	41	7
	<i>Sample size</i>			2970
<b>All the households who had land/pond</b>	Not lost	78	85	78
	Lost some	18	11	13
	Lost all	4	4	9
	<i>Sample size</i>	2857	1061	138
<b>All the households who lost any land</b>	Damaged in the earthquake	26	60	22
	Reconstruction after the earthquake	44	20	24
	Other reasons	37	28	54
	<i>Sample size</i>	854	211	30

Note: Based on the 2009 survey, all the households that conducted agricultural activities during July 2008 and July 2009.

However, earthquake damage was not the only reason for the losses one year after the earthquake. According to the Overall Reconstruction Plan, the reconstruction projects had intended to use 47,800 hectares (or 717,000 mu) of new land in the Sichuan earthquake-affected area for various reconstruction purposes (State Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction 2008). This newly-occupied land could have been farming land, original construction land or waste or

<sup>78</sup> 1 mu = 666.67 square metres.

abandoned land etc. The 2009 survey indicated that reconstruction following the earthquake was a major reason for households losing their farming land. Only 25 per cent of the households that lost their cultivated land did so directly from damage by the earthquake; as many as 44 per cent of households lost their cultivated land due to the post-earthquake reconstruction. Other reasons included other natural disasters such as land degradation.

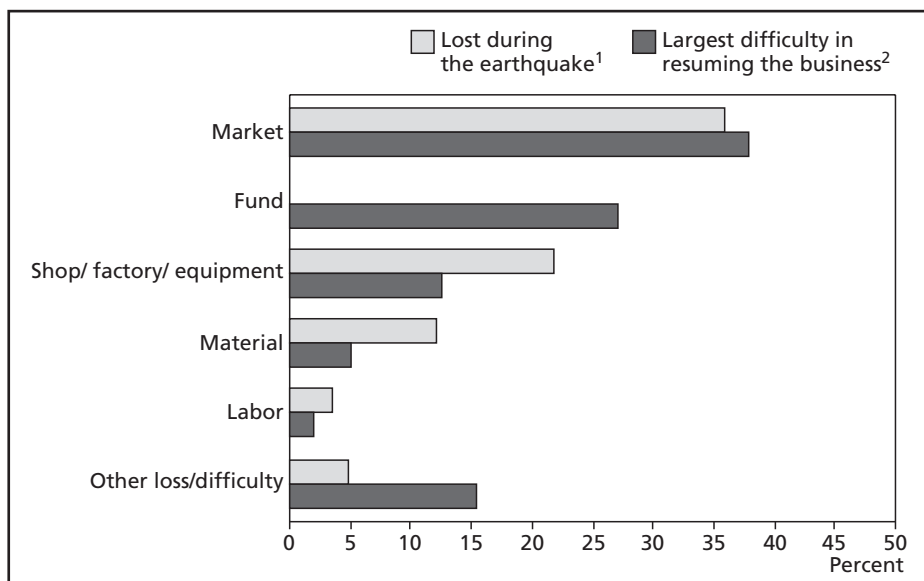
The Chinese Government had been working on urbanisation, and after the earthquake urbanisation was accelerated. Three years after the earthquake, 22 per cent of the households that had land before the earthquake lost some land. Of these, over 40 per cent lost all their land. Reconstruction work such as infrastructure, house and industrial park construction was the main reason for households losing cultivated land, and it accounted for half of the land losses after the earthquake. Another 11 per cent of agricultural households lost land due to land redistribution, and 16 per cent due to the land being returned to forest.

During the reconstruction and accelerated urbanisation, agricultural households were faced with new challenges within agricultural production. Many rural households lost their agricultural land and were moved **into newly-built apartments by the Government**. Lack of space needed for agricultural production was one of the predominant challenges reported by the interviewed households in the 2011 survey. As many as 11 per cent of the households that conducted agricultural activity reported that they lacked space for agricultural product storage and drying, or space to breed animals.

### **Non-agricultural Family Business Income**

Non-agricultural family business income is an important income source for both rural and urban households in the earthquake areas. In the first survey, 12 per cent of the households in the survey area reported that they ran a family business before the earthquake. However, 16 per cent of those running a business before the earthquake reported that they could not continue to run it in the aftermath of the earthquake, and over half had to struggle to continue the business. Figure 6.3 illustrates the losses from the earthquake by households that ran a family business beforehand, and the difficulties and needs reported by the households that could not continue their family business or had difficulty in running it after the earthquake.

Figure 6.3 Households' loss of family business during the earthquake and their difficulties in resuming the business immediately after the earthquake



Notes: <sup>1</sup> Based on the 2008 survey, all the households that had run a family business before the earthquake (sample size=428).

<sup>2</sup> Based on the 2008 survey, all the households that were running a family business during the survey; each household could report more than one difficulty, and totals may therefore add up to more than 100 per cent (sample size=295).

Immediately after the earthquake, 22 per cent of households that ran a family business lost their shop, factory or equipment (Figure 6.3). Of these, nine per cent had their shop, factory or equipment completely destroyed, 12 per cent lost stock and four per cent lost their employees. However, the biggest loss for the households' family business was the loss of their clients, partners, relationships and market. Over one-third of households that ran a family business before the earthquake lost their clients, partners or market. This also turned out to be the biggest problem faced by households that could not continue or had difficulty in running their family business (Figure 6.3). The other important problem faced by family businesses was the lack of funding to run the business, and 27 per cent reported funding as being the most important issue. Furthermore, 13 per cent had no shop, factory or equipment, five per cent could not obtain the necessary materials, two per cent did not have sufficient labour and 15 per cent faced other difficulties.

Family businesses recovered slowly after the earthquake. Immediately after the earthquake, in the first survey, as many as 10 per cent of households claimed that they had plans to start a new family business after the earthquake. One year after the earthquake, family businesses were still in a difficult situation. Only eight per cent of

households had been able to continue running the family business since the earthquake, and 1.5 per cent of households had started a new family business after the earthquake. One year after the earthquake most households were still waiting until the economic situation became more promising. Three years after the earthquake, the 2011 survey found that 13 per cent of households were running a non-agricultural family business, among which 30 per cent had begun their business after the earthquake.

Around half of the households that ran family businesses reported that their businesses had deteriorated one year after the earthquake (Table 6.4). However, comparison of the family business income of the households that ran family business before and after the earthquake indicated that more than half received a higher income from their family business, and only one-third earned less. Furthermore, the percentage of households that ran a family business had decreased in most regions one year after the earthquake, but by 2011 had increased to a level close to that before the earthquake (Table 6.6).

Table 6.6 Households with a family business before and after the earthquake (percentages)

		Before the earthquake	One year after the earthquake	Three years after the earthquake
Seriously affected area	Chengdu	8	12	22
	Deyang	11	9	9
	Mianyang	8	8	13
	Guangyuan	11	8	8
Very seriously affected area	Chengdu	27	17	16
	Deyang	14	13	10
	Mianyang	13	9	13
	Guangyuan	14	8	12
<i>Sample size</i>		<i>3643</i>	<i>4018</i>	<i>3641</i>
<b>Total</b>		<b>12</b>	<b>9</b>	<b>13</b>

Despite the problems reported for family businesses, those who managed to continue their business increased their income after the earthquake. Among the households that were interviewed in both surveys and who reported running a family business during both survey periods, one year after the earthquake 59 per cent of them had a higher annual family business income, while 31 per cent had a lower annual income. For those who ran a family business, the mean annual family business income was CNY 7,425 before the earthquake and CNY 11,010 after the earthquake. Three years after the earthquake, households had a more positive evaluation of their family business. The mean family business income for households that ran a family business in the survey area dramatically increased to CNY 17,757, more than double that before the earthquake. The survey indicates that quite a lot of households had difficulties in running their family business and had to close the business soon after the disaster. The positive Government policies supporting non-agricultural family businesses after the earthquake had encouraged people to start new businesses and had helped to increase the family business income significantly in the disaster area. However, the major

opportunities during the large-scale reconstruction work after the disaster could also have played an important role in this improvement.

## Subsidies

After the disaster, many households in earthquake-affected areas received various kinds of livelihood assistance or housing subsidies from the Government, social organisations, friends and relatives, and other sources of donations. The first earthquake survey in 2008 was around two months after the disaster. Approximately half of the interviewed households reported having received livelihood assistance (i.e. CNY 10 per day for the first three months), and five per cent of households had received solatium. It was reported that the livelihood subsidies covered 65 per cent of the households in the survey area for one year after the earthquake.

As the first survey was only two months after the earthquake, very few households (2.5 per cent) had yet received the transition house subsidy or the self-built permanent house subsidy (0.3 per cent), while 4.1 per cent of households had received other subsidies or donations following the earthquake. According to the Sichuan rural housing reconstruction programme, the Sichuan rural housing repair and reinforcement programme and the urban housing reconstruction programme, households were entitled to housing subsidies according to the extent of damage to their house. They were also entitled to transition house subsidies if they lost their house and found a temporary house by themselves before they moved into a new house. In the second survey in 2009, around 65 per cent of the households had either rebuilt, repaired, bought or replaced their houses or had plans to rebuild, repair, buy or replace their houses. Of these, 84 per cent (or 55 per cent of households in the survey area) had received housing subsidies from the Government, and 24 per cent of the households in the survey area had benefited from the transition house subsidy. In addition, 11 per cent of households had received housing replacement subsidies, land compensation for reconstruction, and other subsidies, compensation and donations.

The distribution of the subsidies was highly dependent on the area in which the households lived for the short period after the disaster. Table 6.7 presents the percentage of households that received subsidies in various periods. Households in the very seriously affected area received more subsidies than those in the seriously affected area. Almost all the households in the very seriously affected areas of Guangyuan and Deyang received subsidies immediately after the earthquake. The subsidies only covered 29 per cent of the households in the Chengdu seriously affected area, probably because the damage there was not as serious as that sustained in other regions. The subsidies had been sent to the households fairly rapidly, as most households had received subsidies immediately after the earthquake.

Three years after the earthquake, the households in the very seriously affected area appeared to receive no more subsidies than other households. In the one-year period before the 2011 survey, only 17 per cent of the households still received subsidies from various sources. Moreover, compared to those in the seriously affected area, the households in the very seriously affected area no longer received the most subsidies.

Table 6.7 Households receiving any subsidies after the earthquake by region (percentages)

		Two months after the earthquake	One year after the earthquake	One year between July 2010 and July 2011
<b>Serious area</b>	Chengdu	21	29	16
	Deyang	59	75	13
	Mianyang	35	45	24
	Guangyuan	99	96	14
	Aba	-	-	25
<b>Very serious area</b>	Chengdu	50	76	25
	Deyang	93	100	13
	Mianyang	40	57	14
	Guangyuan	100	100	15
	Aba	-	-	13
Sample size		3642	4010	3824
<b>Total</b>		<b>52</b>	<b>68</b>	<b>17</b>

All these subsidies, compensation and donations that households received played an important role in helping them through the most difficult period after the disaster. These aid funds improved households' income to a large extent, and changed the income distribution in the earthquake-affected areas, which will be discussed later. The various subsidies played an important role in meeting households' basic needs for survival and in maintaining better living conditions after the disaster. However, this kind of subsidised income compensation could only work for a limited period of time and could not be a main income source in the longer term. As shown in the survey, three years after the disaster the subsidies had been reduced to a level which contributed only a little to improving the household income.

### Household Income Sources

Households' access to diversified income sources can contribute to a higher household income particularly in developing countries (Ellis, 2000). The earthquake surveys also found that income diversity played an important part in households' ability to withstand the impact of the disaster. Households with few income sources generally had a lower income than households with several sources of income. In the 2009 and 2011 surveys, households were asked about the individual income of each household member, the household agricultural income, the family business income and the subsidies received. All households in the survey area were divided into five groups ac-



cording to the household annual income; each group had within it the same number of households. One year after the earthquake, over 70 per cent of the households with only one income source had the lowest income, while over half of the households with three income sources and over 60 per cent of the households with four income sources had a high or the highest household income in the survey regions (Table 6.8).

Table 6.8 Income subject to the negative impact of the disaster one year after the earthquake (percentages)

	Total number of income sources				
	1	2	3	4	Total
Income group by number of income sources immediately after the earthquake <sup>1</sup>					
Lowest income	72	18	6	3	20
Low income	7	24	19	20	20
Medium income	7	22	21	16	20
High income	5	23	21	34	20
Highest income	9	13	34	28	20
Impact of the earthquake on household income within a year by number of income sources <sup>2</sup>					
Income reduced one year after the earthquake	63	48	35	4	49
Income increased one year after the earthquake	37	52	65	96	51
Subjective evaluation of living condition in 2011 compared to that before the earthquake <sup>3</sup>					
Much better	6	7	10	17	7
Better	37	46	45	45	41
The same	41	35	36	33	38
Worse	13	8	5	4	10
Much worse	5	4	5		4
Total	100	100	100	100	100

Notes: <sup>1</sup> Based on the 2008 survey (sample size=3,658).

<sup>2</sup> Based on the 2008 and 2009 surveys, all the households interviewed both in 2008 and 2009 (sample size =2,030).

<sup>3</sup> Based on the 2011 survey (sample size =3,797).

A diversity of income streams reduces the vulnerability of households during major disasters; households with few income sources are the most vulnerable. Of the households that were interviewed in both the 2008 and 2009 surveys, 51 per cent had a higher household income after the earthquake and 49 per cent had a similar or lower income (Table 6.8). Of these, 63 per cent with only one income source had a lower or the same income after the earthquake, while 65 per cent with three income sources and 96 per cent with four income sources had a higher income. Three years after the earthquake, most households reported a better economic situation compared to that before the earthquake. Households with more income sources appeared to have a better situation: 63 per cent of households with four income sources reported better living conditions, while only 42 per cent of those with only one income source did so. In addition, only four per cent of the households with four income sources reported

their living conditions to be worse, while 17 per cent of those with only one income source considered themselves to be in worse situation.

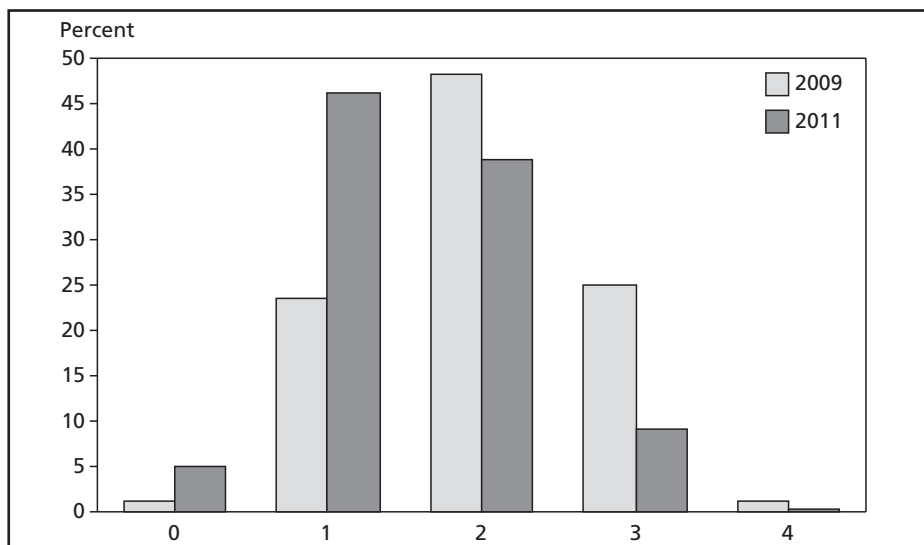
The households with more income diversity more easily recovered from the economic shock. The 2011 survey found that most households with diversified income sources had already recovered from the disaster, while households with few income sources were in the most difficult situation. Table 6.9 shows all the households that reported that their economic situation had been affected by the earthquake, and the timeframe that these households reported when their economic situation had recovered or was expected to recover. One-quarter of households without any income source reported that it would take more than five years for their economic situation to recover to the level before the earthquake. However, of the households with four different income sources, 60 per cent had recovered within one year of the earthquake, 35 per cent had recovered within three years of the earthquake and none reported needing more than five years to recover to their pre-earthquake level.

Table 6.9 Households recovering in different periods by the number of income sources in 2011 (percentages)

Number of income sources	Within one year	2-3 years	4-5 years	5+ years	Sample size
0	43	30	2	24	191
1	51	28	3	18	1823
2	55	31	3	11	1481
3	59	30	2	10	329
4	60	35	5	-	18
<b>Total</b>	<b>53</b>	<b>30</b>	<b>3</b>	<b>14</b>	<b>3842</b>

As mentioned, the areas most affected by the disaster were mainly remote rural areas, and the surveys also found that the households that had few income sources were mainly agricultural households that had relied solely on their agricultural activities. During the reconstruction, households in the survey area had on average more income sources during the short period after the earthquake, mostly because many households received subsidies as an important supplementary income immediately after the earthquake. Three years after the earthquake, when reconstruction was complete, households no longer received subsidies (Figure 6.4). Households with access to only agricultural income were much more vulnerable to the crisis, while those with more diversified streams of income were better placed to recover from the disaster. The Government assistance was useful in buffering the impact of the disaster in the short term, while households' diverse income sources helped them in the longer term to recover more rapidly after the disaster.

Figure 6.4 Number of income sources after the earthquake



Note: Based on the 2009 survey (sample size=4,020), and the 2011 survey (sample size=3,842).

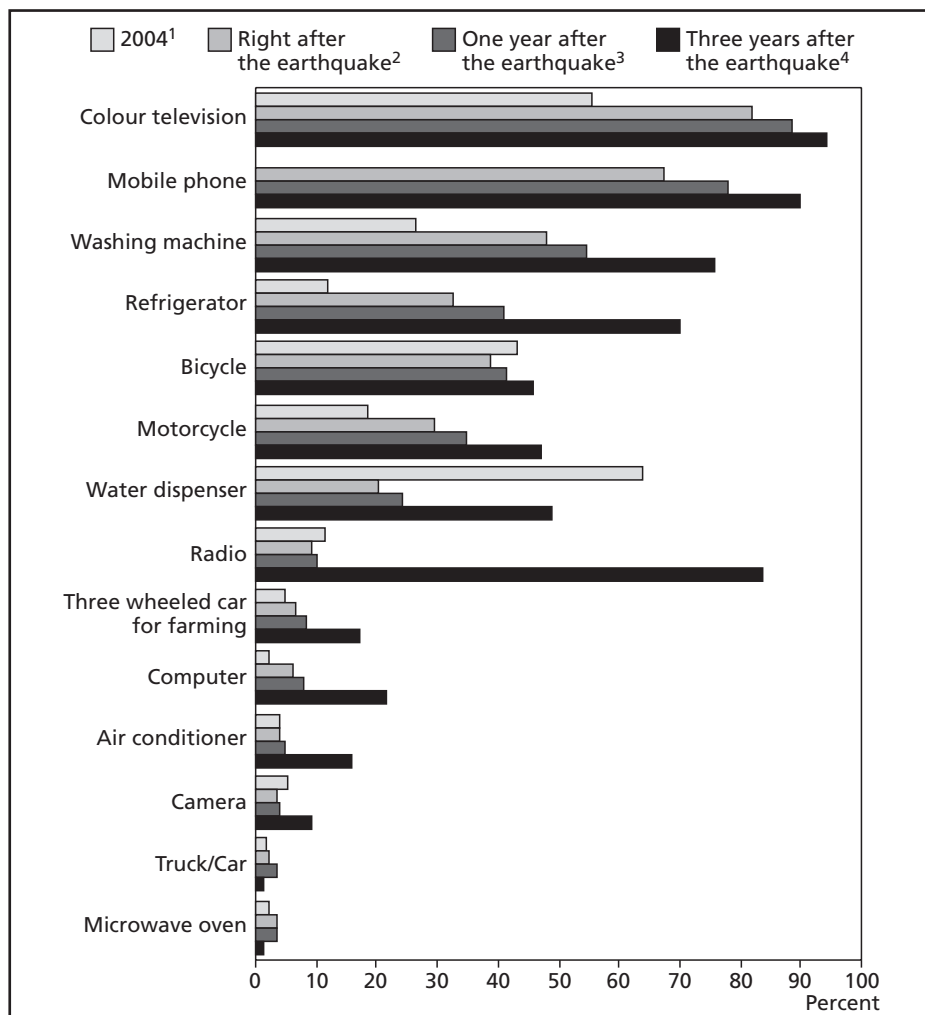
## 6.4 Household Assets and Wealth

Household possessions, as an important part of household wealth, are a good indicator of households' long-term economic situation. Particularly after the earthquake, when a large amount of durable consumer goods were destroyed or damaged, access to assets was very important to enable households to maintain an appropriate living standard and quality of life. Therefore, taking advantage of the 2004 survey, access to assets of households in the earthquake-affected area was compared between 2004 and one year after the earthquake. Unfortunately, we do not have the data to enable a comparison between households' access to assets immediately before and after the earthquake.

Compared to the survey in 2004, one year after the earthquake households in the earthquake-affected areas **already had greater access to most assets**. Households' possession of a colour TV, washing machine, microwave oven, motorcycle, three-wheeled car for farming, truck or car had increased by 50 to 100 per cent, while the number of households owning a refrigerator, drinking water dispenser and computer increased by 200 to 300 per cent (Figure 6.5). Only the possession of a bicycle, radio and camera had slightly decreased. Three years after the earthquake, the 2011 survey found that access to all household assets, particularly home appliances such as a colour television, washing machine, refrigerator and so on, had greatly increased. The percentage of

households owning a refrigerator, water dispenser, air conditioner, microwave oven, computer and camera had doubled or tripled since 2009.

Figure 6.5 Access to household assets in 2004<sup>79</sup> and after the earthquake



Notes: <sup>1</sup> Based on the MEDOW survey, all the households in earthquake areas (sample size=853).

<sup>2</sup> Based on the 2009 survey (sample size=4,018).

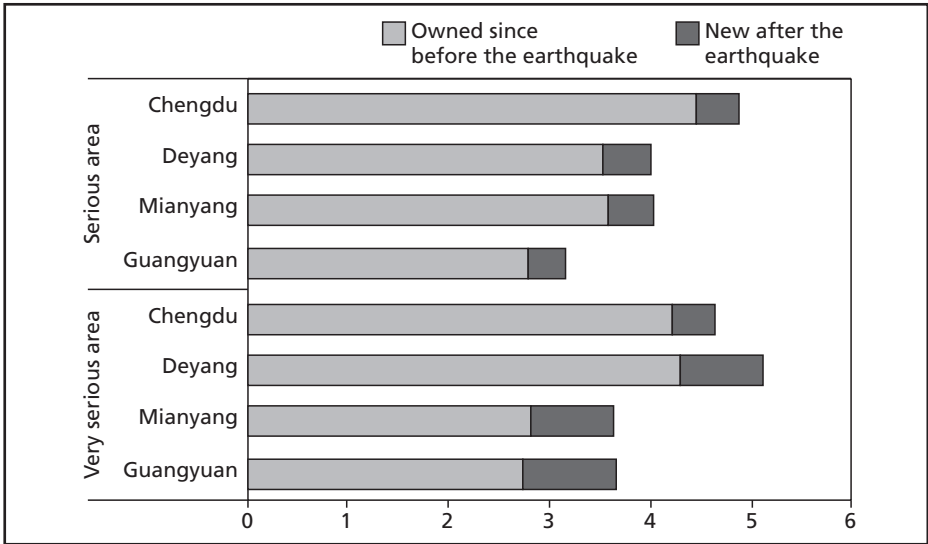
<sup>3</sup> Based on the 2009 survey (sample size=4,018).

<sup>4</sup> Based on the 2011 survey (sample size=3,839).

<sup>79</sup> Households' access to mobile phones was not asked about in the 2004 survey.

Due to the damage caused by the earthquake, some assets were purchased within one year of it, particularly in the very seriously affected area. In the 2009 survey, the interviewed households were asked whether the assets were bought after the earthquake. Figure 6.6 shows the mean number of assets owned by households in various regions before the earthquake and those bought within one year of the earthquake. The ownership of household appliances and assets varied in different regions, either due to the varying development level of each region or to the destruction caused by the earthquake. The mean number of assets was lowest in the Guangyuan and Mianyang very seriously affected areas – on average households in these areas owned fewer than three assets before the earthquake. However, after the earthquake households in the very seriously affected area bought more new assets than those in the seriously affected area, indicating a higher destruction of family assets during the earthquake. The mean number of newly-bought assets after the earthquake in the very seriously affected area was close to one, while in the seriously affected area newly-bought assets averaged less than 0.5.

Figure 6.6 Mean assets owned before the earthquake and bought within one year of the earthquake



Note: Based on the 2009 survey (sample size=4,018).

Households' possession of assets was consistent with household income. Table 6.10 shows households' access to assets across various income groups. One year after the earthquake, among households that only owned two or fewer assets, 54 per cent were in the lowest income quintile, while close to 40 per cent of households that owned eight or more assets were in the highest income group. However, households' decision to buy

new family appliances was not as dependent on household income – most households bought new assets mainly because they had lost necessary items during the earthquake.

Table 6.10 Households' income by access to household assets in 2009 (percentages)

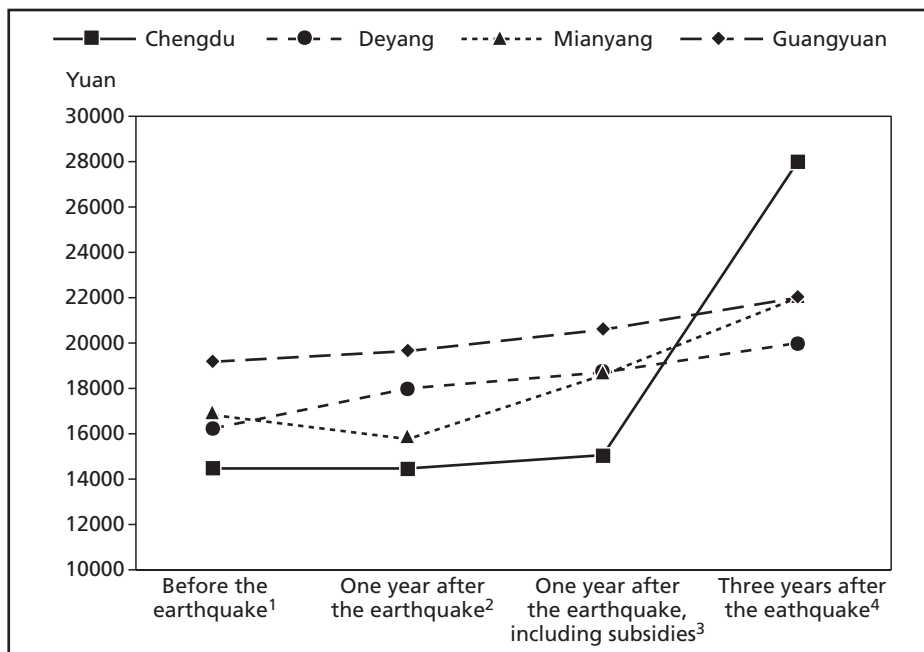
		Lowest income	Low income	Medium income	High income	Highest income	Sample size
Number of assets households owned one year after the earthquake	0 to 2	54	20	9	9	8	738
	3 to 5	22	22	21	20	15	1766
	6 to 7	10	19	24	24	23	844
	8 or more	4	18	17	23	39	312
Number of assets households bought one year after the earthquake	0	24	19	19	22	17	2243
	1	19	20	23	20	18	887
	2 or more	13	22	17	17	31	526

## 6.5 Income Distribution

In the first survey immediately after the earthquake in 2008, households were asked about their income during the 12 months before the earthquake; in the second survey in 2009, households were asked about their income from different sources in the 12 months between July 2008 and June 2009; in the 2011 survey, households were asked about their income in the 12 months between July 2010 and June 2011. Figure 6.7 illustrates how the households' income changed after the earthquake. When households' individual income, agricultural income and family business income were added together, the median annual household income was CNY 16,800 one year before the earthquake, CNY 15,600 (CNY 18,600 including subsidies) one year after the earthquake and CNY 22,200 three years after the earthquake.

In all the seriously affected regions, household income had not significantly changed two months after the earthquake compared to that before the earthquake, while there was apparently a negative impact on household income after the earthquake in the very seriously affected regions. The median annual household income had not apparently been affected by the earthquake except in the Mianyang seriously affected area (Figure 6.7). Furthermore, subsidies had not played an important role in the areas with little effect on income but had helped improve the situation in the Mianyang seriously affected area where household income had been negatively affected. The subsidies succeeded in raising household income to a level higher than the post-earthquake level in the affected area.

Figure 6.7 Median annual household income before and after the earthquake in seriously affected areas<sup>80</sup>



Notes: <sup>1</sup> Based on the 2008 survey, all the interviewed households in seriously affected areas (sample size=1,703).

<sup>2</sup> Based on the 2009 survey, all the interviewed households in seriously affected areas (sample size=1,799).

<sup>3</sup> Based on the 2009 survey, all the interviewed households in seriously affected areas (sample size=1,799).

<sup>4</sup> Based on the 2011 survey, all the interviewed households in seriously affected areas (sample size=1,650).<sup>81</sup>

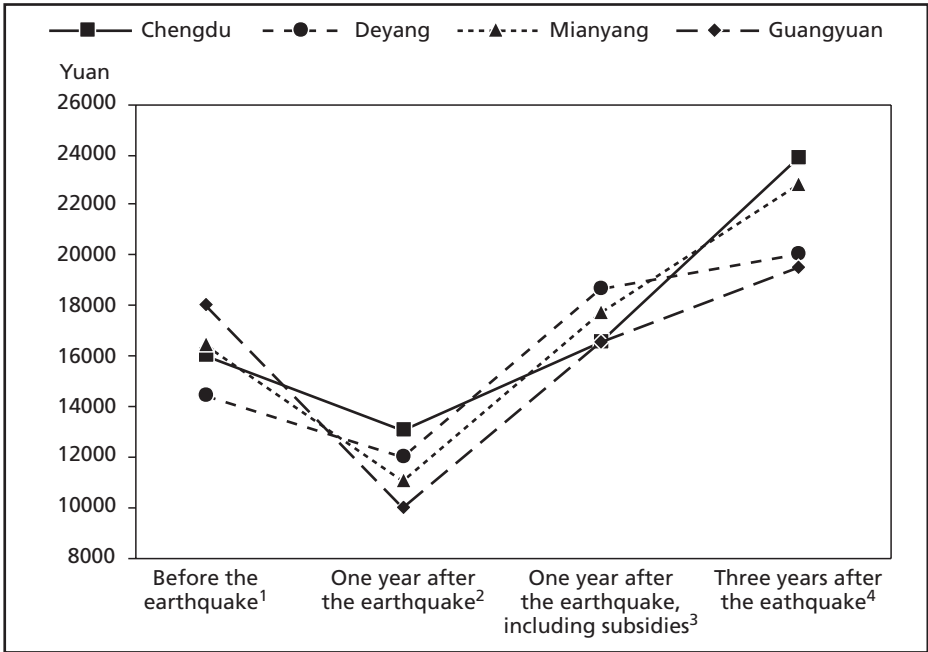
The earthquake's effects on household income appeared to show different patterns in the seriously and very seriously affected areas. Compared to the insignificant impact of the earthquake on household income, the median annual income had decreased significantly in all the very seriously affected areas, particularly in the districts of Mianyang and Guangyuan (Figure 6.8). The median annual household income had decreased

<sup>80</sup> Household income 12 months before the earthquake included households' individual income, agricultural income and family business income; subsidies were not reported in the first survey, and private remittances and other income were not asked about in both the 2008 and 2009 surveys and are therefore not included in the total household income. The total household income may therefore be somewhat underestimated.

<sup>81</sup> Relatively few households were interviewed in 2008 (104 households) and in 2009 (73 households) in the Chengdu seriously affected areas.

from CNY 16,400 to CNY 11,000 in the Mianyang very seriously affected area, and had decreased from CNY 18,000 to CNY 10,000 in the Guangyuan very seriously affected area. The Guangyuan district, which had previously had the highest median annual household income, became the district with the lowest annual household income in its very seriously affected area when the subsidies were not taken into account.

Figure 6.8 Median annual household income before and after the earthquake in very seriously affected areas<sup>82</sup>



Note: <sup>1</sup> Based on the 2008 survey, all the interviewed households in seriously affected areas (sample size=1,942).

<sup>2</sup> Based on the 2009 survey, all the interviewed households in seriously affected areas (sample size=2,222).

<sup>3</sup> Based on the 2009 survey, all the interviewed households in seriously affected areas (sample size=2,222).

<sup>4</sup> Based on the 2011 survey, all the interviewed households in seriously affected areas (sample size=1,991).

<sup>82</sup> Household income 12 months before the earthquake included households' individual income, agricultural income and family business income; subsidies were not reported in the first survey, and private remittances and other income were not asked about in both the 2008 and 2009 surveys, and are therefore not included in the total household income. The total household income may therefore be somewhat underestimated.



However, one year after the earthquake, the subsidies to households in the earthquake areas had helped to improve the households' living conditions, as indicated in Figure 6.8. The 2009 survey indicated that when subsidies were included in the total household income, they could be seen to function well in maintaining households' living conditions at a certain level, particularly in areas where negative impacts on the household income were observed. Due to the subsidies received, the median annual income for households in all the very seriously affected regions had recovered to the same or a higher level than that before the earthquake except in the Guangyuan district. The median annual household income in the Guangyuan very seriously affected region had increased to CNY 16,500 in 2009, slightly lower than its level before the earthquake.

Figure 6.7 and Figure 6.8 also show that three years after the earthquake in 2011, although subsidies to households had decreased to a very low level, the annual household income in all earthquake-affected areas had increased significantly. The annual household income had increased most significantly in the districts of Chengdu and Mianyang. Although the subsidies were only available for a certain period so as to improve households' living conditions in areas negatively affected by the disaster, three years later household income had improved significantly without substantial subsidies.

Subsidies in the earthquake areas not only improved households' income in the very seriously damaged regions but also changed the income distribution in the whole earthquake area. One commonly-used measure of income distribution and inequality is the Gini coefficient, defined from the Lorenz Curve, which plots the cumulative percentages of total income received against the cumulative number of recipients, starting from the poorest. The Gini coefficient shows how the actual distribution of income in an economy deviates from a perfectly equal distribution. In the survey area, the Gini coefficient – calculated based on household annual per capita income after the earthquake, excluding subsidies – was 0.461 [Cl: 0.459, 0.463]. When subsidies were included in the household income, the Gini coefficient was calculated as 0.435 [Cl: 0.433, 0.437], much lower than before.

Another measure of inequality is the share of overall income going to the richest and poorest groups in society. Calculated based on the per capita household income in the survey, Table 6.11 lists the share of income of various income groups. One year after the earthquake, the richest 20 per cent of the population enjoyed nearly half of the total income and the poorest 20 per cent of the population received two per cent of the total income. The inequality measure, calculated as the ratio of the richest 20 per cent to the poorest 20 per cent, was 27. When subsidies are included, the inequality measure was only 8.9. Therefore, the subsidies given to households in the disaster area helped to reduce income inequality during the period immediately after the earthquake.

Table 6.11 Quintile share of per capita income

		Lowest income	Low income	Medium income	High income	Highest income	Sample size
<b>2009</b>	Excluding subsidies	2	9	16	25	48	3658
	Including subsidies	5	12	18	24	41	3658
<b>2011</b>		3	9	15	23	50	3839

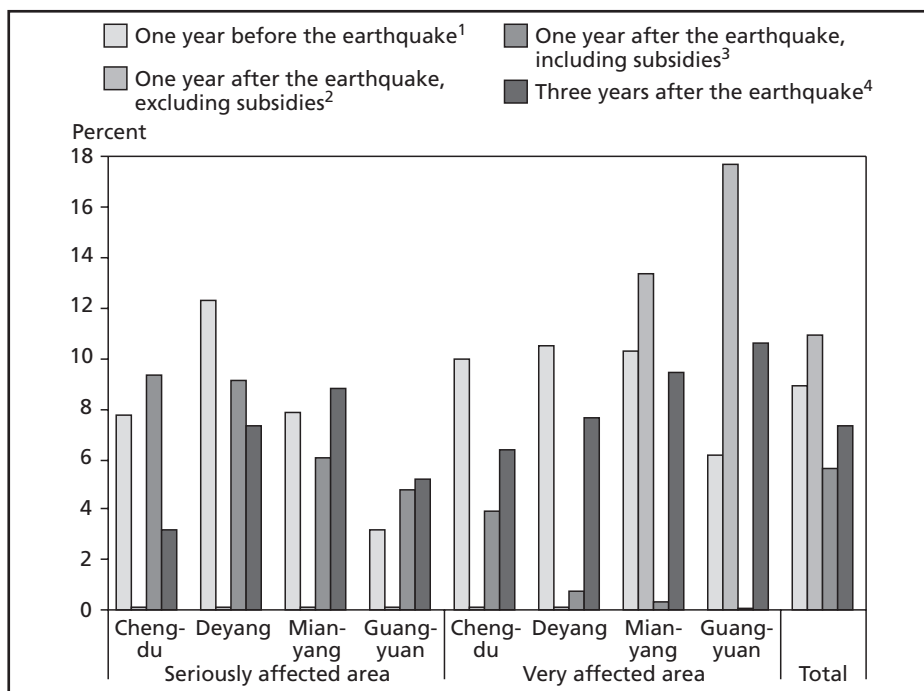
Three years after the disaster, when reconstruction was complete, the 2011 survey found that the Gini coefficient – calculated based on household annual per capita income, including subsidies – had increased to 0.474 [CI: 0.472, 0.475], slightly higher than the pre-disaster level. The effect of subsidies in reducing income inequality in the disaster area was only valid within a short period after the earthquake.

## 6.6 Poverty and Vulnerable Households

During the earthquake, a large amount of subsistence and production materials were destroyed. As discussed before, households' income was affected to varying extents. The impact of the disaster on poor households was much more serious than it was on other households as the poor households were more vulnerable to the disaster and it would take much longer for them to recover to their pre-disaster income level. In 2009, the new poverty standard was implemented as a per capita net annual income of CNY 1,196. For comparison, this poverty standard was used as the poverty line in the survey area, to compare the number of households in poverty before and after the earthquake.

Although the mean annual household income in seriously affected areas after the earthquake was similar to that before the earthquake, as indicated in Figure 6.7, in most areas more households fell into poverty after the earthquake (Figure 6.9). In total, the number of households living below the poverty line grew from nine per cent one year before the earthquake to 11 per cent one year afterwards. With the exception of the Deyang district, all districts contained more households living in poverty. This clearly indicates the high vulnerability of the poor households, particularly in the areas very seriously affected by the earthquake. In the Guangyuan very seriously affected area, the income of over 10 per cent more households had dropped below the poverty line in 2009 compared to before the earthquake. However, subsidies had helped poor households through the most difficult period. When subsidies are included, only six per cent of households still lived below the poverty line in the survey areas. The subsidies played an effective role in the very seriously affected area. In 2009, and taking subsidies into account, practically no households lived below the official poverty line in the very seriously affected areas of Mianyang and Guangyuan.

Figure 6.9 Percentage of households living below the poverty line before and after the earthquake



Notes: <sup>1</sup> Based on the 2008 survey (sample size=3,253).

<sup>2</sup> Based on the 2009 survey (sample size=4,018).

<sup>3</sup> Based on the 2009 survey (sample size=4,018).

<sup>4</sup> Based on the 2011 survey (sample size=3,839).

The households living in the very seriously affected regions benefited most from the subsidies. Three years after the earthquake, household income had greatly improved but seven per cent of households still lived below the poverty line. This figure was lower than the level before the earthquake but higher than the level one year after the earthquake. The subsidies after the earthquake helped poor households through the most difficult period, and improved poor households' living conditions to a large extent during the short period after the earthquake.

The subsidies from the Government and other channels helped to improve households' income and to reduce the prevalence of poverty in earthquake areas during the period immediately after the earthquake. Nevertheless, as indicated by the survey, this only temporarily removed poverty. It was very important for households to find sustainable ways to recover from the disaster and to maintain and improve their living conditions in the longer term. When subsidies are not taken into consideration, households with only an agricultural income were almost all in the lowest income group,

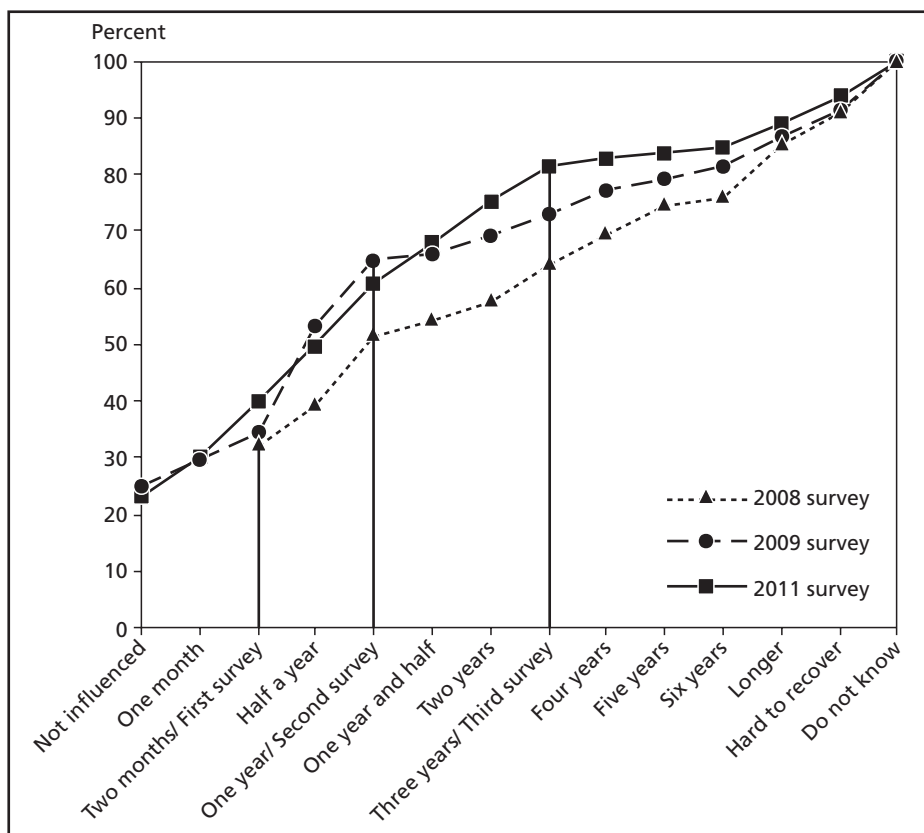
and 89 per cent of households that had no individual income from non-agricultural activities were in the lowest income group. Thus, agricultural households with no individual income were the most vulnerable households. The most important strategy for eliminating poverty in earthquake areas in the longer term would be for poor agricultural households to be encouraged and helped to conduct non-agricultural activities, and at same time for the agricultural income of those carrying out farming work to be increased.

## **6.7 Living Conditions Recovery and the Earthquake**

Households were asked in all three surveys about how their living conditions had been influenced by the earthquake and if these living conditions had recovered to the level before the earthquake or when they expected them to have recovered. In the first survey, which was around two months after the earthquake, 32 per cent of households reported that their living conditions were the same as before the earthquake, seven per cent thought that their living conditions would recover within six months, 11 per cent estimated their situation would recover within a year, 13 per cent estimated three years and 10 per cent estimated five years (Figure 6.10) This means that approximately half of the households expected their living conditions to be at the same level or higher one year after the earthquake compared to before.

The economic recovery of households after the earthquake turned out to be more rapid than their expectations. Both the 2009 and 2011 surveys indicated that one year after the earthquake, the living conditions of 65 per cent of households had already recovered to that before the earthquake, which was a much quicker recovery than households had predicted in 2008. In the longer term, households' estimates for the recovery of their living conditions was more optimistic in the 2009 survey than in 2008, as indicated in Figure 6.10. In the 2009 survey, only 8.3 per cent of households expected their living conditions to recover within three years of the earthquake. In 2011, 82 per cent of households reported that their situation had already recovered, which was around 10 per cent higher than the expectations of 2009. Furthermore, households' expectations of recovery were more optimistic in the 2011 survey than in the 2009 survey (Figure 6.10).

Figure 6.10 Households' own perceptions or expectations of household living conditions reaching the level of that before the earthquake (cumulative percentages)



Note: Based on the 2008 survey (sample size=3,642) giving households' expectations of their living conditions, and the 2009 survey (sample size=4,018) and the 2011 survey (sample size=3,803) giving households' perception of their recovery before the survey and expectation of recovery if it had not yet reached the pre-disaster level.

In both the 2008 and 2009 surveys, five per cent of households thought that it would be very hard for their situation to recover to the level before the earthquake and around 10 per cent were not sure when their situation would recover. One year of reconstruction and development in the earthquake areas did not change their pessimistic estimates regarding their economy. In the 2011 survey, uncertainty about the households' future situation decreased to six per cent. Although households were more optimistic than they had been in the previous surveys, pessimistic households still accounted for 10 per cent of all the households in the survey area. Around five per cent of households still expected it to take more than six years for their living conditions to recover, and another five per cent believed that their conditions would never recover to pre-earthquake levels. These were relatively poor households with fewer income

sources, and would therefore be the group of people facing the greatest challenges in earthquake areas after the reconstruction.

The surveys show that households' incomes did not affect their expectations for the recovery of their living conditions; however, households' expectations were to a large extent dependent on the impact of the earthquake. One year after the earthquake, households living in the very seriously affected regions were more pessimistic than other households. In the Mianyang very seriously affected region, 20 per cent of households did not think their living conditions could recover to their pre-disaster level, and 15 per cent were not sure when they would recover. Furthermore, Table 6.12 shows that the households' economic recovery was closely related to the community recovery. Those living in communities that had been destroyed by the earthquake and no longer existed were the most vulnerable people. Most of these households needed three years or longer to recover; and almost half thought that it would be very difficult for their living conditions to recover to the pre-earthquake level.

Table 6.12 Household economic recovery one year after the earthquake by community recovery in 2009 (percentages)

	Living condition of the household expected to recover to the same level as before									Sample size
	Not affected or recovered	Within six months	Within one year	Within two years	Within three years	Within five years	Longer	Hard to recover	Do not know	
Community influenced	92	0	2	0	2	1	1	0	3	411
Community already recovered	88	1	1	2	1	1	2	1	4	1290
Community not recovered	32	2	7	8	8	9	11	9	15	1700
Community no longer exists	5	0	0	0	15	9	17	49	6	32

The 2011 survey also found that households that needed more than five years to recover were relatively poor – among those who reported that their household living conditions would not recover within five years, 16 per cent were below the poverty line and around 30 per cent were in the lowest income group. The 2011 survey found no significant regional differences in economic recovery except that in the very seriously affected area of Aba 23 per cent of households reported it being difficult to recover to pre-disaster levels. The Aba very seriously affected area was among the most remote and poor areas, and households living here were the most vulnerable households following the disaster.

Multiple correspondence analysis is another method of ascertaining the characteristics of households that had difficulty recovering from the disaster. Multiple correspondence analysis (MCA) is an extension of correspondence analysis (CA), which was developed by Hirschfeld (Hirschfeld, 1935) and Jean-Paul Benzécri (Benzécri, 1973). MCA uses mathematical procedures to reveal patterns of relationships between several categorical variables in complex data sets. It is very useful in constructing complex visual maps. A technical description of the method can be obtained in Greenacre and Blasius (Greenacre, 2006).

Figure 6.11 Household living conditions' recovery by region, extent of house damage, household assistance received and household income level. Multiple correspondent analysis

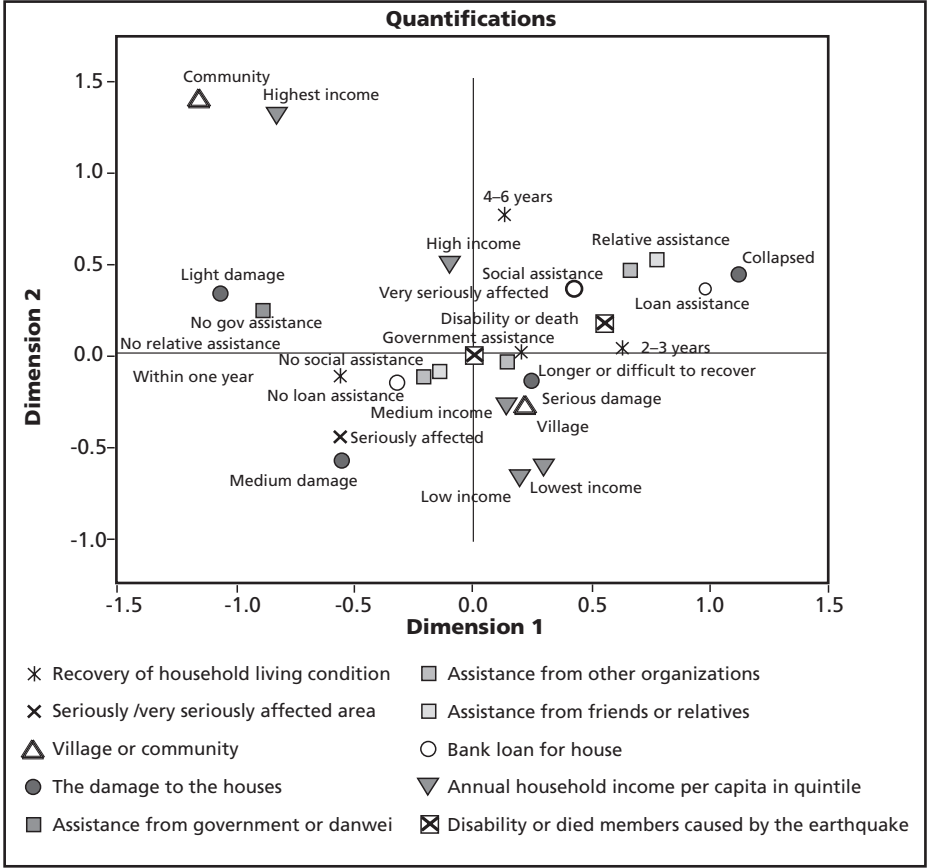


Figure 6.11 shows a map of characteristics of the interviewed households in the affected areas in 2011, including the households' income level, extent of house damage, recovery of household living conditions, assistance received and so on. Only households that were interviewed in the 2011 survey and affected by the disaster were included in the analysis. In multiple correspondence analysis characteristics which are related have a short distance separating them, while characteristics that are not linked are further apart.

In the plot of Figure 6.11, quadrant I can be defined as presenting rich urban households with little damage that received no assistance, quadrant II can be defined as presenting households with medium damage in a seriously damaged area, quadrant III can be defined as presenting rural poor households, and quadrant IV can be defined as presenting households with collapsed houses in a very seriously affected area. The component loadings for two dimensions out of the component analysis in Figure 6.11 show that dimension 1 is consistent with the damage to the houses. The higher the score is in dimension 1, the more serious the damage was to the house occupied by the household. Dimension 2 is correlated with income level, where the higher the score is, the higher the household income was.

The result of this analysis shows that households with light or medium damage to their houses were more likely to have recovered within one year, while households with serious damage needed a longer time to recover. High-income households may also need a relatively longer time to recover, probably because compared to poor households their absolute losses from the disaster were large and it took longer for them to recover. In the plot, households who found it very difficult to recover to the pre-disaster situation were not far from the middle apart from a small positive loading in dimension 1. This may indicate that these households did not have special characteristics except that households with serious house damage were slightly more likely to have difficulty in recovering their living conditions.

Government assistance had been distributed among almost all the affected households, while assistance from social organisations and relatives and bank loans were allocated particularly for the worst-hit households.

## 6.8 Conclusions

The Sichuan earthquake was disastrous for the affected households' economic situation. The affected population suffered huge economic losses and lost property, houses and land. The households already living in poverty were the group that had the greatest difficulty and could not afford to maintain even very basic living needs. Having a range



of household income sources was very important in helping households through the most difficult period, and also helped them recover quickly to the level before the earthquake. Households with more diversified income resources had a relatively better economic situation after the earthquake, while households with few income sources needed longer to recover and were more likely to live in poverty.

The new Government policies on promoting agricultural income had started long before the earthquake, and the post-earthquake policy was aimed at further developing these policies and improving the income from agricultural activities. However, the Chinese Government's policy on accelerating the urbanisation process during the reconstruction lowered agricultural income to a certain extent. Some agricultural households lost their land mainly due to the reconstruction, while only a few lost their land directly due to the earthquake. Households also reported difficulties in conducting agricultural activities in traditional ways, and more households diversified into non-agricultural activities. Those that had found a way to conduct both agricultural and non-agricultural activities were less vulnerable than the purely agricultural households. In the longer term, when more agricultural households diversify into non-agricultural activities during the process of urbanisation, income from agricultural production may increase.

The reconstruction policies on non-agricultural family businesses had also been introduced in the Overall Reconstruction Plan. More households were encouraged to run non-agricultural businesses, and although various difficulties were reported, households' income from non-agricultural activities greatly improved during the reconstruction period. The potential income from non-agricultural small businesses would without doubt prove attractive to more agricultural households in the longer term.

Apart from Government policies on agriculture and family businesses, Government direct subsidies also played a major role in helping the affected households during the period after the earthquake. The number of people in poverty after the earthquake increased, particularly in the very seriously affected areas, and Government subsidies significantly reduced the number of those in poverty. After the earthquake, the affected households had already suffered huge economic losses and the income reduction due to unemployment or land losses would undoubtedly impose a greater burden on households' economy. Although Government subsidies did not play an effective role three years after the earthquake, they helped households to maintain relatively sound living conditions during the period after the disaster. Furthermore, households' income continued to improve after the difficult period in all the disaster areas, and reconstruction worked well in continuing to increase household income in the affected areas.

Subsidies after the earthquake were not only important in reducing poverty: they also substantially reduced income inequality following the disaster. When subsidies were introduced one year after the earthquake in 2009, income inequality was reduced, as revealed by the Gini coefficient – income distribution was more equal than if the

subsidies had not been included. Income equity was important for social stability after such a disastrous event, and the subsidies after the earthquake thus contributed both to poverty eradication and to the elimination of income disparities. However, the subsidies only worked for a limited period after the disaster as in the longer term households in poverty were the group which needed most attention.

The economic recovery in the Sichuan earthquake area was fairly rapid. The three surveys in parallel found that the actual recovery of the households' living conditions was better than their own expectations. However, the surveys also found that some households had much more difficulty recovering to pre-disaster levels. All three surveys found that approximately 10 per cent of the households still found themselves unable to recover within five years or longer, and another 10 per cent did not know when their economic situation would recover. Although the 2011 survey found that households recovered more quickly than expected in the previous surveys, it also indicated that there were only slightly fewer households in the category that needed a longer time to recover or were not sure of their recovery period. Those households would be the ones that suffered most from the disaster in the very long term, even after reconstruction.

## 7 Social Cohesion and Views on Recovery

Kristin Dalen

### 7.1 Introduction

How do major disasters like the Wenchuan earthquake and its aftermath affect the social infrastructure of societies and their capability for recovery? This chapter looks more closely at the relationships among people, and between people and institutions, in societies hit by major disasters. How has reconstruction affected the infrastructure of a society that was seriously or very seriously affected by the earthquake and vice versa?

The ability of societies to recover after disasters has been analysed in a large body of literature (Berke, Kartez, & Wenger, 1993; Fischer, 1998; Fritz, 1961; Haas, Kates, & Bowden, 1977; McEntire, 2004; Nigg, 1995; Quarantelli, 1999) that identifies several aspects as important in recovery. These include external factors such as governance, the level of aid delivery and the magnitude of the disaster, internal factors such as the demographic structure, access to land and access to assets, and finally social resources such as social capital, which comprises participation, trust and social networks. “Social capital is a capability to act that arises from the prevalence of trust in a society or in certain parts of it. It can be embodied in the smallest and most basic group, the family, as well as the largest of all groups, the nation, and in all other groups between” (Coleman, 1990).

Several researchers have been looking into how local social capital<sup>83</sup> predicts resilient disaster recovery better than other internal and external factors (Chamlee-Write, 2010A) (Chamlee-Write, 2010B; Chamlee-Write, 2008; Putnam, 1993; Aldrich, forthcoming summer 2012; Buckland & Rahman, 1999). It seems clear that in the long run societies with a higher social capital recover better from disasters than societies with a low social capital. It can also be argued that it is often the “capital” that suffers the least damage during the disaster and is the only form of capital that is renewed and enhanced during the emergency period; this can be in the form of strengthening already existing social capital but also in the creation of new social capital (Dynes, 2002).

Immediately following disasters, unorganised interaction among people often increases substantially – people have to work together to respond to physical and psychological destruction in the emergency situation created by the disaster and seek together to give and to get help and emotional support<sup>84</sup>. This is particularly true before Government entities are able to establish support systems in disaster areas, but also continues to play a role afterwards. To what extent, if any, did the increased social interaction after the disaster contribute to building longer-term relationships among people and increased levels of social capital and trust towards others in communities that survived the Wenchuan earthquake?

The Chinese Government made huge efforts towards reconstruction after the Wenchuan earthquake. If successful, these efforts should improve the image of the Government and contribute to good relations between the various levels of Government and the people. To what extent these efforts were successfully implemented on the ground and to what degree the people affected by the disaster were satisfied with the efforts of the Government institutions at various levels constitutes an important element in the future legitimacy of the Government and the relations between people and institutions.

The three surveys provide a unique opportunity to examine the development of social capital in communities affected by the disaster over time. Not only can the three surveys provide valuable information at various points in time after the disaster, but

<sup>83</sup> The social capital literature contains a rich and ongoing debate about what matters most in determining the value of the social capital to which one has access. Is it through close-knit insular community bonds that we gain the most social capital (Bourdieu, 1984 [1979]; Coleman, 1990), or is it through cultivating lots of bridges beyond our most immediate sphere (Granovetter, 1973; Burt, 1992; Putnam, 1995; Wuthnow, 2002)? When we see social capital as a complex structure, we understand bits and pieces of the capital structure in countless different ways depending on the task at hand. Burt (Burt, 2001) focuses our attention on exactly this point when he observes that “brokerage across structural holes is the source of value added, but closure can be critical to realising the value buried in structural holes”. In other words, social entrepreneurs will find the complementarities among these various elements of social capital (Chamlee-Write, 2008).

<sup>84</sup> There is often a decline in some other forms of (organized) interaction such as work-related, at schools etc.

due to their comparability they can also provide insight into developments over time. Furthermore, the comprehensive approach used in all three surveys offers the opportunity to look at how various segments in society relate differently to the reshaping of social constructions.

All three surveys contained a subsection recording the personal feelings and opinions of one randomly-selected individual (RSI) of the household (the RSI questionnaire).<sup>85</sup> The findings in this chapter are mainly based on the results from these questions on opinions in combination with the characteristics of the respondents. Different groups within society may have different views and opinions related to reconstruction following disasters. Investigating this diversity provides an enhanced understanding of how societies are affected by disasters and how they will develop further. The individual background variables used in this chapter focus mainly on age,<sup>86</sup> gender and education<sup>87</sup> and on whether or not respondents are members of the Chinese Communist Party (CCP). The chapter also distinguishes between areas that were very seriously affected by the disaster and areas that were seriously affected by the disaster.<sup>88</sup>

To describe the relations between society and institutions, including the Government, the analysis looks at the degree of satisfaction with the efforts of the Government at five different Government levels: central, provincial, city, township and local. It is important to include all levels of government since they play different roles in the provision of assistance, and because the Chinese government model is characterised by a high degree of decentralisation.<sup>89</sup> In addition to satisfaction, the analysis also looks at the level of trust in institutions and among other actors in society. Trust is often seen as encompassing satisfaction, but has been included in this set of analysis since it provides a more comprehensive approach to the relations between Government and society, and because it allows for comparisons between trust in Government institutions and other actors in society.

As an indication of the relationships among people within societies, the analysis looks at the level of participation in public activities over recent years, at who organised these activities and at the feeling of unity in the communities after the disaster.

<sup>85</sup> See Chapter 1 for more information regarding the structure of the questionnaires and sample size.

<sup>86</sup> Age was categorised into three groups: 16-24, 25-64, and 65 and older.

<sup>87</sup> Education was categorised into no education, incomplete primary school, complete primary, complete secondary and higher education.

<sup>88</sup> The classification of areas was made in accordance with the Chinese Government's classification of damage caused by the earthquake; see the section on sampling (*ibid*) for more information.

<sup>89</sup> For a description of the Government structure in China, see <http://www.fas.org/sgp/crs/row/R41007.pdf> (accessed 24.04.2012).

Furthermore, the analysis looks at how satisfied people are with their life and what their expectations are of the future.

Taken together, the analysis of these indicators provides a comprehensive illustration of how the disaster has influenced social construction in the societies affected by the disaster, and contributes to the debate on the effects of disasters on the social fabric. In addition it will add to understanding the efforts made by the Chinese Government in the post-earthquake reconstruction.

## **7.2 Trust in and Satisfaction with Government Institutions and Actors in the Rescue and Reconstruction**

### **Indicators and Definitions**

To evaluate the performance of the Government, so-called “hard indicators”, often including resources and outputs, have been widely used. However, over the years more focus has been directed to the “soft indicators” of Government performance such as citizen and user satisfaction (Bouckaert & van de Walle, 2003). In addition, greater focus has been placed on the level of trust in institutions. This has partly been triggered by more attention being focused on accountability, impact and the Government’s legitimacy as well as on performance in relations to governance as a whole, including “quality of life” indicators.

In addition to being seen as valuable in describing the performance and legitimacy of a particular government, measurements of both trust in and satisfaction with the government have been criticised. In many contexts these concepts become vague, and particularly satisfaction with government performance has been argued as being too closely related to specific outputs in service delivery by governments. Satisfaction and trust have also been said to be too closely interlinked, and changes in one indicator would lead directly to changes in the other (Bouckaert & van de Walle, 2003).

In the following analysis of satisfaction with and trust in the various levels of government, we still argue that both approaches are valuable. In the specific post-earthquake situation, the use of satisfaction with governments as an indicator of performance worked well since it is directly related to the implementation of measures for recovery and reconstruction. The level of trust in the Government provided valuable insight since it could be contrasted to the level of trust in other institutions and actors in society, and because trust is often a more encompassing and longer-term feeling than satisfaction.

Comparing the five levels of government provides a rare opportunity for distinguishing between central and local governments in China. Due to the decentralised structure of the Chinese Government, such comparisons provide knowledge about the relations between the various levels of government, the changes of this interplay over time, and relations between the respondents and institutions. Thus, the measurements of satisfaction with and trust in different levels of government over time provide a valuable insight into the relations between society and institutions, i.e. the state's ability for governance.<sup>90</sup>

### **Satisfaction with the Government**

Satisfaction with the performance of various levels of Government in the post-earthquake reconstruction period refers specifically to experiences with the Government and its services and its interaction with the local community. Western research (Christensen & Lægveid, 2002) has highlighted that citizens are often more sceptical about the Government when it is presented in general and abstract terms, and more satisfied when they are presented with specific actions, specifically service delivery, i.e. respondents are often more satisfied with the local than the central Government. Frederickson (Frederickson, 1997) describes this ambivalence as the “paradox of distance” where people express trust in Government officials who are close at hand, but believe that officials who are far away are lazy, incompetent and probably dishonest. This paradox seems to play out the opposite way in China where the results from all three surveys show a much higher level of trust in the central Government that is far away and less trust in officials in the local community, thus introducing an “inverse paradox of distance”.

Satisfaction with all levels of government was high in Sichuan after the earthquake; however, there was substantially less satisfaction with lower levels of government than with higher levels, particularly with township and village government. The central level of government (Beijing and Sichuan province) enjoy almost complete satisfaction with the handling of the reconstruction, while there is somewhat less satisfaction with the county-level government, and even less satisfaction with the local level (township and village/neighbourhood), where less than three in four were satisfied with their performance.

<sup>90</sup> There are a variety of definitions of governance; in the above we use a more general definition based on Hirst (Hirst, 2000) where governance is defined as “the means by which an activity or ensemble of activities is controlled or directed, such that it delivers an acceptable range of outcomes according to some established social standard” (page 24).

Table 7.1 Respondents who are satisfied<sup>91</sup> with the government's performance in the reconstruction (percentages)

	2008	2009	2011
Central	100	99	-
Provincial	98	98	94
County	84	82	-
Township	73	66	71
Village/neighbourhood	73	64	70
<i>Sample size</i>	<i>3594</i>	<i>4013</i>	<i>3576</i>

Contrary to the “paradox of distance” mentioned above, people expressed far greater satisfaction with the actions of the central Government than the local. This may be closely linked to the effect of press coverage – Chinese press often portrays a very favourable picture of the central Government and their actions. Particularly in the immediate aftermath of the earthquake the central Government, and the president and prime minister in particular,<sup>92</sup> were seen as responding to the needs (particularly the emotional needs) of the people in an unprecedented way with regard to both “closeness and timeliness”. It is also important to bear in mind the huge efforts made by the military immediately after the earthquake, representing the efforts of central Government. Reluctance to criticise the central Government in an authoritarian political system is also significant in understanding the very high levels of satisfaction with the Government. The responsibility for the reconstruction of dwellings and the distribution of compensation after the disaster was mainly carried out at local level. These are difficult tasks and one would expect these distributions to be the source of dissatisfaction among earthquake victims; thus, the higher levels of dissatisfaction with the lower levels of government fit the general trend in China (“the inverse paradox of distance”). The fact that both the difficult distribution of compensation and the rebuilding of houses was dealt with at local level allowed the potential for dissatisfaction with this level of government to be higher.

<sup>91</sup> Including respondents who were very or somewhat satisfied with the performance in the post-earthquake reconstruction last year.

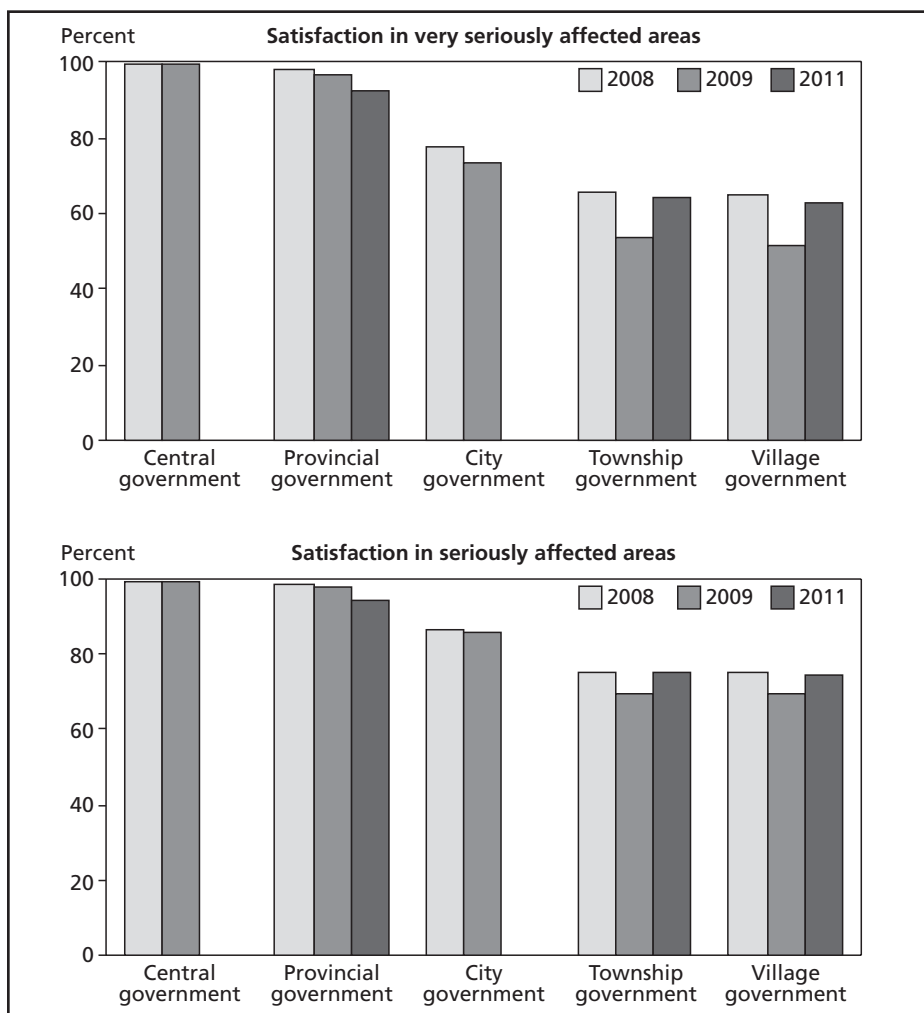
<sup>92</sup> President Hu and Premier Wen both made trips to the earthquake-affected areas and met with victims and showed moral support and sympathy.



The pattern of satisfaction with the performance of the different levels of government in the reconstruction has changed over the three-year period covered by the surveys. One year after the disaster, the second survey (2009) found that the degree of satisfaction with all levels of government had declined; this was particularly true for the township and village levels of government which both experienced an eight per cent drop in the level of satisfaction from 2008 to 2009. The situation one year after the disaster was characterised by incomplete reconstruction programmes; many people were still living in temporary dwellings and camps, and for many people the initial gratefulness for being taken care of had changed to impatience to move back into the reconstructed houses, worries about the futures, and a longing to get back to “normal” life. This indicates that the most critical phase in disaster recovery was not immediately after the disaster but after some time, when people were starting to question when the reconstruction would be completed and when, if ever, life would return to normal.

Different areas in Sichuan were differently affected by the disaster. The level of satisfaction with the Government varies in the areas that were very seriously affected and those that were seriously affected. The level of satisfaction is lower in the most seriously affected areas, particularly with regard to satisfaction with the local level of government. The satisfaction rate in the most seriously affected areas with city, township and village governments was on average more than 10 per cent lower than that in the less seriously affected areas. This gap repeats itself although we see in both charts the same pattern of regained satisfaction at local level in 2011 compared to 2009. Those who had the closest experience with the actions of the Government were the ones who expressed the least satisfaction.

Figure 7.1 Percentage of satisfaction with different levels of government



Note: Based on the 2008 survey, all the interviewed RSIs in very seriously affected areas (sample size=1,909), seriously affected areas (sample size=1,685).

Based on the 2009 survey, all the interviewed RSIs in very seriously affected areas (sample size=2,215), seriously affected areas (sample size=1,798).

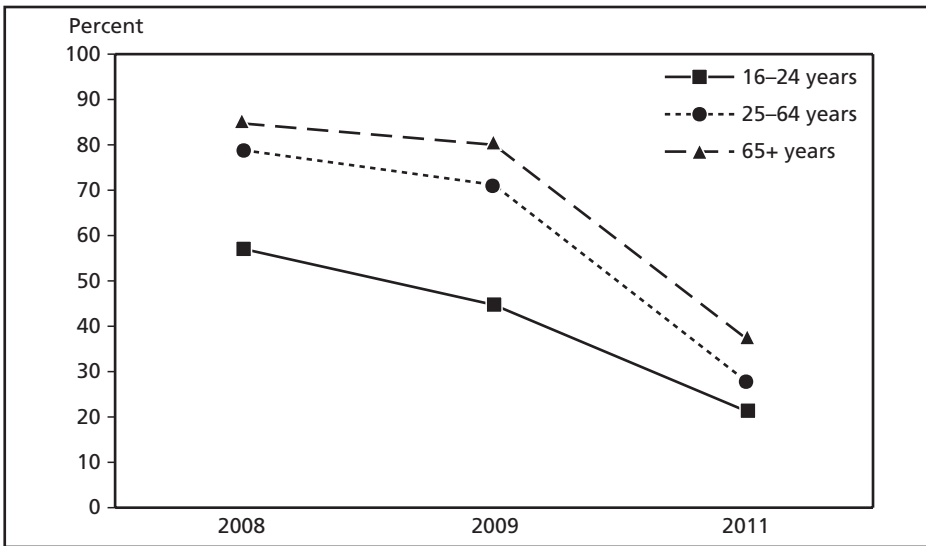
Based on the 2011 survey, all the interviewed RSIs in very seriously affected areas (sample size=1,979), seriously affected areas (sample size=1,597).

However, on average the level of satisfaction with the Government in the earthquake-affected areas is high; in any given area at any given time more than 50 per cent of the respondents stated they were satisfied with the Government's efforts. Notwithstanding this, one year after the earthquake, when people realised the enormity of the losses and that much of the rebuilding was still incomplete, satisfaction with the lowest level of

government in the most seriously affected areas was substantially lower than at any other time. However, the increase in satisfaction with the lower levels of government from 2009 to 2011 clearly indicated that the Government was successful in their reconstruction efforts and was to a large extent able to satisfy the affected populations by the completion of the reconstruction.

Separating levels of satisfaction into very satisfied and somewhat satisfied is valuable in trying to understand developments over time; these analyses provide an understanding not generated by looking simply at a general expression of satisfaction with the Government. Although in 2011 the general level of satisfaction increased, the percentage of respondents who expressed a high degree of satisfaction with the Government has steadily dropped over the years. This is particularly true regarding satisfaction with the provincial government where a sharp drop can be seen in those who are very satisfied – from more than 70 per cent in 2009 to less than 30 per cent in 2011.

Figure 7.2 Percentages of ‘very satisfied’ with provincial government in different age groups

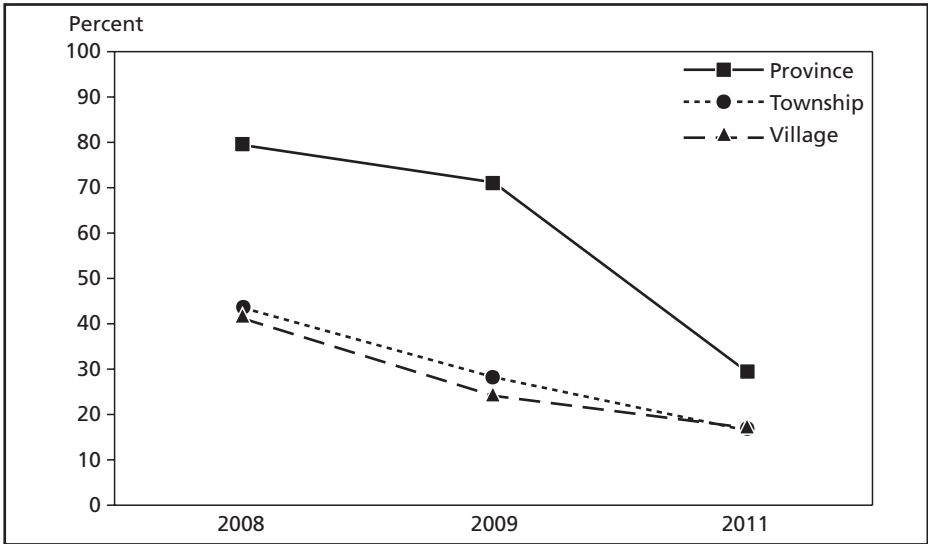


Note: Based on the 2008 survey (sample size=3,594), the 2009 survey (sample size=4,013) and the 2011 survey (sample size=3,576), all the interviewed RSIs.

The unwillingness to express a high degree of satisfaction with the Government is most apparent within younger cohorts of the population. Figure 7.2 illustrated the changes over time in the willingness of respondents to indicate that they were “very satisfied” with the provincial government. To add further depth to the analysis, Figure 7.3 is included to illustrate the pattern of substantially less willingness among the youngest age cohort to indicate that they were very satisfied with the Government’s performance.

The trend over time is consistent for all age groups – ever fewer were willing to express a high degree of satisfaction.

Figure 7.3 Percentages of ‘very satisfied’ with different levels of government



Note: Based on the 2008 survey (sample size=3,596), the 2009 survey (sample size=4,013) and the 2011 survey (sample size=3,576), all the interviewed RSIs.

Satisfaction with the Government’s performance in the aftermath of the earthquake is specific and output related; assuming that satisfaction with Government activities is trust enhancing, there should be a close relationship between satisfaction and trust. Below we will look at the levels of trust in institutions and actors in the aftermath of the earthquake.

### Trust in Institutions and Actors

Political trust is important because it is the basis for the development of political capital. In the same way that social capital can be seen as the social resources that enable individuals and groups to engage in collective action (Putnam, 1993), political capital can be seen as necessary for political cooperation and effective action – an ability to resolve conflicts peacefully and a capacity to engage productively in common interests (Newton & Delhly, 2004). Political capital may thus be expected to improve the possibilities of political cooperation and to reduce the chances of social and political unrest and exploitation on the part of both political elites and citizens. A lack of political trust in a society can, in the long term, undermine a regime’s credibility and can lead to social and political unrest.

A regime that enjoys high levels of political trust has more space and freedom to act, and the consensus among individuals – that institutions can be trusted – includes a commitment to the design of these institutions and, through this commitment, social and political stability. Trusted institutions will not be monitored at all times and as a result they will have both more freedom to make long-term investments and the opportunity to prove that their actions are for the best of the people who place their trust in them.

Initial and continued high trust in the Chinese Government would allow for more space in implementing the reconstruction efforts after the Wenchuan earthquake. It would be critical for the smooth implementation and fulfillment of the Overall Reconstruction Plan in the area that the degree of trust in all levels of government did not decline too much over time and thus jeopardise reconstruction.

Mutual personal trust constitutes a form of social capital since it reduces the cost of monitoring and sanctioning activities. As trust becomes a substitute for obtaining information in every transaction among actors, it lowers the uncertainty and risk surrounding people, and thus the ability to act increases proportionally to the increase in trust. Trust has important functions not only for the partners in a trusting relationship, but also for wider communities (groups, associations, organisations etc.). It encourages sociability and participation with others in various forms of associations, and it also allows for a greater intimacy of interpersonal contact. According to the relevant literature, it enlarges social capital (Putnam, 1995), spontaneous sociability (Fukuyama, 1995) and civic engagement (Almond & Verba, 1963).

Trust is an important aspect of social capital that is seen as beneficial to societies and that has been shown to be particularly important in the ability to recover from disasters. In addition to political trust, interpersonal trust and social capital in society are seen as very valuable assets in both the physical and the social reconstruction of societies.

The findings from the three surveys showed that the levels of trust were generally high in the Sichuan earthquake area. This corresponds to previous research on trust in China which finds that the general level of trust in the Chinese context is high (Dalen, 2005). Comparisons with previous research conducted by Fafo in the 2004 MEDOW survey in the same areas show that the general level of trust both in institutions and in out-groups has increased somewhat.

However, even with a generally high level of trust in the earthquake areas, the pattern of the distribution of trust among various actors in society, and the changes over time, still provide important insights.

Table 7.2 Respondents that trust people and institutions (percentages)

	2008			2009			2011		
	Serious	Very serious	Total	Serious	Very serious	Total	Serious	Very serious	Total
Family	99	98	99	99	99	99	99	99	99
Neighbours	93	93	93	93	92	93	90	90	90
Foreigners	45	56	48	22	37	26	32	30	31
Volunteers	93	94	93	84	93	86	90	93	91
Businessmen	52	57	53	49	50	49	50	51	50
Strangers	38	49	41	24	38	28	33	34	33
Central government	98	98	98	97	99	98	98	96	97
Provincial government	97	96	96	96	94	95	94	92	93
Municipal government	87	78	85	83	72	80	82	74	79
Town government	73	65	71	68	54	64	71	60	67
Local government	76	67	74	67	51	63	73	61	69
Police	93	92	93	87	87	87	87	84	86
Doctors	93	93	93	90	91	90	87	85	87
Media	93	88	92	92	89	91	86	83	85
Judicial system	82	88	84	80	82	80	78	72	76
Sample size	1681	1907	3588	1783	2201	3984	1596	1978	3574

The results from the whole area show a small but steady decline in trust in the higher levels of government (central, provincial and municipal) and in other institutions (police, doctors, media and the judicial system). Trust in local government (town and village) saw a sharp decline in 2009 but regained somewhat by 2011, although the level of trust did not reach the same level as in 2008.

The measures of interpersonal trust show that close personal relations (family and neighbours) enjoy very high levels of trust. The patterns of interpersonal trust in out-groups relations (strangers and foreigners) illustrate clear changes in the trust of others outside close relations. In 2008 more than 40 per cent of respondents indicated that they trusted strangers and foreigners (41 and 48 per cent respectively). These levels of trust in such out-groups dropped sharply in 2009 to less than 28 per cent, then somewhat increased in 2011 but did not reach a level greater than approximately 30 per cent. The decline in out-group trust may be linked to the positive image of strangers and foreigners that was presented during the immediate aftermath of the earthquake, when the influx of aid and support was at a high level. The sharp decline seen in the results from 2009 may be a result of “unkept promises” and less attention from “these others”, in combination with dissatisfaction with the rebuilding and reconstruction process.

Respondents in very seriously affected areas expressed a much higher degree of trust in out-groups in 2008 and 2009 than those in the seriously affected areas. Again, this may be caused by the influx of outsiders into the areas after the earthquake and the

dependency upon assistance and aid from people from outside. The high level of out-group trust is often linked to a high degree of social capital in most seriously affected communities, a factor that in turn may have facilitated the reconstruction in the area. Meanwhile the fact that trust in these groups is constantly declining within the most seriously affected areas, whereas trust had been regained in the seriously affected areas, may indicate that the process of reconstruction may not have come to a completion in the most seriously affected areas and that people there still felt that the expectations raised after the disaster had not been met.

Another clear difference between the very seriously and the seriously affected areas was the substantially lower levels of trust in local government reported by respondents in the most seriously affected areas. This may be caused by the fact that the main responsibility for the implementation of the reconstruction rested with local government. Furthermore, local governments were in several instances blamed for not having followed rules and recommendations pertaining to preparing buildings for earthquakes (earthquake-safe construction).<sup>93</sup> The fact that local government regained trust in the most seriously affected areas may indicate that most of the reconstruction in these areas had been completed – if there were still unmet needs on a large scale it is hard to see how these levels of government would regain the trust of the respondents.

Levels of trust in and satisfaction with the Government are closely interlinked. The pattern of levels of satisfaction was reproduced in the patterns of trust. We found declining trust in all levels of government except at local level from 2008 to 2011. However, there is a significant difference in that although in 2011 the level of satisfaction returned to the 2008 level, trust was still lower in 2011 than in 2008 indicating that trust in political institutions encompassed something more than just satisfaction with performance.

## 7.3 Participation and Active Societies

From the surveys in 2008<sup>94</sup> and 2009 we find that the degree of participation in social and political activities in society increased greatly, possibly indicating that the “feeling of community and the possibility for participation” was higher, leading to stronger social capital and a contribution to positive developments in the earthquake-affected areas.

<sup>93</sup> This was particularly the case in discussions around the construction of schools.

<sup>94</sup> The numbers from the survey in 2008 have a different reference frame, reflecting public participation in the month after the earthquake. Since the reference period is shorter, this may be the reason for particularly low participation rates.

In addition to trust in others (particularly out-groups), participation in public activities<sup>95</sup> is a significant indication of how a society consciously or unconsciously nurtures social capital. The patterns of differences between very seriously and seriously affected areas presented above are reproduced – participation immediately after the earthquake was much higher in the worst-hit areas, one year afterwards it was at almost the same level in all the earthquake-affected areas (even slightly higher in the seriously affected areas), whereas in 2011 participation was higher in the most seriously affected areas but showed a decline in the seriously affected areas. Participation in public activities steadily increased in the most seriously affected areas while in the other surveyed areas participation reached a peak in 2009 followed by a decline in 2011.

Table 7.3 Respondents that participated in public activity (percentages)

		2008		2009		2011	
Degree of damage		Serious	Very serious	Serious	Very serious	Serious	Very serious
<b>Age group</b>	16-24	8	36	44	54	43	49
	25-64	12	27	49	40	36	51
	65+	3	7	21	19	23	38
<b>Gender</b>	Male	15	31	48	44	37	48
	Female	6	16	41	31	31	49
<b>Party membership</b>	Member	24	42	58	58	48	62
	Not member	9	22	44	36	33	47
Total		11	24	45	38	34	49
Sample size		1686	1909	1797	2215	1596	1978

Different groups in societies participate differently in public activities. Results from the three surveys showed that in addition to party members,<sup>96</sup> young people aged 16-24 in the most seriously affected areas had the highest level of participation, particularly in 2008 and 2009. In the two first surveys, age and gender were strong predictors of participation. Analysing the development over time, we find that participation was much less related to age and gender in the last survey (2011) and that the participation both among women and the elderly increased considerably between 2008 and 2011. Theories about social capital stipulate that high participation in public activities is seen as a strong indication of a high level of social capital (Fukuyama, 1995). Taking the results from the three surveys as a point of departure, the generally increased level of participation, particularly the increased participation of more groups in society, bodes well for the development of social capital within the earthquake-affected areas. It is

<sup>95</sup> “Since last year, have you participated in any kind of public activity, such as patrolling, helping to allocate supplies, donating money and materials, donating blood or construction etc.?”

<sup>96</sup> In addition to being politically active people and often community leaders, party members are often obliged to contribute and participate in public activities.



worth noticing that the level of participation in the seriously affected areas increased sharply from 2008 to 2009, and dropped again in 2011. In the most seriously affected area, participation also continued to increase in 2011, which may be a contribution to the maintenance of social capital in these areas, indicating that one result of the disaster is a higher level of social capital. This is also demonstrated in other research on social capital in disasters (Chamlee-Write, 2008; Chamlee-Write, 2010A; Chamlee-Write, 2010B; Aldrich, forthcoming summer 2012; Zhao, 2009).

Public participation generates a feeling of unity and social cohesion which in turn contributes to social capital and increased trust. In 2009 and 2011, the surveys asked to what extent respondents agreed that their communities had become more united after the earthquake. The vast majority of respondents indicated that they agreed there was a higher level of unity in their community after the earthquake. This was particularly true in 2009 when 88 per cent agreed that the unity in their community had strengthened. In 2011, the feeling of greater unity was still strong although it was somewhat lower than in 2009 (82 per cent). The percentage of respondents who totally agreed with the statement was also lower in 2011. It is worth noticing that the difference between seriously and very seriously affected areas is very limited on this indicator, contrary to findings on the previously analysed parameters such as satisfaction with the Government and trust.

Table 7.4 Respondents that agree to increased feeling of unity in their community (percentages)

	2009			2011		
	Serious	Very serious	Total	Serious	Very serious	Total
Totally agree	41	45	42	34	32	33
Somewhat agree	48	43	46	48	51	49
Agree	88	87	88	82	83	83
Sample size	1756	2182	3938	1574	1954	3528

With regard to the effect of participation in public activities as a contributor to social cohesion and a feeling of unity in society, the findings from the survey show little difference between various groups concerning their perception of unity in society. Whether or not they had participated in public activities had no direct influence on whether they perceived their communities as united or not, nor were there any other clear distinctions among different sectors of the population other than the finding that young people were somewhat less prone to agree to increased unity in their communities. If the “feeling of unity” in a society is taken as an indication of high social capital, the findings presented above contradict much of the underlying assumptions in theories about social capital, indicating that those most active in public activities experience less unity in society.

Insight into this is possible through the data from the surveys conducted in 2009 and 2011. By analysing differences with regard to how public activities were organised, we find that those who had participated in activities organised by themselves or by the community were more likely to perceive increased unity than those who took part in activities organised by the work unit, Government or NGOs. This is interesting since activities by the work unit and the Government have often been seen in China as something that is compulsory rather than voluntary, and it would thus make sense for this to not necessarily contribute to a greater feeling of unity in the community. On the contrary, the feeling of unity is rather initiated by activities organised by the communities themselves. The fact that participation in activities organised by NGOs is not seen as contributing to communities' feeling of unity may seem counterintuitive based on other research (particularly Western research), but it is important to remember that many of the Chinese NGOs in the area are either NGOs that have come in from "afar" and therefore may not be seen as grass-roots activities in the same way as those activities organised by the communities themselves, or they are Chinese NGOs often closely linked with Government organisations.<sup>97</sup>

## 7.4 Satisfaction with Life and Perceptions about the Future

People's subjective evaluation of their satisfaction with life is important, not least because people have different references as to what contributes to their quality of life. This is particularly interesting in the earthquake areas since many of the respondents experienced extreme situations that will remain with them throughout their life. However, their current satisfaction with life at different points in time and with its development over time would contribute to knowledge about aggregated well-being in societies as a whole, as would expectations for the future, indicating whether societies have an optimistic or a pessimistic view of the future.

The 2008 survey found that the level of life satisfaction among earthquake victims was relatively high. On average approximately 80 per cent of people were somewhat (65 per cent) or very satisfied (16 per cent) with their lives. As expected, there was a clear distinction between those who were less affected by the disaster and those who had suffered (and were still suffering) from the earthquake. In the most seriously affected areas, 25 per cent were not satisfied with their current life, contrary to 16 per cent in the less affected areas. The same pattern of satisfaction with life among those

<sup>97</sup> For further analysis of the Chinese NGO sector, see research conducted by (Ku, Ip, & Xiong, 2009) and a lecture by Xiong Yugen on "NGOs and Social Capital", University of Bergen, April 24, 2011.

very seriously affected and seriously affected was reproduced in 2009, although the level of life satisfaction decreased somewhat in both groups. In the 2011 survey, life satisfaction in all the earthquake-affected areas had returned to a level above 80 per cent. Contrary to expectations, it was particularly interesting to find that the level of life satisfaction in 2011 was almost the same in both seriously and very seriously affected areas, possibly indicating that reconstruction had been successful and that life had somewhat returned to “normal”.

People who lived in camps in 2008 and 2009 were less satisfied with their current life than others. A much higher percentage of those living in camps in 2009 were dissatisfied compared with those living in camps in 2008, attesting to the strain of having to endure life in temporary camps for a long time. Rural inhabitants reported a significantly higher life satisfaction than urban inhabitants, despite the fact that rural dwellers in China are generally underprivileged compared to urban ones. Previous research on life satisfaction and happiness in China has repeatedly found that rural dwellers report higher satisfaction rates than urban residents and/or migrants, despite their relatively low socioeconomic conditions (Davey, Chen, & Lau, 2000), (Knight, Song, & Gunatilaka, Subjective well-being and its determinants in rural China, 2009), (Knight & Gunatilaka, 2010).

Table 7.5 Respondents who are very or somewhat satisfied with their current life (percentages)<sup>98</sup>

		2008	2009	2011
<b>Degree of damage</b>	Serious	84	82	83
	Very serious	75	74	82
<b>Urban/rural</b>	Rural	84	82	84
	Urban	74	74	78
	Camp	71	62	-
<b>Household income</b>	Poor	79	73	79
	Middle	81	78	81
	Rich	84	88	86
<b>Age group</b>	16-24	73	80	76
	25-64	80	79	81
	65+	89	86	89
<b>Gender</b>	Male	83	81	83
	Female	81	78	82
<b>Party membership</b>	Yes	91	88	89
	No	80	79	82
Total		82	80	82
Sample size		3575	3992	3556

<sup>98</sup> “How satisfied are you with your life at the moment?”

The numbers clearly show that life satisfaction increased with household income. The satisfaction rate among the poorest households was lowest in 2009, one year after the earthquake. This indicates that one year after the earthquake, which was a very difficult time for the majority of households studied, the poorest were those who suffered the most. On the contrary, the richest were fairly satisfied with life in 2009. By 2011, the gap in life satisfaction had narrowed, and life satisfaction rates were approximately the same as they had been immediately after the earthquake.

Furthermore, results from all three surveys showed that there was a significant difference in satisfaction with life within different age groups in the survey. Younger cohorts were less satisfied and older cohorts more satisfied with life. This pattern is reproduced in all three surveys. The results may be interpreted as a generational or a cultural difference,<sup>99</sup> but may also be an indication that younger people are more dissatisfied and interested in change, presenting a possibility for the transformation of Chinese society. The survey finds no significant differences in life satisfaction between the genders.

In all three surveys, members of the Chinese Communist Party (CCP) reported being more satisfied with their current lives than non-members. This was particularly true in the first survey after the earthquake; the trend is consistent over all three surveys but the differences between party members and non-party members reduced over the course of the three surveys.

People's expectations for the future can provide insight into the general feeling of optimism or pessimism in a society. A general expectation about a better future can be seen as an indication of community trust in the current system and belief in future developments in society. The surveys from 2009 and 2011 measured the expectations for the future among respondents in the earthquake-affected areas in Sichuan and found that in general people were fairly optimistic.

In 2009, 61 per cent believed that their life would become better in the future whereas eight per cent thought life would take a turn for the worse. The remaining 32 per cent expected no change in their lives. The percentage of people who expected no changes in their lives remained at 32 per cent in 2011, but in general more people saw possible improvements in their future and fewer thought that life would change for the worse. The percentage of respondents who expected life to worsen was reduced by half, leaving only around four per cent with negative expectations for the future; simultaneously the percentage with expectations for a better life also increased.

Among people who lived in the most seriously affected areas or in camps, there were fewer who had a "neutral" outlook on their future: a higher proportion believed that life would get better, but more also believed that life would get worse.

<sup>99</sup> It is often expected that older people should express satisfaction with their lives whereas younger people should strive for better living conditions.

Table 7.6 Expectations for the future (percentages)

		2009			2011		
		Better	No change	Worse	Better	No change	Worse
<b>Degree of damage</b>	Serious	60	34	6	66	30	3
	Very serious	64	25	11	61	34	5
<b>Urban/rural</b>	Rural	61	31	7	66	30	4
	Urban	55	36	9	59	37	4
	Camp	65	24	12	-	-	-
<b>Household income</b>	Poor	56	33	11	59	35	6
	Middle	63	30	7	65	31	4
	Rich	63	32	5	68	30	2
<b>Age group</b>	16-24	75	19	6	75	24	1
	25-64	60	32	8	65	32	4
	65+	59	36	6	59	36	5
<b>Gender</b>	Male	61	32	7	66	30	4
	Female	60	31	9	62	34	4
<b>Party membership</b>	No	60	32	8	64	32	4
	Yes	65	29	6	66	30	3
Total		61	32	8	64	32	4
Sample size		2307	1081	342	2095	1095	146

Poorer people were clearly more pessimistic than those belonging to the middle or rich income groups. A higher proportion of respondents in the lowest income group believed that life would get worse in the future, while a lower proportion thought things would get better. Differences in outlook on the future across income groups were more or less the same in 2011 as in 2009.

The youngest age cohorts in the survey were more optimistic than the elderly: in both 2009 and 2011, 75 per cent in the age group 16-24 expected their future to be better than it was at the time of the surveys. Again, clear differences in the results are seen between respondents in the seriously and the very seriously earthquake-affected areas: in 2009 the feeling of both optimism and pessimism was stronger in the most seriously affected areas – more people thought life would get both worse and better compared to those in the seriously affected areas. It could be deduced that there was still a feeling of life not being settled in these areas in 2009, with “only” 25 per cent expecting that no change would happen in their lives. Two years later, more people expected their lives to go on with no changes and fewer saw neither positive nor negative changes in their lives, indicating that people felt that stability was re-established in their lives. On the contrary, in seriously affected areas expectations for a better future had increased and negative expectations and expectations of no change had decreased, indicating a generally more optimistic view of the future.

## 7.5 Conclusions

The devastating Wenchuan earthquake shook the ground and societies in the area when it hit Sichuan on May 12, 2008. For a large number of people life as they knew it was turned upside down. In the process of the rescue and reconstruction of material goods, societies and relationships were also rebuilt and developed. This chapter has attempted to shed light on developments and trends in people's feelings towards each other and towards communities and institutions after the "512 earthquake", arguing that these processes represent important aspects of the reconstruction and rehabilitation of the area and its people. Whether societies emerge from disasters as more united entities with stronger relationships among people, and between people and institutions, is of importance for the efforts and ability to rebuild and develop, as well as increasing their resilience to further external shocks.

The degree of satisfaction with and trust in the Government was relatively high for all levels, but there was an inverse relation between closeness to and satisfaction and trust with the Government. Respondents expressed a substantially higher degree of both satisfaction and trust with the central Government, presenting an inverse "paradox of distance". This is most likely related to the decentralisation of the Chinese Government and to the fact that the main responsibility for the implementation of the reconstruction lay with local government, which thus became the main target of dissatisfaction in the aftermath of the disaster. It may also be linked to a lack of critical media reports about the central Government's role in the reconstruction following the earthquake. In 2009, after a clear decline in satisfaction with the efforts of local government in particular, local government regained the satisfaction of respondents in 2011, coinciding with the completion of the reconstruction in the affected areas. However, there is a clear difference in satisfaction and trust with the Government between the most seriously affected areas and other seriously affected areas. The worst-hit areas remained more dissatisfied and less trustful, particularly towards local government, although the trend over the three surveys showed somewhat more satisfaction and trust in these areas by 2011.

However, if the most seriously affected areas seem to lag behind on trust and satisfaction with institutions and governments, they do show substantially higher trust in what is often termed "out-groups", represented by strangers, foreigners and NGOs. A higher level of trust in these groups is often taken as an indication of a higher social capital, which is confirmed in higher levels of participation and a feeling of unity in the community. Based on these findings we argue that the most seriously affected areas have been able to develop communities with a higher degree of social capital following the disaster. Among other things, this is due to the fact that they did not feel completely satisfied with the way the Government at all levels had been able to assist them in the

reconstruction and thus had to rely on more informal relations based on common efforts and initiatives and on additional assistance from strangers and outsiders.

Finally, satisfaction with current life was relatively stable over time although we found a slight trend towards reduced life satisfaction in 2009. This confirms the general trend in the material that shows that one year after the disaster the affected areas were at a point where there was a perception of developments taking a negative turn. However, as with most of the other indicators, satisfaction with life increased again in 2011.

The differences between very seriously and seriously affected areas regarding satisfaction with life had disappeared by 2011, indicating a trend towards a more equal situation in all areas and a situation of stability and normality. As shown in previous chapters, this may illustrate the relative success of the implementation of the Overall Reconstruction Plan in the area.

Based on the analysis of the key indicators of social coherence and relationships among people and between institutions and people, this chapter exemplifies how the earthquake, and more importantly its aftermath during reconstruction, affected societies and the people in them. Unique time series data allowed us to follow a trend over three years, showing that particularly in the most seriously affected areas new social capital had been built and that the situation was progressing towards a state of normality. The time series data also allow us to illustrate that one year after the disaster (2009) the Chinese Government and other stakeholders in the areas were at a crucial crossroads for delivering the reconstruction of the area, shown by an increasing dissatisfaction and a decreasing trust towards institutions. Results from 2011 show that such expectations seem to have been met, and that levels of satisfaction and trust have returned to those of 2008.





## 8 Shaken or Stable Societies after Disaster

Hedda Flatø

### 8.1 Introduction

How did the earthquake affect communities in the disaster areas? Was society disturbed for only a short while, or did the disaster cause profound change? Did the recovery process fulfill the ambitions of “building back better”, or did it only restore the old order? This report has outlined numerous social developments, most of which are likely to have been affected both by the earthquake and by more general social trends. This final chapter synthesises the many results in order to make an overall assessment of the outcomes of the post-earthquake recovery process.

The overall conclusion is that the recovery process to a large extent achieved its objectives. As the process proceeded, it appeared unlikely that the disaster would hinder further development. In its earliest phases, the recovery had a mitigating effect on social inequalities but in the long run social structures and inequalities that existed before the disaster were reinstated. The worst-hit households found it more difficult to recover than others, but at the same time social capital was strengthened in the most seriously affected areas during the study period.

Section 8.2 addresses the extent to which the results of the recovery process are in line with the reconstruction goals outlined in the Overall Reconstruction Plan. The objectives of the Plan are not limited to specifying the intended direct effects of certain policies. Instead, the Plan sets out a vision of where the Government wanted societies affected by the earthquake to be once reconstruction was completed – regardless of whether this could be directly attributed to reconstruction or not. The three post-earthquake surveys provided results relevant for assessing the performance of almost all the objectives outlined in the Plan, i.e. those related to housing and infrastructure, work and income, and social security.

Section 8.3 analyses the results of the recovery process in a broader perspective. Apart from the specific objectives expressed in the Plan, China’s Government aimed for the recovery process to contribute to the overarching goals of spurring development and diminishing inequality. How did the affected areas develop during the recovery

process? Who benefited from recovery, and who were left out? The section analyses these questions in light of previous literature and of the analytical framework employed throughout the project.

## **8.2 Were the Recovery Plan's Objectives Achieved?**

### **Housing and Infrastructure**

The first and foremost objective of the Overall Reconstruction Plan was to restore houses – specifically “to complete the restoration and reconstruction of urban and rural residences, making it possible for the disaster-affected population to live in safe, economical, practical and land-saving houses”. Based on the survey results reported in Chapter 2 on housing, it can be concluded that to a large extent this objective had been achieved by 2011.

Three years after the earthquake, almost everyone in the earthquake-affected area lived in permanent homes. Thus, the objective of completing the restoration of urban and rural residences had largely been fulfilled. In 2008, almost half of the population in earthquake-affected areas no longer lived in their pre-earthquake homes, and only one year later most had already moved into permanent houses. However, one-third of those whose houses had become inhabitable in the earthquake still faced considerable hardship: many of them lived in tents, prefabricated houses, temporary self-built dwellings or other people's houses. However, by 2011 almost everyone had a permanent house, with only 0.6 per cent of households still living in temporary houses or tents.

Results relating to the second part of the housing objective – that houses should be “safe, economical, practical and land-saving” – are more mixed. Whether or not the new houses are “economical” remains an open question. Although 80 per cent of those who needed to repair or rebuild their homes received subsidies for doing so, a large proportion of the cost still had to be paid by the individual household, either by using savings or by taking out a loan. Government assistance accounted for on average approximately 40 per cent of the cost for households that repaired their houses, but for those whose houses were so severely damaged that they had to rebuild them or buy a new house, Government assistance only accounted for 26 per cent for rural households and 12 per cent for urban households. While house mortgages were rare before the earthquake, more than half of those who rebuilt their house or bought a new house took out a bank loan, and almost all of them borrowed money from friends and relatives. This may become an economic burden for households in the future. One year after

the earthquake, 40 per cent said they would need an extension to pay back the bank loan, while six per cent thought they would never be able to afford to pay back the loan.

Regarding the safety of houses in earthquake areas, post-earthquake regulations requiring that all houses should be reinforced to become earthquake-resistant were reported to have been implemented for the majority of new houses but for few of those that had been built before the earthquake. Three out of four houses that had been built after the earthquake were reported to be in accordance with the Government's seismic reinforcement criteria. However, only 28 per cent of houses that were built before the earthquake had been reinforced. By 2011, more than half of all households in the survey area lived in a house that had not been reinforced to withstand seismic activity.

Where infrastructure is concerned, the Overall Reconstruction Plan's objective was to "completely restore infrastructure functions such as transportation, communications, energy, water conservancy etc. to meet or surpass pre-disaster levels". The surveys produced limited information on transportation and communications, but they did yield information on the reconstruction of amenities such as water, electricity and sanitation provisions. Results indicate that for the types of infrastructure we have data on, reconstruction by and large achieved the goals. The standard of such infrastructure was quickly restored to pre-earthquake levels and later surpassed 2004 levels. Electricity was restored fairly rapidly after the earthquake for all households. Although more than 10,000 villages in Sichuan lost their electricity supply immediately after the earthquake, 98 per cent of permanent houses and 62 per cent of temporary houses already had access to electricity in the seriously affected areas two months after the earthquake when the 2008 survey was conducted. One year after the disaster, households residing in temporary dwellings had somewhat less access to basic amenities such as tap water, flush toilets and private kitchens compared to numbers from the same districts in 2004. However, by 2009 the rates for those living in permanent houses were somewhat higher than in 2004, while in 2011 the standards of drinking water provision, toilets, kitchens and waste disposal were all considerably higher than in 2004.

## **Work and Income**

The second reconstruction objective outlined in the Overall Reconstruction Plan was "to ensure that at least one member in each family has a stable job, and that urban household per capita disposable income and rural household per capita net income surpass the pre-disaster levels". The results from the surveys among earthquake victims show that during the three-year reconstruction period, employment was indeed relatively high and household income increased considerably. About 92 per cent of households in earthquake-affected areas had at least one member who was employed; this percentage could scarcely have been much higher since some households consisted of only

retired members. Nevertheless, only half of the households with employed members had someone working in a work unit.

The unemployment rate in earthquake-affected areas was found to be very low, at about two per cent. The labour force participation – i.e. the proportion of those above 16 who were working or actively seeking work – was around 70 per cent. This is relatively high by international standards. A considerably higher proportion of those living in very seriously affected areas or camps were outside the labour force in 2008 and 2009 compared to those living in seriously affected areas; however, by 2011 there were no significant inequalities in participation due to degree of earthquake damage. Overall, the proportion working or actively seeking work was 10 percentage points lower in 2011 compared to 2004. This is likely also to be a function of a general trend in China towards lower participation.

Although labour participation was relatively high, gender inequality in the labour force participation increased significantly during the reconstruction period. In both 2004 and 2008 the proportion who was working was six percentage points higher for men than for women. One year after the earthquake, this gap had doubled with the labour force participation for men being 12 percentage points higher than that for women, and by 2011 the gap was approximately nine percentage points. This is also likely to be a function of the general trend towards lower participation, particularly among women.

A further issue is the extent to which jobs are “stable”. Around 90 per cent of those who had been locally employed before the earthquake and 96 per cent of those who had been migrant workers were also employed in 2011, attesting to one form of stability.

In China, those who have a permanent contract with a work unit have the most stable jobs in terms of security and welfare benefits. In 2011 approximately 80 per cent of the labour force employed in earthquake areas did not have a working unit and were self-employed, most of them being farmers. These workers are not entitled to unemployment support, sick leave or pensions. The percentage of workers in the volatile category of working freelance or doing odd jobs increased significantly after the earthquake compared to that in 2004 – from around four per cent to 20 per cent.

Income increased considerably during the reconstruction period: Individual income grew by an average of around 13 per cent per year from 2008 to 2011. This occurred despite the fact that the direct impact of the earthquake on household economies was disastrous. One year after the earthquake, ordinary income was lower than before, but this negative impact on income was offset by subsidies. Later in the reconstruction period, subsidies dwindled to a very low level. However, household incomes continued to increase and by 2011 were 32 per cent higher than a year before the earthquake.

Households’ economic recovery after the earthquake was much better than expected. In the 2009 survey, only 8.3 per cent of those who reported their economic situation to

have been affected by the earthquake expected their economic situation to recover by three years after the earthquake to the level it was at before. However, in 2011, 82 per cent of the households reported that their economic situation had already recovered.

Subsidies were successfully channelled to the poorest households, thereby considerably contributing to narrowing the gap between rich and poor for a short period of time. Furthermore, subsidies lifted the income of many of the poorest households to above the poverty line during the first year after the disaster. However, by 2011, subsidies no longer had the effect of reducing income inequality and poverty. Income inequality measured by the Gini coefficient was slightly higher than before, and the proportion of those whose income was below the poverty line was almost as high as before the earthquake. Five per cent of households believed that their economic situation would never recover to its pre-earthquake level; these were all relatively poor households with few income sources, and most of them were located in the very seriously affected communities. Thus, reconstruction goals were not achieved for the most seriously affected and most vulnerable social groups.

Objective number five in the Overall Reconstruction Plan was to develop the economy, improving and expanding industries with special advantages, optimising industry structure and enhancing capacity for scientific development. The post-earthquake surveys did not collect data on large industries. However, they do provide data on one main strategy that was promoted in the Plan for achieving these aims – namely urbanisation. Results from the survey show that urbanisation had indeed been implemented to a large extent. However, it also shows that this has had adverse effects for farmers, causing the loss of arable land and disrupting their production capacity.

## **Social Security**

The reconstruction of schools, hospitals and other public service facilities were given priority in the Plan, which states the long-term aim of ensuring that “everyone in the disaster-affected population enjoys basic social security and has access to fundamental public services such as compulsory education, public sanitation and basic medical treatment in addition to public culture and sports, social welfare etc.” Both the healthcare and the education systems continued to function relatively well despite the massive challenges caused by the destruction of schools, hospitals and clinics. However, serious socio-economic inequalities and barriers to accessing education and health services remain in earthquake districts, as they do in the rest of China.

Schools in the affected areas were closed in the wake of the earthquake. Massive efforts were made to enable them to open again in time for the start of the autumn semester. Indeed, the earthquake surveys found that enrolment in the nine-year compulsory education did not significantly change compared to before the earthquake, indicating that most students did start school again soon after the earthquake. One

year after the disaster, approximately one-third of students were studying in temporary, moveable buildings. Most households perceived the newly-built or reconstructed schools to be of better quality than before the earthquake, and most believed that the teaching quality had also improved. During the first year after the earthquake, almost half of the students in the earthquake areas benefited from subsidies or preferential policies aimed at enabling them to continue their education. By 2011, almost all the schools had been rebuilt.

However, major challenges remain in the earthquake-affected areas when it comes to equality of access to education. As in the rest of China, there are great disparities in educational levels between rural and urban areas and between women and men. The adult illiteracy rate was fairly high in earthquake areas, with particularly high illiteracy rates among adult women. However, the gender gap has closed in the younger generation, and there were no differences in school enrolment between boys and girls. Yet gaps in school enrolment between rural and urban areas as well as between rich and poor population groups remained. The elimination of tuition fees in 2007 and 2008 reduced the number of students in earthquake-affected areas who dropped out, but did not produce positive effects on improving children's access to schools for those who had never attended – mainly children from poor, rural families. Late enrolment was also common and was a particularly serious problem in rural areas and among poor families.

The severely damaged healthcare system faced a sharp increase in physical and psychological health needs among the population. The post-earthquake surveys show that the emergency healthcare system operating immediately after the earthquake was successful in providing care for most of those who were injured and in channelling help to those that needed it most. Many medical services were provided free in earthquake districts during the first few months after the disaster. Indeed, access to healthcare services appears to have been somewhat better during the emergency period after the earthquake than under normal circumstances. Comparisons with data from the same districts in 2004 also show extraordinary increases in health insurance coverage, in line with nationwide increases in insurance coverage due to reforms of the rural health insurance system.

However, the survey from 2011 – after the reconstruction of the healthcare system was completed – indicates no lasting improvement in access to healthcare services compared to 2004. Results also show considerable inequalities between rural and urban districts when it comes to the type of healthcare services used. This is despite the fact that the rural population, most of which was uninsured in 2004, now has around 95 per cent health insurance coverage. The post-earthquake surveys found that the New Rural Cooperative Medical Scheme, which covers most rural low-income households, provides limited benefits compared to other insurance schemes. As the insurance scheme only covers a small proportion of medical expenses, most rural people still have to pay most medical fees themselves. Moreover, the post-earthquake surveys indicate

that those suffering from chronic disease, disability or mental disorders benefited less than others both from post-disaster emergency health policies and from China's new health insurance schemes.

### 8.3 Recovery: How and For Whom?

The analytical framework employed throughout the project assumes that the earthquake and post-earthquake measures may affect the production and distribution of living conditions in two ways: by changing households' access to resources, or by changing the arenas through which those resources are put to use. From existing literature on disaster recovery, we can in addition make the following assumptions:

- The recovery process may mitigate social inequalities, but usually it widens the gaps.
- Who benefits from recovery and how they do so is strongly influenced by pre-disaster dynamics and by the relationships between different social groups.
- The recovery process may impede or enable development.

When taking into consideration all the aspects studied in this report, several overall patterns emerge. Firstly, in the emergency and restoration phase in 2008, social conflict appears to have been mitigated. Feelings of unity, trust and life satisfaction were strong even though households were struggling to cope with the material and emotional repercussions of the earthquake. This indicates that altruistic norms and social capital in the affected communities – particularly the worst-hit ones – were strengthened in the period immediately following the earthquake, as has often been observed in post-disaster studies.<sup>100</sup>

Social inequalities were reduced since “those who have” and “those who have not” all lost resources, and emergency and restoration aid was distributed based on assumed needs rather than on pre-disaster social status. Government assistance was distributed among almost all affected households, while aid from social organisations and relatives, as well as bank loans, were specifically targeted towards the worst-hit households. Thus, no evidence was found of emergency and restoration measures creating heaping or clustering in the sense that they benefited those social groups who were relatively well-off to begin with. However, they did not provide special help to particularly vulnerable

<sup>100</sup> E.g. (Fischer, 1998), (Kaniasty & Norris, 2004), (Aldrich, 2011).



social groups such as the old, chronically ill or poor. Most of those affected appear to have been satisfied with the recovery efforts at the time.

Secondly, in 2009, the equalising effects were wearing off but the recovery process continued to have a slightly mitigating effect on social inequality. Although living conditions had improved compared to immediately after the disaster, for many – particularly in the very seriously affected areas – they had not yet reached pre-earthquake levels. Meanwhile, the Government's and aid agencies' contributions to household resources had diminished, and arenas were arranged in the same way as before – for example, the distribution of food and healthcare again largely relied on market principles.

However, in 2009 some aspects of the recovery process did continue to have a mitigating effect on inequality. For example, subsidies and loans for rebuilding houses were granted based on the degree of damage to the households' original homes and on household size, whereas under normal circumstances obtaining financing for housing requires considerable economic and social resources. Although subsidies and loans had to be combined with private financing in order to be sufficient to build a house, they provided households that would otherwise be unable to obtain loans with considerable start-up help. In 2009, subsidies significantly reduced the income inequality measured by the Gini coefficient. Moreover, the high rate of construction activity improved job opportunities and salaries for relatively underprivileged social groups. Thus, income inequality was lower than before the earthquake.

During this period, many appeared to be growing weary of the reconstruction process: more people were feeling pessimistic about the future, many were less satisfied with life and with Government performance (particularly local government) than before, and trust rates were going down. Those living in very seriously affected communities were most dissatisfied, but at the same time social participation and interpersonal trust were even higher in these communities than before, while the immediate effect of the earthquake on social participation had worn off among those who were less seriously affected. Life satisfaction among relatively low-income households was at its lowest in 2009, while the richest remained fairly satisfied, indicating that this period of hardship disproportionately affected the poor.

In 2011, once the recovery period outlined in the Plan had been completed, most households' living conditions had indeed recovered to pre-earthquake levels or better. By then most people were also highly satisfied with the recovery process. Life satisfaction, trust and social participation had also normalised and were back to pre-disaster levels in most areas. However, the hardest-hit areas, where more people had had direct experience with the recovery policies and measures, were an exception: there, more people remained dissatisfied but social participation and feelings of unity also remained high, indicating a lasting effect of the disaster on social cohesion in the most seriously affected communities. Social and income inequalities were also largely similar to what they had been before, indicating that the disaster's effect of mitigating differences



between social groups was short-lived and that the recovery process reproduced social inequalities in the long run.

Although three years after the earthquake most households had recovered, some had not. An important question is who these households were – for whom did the recovery process not have the intended effect? The survey data indicate that the only clear pattern is that those who were more seriously affected by the earthquake (i.e. those whose houses had been most seriously damaged) were less likely to have recovered three years later. Apart from differences due to degree of damage, the surveys found no evidence of differences between social groups – for example, in income, education and rural or urban residency – with regard to who did and did not recover. Recovery benefits were equally distributed: the surveys show no evidence that any social groups benefited in particular. This indicates that no groups of people were particularly excluded from the recovery process and that recovery did not heavily depend on pre-disaster social structures.

## **8.4 What is the Key to Successful Recovery?**

It is outside the scope of the post-Wenchuan earthquake project to identify reasons for the largely positive outcomes of the recovery process. However, some notes can be made about certain features of the post-Wenchuan earthquake recovery which, according to international experience, appear to have been particularly advantageous and could warrant further research.

A report on learning from post-earthquake experiences summarises a number of pitfalls that often occur in recovery efforts (Provention Consortium & Alnap, 2008). Most of these pitfalls were avoided in the Wenchuan case. Firstly, recovery was a focus from the very start of the work on post-earthquake response policies, whereas separating relief coordination from recovery coordination has been observed to have considerable negative consequences in post-tsunami Sri Lanka and after the 2005 Pakistan earthquake. Secondly, there was no lack of policy coherence between different parts of the Government contrary to, for example, experiences after the Pakistan earthquake where there were policy differences between ministries and central and local governments. Thirdly, decisions on policy issues vital for recovery were made quickly, whereas slow decision-making seriously hampered recovery in Sri Lanka and Pakistan. The fourth pitfall listed in the Provention Consortium & Alnap report is a lack of clarity about procedures that would apply to, for example, rules for compensation. Fifthly, and perhaps most importantly in this case, a lack of general development frameworks and plans has been a problem, for example after the tsunami in Indonesia and Sri Lanka. As this report has documented, in the Wenchuan case recovery was developed with a

strong emphasis on general development strategies, and the recovery process and output was to a large extent in line with the same overarching development goals.

The tragic aftermaths of disasters such as Hurricane Katrina in 2005 (U.S. House Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, 2006) (White House, 2006), the L'Aquila earthquake in Italy in 2009 (Alexander, 2010) and the Haitian earthquake in 2010 (Zanotti, 2010); (Pierre-Louis, 2011) show the perils of governments failing to take responsibility when disaster strikes. However, a paternalistic central government response that refuses to take advantage of local and external resources has also proved disastrous, such as after cyclone Nargis in Myanmar in 2008 (Stover & Vinck, 2008) (Seekins, 2009) and the 1999 earthquake in Izmit, Turkey (Ganapati, 2008) (Unlu, Kapucu, & Sahin, 2010). Local governments and communities have repeatedly been found to be crucial to the successful implementation of disaster relief and recovery efforts (Col, 2007; Olshansky, Johnson, & Topping, 2006; Berke, Kartez, & Wenger, 1993). In China, the response to the highly fatal Tangshan earthquake in 1976 – where more than a quarter of a million people died – can be seen as an example of the problems of both a lack of central government responsibility-taking and a paternalistic state response. Although some scholars have seen the Tangshan case as an example of local government successfully taking the initiative in disaster response and recovery (Col, 2007) (Mitchell, 2008), local authorities in fact had little choice but to manage on their own. The central Government was practically incapacitated after more than ten years of Cultural Revolution and with Chairman Mao on his deathbed. A recent book shows that the few decisions the central Government did make at the time enraged earthquake victims – including refusing to allow international aid and focusing the few army troops that were sent to help solely on Tangshan city itself, leaving many severely affected villages isolated for a long time after the disaster (Palmer, 2012).

After the Wenchuan earthquake, the Chinese Government enabled local governments by providing resources, authority and broad policy guidelines. At the same time, the formulation and implementation of specific response and recovery measures was to a large extent left to local governments and could thus be based on local knowledge. International NGOs did not play a very important role, despite there being more allowance for external help than previously. However, civil society played a major role in the form of collecting money, serving as volunteers and engaging businesses. Importantly, local governments in other parts of the country were instructed to contribute to the recovery by providing comprehensive and long-lasting “counterpart assistance” through direct links to county-level governments in earthquake-affected areas. Thus, the organisation of the disaster response and recovery process ensured the nationwide contribution of financial and human resources, which could be put to use in a flexible manner well adapted to local contexts.

## 8.5 Summary Conclusion

Overall, the results from the three post-Wenchuan earthquake surveys give grounds to describe the recovery process as successful. Communities in disaster areas were severely disturbed, but in the long term society remained stable. Our report shows that most damage caused by the earthquake was quickly repaired, that households were able to resume economic activities relatively quickly, and that education and healthcare systems continued to function under extraordinarily difficult circumstances and resumed normal operations well before the end of the recovery period. In material terms, the recovery process did succeed in “building back better” by providing new and improved public facilities, houses and infrastructure.

A fundamental observation is that China’s Government efficiently managed and coordinated the disaster response and recovery processes, striking a balance between the commitment of considerable financial, human and organisational resources on the one hand and devolution to local and external agencies on the other.

However, the fact that societies in earthquake-affected areas remained stable also meant that social inequalities and other structural problems that were to some extent mitigated in the period immediately following the disaster were reproduced by the end of the recovery process. Few of these challenges were directly caused by the earthquake disaster; instead, they are related to socio-economic inequities and other problems prevailing in Chinese society in general.



## Appendix: Sampling Method

The samples in all three surveys were cluster sampling with Proportional Probability Sampling (PPS) selection. In the first stage of sampling, the clusters were selected using linear systematic PPS selection. In the second stage, a fixed sample take of households was drawn in each selected cluster. The basic sampling frame consisted of the villages (rural areas) and residence committees (urban areas) in the earthquake-affected counties. In the first and second surveys, the sampling frame also included camps, which are temporary living areas with board houses built and organised by the Chinese Government. A great deal of work was spent obtaining lists of villages, neighbourhood committees and camps because such lists were not readily available in Sichuan at either provincial or district level.

In 2008, population sizes for townships (in rural areas) and neighbourhood committees were obtained from the 2000 Census of China (National Bureau of Statistics of China, 2002). Population estimates for the agricultural population of villages were obtained from the Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction under the State Council. Information on the population with an urban residence registration was not available at residence committee or village level, and had to be inferred from the population size of the neighbourhood committees and inquired about at local level. Immediately after the earthquake and during reconstruction, a large number of houses were destroyed and people had to live in temporary camps, makeshift houses and shelters. The Chinese Government rapidly built camps to accommodate victims of the disaster. Camps that were located within a community were considered as part of that community, while camps that administratively belonged to no community were listed separately as independent clusters. Lists of camps were obtained for each city. As with the villages, the survey team had to inquire at local level – either at the city administration or the neighbourhood committee administration – in order to receive usable lists of camps.

Table A1: Allocation of the sample in 2008

Stratum	Population size	Number of PSUs	Selected PSUs	Reporting domain
Very seriously affected area	3,666,220	3,038	110	Very seriously affected
Seriously affected area	7,976,816	5,365	40	Seriously affected
Margin of seriously affected area	1,437,349	1660	10	Seriously affected
Deyang camps	142,943	166	5	Camps
Mianyang camps	182,390	18	5	Camps
Guangyuan camps	42,244	19	5	Camps
Chengdu camps	103,905	15	5	Camps

The sample was stratified by the type of location (camp/non-camp) and the degree of impact caused by the earthquake. Within each stratum the primary sampling unit (village, residence committee or camp) was selected through linear systematic sampling with probability proportionate to size. The sampling frame was ordered geographically by county, so that an implicit stratification was obtained. In 2008, 35 households in each cluster were selected for interviews. The relatively high household sample take was based on the assumption that a large number of households would be impossible to interview. This turned out to be an incorrect assumption, and even though non-response was larger than in other surveys in China, it was not excessive. For reporting purposes, the strata can be merged into three reporting domains: “very seriously affected areas”, “seriously affected areas” and “camps”.

In the second survey in 2009, all the households sampled in 2008 were revisited, and therefore the households interviewed in both surveys became panel surveys. However, a new sample was drawn for those living in camps, with 25 households in camps selected for each cluster. Altogether 2,030 households were interviewed in both surveys.

Table A2: Allocation of the sample in 2011

District	Strata/County	Number of Households	Selected PSUs	Reporting domain
<b>Aba</b>	Jiuzhaigou	18,021	1	Seriously affected
	Songpan	17,415	1	Seriously affected
	Wenchuan	25,595	2	Very seriously affected
	Lixian	11,905	1	Seriously affected
	Maoxian	28,517	2	Very seriously affected
	Jinchuan	17,408	1	Seriously affected
	Heishui	15,566	1	Seriously affected
<b>Chengdu</b>	Dayi	150,734	4	Seriously affected
	Chongzhou	206,508	6	Seriously affected
	Pengzhou	250,840	21	Very seriously affected
	Dujiangyan	210,521	6	Very seriously affected
<b>Deyang</b>	Zhongjiang	416,152	12	Seriously affected
	Shifan	147,446	13	Very seriously affected
	Guanghan	206,247	6	Seriously affected
	Jingyang	256,764	8	Seriously affected
	Mianzhu	191,747	16	Very seriously affected
	Luojiang	78,230	2	Seriously affected
<b>Guangyuan</b>	Yuanba	54,405	2	Seriously affected
	Lizhou	168,056	5	Seriously affected
	Jiangge	164,872	5	Seriously affected
	Chaotian	52,704	2	Seriously affected
	Qingchuan	76,047	6	Very seriously affected
<b>Mianyang</b>	Santai	378,146	11	Seriously affected
	Zitong	108,642	3	Seriously affected
	Jiangyou	280,179	24	Very seriously affected
	Beichuan	67,514	6	Very seriously affected
	Anxian	143,826	12	Very seriously affected
	Pingwu	55,148	5	Very seriously affected
	Fucheng	301,161	6	Seriously affected
	Youxian	178,901	5	Seriously affected
<b>Grand Total</b>		<b>4,279,217</b>	<b>195</b>	

In the last survey in 2011, the 2010 Chinese census had just been completed. Therefore, the 2010 census data were used to draw clusters with PPS selection. However, the complete household list was not given to the research team, and the National Bureau of Statistics of China was responsible for drawing the clusters according to the request of the sample design. The complete household list of each selected cluster could only be obtained when the team in the field contacted local authorities. Challenges were met when the research team found that the enumeration units used by the census were quite often geographically much larger than the administrative communities or villages. Several or tens of communities or villages may have been merged during the census for the convenience of the census work. To select households from such a large area would basically mean that the households selected could be very far away from each

other. In such cases, segment sampling was conducted. The cluster was divided into segments, or each community or village was considered as segments, and one segment was selected with PPS selection, i.e. one extra sampling stage was added. When accurate household lists could not be obtained, the segment sampling also divided the cluster into segments of approximately 200 households, with one segment being randomly selected for mapping and listing all households in the segment. The households to be interviewed were then selected from the list. In 2011, a new sample was drawn in 195 clusters covering 30 counties.<sup>101</sup> In each cluster, 25 households were drawn for interview.

The final stage sampling, i.e. the selection of households in the chosen clusters, was carried out in one of two ways. In communities that still had reliable household lists, these were used and households were selected using random linear systematic sampling from the lists. If lists were not available or after verification could not be trusted, a random walk procedure was used. Lists were nearly always available because communities needed updated details of households for the distribution of aid/assistance. The substitution of non-responding households was not carried out. Within the selected households, the respondent to the randomly selected individual (RSI) questionnaire was chosen by simple random sampling automatically generated by the interviewer's computer. If a computer could not be used a Kish table (Kish L. , 1995[1965]) was employed for the selection.

One benefit of the sampling design is that accurate sampling weights can be calculated. Since an area affected by an earthquake may potentially have high rates of migration, accurate sampling weights are important in order to obtain unbiased estimates, particularly between geographical sub-groups or between groups that may have different rates of migration.

The sampling weights were computed as follows:

$$P_1 = \frac{N_{h,c} m_h}{N_h}$$

Equation 1, first stage.  $N$  refers to the population of individuals in clusters ( $N_{h,c}$ ) and in strata ( $N_h$ ), and  $m_h$  is the number of selected clusters.

$$P_2 = \frac{n_c}{N_{h,c}^{lh}}$$

Equation 2, second stage.  $N_{h,c}^{lh}$  refers to the population of listed households in a selected cluster, and  $n_c$  is the sample taken in the selected cluster (35 in 2008, 25 in camps in 2009 and 25 in 2011).

$$P = \frac{n_{h,c} m_h}{N_h} \frac{n_c}{N_{h,c}^{lh}}$$

Equation 3. The final household sampling inclusion probability.

<sup>101</sup> Altogether 198 clusters covering 33 counties were sampled, but three clusters were dropped during fieldwork because the road had been destroyed by flooding and it was difficult to access the area.



$$P_{rsi} = \frac{1}{N_{h,c,f}}$$

Equation 4. The inclusion probability of randomly selected individuals within household  $f$  in cluster  $c$  in stratum  $h$ .  $N_{h,c,f}$  refers to the number of eligible individuals (those aged 18 and above) in the household. The final inclusion probability for the randomly selected individual is the product of the RSI inclusion probability and the final household probability in equation 3.

Sampling weights were calculated as the reciprocal of the inclusion probabilities (for household  $i$ ,  $w_i = 1/p_i$ ).

When the sampling segment was used, one extra sampling stage was included. The second stage then becomes:

$$P_{21} = \frac{n_{h,c,s}}{N_{h,c}^{lh}}$$

Equation 5, second stage.  $N_{h,c}^{lh}$  refers to the population of listed households in a selected cluster and  $N_{h,c,s}^{lh}$  refers to the population size of a selected segment of the cluster.

$$P_{22} = \frac{n_c}{N_{h,c,s}^{lh}}$$

Equation 6, second stage.  $N_{h,c,s}^{lh}$  refers to the population of listed households in the selected segment and  $n_c$  is the sample taken.

$$P = \frac{N_{h,c} m_h}{N_h} \frac{N_{h,c,s}}{N_{h,c}^{lh}} \frac{n_c}{N_{h,c,s}^{lh}}$$

Equation 7. The final household sampling inclusion probability.

The response rates of the three surveys were between 70 and 80 per cent. The main reason for non-interviews was being unable to contact the household, while refusals and various frame errors were not dominant reasons for non-response in any of the surveys. Non-responding households can be clarified into two main categories: those who in principle it was possible to interview but who were not available due to temporary absence or refusal, and those who did not actually exist or who were ineligible for interview. The latter category was due to sampling frame errors and thus the weight did not need to be adjusted, while the former category needed weight adjustment according to the response rate (Hidiroglou, Drew, & Gray, 1993).

One way to reduce the biases produced by unit non-response is to adjust the sampling weights. The method of correction of the weights for non-response used was the "adjustment cell method" (Lehtonen & Pahkinen, 1995). In this approach, households that are considered to be fairly similar are identified and grouped and the non-response rate is then calculated separately for each group, resulting in so-called adjustment cells.

In line with the description above, when non-response rates were calculated only the non-response of households who could have responded but for some reason did not was considered. Similarly only households that could respond were considered in the calculation. The inverse of the non-response rate in each adjustment cell was then used to adjust the sampling weights for each household. The resulting estimated weights give a weighted sample size as it would have been if all the households had responded. The effect is also to increase the relative contribution to the estimates of units that are similar to those missing. In this study the adjustment cells used consisted of a number of geographically adjacent PSUs. The weights were then adjusted by multiplying each with the correction factor.

Table A3: Notation for non-response adjustment

Symbol	Explanation
C	Adjustment (Correction) factor
a	Index of adjustment cell
h <sup>r</sup>	Responding households
h <sup>f</sup>	Non-responding households

$$C_a = \frac{1}{\frac{h_a^r}{h_a^r + h_n^r}} \quad C_a = \frac{1}{\frac{h_a^r}{h_a^r + h_a^f}} \quad \text{Equation 5, non-response correction}$$

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# Recovering from the Wenchuan Earthquake

On May 12, 2008, Wenchuan County in Sichuan China was hit by one of the strongest earthquakes in modern history. In order to provide information for the planning and implementation of recovery policies in disaster areas, Fafo and the Chinese Academy of Science and Technology for Development (CASTED) undertook a research project with three follow-up surveys in the worst-hit province Sichuan. This report compiles the results of three surveys over the entire recovery period. It describes how the affected population viewed the recovery process, and its impact on social cohesion, trust, and satisfaction with government. The report also assesses to what extent the government managed to achieve its recovery objectives, and to what extent the recovery process spurred further social change and development. The experiences and results from this project can also be useful for scholarly and policy purposes in other contexts.



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