Introduction

China is no stranger to natural disaster. Having already experienced many severe natural disasters, China must now contend with increasing threats and expanding vulnerability. Most of its territory is characterized by compact regions (Yu et al. 2012), a recent history of rapid economic development, and the onset of global climate change (Zou and Li 2010). Although China’s exposure to natural disasters has increased in recent years, effective disaster risk management has figured prominently in Chinese governance throughout its extended history. Even though most scholars and practitioners realize that natural disasters are crucial tests of good governance, historical evidence shows that we may fail to fully understand the relationship between disaster risk management and local governance. Various policy dilemmas caused by specific crisis situations and the limitations of the top-down policymaking system urge us to reconsider the interactions among the central government, local governments, and society while coping with disasters (Zhang 2010). Within the current performance evaluation system that focuses on economic growth, it is not easy for local authorities to recognize better mechanisms for strengthening local governance capacity and improving collaborative processes, which would make governing in times of natural disasters more effective and enhance community resilience.

The role of governance and its importance in building community resilience have been widely discussed by scholars in recent years. The key elements of governance—including polycentric and multilayered institutions, learning and communication, community competence, and participation and collaboration—have been analyzed and discussed, especially in regards to their roles in building community resilience (Lebel et al. 2006, Norris et al. 2008). However, a distinctive gap between these two concepts—improving governance and improving disaster management—remains. Scant attention has been paid to specific enhancements to overall governance quality that would lead to better disaster risk management for at-risk societies and populations. Few concrete strategies have been offered for improving local disaster risk management capacities. On the other hand, the need to develop guidelines and procedures for integrating disaster risk management into government systems is receiving growing attention.
This paper attempts to explore disaster risk management practices that reflect core governance capacities, and the role of community social capital in local governance. The critical questions to be asked are these: Is local governance capacity able to prepare for and respond to natural hazards effectively and efficiently? What is the influence of community social capital on local governance? We employed two major research methods, both including in-depth interviews and household surveys. On one hand, we interviewed local governors of the most hard-hit counties from the Lushan Earthquake to assess their disaster risk management (DRM) measures and governance capacities. On the other hand, we conducted surveys of local residents to explore the potential impact social capital exerted on disaster risk management, local governance, and, thus, community resilience.

The paper will first review the impact of Chinese national governance structures on disaster risk management from a historical perspective. Based on the review, it will discuss interacting mechanisms of the central and local authorities, and the pros and cons of the current system. It will then assess the effectiveness of local disaster risk management systems—including disaster preparation, response, mitigation, and recovery—based on an empirical study of Lushan County and Baoxing County, which were hit by a large earthquake on April 20, 2013. The paper analyzes the intricate relationship of key governance elements, disaster risk management problems, and community social capital. It concludes with suggestions to improve local disaster risk management through enhancing governance capacities. The paper also calls for further research in the new arena of disaster governance.

**I. Historical Review on China’s Disaster Risk Management Systems**

This review summarizes valuable experiences relating to disaster management and governance capability in the Chinese national context. While there is an immense amount of literature about disaster management in China, this review analyzes disaster management systems since the founding of the People's Republic of China (the P.R.C. or New China) in 1949.

**China’s Governance System**

The unique political system in China has had a great impact on disaster risk management. As the sole ruling party of the country, the Communist Party of China (CPC) achieves its leadership through the CPC National Congress held every five years. The Central Committee of the CPC establishes framework documents on the country's national strategies, development goals, laws, and regulations, as well as overall policies in its annual plenary session.

China's National People's Congress (NPC) is the country's legislative authority, and the State Council is its administrative office at the national level. Similarly, local government is the administrative organ of the local NPC. The State Council and local governments are
not only responsible for implementing specific policies, but also for establishing policies in accordance with national strategies. Under the State Council, there are around 50 committees, ministries, and subordinate agencies. Although the division of powers among these entities is generally clear, there are still overlapping parts. Therefore, coordinating bodies such as the National Committee for Disaster Reduction (NCDR) were established within the State Council (at the national level) to coordinate actions and resolve conflicts among the disaster risk management entities. It should be noted that such coordinating bodies have much less administrative power than the 50 entities mentioned above.

There are two types of coordinating bodies. One is a coordinative committee or formal “leading small group” (Lingdao Xiaozu), which deals with issues related to routine functions and long-term objectives. The other is a command headquarters (Zhihuibu) or informal “leading small group” (Lingdao Xiaozu), which deals with disasters or temporary issues. Whether the coordinating body works or not mainly depends on who is serving as leading director. It is more effective when the director is a national-level leader (vice premier and above), or is from a powerful agency such as the National Development and Reform Commission (NDRC), the Ministry of Finance (MOF), or the Organization Department of the Central Committee of the Communist Party of China (CPC). The coordinating body is most powerful when a member of the Politburo Standing Committee of the CPC directs it. This structure works very well when the problem to be solved is a one-time issue or a long-term goal with clear measurements. If not, the coordinating body becomes dysfunctional.

With regard to local governments, the combination of horizontal administrative leadership and vertical operational instruction is the main governing approach. Central government tries to enhance the implementation of its national strategy for disaster risk management (DRM). However, it does not establish respective performance evaluations of the local governments. Since local governments have various choices to make when they allocate resources, they might compare DRM with other urgent problems, such as economic growth. Even with national guidelines issued by the Ministry of Civil Affairs (MOCA) or the National Committee for Disaster Reduction, DRM may not be included in their priorities.

Currently, performance tends to be measured using quantitative approaches such as GDP, since there is no uniform, clear, and systematic evaluation system for governments at all levels. China attaches importance to the five-year plan and ten-year plan, which are longer than the tenures of most government leaders. According to the traditional culture of political leadership, each new generation of leaders should have their own characteristics (a new broom sweeps clean, Xin guan shang ren san ba huo). At the same time, it is hard for new leaders to modify or abandon the existing five-year plan. As a consequence, existing long-term plans are neither fully followed nor fully abolished. To some degree, this inconsistency brings about shortsightedness on the part of officials.
Moreover, the policymaking process is relatively closed and normally excludes participation of nongovernmental subjects.

<b>China’s Disaster Risk Management System</b>

<c>Review of Major Disasters and Losses</c>

Being the third-largest and most populous country, China has suffered its share of natural disasters, which can be characterized by their wide variety, high frequency, and great impact. Five of the most common natural disasters in China are floods, droughts, earthquakes, typhoons, and landslides and debris flows. The losses caused by the above five types account for 80 percent to 90 percent of total losses brought by natural disasters in China. The direct economic loss caused by natural disasters is 100 billion yuan per annum since 1949, with annual disaster-covered farmlands exceeding 40 million hectares and the annual afflicted population exceeding 200 million. Figure 1 shows direct losses incurred by natural disasters since 1989, and its proportion in GDP. Table 1 shows losses by major large disasters since 1949. (For more information about the disasters, please refer to Appendix I).

Figure 1. Direct Losses Incurred by Natural Disasters Since 1989 and Its Proportion in GDP

Source: Calculated from data published by the Ministry of Civil Affairs and China Statistical Yearbook 2012.

Table 1. Losses of Major Disasters Since the 1998 Flood

<table>
<thead>
<tr>
<th>Disaster</th>
<th>Number of Provinces Affected</th>
<th>Deaths &amp; Missing (in 1,000)</th>
<th>Emergent Relocation (in 1,000)</th>
<th>Collapsed Houses (in 1,000)</th>
<th>Economic Loss (in 1 billion yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998 Flood</td>
<td>29</td>
<td>2,291</td>
<td>16,640</td>
<td>4,833</td>
<td>210.4</td>
</tr>
</tbody>
</table>
In economic terms, China has been the fastest-growing developing country over the last three decades, and has experienced tremendous achievements. The population living in absolute poverty in rural areas decreased from 250 million in 1978 to 14.79 million in 2007, and the percentage of the rural population living below the poverty line declined from 46 percent in 1990 to 10.4 percent in 2005. This progress could not have been made without a series of calculated strategies, such as poverty alleviation and urban-rural balanced development. However, past approaches to pursuing development overemphasized the growth rate while ignoring other issues. With regard to balancing economic development, social development, and environmental development, China still faces severe challenges, such as eliminating pollution, bridging the huge gap between urban and rural areas, reducing unequal access to public services, etc.

The existing political and social problems become exaggerated when disaster strikes, calling for the urgency of improving governance capacity and disaster management. On the other hand, apart from the physical damages a disaster would inflict, it might also create opportunities to enhance governance capabilities, hence contributing to long-term improvements.

### Institutional Setup

China’s disaster management and emergency management systems can be regarded as an integrated network set up by governments and other social organizations to cope with emergencies. The network is comprised of a system of laws and regulations, institutional organizations, mechanisms and rules, capabilities and technologies, and environment and culture (Xue 2010).

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
<th>Death</th>
<th>Injured</th>
<th>Missing</th>
<th>Damaged</th>
<th>Direct Damage</th>
<th>Indirect Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Huaihe Flood</td>
<td>3</td>
<td>31</td>
<td>2178</td>
<td>389</td>
<td>36.43</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>SARS (Chinese Mainland)</td>
<td>/</td>
<td>349</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>Typhoon Rananism</td>
<td>6</td>
<td>183</td>
<td>660</td>
<td>722</td>
<td>19.89</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Sichuan-Chongqing Drought</td>
<td>2</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>22.27</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Typhoon Saomei</td>
<td>3</td>
<td>483</td>
<td>1,801</td>
<td>137</td>
<td>19.65</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Severe Tropical Storm Billis</td>
<td>6</td>
<td>843</td>
<td>3,369</td>
<td>391</td>
<td>34.82</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Huanhe Flood</td>
<td>3</td>
<td>39</td>
<td>1,441</td>
<td>133</td>
<td>19.59</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Snow Disaster</td>
<td>21</td>
<td>132</td>
<td>1,660</td>
<td>485</td>
<td>151.7</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Wenchuan Earthquake</td>
<td>10</td>
<td>87,866</td>
<td>15,100</td>
<td>7,967</td>
<td>845.1</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>Yushu Earthquake</td>
<td>27</td>
<td>2,698</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Lushan Earthquake</td>
<td>/</td>
<td>198</td>
<td>608</td>
<td>24</td>
<td>/</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Shi Peijun et al. 2009a. Presentation at IHDP meeting in Bonn, Germany.
As a country prone to natural disasters, China has attached much importance to disaster management since the founding of the P.R.C. At the end of 1949, a national disaster reduction and relief function system was established by the Government Administration Council (now called the State Council) of the central government, with the Ministry of Internal Affairs (now called the Ministry of Civil Affairs) set up to take charge of civil affairs, including disaster relief. Local offices of the Ministry of Civil Affairs were set up in administrative regions, the Department of Civil Affairs in provinces/autonomous regions/municipalities, the Bureau of Civil Affairs in cities, and the Division of Civil Affairs and the Section of Civil Affairs in sub-provincial administrative regions (see Table 2). In 1950, the Central Disaster Relief Commission was established and Dong Biwu, deputy premier of the Government Administration Council, was appointed as the commission's director. Meanwhile, the Ministry of Internal Affairs was entrusted with handling daily affairs. Later on, in keeping with the features of China's administrative organization, the system of “pairing one department with one type of disaster” was set up. For example, the Ministry of Water Resources was responsible for flood control, while the Seismological Bureau (now called the China Earthquake Administration) was responsible for coping with earthquakes. In 1951, the Central Manufacture Disaster Relief Commission issued the “Notice on Uniform Standard for Disaster Statistics.” During a long period after the founding of the P.R.C., agriculture was the main sector affected by natural disasters, as agricultural production accounted for a large part of industrial activities and was a relatively simple sector on which to gather disaster statistics (Yuan and Zhang 2006). At the First National Civil Affairs Conference in 1950, the disaster relief policy was proposed: “pulling through by hard working, resource saving, mutual assistance, work relief, and other necessary relief” (Li 2007). Improvements to the disaster management system largely came to a stop during the Cultural Revolution.

The top-down system for disaster response was formed by 1978. Disaster response was treated as a political mission to show the advantages of the Chinese socialist regime (Zhang 2014). The framework for DRM during this period was affiliated with the planned economy (Kang 2006). Only the government took responsibility, with social participation or foreign aid refused, even when budgets were very limited (Zheng 2009). This system worked well to mobilize people and local governments, while implementing the simple principle that “we should rely on our ordinary people.” This winning strategy, named Qunzhong Luxian, came from one of three legacies of the CPC.²

While the reform and opening-up movements in 1978 spurred rapid developments in society, the economy, and industrialization, more and more sectors have suffered from the increasing frequency and intensity of natural disasters, epidemics, and industrial accidents. The previous system of “pairing one department with one type of disaster” has faced difficulties in coordination among various sectors. In such a context, the cross-sector deliberation and coordination mechanism was carried out during significant restructuring of government departments. Under the mechanism, various organizations were established by the State Council, including the National Committee for Disaster
Reduction, State Flood Control and Drought Relief Headquarters, the State Council’s Earthquake Rescue and Relief Headquarters, China’s National Forest Fire Prevention Headquarters, China’s National Nuclear Emergency Coordination Committee, and National Disaster Control and Relief Coordination Office, with many corresponding organs set up by governments at provincial and lower levels as well. For a long while, this pattern remained unchanged. By 1994, though, after the 10th National Civil Affairs Conference, graded management of disaster relief was put into practice by central and local governments. At the central government level, the National Committee for Disaster Reduction acted as a coordinating organization and the Ministry of Civil Affairs took responsibility for disaster relief work. Within the Ministry of Civil Affairs, there is a four-grade response system (refer to Figure 2) depending on the scale of disasters. Local governments have similar mechanisms. Thus, there emerged a disaster relief management system of "graded management under the unified leadership of governments with division of labor and responsibility among departments" (Li 1997).

Figure 2. China’s Four-Grade Disaster Response System

In April 2006, the General Office of the State Council formally set up the State Department Office of Emergency Management, which undertakes the daily work of emergency management and related general duty work of the State Council. This department fulfills functions such as emergency guarding, information aggregation, and integrated coordination. At the same time, four categories of emergencies and their respective responsible departments have been identified: natural disasters are mainly managed by the Ministry of Civil Affairs, Ministry of Water Resources, and the China Earthquake Administration, and so on; incident disasters by the State Administration of Safety (now divided into the State Administration of Work Safety and State Administration of Coal Mine Safety); public health emergencies by the Ministry of Health (now called the National Health and Family Planning Commission); and social security incidents are managed by the Ministry of Public Security and coordinated by the State
Council. In accordance with such adjustments, emergency management offices have been established within military and large state-owned enterprises or other entities at the national level. Moreover, certain adjustments were carried out in the 16 coordinating entities at the national or State Council levels, including 7 headquarters, 5 leading groups, 4 commissions, and 9 joint conferences. Thirty-one provinces also set up leadership organizations for emergency management, as well as special offices named emergency management offices. The improvements were almost complete by the end of 2007, at which point each of the provincial governments, 96 percent of the municipal governments, and 81 percent of the local governments had established institutional support for emergency management.

Figure 3. The Structure of Emergency Management in China

Table 2. Changes in Emergency Management Organizations Since the Founding of the P.R.C.

<table>
<thead>
<tr>
<th>Time</th>
<th>Changes in Emergency Management Organizations</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>The Government Administration Council set up the Ministry of Internal Affairs. The Department of Social Affairs of the Ministry of Internal Affairs was appointed to take charge of social relief work.</td>
<td>In the same year that the P.R.C. was founded, a nationwide flood struck 16 provinces/regions across the country.</td>
</tr>
<tr>
<td>1950</td>
<td>The Central Disaster Relief Commission was established, with Dong Biwu, deputy premier of the Government Administration Council, acting as its director. Members included the heads of the Ministry of Internal Affairs, Finance and Economic Committee, Ministry of Finance, Ministry of Agriculture, Ministry of Railways, Ministry of</td>
<td>At the end of 1949, the “Instruction on Manufacture Disaster Relief” was issued by the Government Administration Council, which clearly stated that &quot;manufacture disaster relief</td>
</tr>
</tbody>
</table>
The Central Disaster Relief Commission set up its office under the Rural Social Relief Department of the Ministry of Internal Affairs.

1958 The Central Disaster Relief Commission was abolished and other local disaster relief organizations were either abolished or merged, except those serving areas most frequently hit by natural disasters. Since then, the Ministry of Internal Affairs began to take charge of national disaster relief coordination work, while the Ministry of Civil Affairs took responsibility for regional disaster relief work.

During the Great Leap Forward (1958–1960), there existed a point of view that natural disasters could be completely eliminated, so disaster relief organizations might just be abolished.

1969 The Ministry of Internal Affairs was abolished. As a result, disaster relief work formerly undertaken by the Rural Social Relief Department of the Ministry of Internal Affairs was assigned to the Central Agricultural Affairs Committee, Ministry of Agriculture, Ministry of Finance, and other departments.


1978 The Ministry of Civil Affairs was established, and the Rural Social Relief Department under its administration was given responsibility for rural disaster relief work across the country. However, during the Cultural Revolution, the Ministry of Civil Affairs did not take over the disaster relief organization or the coordination work undertaken by the Central Agricultural Affairs Committee. From 1978 to 1989, comprehensive coordination of disaster relief work was successively under the charge of the Central Agricultural Affairs Committee, the Agricultural Bureau of State Economic and Trade Commission, and the Production Safety Dispatching Bureau of the State Planning Commission.

The Cultural Revolution ended in 1976.

1989 The China National Committee for the International Decade for Natural Disaster Reduction, predecessor of the National Committee for Disaster Reduction, was established. The ten years from 1990 to 2000 were designated as the period for responding to the initiative of the
established as an interministry coordinating organization consisting of the heads of 32 ministries, commissions, and bureaus, as well as related departments of the Chinese People’s Liberation Army. Its office was set up under the Department of Disaster Reduction and Social Relief of the Ministry of Civil Affairs. Primary missions of the committee were to work out the policies, guidelines, action plans, and disaster reduction plans for China’s International Decade for Natural Disaster Reduction and organize relevant departments to work together in disaster prevention and relief.

1989 A portion of China’s provinces/autonomous regions/municipalities set up some ad hoc disaster relief offices, some of which were established under the general offices or offices of provinces/autonomous regions/municipalities, some under provincial planning and economic committees, and some under the Department of Civil Affairs or the Council of Agriculture of the Provincial CPC Committee.

2003 The Ministry of Civil Affairs was explicitly assigned to "undertake the organization and coordination of disaster relief work; to undertake the work of verifying the disaster situation and releasing the disaster news; to undertake the management, distribution, and use of the funds and supplies allocated for disaster relief from the central government; to organize and guide the donation for disaster relief; to undertake daily work of the China National Committee for International Natural Disaster Reduction; to formulate plans for disaster alleviation and undertake the international cooperation for disaster alleviation."

State Council issued the “Notice on Report by State Planning Commission on Strengthening and Improvement of National Disaster-relief Work approved by the State Council.”

The fifth institutional reform of the State Council occurred.


**Establishment of China’s Emergency Management System**

Response to the SARS (severe acute respiratory syndrome) outbreak of 2003 became a defining event, one that connected the past and future development of disaster management in China. SARS challenged top Chinese leaders’ mindsets about coping with disasters and emergencies. As an unprecedentedly complicated emergency management environment, SARS was difficult to deal with through the traditional system of “pairing one department with one type of disaster” and required comprehensive cross-sector deliberation and coordination mechanisms. The outbreak took its shape as a result of changes in international political, economic, social, and natural environments, especially...
the great impact of globalization, together with the complex social changes in China due to rapid economic development and rapid transformation of the economic system. Given that SARS developed from an epidemic into a political crisis (Fewsmith 2003), the Chinese government fully learned that the changing times were affected by international and social forces, and that a basic task of “Scientific Outlook on Development” is to cope with emergencies and crises. It was extremely urgent for China to make adjustments to existing disaster relief and emergency management systems and mechanisms. A new emergency management system centering on the establishment of “plans, laws, institutions, and mechanisms” for emergency management was fully proposed at the plenary session of the CPC for the first time in 2006 (Gao 2010). At its core, it started with the establishment of an emergency management plan system, and allowed the standardization of procedures for coping with emergencies to gradually transform, adjusting and establishing the laws, systems, and mechanisms for emergency management. Since then, disaster risk management has become a key part of China’s emergency management system. This strategy was completely achieved by the end of 2007 through various steps.

First, a contingency plan system was issued consisting of a master state plan for rapid response to public emergencies, a special state plan for response to emergencies, a departmental emergency plan, a local emergency plan, and emergency plans for enterprises and public institutions (see Figure 4). After several years of efforts, more than 1.3 million contingency plans of all kinds and levels were developed to cope with various public emergencies, forming a basic network of contingency plans.

Second, provincial centers for emergency management were set up in all 31 provinces/autonomous regions/municipalities, and special functional centers for emergency management were strengthened, including those for state flood control and drought relief, earthquake relief and hazard mitigation, maritime search and rescue, forest fire prevention, disaster relief, and production safety.

Third, various emergency management mechanisms were constructed, including a mechanism for each of the following: emergency monitoring and early warning, information communication, emergency decision-making and coordinating, responsibility and response on a graded basis, social mobilization, emergency resources allocation and requisition, rewards and punishment, integrated governance for public security, management of urban and rural communities, interacting between governments and the public, and international coordination.

Last, the Law of Response to Public Emergencies of the People’s Republic of China—China’s first basic law for emergency management—was passed at the Standing Committee of the National People’s Congress on August 30, 2007, and was officially implemented on November 1, 2007. It marked the legalization of emergency management, and brought together an existing network of 35 laws, 37 administrative regulations, 55 departmental rules, and 111 regulatory documents for response to public
emergencies (Gao 2008). Since then, disaster management in China has entered into a new stage that focuses on the construction of an emergency management system, one centering on plans, laws, systems, and mechanisms for emergency management.

Figure 4. Emergency Management Contingency Plan System in China (at National Level)

It should be noted that the “National Action Program on Climate Change” was published in 2007, which is China’s first policy document in response to climate change, and also the first national action program in the field of climate change among developing countries.
Reflections Upon the Current System

Over 60 years, China made significant progress in setting up disaster management institutions across all levels of governments, as well as in formulating laws and regulations to guide actions. However, there is still much to be done.

At the government level, insufficient legalization and the failure to break traditional patterns of division plagued efforts to set up a unified emergency management organization. Thus, emergency management functions are still distributed among various departments, resulting in multiple decision-makers and a lack of decision-making capacity. In practice, decision-making is subject to individual interests, departmental interests, individual capabilities, and other factors. This results in various emergency management difficulties, including separation of information and decision-making, blocked collaboration among decision-makers, and limited decision-making power. Vertically, the failure to shift crisis response centers to the bottom of the government system—which are the first responders in disasters—results in the inability to make quick decisions on the ground. Horizontally, departments are accustomed to cooperative decision-making and thinking modes under normal circumstances. Simulations and exercises for using cooperative decision-making in emergency situations have been lacking, as have the adaptive leadership capabilities needed to respond to catastrophes. Due to a high level of uncertainty during catastrophes, adaptive leadership is especially necessary to inspire innovation and cooperation among team workers. In addition, a fault-tolerant mechanism is also essential (Howitt and Leonard 2009).

Overall, one telling feature of the current disaster management system is that it remains a passive responder to disasters as they strike, and lacks a thoroughly integrated cycle of disaster prevention, risk assessment, notification, response, and relief. There is no risk assessment system in place to evaluate the social and economic impacts incurred by disasters. Disaster management performance systems have not been established for departments at all levels. The lack of such systems impedes improvement of emergency management capabilities. Moreover, both technology and human resources for disaster management are far from satisfactory to meet the challenges brought by large-scale and compound disasters.

Institutional changes to disaster risk management relate to three core elements: national strategy, intergovernmental relationships, and the relationship between state and society. National strategy is the foundation on which DRM institutions, laws, and regulations are based, and the vehicle for changes to be enacted. In the period from 1978 to 2003, China’s national strategy was to promote economic development; therefore, DRM was also regarded as an economic development issue (Zhang 2014). For instance, water conservation projects were regarded as major approaches to dealing with flood and drought, and economic growth was used as a disaster relief method. However, the current national strategy that emphasizes social governance is fostering the formation of a polycentric disaster risk management mode. Moreover, intergovernmental relations
between central and local governments exert great impact on DRM. The traditional top-down system—where local governments follow the orders of central government, and governments at lower levels follow orders from higher levels—prevailed in the past. Central government was the final decision-maker of DRM. But during the Lushan Earthquake in 2013, the earthquake commanding headquarters shifted to provincial governments, in response to growing recognition that local first responders play vital roles in DRM. The other type of relationship—that between state and society—is also changing. In the past, local governments failed to act as first responders due to centralized post-disaster command. A pattern emerged in which central government played the leading role in disaster relief, and local governments and civil society barely took action in the face of disasters. However, in the wake of a booming increase in DRM nonprofits since 2008, along with the growing capacities of civil society to solve societal challenges and support local, national, and global governance (World Economic Forum 2013), nonprofit organizations are assuming a heightened role in DRM.

This review explores the mutual impacts governance capacity and disasters have on each other, in combination with China’s political and economic context. It also summarizes losses from major disasters since the 1998 Flood. Most importantly, the review goes over the changes and improvements to disaster management institutions and legislation since the founding of the P.R.C., and analyzes the major drawbacks of the current disaster management system. How could China set up a feasible, scientifically based evaluation system to integrate disaster management with its regional development agenda? How can China accelerate the legalization process to increase social participation in disaster relief? China still has a long way to go.

II. Literature Review: Disaster Risk Management, Community Social Capital, and Governance Capacity

Disaster Risk Management

Coincident with growing economic and social losses brought about by disasters, disaster risk management (DRM) has gained increased attention worldwide as a way to not only build resilience and reduce the effects of adverse events, but also to allow residents to take advantage of opportunities for improvement (World Bank 2013b). The most commonly used definitions of DRM are from the World Bank and the United Nations. The World Bank adopts the DRM definition of the Intergovernmental Panel on Climate Change:

Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, and sustainable development (IPCC 2012).
The United Nations defines disaster risk management as:

*The systematic process of using administrative decisions, organization, operational skills, and capacities to implement policies, strategies, and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and nonstructural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards* (UNISDR 2004).

Both definitions note that improving DRM requires efforts such as policies, regulations, and education centered on achieving a comprehensive set of goals. To accomplish these goals, a large number of international organizations, think tanks, and scholars created frameworks to guide the actions of public, private, and nonprofit sectors, as well as residents.

First and foremost, the most important strategy—and a key challenge—is to design an institutional framework and mechanisms for building long-term DRM, as governments play a critical role in managing systemic risks (World Bank 2013c). Leading institutions for DRM must have the necessary authority to coordinate powerful sectoral ministries, and there should be cross-departmental collaboration at the highest possible level of government. It is also important to provide proper incentives for people in these institutions to work out disaster reduction plans (World Bank 2013a). Moreover, legislative revamping, perhaps even drastically, is essential to enhance the effectiveness of disaster management institutions (Gopalakrishnan and Odaka 2007).

Second, DRM calls for actions and responsibilities from all members of society, at all levels. Despite cross-sectoral cooperation of government, companies, and nonprofit organizations, efforts contributed from individuals and households to international communities are all valuable (World Bank 2013b). Local participation is especially important in the building of long-term resilient communities (World Bank 2013c).

Third, policies and planning are important to provide specific guidance of DRM, and they are especially important in the recovery phase. While recovery planning should take local realities and cultures into account and pay special attention to the needs of the vulnerable populations (World Bank 2013a, World Bank 2013c), Brennan (2003) proposed that DRM should be *mainstreamed* into development planning, such as urban settlements and housing, agriculture and aquaculture, road construction, school design and construction, etc.

Fourth, financial resources are critical if the policies and planning are to be implemented effectively. To guarantee against potential budget volatility in the aftermath of disasters, the World Bank (2013a) proposed that contingency funds be established at the national
and local levels. Furthermore, it was deemed important to develop a long-term financing framework and encourage vulnerable populations to create self-financing methods (World Bank 2013b). Additionally, risk insurance through public-private partnership might also have huge potential for ensuring that the financial needs of recovery are met. The Organisation for Economic Co-operation and Development (OECD) (2012) emphasizes the role of finance ministries in the management of disaster risks, such as ensuring the quality of risk assessment, establishing financial strategies for DRM, and promoting a risk-free finance market.

Last, information quality, transparency, and availability affect every phase of DRM. For instance, risk information and modeling systems are essential during the risk identification period (World Bank 2013a, 2013c). Risk information sharing for all relevant government agencies, reaching all levels and sectors, as well as communities and the private sector, is conducive to gathering efforts from all stakeholders. Moreover, data on hazards, exposures, vulnerabilities, and losses are crucial to risk assessment, as is the development of risk financing tools and strategies (OECD 2012).

In summary, there are five key elements in the various approaches to enhancing DRM capacities as proposed by different organizations. These key factors include: (1) effective government institutions that bring related departments together to conduct DRM and provide proper incentives for officials to implement DRM strategies; (2) cross-sectoral cooperation of government, corporate entities, nonprofits, and communities; (3) far-sighted policies and planning that can be mainstreamed into long-term socioeconomic planning, and that factor in local needs and realities; (4) sustained financial resources guaranteed by institutional support and the use of diverse tools; (5) transparent information about risks and impacts that can be accessed and shared by the whole society.

**Community Social Capital and Local Disaster Risk Management**

Social capital has a variety of definitions, of which the most widely recognized are from Bourdieu (1986) and Putnam (1993). According to Bourdieu, social capital is “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationship[s] of mutual acquaintance or recognition.” Putnam defines social capital as “features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions.” Community social capital refers to “community-level resources, such as the density of social networks that facilitate cooperative actions for mutual benefit among members of a community” (Paldam 2000, Ferlander 2007).

Social capital plays an important role in enhancing disaster risk management. Prior to a disaster, social capital serves to enhance civic activities and social cohesion (Buckland and Rahman 1999, Murphy 2007), facilitate emergency preparedness activities, and establish and implement disaster management policies (Bihari and Ryan 2012). Regular
interaction between emergency management organizations and community organizations allows for these organizations to plan and implement an emergency response more efficiently (Kapucu 2006a and 2006b; Kapucu, Arslan, and Collins 2010).

Following a disaster, social ties can serve as informal insurance, providing victims with information, financial help, and physical assistance (Beggs, Haines, and Hurlbert 1996). Within a community, individuals who are better connected to more individuals receive more assistance post-disaster than less connected people (Hurlbert, Haines, and Beggs 2000). Moreover, connections to individuals outside damaged areas provided survivors with critical resources such as tools, food, accommodations, and information at a time when typical providers (stores, transportation networks, housing providers, government service agencies) were shut down (Aldrich 2011).

During disaster recovery periods, cooperative relations among different organizations, such as financial institutions and voluntary agencies, have generally assisted in mitigating the consequences of natural disasters, including mobilizing a community’s resources, expertise, professionals, and volunteers (Mathbor 2007). Chamlee-Wright and Rothschild (2007) argued that strong social networks raise the cost of exit from a community and increase the probability that residents will join rebuilding efforts. Moreover, communities with high intra-community connection (social capital), and that are able to maintain additional support through weaker connections with external communities, are likely to thrive in the future (Woolcock 1998).

**Township Disaster Risk Management Framework**

The township is at the bottom of China’s political system (see Figure 5), but it is a critical nexus linking urban and rural areas. Township governments should directly deal with the whole process of disaster risk management, as their capacities have large impacts on the effects of disaster risk management practices.

**Figure 5. Levels of Government under the State Council of China**
Based on international practices and guidelines, as well as China’s emergency response system, we developed the Township Disaster Risk Management Framework (see Table 3), adjusted from Tsinghua’s framework (Zhang 2009).

**Table 3. Township Disaster Risk Management (DRM) Framework**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1. Contingency Plan | 1.1 Contingency plans in townships, contents and coverage.  
1.2 The implementation and effects of the plans. |
| 2. Institutions | 2.1 Specific institutions/people responsible for DRM. |
| 3. Risk Analysis and Early Warning | 3.1 Established mechanisms and resources (human, equipment, funding, expertise, etc.) for risk analysis and warning.  
4.1 First responders of rescue and relief. |
| 4. Emergency Response | 4.2 The involved groups and their participation and coordination.  
4.3 Resources (human resources, equipment, funding, expertise, etc.) for rescue. |
| 5. Logistics Management | 5.1 Resources (human, equipment, funding, expertise, etc.), infrastructure for DRM in routine situations. |
| 6. Social Participation | 6.1 Participation of local residents in DRM.  
6.2 Participation of nonprofits in DRM. |
| 7. Education and Training | 7.1 Mechanisms and forms of education and training for DRM.  
7.2 Involvement of township officials and residents. |
| 8. Recovery | 8.1 The planning process and stakeholders’ participation.  
8.2 Resources management for recovery. |

**Note:** As townships do not have legislative rights, the framework excludes legislation.

IIII. Methodology and Research Areas
This paper intends to explore the following questions: Is local governance capacity able to prepare for and respond to natural hazards effectively and efficiently? What is the influence of community social capital on local disaster risk management? Two hypotheses are considered.

H1: Local capacities of disaster risk management would not be enhanced unless disaster risk management has been mainstreamed into the governance system.

H2: Community social capital has an impact in disaster risk management.

Two major research methods were used to test the above hypotheses. On the one hand, in-depth interviews were conducted in late August 2013 in the most hard-hit counties following the Lushan Earthquake. The interviews sought to find out what disaster risk management (DRM) measures local officials took prior to and after the earthquake, and the pros and cons of local DRM and governance capacities from the perspectives of government officials. On the other hand, we conducted surveys of local residents to explore the potential impact that social capital exerted on disaster risk management, local governance, and, thus, community resilience.

The Lushan Earthquake occurred at 8:02 a.m. (GMT+8) on April 20, 2013. The epicenter was located in Lushan County, Sichuan, about 116 kilometers from the provincial capital Chengdu. Table 4 shows the impact of the Lushan Earthquake.

<table>
<thead>
<tr>
<th>Category</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>8:02 a.m. (GMT+8), April 20, 2013</td>
</tr>
<tr>
<td>Magnitude</td>
<td>7.0 on Richter Scale</td>
</tr>
<tr>
<td>Epicenter</td>
<td>Longmen Township, Lushan County, Sichuan Province</td>
</tr>
<tr>
<td>Source</td>
<td>Xichuangou, Shuangshi Township</td>
</tr>
<tr>
<td>Depth</td>
<td>13 km</td>
</tr>
<tr>
<td>Intensity</td>
<td>Level 9</td>
</tr>
<tr>
<td>Casualty</td>
<td>196 killed; 2 missing; 11,485 injured</td>
</tr>
<tr>
<td>Affected Population</td>
<td>2,184,000</td>
</tr>
</tbody>
</table>

Data as of May 23, 2013.  

According to the disaster impact evaluation of the Lushan Earthquake (State Council 2013a), Lushan County (right in Figure 6) and Baoxing County (left in Figure 6) were the hardest-hit. Therefore, research was situated in the area of the 16 townships of Lushan and Baoxing.
Located in China’s southwestern region, Sichuan Province is the center of this area through its location and economic power. In 2012, the GDP of Sichuan Province reached 2,387 billion yuan, ranking eighth in the country and first in the southwestern region. Lushan County is located on the western edge of Sichuan Basin. Lushan was severely damaged in both the Wenchuan and the Lushan Earthquakes. Baoxing County is on the eastern side of Lushan and 200 kilometers away from Chengdu. Located in the transitional area of Chengdu Plain, this famous tourist site is the natural habitat for pandas and has a mountainous landscape. Ethnic minority groups accounted for 18.17 percent of Baoxing’s population in 2010, of which the Tibetan people make up 96.64 percent. The major contribution to economic growth of the two townships still stems from agriculture.

IV. Disaster Risk Management and Local Governance Capacity

In order to test our first hypothesis—that is, local capacities of disaster risk management would not be enhanced unless disaster risk management has been mainstreamed into the governance system—we conducted in-depth interviews of township officials in Lushan County and Baoxing County to understand what disaster risk management measures were taken prior to and after the Lushan Earthquake. Among the 18 townships of the two counties, two township officials rejected the research request. Therefore, we interviewed governors of 16 townships (8 in Lushan County, 8 in Baoxing County) during August 12–16, 2013, when temporary relocation was almost completed and recovery planning under preparation. The in-depth interviews were structured in accordance with the Township Disaster Risk Management Capacity Framework, and the findings are as follows.

Contingency plan

According to the National Emergency Management System, township authorities bear the responsibility of establishing contingency plans at the township level (State Council of the People’s Republic of China 2003).
The importance of contingency plans (CPs) was reinforced after the 2008 Wenchuan Earthquake. However, our interviews reveal that there are still problems that require attention to improve the CP systems.

First, as the townships’ CP systems are comprised of separate plans for specific disasters, the interviews indicate that while most CPs offer detailed guidance for dealing with common hazards such as floods, droughts, forest fires, landslides, and mudslides, the townships lack plans for dealing with earthquakes. As the governor of LS03 stated: “Our contingency plans cover floods and (small) geological disasters. We could not make plans for catastrophes such as earthquakes” (LS03 Governor 2013). The progress made after 2008 is mainly based on CPs for cascading disasters, which a few townships established to help avoid casualty in the aftermath of calamities. In these townships, such plans helped achieve zero casualty in the cascading disasters of the Lushan Earthquake.

Second, the implementation of CPs is highly dependent on roads, electricity, and telecommunication—the basic infrastructure components that are extremely fragile in times of disasters. Moreover, the CPs mainly target township governments and fail to address how infrastructure should be fixed with the support of related departments under the administration of counties, including the county transportation department and the national power plant (LS03 Governor 2013).

**Institutions**

Despite the CPs, institutions present a difficult challenge with respect to the implementation of disaster risk management (DRM). As there are only four units of township authority, no specific office is in charge of DRM. Therefore, not only do the townships lack first responder ability when a disaster hits, but they also lack a specific unit for disaster preparedness, relief, mitigation, and recovery. Before the Wenchuan Earthquake, adaptive measures were adopted by county authorities mandating that the counties’ Office for Work Safety act as an informal coordinating unit of disaster management of the townships. Since 2010, counties have organized annual emergency management conferences and convened township officials to guide their DRM work (LS05 Governor 2013). However, the fundamental institutional structure has still not been revamped.

In addition to the lack of an administrative body, the townships do not have specific rescue teams either. Every village organized its own emergency rescue team, mainly comprised of militia members and other villagers who were trained to cope with floods and forest fires. After the Wenchuan Earthquake, there were growing numbers of militia members on the rescue teams who played positive roles in the rescue efforts during the 2013 Lushan Earthquake.

**Risk analyses and early warning**
Aimed at geological disasters, the traditional township early-warning system operates by employing residents as monitors to watch for high-risk spots near their own houses and to use certain instruments to alert others. Such a system lacks adequate human resources, as well as financial and equipment support. First, there is a lack of sufficient professional labor responsible for risk analysis and early warning. After the Wenchuan Earthquake, a four-level monitor system was established, specifying that the community within the village, the village, the township, and the county would designate specific people to cooperatively monitor high-risk areas (LS02 Governor 2013). At the bottom (community) level, there was a geological hazard monitor and a road safety monitor, both of whom worked either full-time or part-time (LS06 Governor 2013). However, these monitors performed their responsibilities based on experience rather than on professional knowledge, and they seldom received training. Second, the stipend for the monitors is very low, only 3–10 yuan per day (LS07 Governor 2013). Under such circumstances, it is difficult to recruit monitors and to provide proper incentives for them to perform at a satisfactory level. Third, as monitors are provided no equipment to perform risk analyses, they must rely solely on their eyes to define risks. Furthermore, the equipment used to inform villagers of disasters is extremely crude—in many cases, only a gong, which can be heard by nearby neighborhoods, but is inadequate for communicating alerts over long distances. A few townships have two-way radios for communication, but such equipment is only found in townships that are highly prone to debris flows and landslides (LS02 Governor 2013).

In addition to the insufficient labor, expertise, financial support, and equipment, a lack of awareness regarding disasters on the part of local residents adds to the challenges associated with effective DRM. In some highly vulnerable and at-risk locations, even when risk analysis recommends that residents move to other areas, some of these residents accept relocation only after suffering great losses due to a catastrophe or to numerous disasters.

<c>Emergency response</c>

Township authorities and officials are the main groups responsible for directing DRM. Normally, a township has approximately 30 officials who, in the event of an earthquake, would be grouped into several task forces. During the rescue period, three task groups are formed: a rescue group, an information collection and communication group, and a supply management group. Later, other groups evolve, such as a sanitation group, a relocation group, and a security group (LS01 Governor 2013). To alleviate labor challenges, officials would develop a temporary party-member mechanism to absorb more manpower for performing administrative work.

Local residents were the most effective rescue forces in the earthquakes. In the Wenchuan Earthquake, it was local residents who saved themselves and helped others. Aside from the residents and local emergency rescue teams, rescue forces included
external military forces, armed police, and firemen. However, the contribution of these three forces was limited due to their lack of related training, experience, and equipment.

Within government systems, frequent, multilayered cross-regional and cross-departmental coordination and cooperation took place. Apart from township authorities, government officials at the county and municipal levels also worked to manage disaster rescue and relief. These officials responded to disasters more quickly and worked in post-disaster areas for longer periods of time. Cross-regional cooperation was a frequent occurrence during rescue periods, as nearby townships shared emergency supplies and information. Township officials, military, police, and firemen also engaged in cross-departmental cooperation through working together and convening conferences.

Logistics management

Logistics management systems include emergency supplies such as food and water, funding, tents, medicine, and rescue equipment, as well as infrastructure—roads, shelters, electricity, and telecommunications.

While townships face severe challenges dealing with emergency rescue resources, the lack of financial support for supply acquisition is the most critical problem. As townships lack fiscal power, they have no budgets for emergency supply acquisition (LS06 Governor 2013). With respect to a contingency fund, some townships have no funds (LS11 Governor 2013), while others have only minimal funds (LS12 Governor 2013).

Neither the township authorities nor the villagers reserve sufficient and usable food, water, medicine, tents, and rescue equipment. One governor noted, “I hope in the future our township will have two-way radios and cars for rescue” efforts (LS15 Governor 2013). Because of severe impoverishment, some areas lacked enough stores to provide food and water.

Although a few townships stockpiled tents and tarpaulins after the 2008 Earthquake, the amount acquired in the “official response” was far too small to be effective when the Lushan Earthquake hit. For instance, LS01 Township actually had a reserve of only ten tents, while LS06 Township had only one. The lack of food reserves was also due to the absence of a flexible reserve mechanism in some townships. As one governor said, “We could not reserve enough food because it easily goes bad” (LS04 Governor 2013).

A degree of progress is evident in the mechanics of acquiring supplies through the establishment of public-private partnerships (PPPs). Some townships signed PPP contracts with local stores, which allowed the authorities to use commodities under emergency circumstances and make payments later (LS02 Governor 2013, LS14 Governor 201, LS15 Governor 2013).
As these townships were located in mountainous areas, it was difficult to build large-scale emergency shelters. The importance of emergency shelters was stressed after the 2008 Earthquake. In the majority of townships visited, gyms and “town squares” had been constructed to also be used as emergency shelters.

Transportation, electricity, and telecommunication remain difficult issues with respect to DRM. In both earthquakes, these areas of infrastructure quickly crashed, and it took a significant period of time for them to recover. The majority of cases, the townships interviewed were islanded, without emergency supplies or information. During the recovery period following the Wenchuan Earthquake, disaster response capacity of the infrastructure systems was supposed to be enhanced, but no fundamental improvements seem to have been achieved. Although roads were reconstructed and strengthened to better withstand the ferocity of disasters, the standard width of 3.5 meters was not changed. Narrow roads impeded large rescue vehicles from passing and reaching affected areas (LS10 Governor 2013). While a few townships were able to recover electricity and telecommunications within three to five days after the Lushan Earthquake, many others had to wait passively for recovery.

Social participation

Social participation consists of the engagement of local residents and nonprofits. The participation of local residents in DRM was mainly through serving as risk monitors and joining the militia, as well as conducting self-evacuations. However, residents rarely joined in other phases of DRM, such as disaster preparedness, mitigation, and recovery.

The year 2008 was referred to as the NGO Year Zero or the Year of the Civil Society (Shie and Deng 2011), to denote the boom of nonprofits’ participation in providing public services after the Wenchuan Earthquake. By 2013, following five years of development of civil society, the efforts of many established, renowned nonprofits were evident. The nonprofits played very positive roles in various aspects of disaster response, including rescue, relocation, and service delivery—such as building kindergartens and libraries, as well as broadcasting movies. Most of these nonprofits, however, were from areas outside the impacted regions, and there were no local nonprofits. “We need them (the nonprofits) to stay here for the long run,” as the governor of LS09 Township said.

To better cooperate and communicate with nonprofits in 2013, the Sichuan provincial government and the Ya’an municipal government established the Nonprofit and Volunteer Service Center for Ya’an disaster relief. Two branches were created, one in Lushan County and one in Baoxing County, to provide information and to coordinate the actions and resources of the nonprofits. However, our interviews reveal that township governors still did not have a clear understanding of the definitions and roles of the nonprofits. They also held overly vigilant attitudes toward nonprofits, attempting to control them rather than to cooperate with them or provide services to them. One
governor claimed, “We certainly welcome nonprofits that could help us. But they must obey our (township authority’s) rules and management” (LS13 2013).

During our field visit in August 2013, we recorded at least 74 nonprofit organizations that had established 98 service stations in Lushan County, Baoxing County, Tianquan County, and the city of Ya’an. The nonprofits covered more than 24 townships, and provided a variety of services, including child care, community activities, and psychiatric therapy.

*Education and training*

The interviews revealed two problems related to disaster preparedness education and training.

First, there was a lack of engaging participatory approaches to education and training. Township governments used annual conferences and drills to implement education and training. However, as the conferences and drills were organized through compulsory orders, and the drills were monotonous, they were met with resistance from residents. Moreover, it was difficult to evaluate the effect of education and training on the local residents. To some degree, the activities were regarded simply as evidence that the governments had carried out their responsibilities.

*Recovery planning*

As the interviews were conducted before recovery efforts began, we analyzed related issues based on how township governors envisioned recovery plans and how they predicted potential challenges.

First, at a macro level, there was a lack of feasible recovery planning, as well as a failure to incorporate a participatory approach in the planning. Townships faced impractical orders from upper-level government that were focused on pursuing rapid reconstruction regardless of the difficulties encountered, such as weather, manpower, economic conditions, etc. Moreover, as township authorities were unable to participate in the planning process, they were unable to voice their demands. Under such circumstances, it is highly unlikely that the local demands were considered in the plans.

Second, at the micro level, several factors prevented residents from rebuilding their own houses, including insufficient human and financial resources. Despite the huge economic input for recovery, amounting to 46 billion yuan in 2013, a very small part of that money was allocated to residents as compensation to rebuild their houses. Every household whose house had collapsed or been destroyed was eligible for receive a maximum of 35,000 yuan, but the average cost to build a house was more than 150,000 yuan, and the soaring prices of construction materials made the situation even worse. Therefore, the majority of residents decided to make up the shortfall by finding employment in cities as migrant workers, thereby depleting the already short supply of manpower and technical
expertise needed for reconstruction. Some families had not even paid back the debts incurred from the Wenchuan reconstruction when Lushan reconstruction began.

V. Impact of Community Social Capital on Local Disaster Risk Management Capacity

The household survey was organized to test our second hypothesis that community social capital plays a positive role in disaster risk management. For the survey, 180 random households were selected in 10 townships and 14 villages in Lushan County and Tianquan County. Of those, 160 surveys were successfully completed, 140 from Lushan and 20 from Tianquan. The survey assessed the needs of the community residents and the impact of community social capital on local DRM capacities. The survey results of local needs are shown in Figure 7.

![Figure 7. Issues Causing Greatest Concern Among Local Residents After the Lushan Earthquake](image)

Of the survey questions, 31 are designed to measure social capital and 5 to measure disaster risk management of township government. The survey used 7 factors and 20 variables to evaluate community social capital. These factors include: the relationship between residents and the local authority, participation in community affairs, trust, community transparency, sense of belongingness to the community, strength of interpersonal relations, and willingness to participate in community affairs (Table 5).

Five variables were used to measure local disaster risk management, including: organizing capacity, emergency response efficiency, overall performance, fairness in
community affairs, and rationality of public policy. Factor analysis of the 25 total variables shows that the KMO coefficient was 0.783, and the Bartlett Test of Sphericity was 0.000 significant (Table 6). The cumulative square and loading cycle was 70.9 percent. The result of the principal component factor analysis after orthogonal rotation is shown in Table 6.

### Table 5. Measuring Factors of Community Social Capital

<table>
<thead>
<tr>
<th>Factors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between Residents and Local Authority</td>
<td>The relationship between community residents and the local authorities.</td>
</tr>
<tr>
<td>Participation in Community Affairs</td>
<td>Willingness to participate in community affairs.</td>
</tr>
<tr>
<td>Trust Community Transparency</td>
<td>Trust within community residents. Residents’ perspective of the community through their relationships with other residents. The better the relationships are, the more knowledge exists about the community and the more transparent the community is to the residents.</td>
</tr>
<tr>
<td>Sense of Belongingness to Community</td>
<td>Residents’ affection for and dependency on their communities.</td>
</tr>
<tr>
<td>Strength of Interpersonal Relations</td>
<td>The closeness of interpersonal relationships among residents.</td>
</tr>
<tr>
<td>Willingness of Participation and Engagement of Community Services</td>
<td>The willingness of residents to participate in community services or engage others.</td>
</tr>
</tbody>
</table>

### Table 6. Results of Factor Analysis

<table>
<thead>
<tr>
<th>No. of Variable</th>
<th>Variable</th>
<th>Load Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F1</td>
</tr>
<tr>
<td>1</td>
<td>G2_4</td>
<td>Organizing Capacity</td>
</tr>
<tr>
<td>2</td>
<td>G3_4</td>
<td>Emergency Responding Efficiency</td>
</tr>
<tr>
<td>3</td>
<td>G5_4</td>
<td>Overall Performance</td>
</tr>
<tr>
<td>4</td>
<td>G1_4</td>
<td>Fairness in Community Affairs</td>
</tr>
<tr>
<td>5</td>
<td>G4_4</td>
<td>Rationality of Public Policy</td>
</tr>
<tr>
<td>6</td>
<td>N10</td>
<td>Participation in Community Service Organizations (CSO) Election</td>
</tr>
<tr>
<td>7</td>
<td>N5</td>
<td>Knowledge of CSO</td>
</tr>
<tr>
<td>8</td>
<td>N6</td>
<td>Communication with CSO</td>
</tr>
<tr>
<td>9</td>
<td>N9</td>
<td>Caring for Election of CSO</td>
</tr>
<tr>
<td>10</td>
<td>N7</td>
<td>Trust in CSO</td>
</tr>
<tr>
<td>11</td>
<td>N3</td>
<td>Participation in Community Affairs</td>
</tr>
<tr>
<td>12</td>
<td>N4</td>
<td>Interest in Community Affairs</td>
</tr>
</tbody>
</table>
Willingness to Participate in Community Affairs & 0.62 \\
Borrow Materials from Neighbors & 0.87 \\
Ask Help from Neighbors & 0.81 \\
Sense of Happiness with Community & 0.74 \\
Unwillingness to Leave Community & 0.72 \\
Affection for Community & 0.65 \\
Number of Close Friends & 0.78 \\
Number of Friends & 0.63 \\
Knowledge of Neighbors & 0.60 \\
Number of Neighborhood Visits & 0.79 \\
Number of Neighborhood Greetings & 0.79 \\
Willingness to Participate in Community Service & 0.84 \\
Willingness to Engage Others in Community Service & 0.83 \\

Note: F1-Local disaster risk management capacity; F2-Relationship between residents and local authorities; F3-Participation in community affairs; F4-Trust; F5-Community transparency; F6-Sense of belongingness to community; F7-Strength of interpersonal relations; F8-Willingness to participate in community service.

We applied structural equation modeling (SEM) to construct the model of community social capital’s impact on local governance capacity. The seven factors of community social capital and the factor of local disaster risk management were used as latent variables; the former seven are exogenous variables and the latter one is endogenous. Corresponding variables of each of the factors are observed variables. Figure 8 shows the model construction.

**Figure 8. Community Social Capital’s Impact on Local DRM Capacity**
The model was tested by AMOS20.0, which shows the goodness-of-fit as well, with CFI=0.917, NFI=0.803, RMSEA=0.059. Load factors of latent variables are statistically significant at P=0.001.

The results of the structural equation modeling show that community social capital has an impact on local disaster risk management, while its seven variables exert different influences.

Table 7 shows the standardized path coefficient between the latent variables results. Relationships between residents and local authorities have the largest positive impact on local disaster risk management capacity, with the path coefficient of 0.980. This is followed by the strength of interpersonal relationships and trust, with path coefficients of 0.223 and 0.155, respectively. Willingness to participate in community services has the smallest impact coefficient of 0.063. Participation in community affairs, community transparency, and sense of belongingness to the community have negative influences on local disaster risk management capacity.

**Table 7. Path Coefficient of Community Social Capital’s Impact on Local Disaster Risk Management Capacity**

<table>
<thead>
<tr>
<th>Endogenous Variable</th>
<th>Path Direction</th>
<th>Exogenous Variable</th>
<th>Path Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Disaster Risk</td>
<td>&lt;---</td>
<td>Trust</td>
<td>.155</td>
</tr>
</tbody>
</table>
### Endogenous Variable Path

<table>
<thead>
<tr>
<th>Management Capacity</th>
<th>Path Direction</th>
<th>Exogenous Variable</th>
<th>Path Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Sense of Belongingness to Community</td>
<td>-.173</td>
</tr>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Willingness to Participate in Community Services</td>
<td>.063</td>
</tr>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Community Transparency</td>
<td>-.281</td>
</tr>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Participation in Community Affairs</td>
<td>-.366</td>
</tr>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Relationship between Residents and Local Authorities</td>
<td>.980</td>
</tr>
<tr>
<td>Ibid.</td>
<td>&lt;---</td>
<td>Strength of Interpersonal Relations</td>
<td>.223</td>
</tr>
</tbody>
</table>

The standardized path coefficient shows that as the reported relationship between residents and local authorities becomes closer, the positive impact that social capital has on local disaster risk management grows larger. This implies that if the residents maintain close connections with government authorities, the local disaster risk management (DRM) capacity will improve.

Our findings that the higher level of participation in community affairs, transparency of community affairs, and sense of belongingness to the community would actually reduce local DRM capacity might go against empirical study results by other scholars. To explain these results, we look at some possible causes. According to other scholars (Nakagawa and Shaw 2004, Mathbor 2007), a sense of belongingness to a community has positive impacts on DRM, especially recovery and reconstruction. Residents with community cohesion tend to devote more efficient and effective efforts into rebuilding their homelands. However, as the relocation planning did not involve residents’ participation, they had to move to new communities, sometimes unfamiliar, which increased their negative attitudes toward reconstruction.

One reason that community transparency and participation failed to positively affect disaster risk management may lie in China’s governance system. While communities do not have formal government officials, and their local leaders (Cunzhang) are under the township governments, community villagers treat their Cunzhang as government representatives. Community heads are responsible for implementing policies and orders from township governments, though they do not have the right to participate in the policymaking process. Therefore, when the heads seek to expand transparency and encourage social participation in community affairs, they might find themselves unable to explain the rationale behind the policies. For instance, the subsidies for restoring collapsed houses varied per household, and the amounts were decided by the State Council (2013b). When the information was publicized, doubts about the fairness of the amounts were inevitable, but community heads were unable to solve the conflicts.
However, the survey results might also stem from having limited samples, which were gathered under constrained conditions in dangerous, post-disaster areas.

**VI. Analyses**

The findings reveal the serious DRM problems in the townships of Lushan County and Baoxing County. Further analysis of these problems from the perspective of governance shows that although the four dimensions of governance capacities—namely, polycentric and multilayered institutions, learning and communication, community competence, and participation and collaboration—have been embedded into the DRM system, there is still a long way to go before they are thoroughly achieved. Figure 9 shows the DRM challenges found in the empirical study and their relationship with the four elements of governance capacity.

**Figure 9. Integrated Framework of Governance Capacity, Disaster Risk Management, and Community Resilience**

A country’s government structure has significant impact on its disaster risk management capacities (Ahrens and Rudolph 2006). A township’s governance structure, fiscal system, decision-making process, accountability, and adaptability, combined with the engagement of the communities and other sectors of society, all affect its disaster risk management capacities. First of all, the immaturity of polycentric governance systems
mainly account for deficiencies in financial resources and human resources in pre-, trans-, and post-disaster periods. Currently, township governments are the sole responders for disaster risk management situations occurring in their jurisdictions, but this administrative body is not equipped with sufficient resources to cope with natural hazards. According to the township’s fiscal system (xiang cai xian guan), which was established in 2008, the right to collect revenues and use township budgeted money was incorporated into the county government. Therefore, township finances are subject to strict monitoring by the county government. However, the townships still have to pay the costs to deliver public services (Hou and Yang 2008, Yao 2009). Under such circumstances, township governments often have a limited budget for disaster risk management, as money must go to priorities such as economic development and other issues. There is also a lack of financial support to employ and train full-time local workers and experts for risk assessment, monitoring, and post-disaster recovery. The limited money available may be allocated to establish contingency funds and reserve emergency supplies, such as food and water, medicine, two-way radios, and monitoring equipment. Moreover, with only about 30 officials, the township government that should be responsible for the whole cycle of disaster risk management lacks sufficient human resources at each stage.

Second, insufficient learning and communication was reflected by several DRM challenges. The communities failed to learn from experiences and convert the lessons into capacities to avoid future losses. Residents of the disaster-prone areas had low risk awareness and little prevention knowledge and skills, and the governments of these regions have neither established contingency plans for earthquakes nor organized effective training and educational activities. In addition, rescue, disaster management, and reconstruction personnel lacked specific experience and expertise. Regarding communication, flimsy infrastructure was the primary cause of information breakdowns, and severely impeded DRM progress. Furthermore, insufficient dialogue between township governments and communities was obvious. Although local governments took measures to improve social participation—including selecting villagers to observe risks as volunteers (either part-time or full-time), organizing drills and training for residents, and providing small funds for disaster preparedness and stipends for volunteers—limited effects were seen. The government did not establish an effective approach for engaging nonprofits, and even prevented nonprofits from assisting in the post-disaster areas. Though nonprofit services and management centers were established in Ya’an Municipality, Lushan and Baoxing Counties, and seven townships, the township centers were soon abandoned because officials perceived the nonprofits’ roles to be negligible.

Third, for communities exposed to lack of financial and human resources and that suffered from poor infrastructure, these problems were closely related with low community competence. Leadership proved to have a strong influence on the DRM results. Though most townships relied heavily on infrastructure for electricity and communication, which were immediately cut off during the earthquakes, a few township officials managed to restore some electricity with hand-operated generators. Similarly, in
the case of financial resources, a few officials guaranteed emergency supplies through initiating public-private partnership (PPP) contracts with nearby stores.

Fourth, collaboration of community disaster risk management takes various forms, including government-resident, government-nonprofit, and public-private forms. Prior to the disaster, the lack of community participation resulted in inefficacy of disaster education and drills and contingency plans. When disaster strikes, traditional top-down decision-making and policy-making processes fail to grasp the real needs of townships during the chaotic disaster management process. The Lushan Earthquake Reconstruction Plan was organized and developed by the central government and by experts, and excluded the appropriate participation of township authorities and residents. Accordingly, these plans did not accurately reflect the needs and resources required for long-term development. For instance, the Lushan Earthquake Reconstruction Plan emphasized the development of local industries without considering the large-scale labor migration to the coastal areas. Insufficient partnerships between governments and nonprofits plagued the entire DRM cycle, especially in the rescue and mitigation period, when the two sides failed to coordinate resources to meet the diverse needs. One final observation is that the shortage of emergency supplies sends a clear signal about the importance of developing public-private partnerships.

<a>VII. Conclusions and Discussion</a>

In an age when communities are highly exposed and vulnerable to natural disasters, building resilience becomes a heated topic globally. As a country extremely prone to disasters, China’s need to improve overall governance capacities and incorporate disaster risk management into its government system becomes urgent.

This research has explored the disaster risk management (DRM) capacities of earthquake-stricken townships in Sichuan Province in 2013, and analyzed the causes of the challenges these areas faced. The research finds that townships in Lushan County and Baoxing County, which were the most hard-hit after the Lushan Earthquake on April 20, 2013, contended with various DRM challenges. As to disaster preparedness, the townships lacked specific contingency plans for earthquake response. Furthermore, the existing plans were not feasible due to their heavy reliance on infrastructure, which proved to be highly vulnerable in natural hazards. There were fundamental problems related to institutional design as well. Because fiscal systems are centralized, townships faced difficulties leveraging sufficient funding and human resources to establish effective DRM systems. Accordingly, the townships were unable to employ DRM professionals, purchase equipment for risk monitoring and alert systems, and support logistics management, including the establishment of contingency funds and reserve emergency supplies. Furthermore, due to ineffective community engagement and public education, these townships also failed to build preparedness systems for the residents. Poor disaster preparedness directly affected emergency response, as the townships lacked the human resources, financial resources, or equipment needed for rescue and relief. During the
recovery period, top-down planning and labor shortages were among the most outstanding problems. The impractical recovery planning failed to promote economic and social sustainability of post-quake areas, and failed to provide sufficient manpower due to large-scale migration, resulting in households that were unable to rebuild their houses.

Through analyzing the findings, the argument has been made that the DRM problems were tangled with the deficiencies of the governance systems. Namely, the DRM challenges reflected the insufficiencies of the governance systems, which, in turn, partially account for the DRM issues. Therefore, it is important to take measures to reinforce the governance capacities to achieve community resilience. Polycentric and multilayered institutions, ranging from the central government to local governments, and those from different sectors, should be offered incentives to play positive roles in DRM. Learning and communication platforms that focus on DRM should be established to involve various stakeholders. Based on the community itself, leaders should enhance community competence through improving both economic and social capital. It is also critical to establish a participation and collaboration mechanism for residents and nonprofit organizations to become fully engaged in not only DRM, but also routine issues. Furthermore, while we found the relationship between residents and local authorities to be one important dimension of community social capital that had a positive impact on local governance capacity, three additional dimensions—participation in community affairs, transparency of community affairs, and sense of belongingness to community—reduced local DRM capacity. The causes of this failure likely stemmed from the centralized and nonparticipatory governing process.

Facing the challenges of societal transitions, traditional DRM strategies, measures, and mind-sets may be unable to address disasters in the pre-, trans-, and post-disaster periods. Therefore, we propose a new road map to enhance DRM at both the central and local government levels by exploring a governance system that addresses disasters. This proposed system consists of the interrelated sets of norms, organizational and institutional actors, and practices (Tierney 2012). Future studies may address issues such as mainstreaming DRM into governance frameworks and enhancing governance capacities through DRM to achieve community resilience.

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**Appendix I: Major Disasters in China Since the 1998 Flood**

**1. 1998 Flood**

During June to August in 1998, China’s main waters nationwide were hit by unprecedented flooding, which affected 29 provinces, cities, autonomous regions, and municipalities in total. The flood-covered farmlands amounted to 22.29 million hectares,
and flood-affected farmlands amounted to 13.78 million hectares. The 1998 Flood also caused 2,291 deaths and 210.4 billion RMB in economic losses. By the end of August, there were 8 million people participating in rescue, 6.7 million of whom were in the Yangtze River area (Ministry of Water Resources 1999).

<b>2. 2003 SARS</b>

On November 26, 2002, the city of Shunde in Guangdong Province witnessed the first case of SARS. The disease spread rapidly across the country and even worldwide in the first half of 2003, and became a horrible disaster to everyone affected. The Chinese Mainland and Hong Kong Special Administrative Region (HKSAR) were the most heavily struck areas. According to the World Health Organization, by July 31, 2003, reported probable cases in the two areas were 5,327 and 1,755, respectively; the number of deaths was 349 and 299. In order to prevent further spreading of the epidemic, classes were suspended across the Chinese Mainland, especially at the universities in Beijing. As the most severe disease ever experienced in HKSAR, SARS caused the closure of all schools, which lasted for nearly a month.

<b>3. 2008 Snow Disaster in South China</b>

China’s southern areas saw continual heavy snow starting on January 10, 2008. Massive snowfall hit 19 provinces, autonomous regions, and municipalities. By the end of February of that year, snow had caused 132 deaths (or missing) and 151.65 billion (RMB) in direct economic losses. In addition, it forced 1.66 million residents to move to emergency relocation sites, and destroyed 485 thousand houses. More than 20.7 million people were affected, and the extent of snow coverage of farmlands amounted to 11.9 million hectares (Shi Peijun 2009a).

The 2008 Snow Disaster afflicted every aspect of the affected areas. Direct economic losses in the forestry, animal husbandry, and fishery sectors were 57.3 billion, 9.86 billion, and 6.8 billion, respectively (all in RMB). The damage to power plants was unprecedented, with power supplies cut to 80 townships and more than 18 billion (RMB) in direct economic losses caused. Moreover, the accumulative direct economic losses in the telecommunications industry amounted to 1.2 billion. Since it was the peak period for international transportation due to the Chinese New Year, more than 1.8 million passengers were trapped in railway stations and coach stations. The damage of 824 tourist attractions brought about 7 billion (RMB) in direct economic losses. The health of the market economy was also disturbed due to skyrocketing prices of some commodities. In addition, the insurance industry suffered heavy financial blows (Wei Hualin 2008).

<b>4. 2008 Wenchuan Earthquake</b>

Still resonating as a deeply painful memory, the 2008 Wenchuan Earthquake caused immense damage to Chinese society, both physically and mentally. On May 12, 2008, an
earthquake hit Wenchuan, a township located 80 kilometers northwest of Chengdu, the capital city of Sichuan Province. The earthquake measured 8 on the Richter magnitude scale. In all, **10 provinces and 51 townships**, spanning 13 thousand hectares, in the provinces of Sichuan, Gansu, and Shanxi were stricken. According to the State Council, by September 4, 2008, the Great Earthquake resulted in direct economic losses of 845.1 billion, with Sichuan bearing 91.3 percent of it, Gansu 5.8 percent, and Shanxi 2.9 percent. By October 10, 2008, the earthquake caused 69,927 deaths and 17,939 missing (Shi Peijun 2009b). The total population affected amounted to 46.3 million, and 15.1 million of them were relocated outside their own townships and villages. Collapsed houses amounted to 7,967 thousand, and nearly 24,543 thousand were damaged. The earthquake also brought great losses to local infrastructure, including 24 superhighways, 163 national or provincial highways, 7 main railways, 3 branch railways, and 22 airports. Power supplies to 6 townships and 125 counties were cut. With regard to industry, 17,826 industrial factories were affected, among which 5,646 were forced to suspend operations (Shi Peijun 2009b).

<b>5. 2010 Yushu Earthquake</b>

On April 14, 2010, an earthquake measuring 7.1 on the Richter magnitude scale hit Yushu, a township in Qinghai Province. The earthquake affected 27 counties in 7 townships in both Qinghai and Sichuan Provinces, covering 3,586 hectares and 246,842 people. By May 30, 2010, the Department of Civil Affairs, the Department of Public Security of the province, and Yushu government officials confirmed that the earthquake killed 2,698 people. Scholars estimated that the economic losses due to damaged or destroyed houses amounted to 2.5 billion (RMB) (Yuan Yi et al. 2011).

<b>6. 2013 Lushan Earthquake</b>

On April 20, 2013, the Lushan Earthquake hit, measuring 7 on the Richter magnitude scale. It was another deadly disaster for Sichuan Province, which was still recovering from the Wenchuan Earthquake. The epicenter was in Longmen Township, located 100 kilometers southeast of Chengdu. The earthquake killed 196 people, as well as 2 missing and 11,485 injured.

<b>Appendix II: Township/Town Governors Interview Questions</b>

<b>1. Emergency Relief</b>
1) How did you collect information of the disaster once it occurred, and what measures did you take immediately?
2) How did residents and communities carry out self-rescue and provide mutual help?
3) When did external rescue forces arrive at the township/town, and when did they leave? How did they implement rescue efforts, and what were the outcomes?
4) Please comment on emergency relief by government, society, and eternal forces, especially concerning your experiences and lessons learned.
<b>2. Temporary Relocation in Tents</b>
5) What are the funding sources for relocation, the relocation modes (i.e., affected residents are allowed to relocate to certain shelters or to another place of their choice), the number of relocation shelters, and the policies regarding relocation to tents?
6) What measures did the township/town party committee and government take during the tent resettlement phase? How were these tasks allocated to officials? What were the experiences and lessons?
7) Did any nonprofits and volunteers participate in the temporary resettlement? What did they do? How did the government coordinate with them?
8) Please comment on the experiences and lessons learned in this phase.

<b>3. Temporary Relocation into Prefab Houses</b>
9) What are the funding sources for relocation, the relocation modes (i.e., affected residents are allowed to relocate to certain shelters or to another place of their choice), the number of relocation shelters, and the policies regarding relocation to prefab houses?
10) What measures did the township/town party committee and government take during this phase? How were these tasks allocated to officials? What were the experiences and lessons?
11) Did any nonprofits and volunteers participate in the temporary resettlement into prefab houses? What did they do? How did the government coordinate with them?
12) Please comment on the experiences and lessons learned in this phase.

<b>4. Recovery</b>
13) In what stage is the recovery planning? In the preparation stage, or has planning already happened?
14) What are your plans and vision regarding recovery of the township/town? What are the difficulties and challenges that have affected reconstruction?
15) How does the government cooperate with nonprofits (including foundations), volunteers, and companies in the reconstruction (e.g., investment, technology, human resources)?
16) Which government or state-owned unit will help with reconstruction? In which of the following aspects will they help: investment, technology, human resources, etc.? When will this paired-assistance reconstruction start? How do the two sides cooperate and coordinate with each other, especially in allocating manpower and resources?
17) Did the government establish a service center for nonprofits and volunteers? If so, how does it operate? Please comment on the work that has been done by Ya’an Service Center for Nonprofits and Volunteers and give some suggestions, if any.

<a>Appendix III: Questionnaire for Households</a> 15

Location: ______(Province)_______(City)_________ (County) ________(Village)
Date and Time: ____ (MM) _____(DD)____(HH)____(MM)
Interviewer: __________
Supervisor: __________

Part I: Socioeconomic Information of the Household

1. Name: __________

2. Gender:  □ Male  □ Female

3. Age:

4. Marital Status:
   □ Married  □ Single  □ Divorced
   □ Widower  □ Widow  □ Separated

5. Relation to Household Head:
   □ Household head  □ Spouse  □ Brother/Sister  □ Parent
   □ Spouse’s parent  □ Son/Daughter  □ Daughter-in-law/Son-in-law
   □ Nephew/Niece  □ Grandchild  □ Other relatives

6. Ethnic Group:
   □ Han nationality  □ Minority: _____________________

7. Total Number of Household Members:
   □ Male:__________  □ Female:__________

8. Gender of Household Head:
   □ Male  □ Female

9. Literacy of the Household Head:
   □ Cannot read or write  □ Elementary school drop out
   □ Elementary school  □ Junior school drop out
   □ Junior school  □ High school drop out
   □ High school  □ Bachelors degree and above

10. Health Condition of the Household Head:
    □ Very good
    □ Normal
    □ Has some slight physical illness
    □ Has some slight mental illness
    □ Other (please specify):______________
11. Average Annual Family Income (in RMB): _______________
12. Income Source and Amount (RMB): _______________________
   - Full-time professional job
     - Local government
     - Public service unit
     - Community governing committee
     - Enterprise
     - GONGO
     - NGO
     - Other
   - Part-time job
     - Construction
     - Service industry
     - Other
   - Agriculture
     - Farming
     - Husbandry
     - Forestry
     - Fishery
     - Other
   - Running business
   - Minimal living allowance
   - Other

Part II: Personal Experiences and Community Participation

13. Damage of property and assets during Lushan Earthquake

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<tr>
<th>Types of property and assets</th>
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14. Did you ever migrate (number of times)
   - Yes______________  No

14a. If yes,

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<tr>
<th>Direction of migration</th>
<th>Reasons for migration</th>
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<td>Rural to rural</td>
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<td>Rural to urban</td>
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<td>International migration</td>
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15. Use of communication media: do you use any of the following?

   1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Regularly, 5 = Very regularly
<table>
<thead>
<tr>
<th>Communication media</th>
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16. Are you a member of the community/village leadership?
   □ Yes  □ No

17. Is any other member of your family working in community/village leadership?
   □ Yes  □ No

18. How many times have you participated in voting for community/village leaders?
    __________

19. In the latest election, how many people in your family voted? __________

19a. Your position on voting is:
   □ Family members vote in an active and voluntary way
   □ Village leadership engaged us to vote
   □ Other situation: ____________________

20. Who has the final word in important community/village issues?
   □ Community/village leadership
   □ Representative conference of villagers
   □ Whole-member conference of villagers
   □ Villager who is influential but not in any type of leadership group
   □ Other (please specify): ____________________

21. Do women participate in the public affairs of the community/village?
   □ Frequently  □ Rarely  □ Almost never

22. Do men and women have equal participation in public affairs of the community/village?
   □ Yes
   □ No, men play more active roles
   □ No, women play more active roles

23. Do you think it is important to communicate with other community residents?
   □ Yes  □ No

24. How do you communicate with other community residents?
   □ Chat when dropping by
   □ Chat when meeting in community public space
   □ Via telephone/short message service (SMS)/online
   □ Other ways, please specify: ________________

25. How many friends do you have in your community? __________

26. How many close friends do you have in your community? __________
27. Are you able to borrow materials when needed from your neighbors?
   ☐ Yes       ☐ No

28. Are you able to obtain help when needed from your neighbors?
   ☐ Yes       ☐ No

29. Have you ever participated in community affairs?

30. Are you willing to participate in community affairs?
   ☐ Yes       ☐ No

31. Do you trust community service organizations?
   ☐ Yes       ☐ No

32. Do you trust other community neighbors?
   ☐ Yes       ☐ No

33. Do you feel happy living in your current community?
   ☐ Yes       ☐ No

34. Are you willing to move to another community?
   ☐ Yes       ☐ No

35. Are you willing to participate in community services?
   ☐ Yes       ☐ No

36. Are you willing to engage other community residents to participate in community affairs?
   ☐ Yes       ☐ No

**Part III: Risk and Vulnerability Assessment**

37. How would you rate the preparedness of the government in facing disasters?

   1 = Not prepared at all, 2 = Poor preparation, 3 = No idea, 4 = Somewhat prepared, 5 = Satisfactorily prepared

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38. What in your opinion are the factors that affect the preparedness of the local government? (Tick the appropriate box or boxes.)

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<th>Factors</th>
<th>Response</th>
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<td>Corruption</td>
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Part IV: Notification and Alert

39. Sources of information on disaster?

1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Regularly, 5 = Very regularly

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40. Has information from the above sources helped you?

☐ Yes  ☐ No

40a. If not, why?

Part V: Coordination and Response

41. How long did your household receive information (e.g., notifications, distributing materials, visits) from local government?

☐ On same day the earthquake hit  ☐ 3 days after the earthquake
1 week after the earthquake
More than 1 week after the earthquake

42. After the disaster, which information sources did you consult about disaster relief?

1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Regularly, 5 = Very regularly

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<td>Neighbors</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

43. Was the information from the above sources helpful to you?

☐ Yes ☐ No

43a. If not, why?

44. How did you receive information about the disaster relief efforts?

1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Regularly, 5 = Very regularly

<table>
<thead>
<tr>
<th>Method</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through talking with family and friends</td>
<td></td>
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<tr>
<td>Through the Internet and short message service (SMS)</td>
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<tr>
<td>Through media</td>
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<tr>
<td>Through talking to community governing leadership</td>
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<tr>
<td>Through collective petition</td>
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</tr>
</tbody>
</table>

Part VI: Relief Effort

45. Compensation of resources

45a. Which organization decided on the compensation principles?
☐ Central government ☐ Provincial government ☐ Local government
☐ Community/village leadership ☐ NGOs ☐ Volunteers
☐ Donors ☐ Others (please specify): ____________________________

45b. Which organization was responsible for distributing compensation resources?
☐ Central government ☐ Provincial government ☐ Local government
☐ Community/village leadership ☐ NGOs ☐ Volunteers
☐ Donors ☐ Villager who is influential, but not in any type of leadership group
45c. Overall assessment of compensation

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{Aspect} & 1 & 2 & 3 & 4 & 5 \\
\hline
\text{Information transparency} & & & & & \\
\hline
\text{Procedural justice} & & & & & \\
\hline
\text{Satisfaction with results of the resource distribution} & & & & & \\
\hline
\end{array}
\]

\(1 = \text{Very low}, \ 2 = \text{Low}, \ 3 = \text{Medium}, \ 4 = \text{High}, \ 5 = \text{Very high}\)
45d. Did the local government provide post-disaster relief and support equitably?

☐ Yes ☐ No

45d (a) If no, what were the factors that influenced the distribution of post-disaster relief and support by the local government?

......................................................................................................................................................
......................................................................................................................................................

46. Do you think the local government has enough capacity to provide appropriate pre- and post-disaster relief and support to the community?

☐ Yes ☐ No

47. Did you participate in the rescue efforts after the disaster?

☐ Yes ☐ No

48. Have you ever participated in the organized reconstruction after a disaster (e.g., patrolling, clearing debris, carrying materials)?

☐ Yes ☐ No

49. Are you aware of any development plans by your local government that are focused on disaster risk reduction and management?

☐ Yes ☐ No

49a. If yes, what are the projects/programs?

......................................................................................................................................................
......................................................................................................................................................

50. Have you participated in any open budget sessions of the local government?

☐ Yes ☐ No

50a. If yes, did the local government make any allocations for disaster management?

☐ Yes ☐ No

50b. If yes, what were they?

......................................................................................................................................................
......................................................................................................................................................
51. Have you received any support from any of the following sources during disasters?

<table>
<thead>
<tr>
<th>Sources of support</th>
<th>Types of Emergent Support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cash</td>
</tr>
<tr>
<td>Central government</td>
<td></td>
</tr>
<tr>
<td>Provincial government</td>
<td></td>
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<tr>
<td>Municipal government</td>
<td></td>
</tr>
<tr>
<td>Local government</td>
<td></td>
</tr>
<tr>
<td>Village/community</td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td></td>
</tr>
<tr>
<td>Community members</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of support</th>
<th>Types of Developing Support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cash</td>
</tr>
<tr>
<td>Central government</td>
<td></td>
</tr>
<tr>
<td>Provincial government</td>
<td></td>
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<tr>
<td>Municipal government</td>
<td></td>
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<tr>
<td>Local government</td>
<td></td>
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<tr>
<td>Village/community</td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td></td>
</tr>
<tr>
<td>Community members</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

52. In your opinion, what is the expected role of local government before and after any disaster? (Rank the boxes according to priority.)
1 = Low priority, 2 = Some priority, 3 = Priority, 4 = High priority, 5 = Very high priority

### Before the disaster

<table>
<thead>
<tr>
<th>Activity</th>
<th>Priority rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper public announcement and early warning</td>
<td></td>
</tr>
<tr>
<td>Helping to build community-level shelters</td>
<td></td>
</tr>
<tr>
<td>Mobilizing community members</td>
<td></td>
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<tr>
<td>Door-to-door awareness campaign</td>
<td></td>
</tr>
<tr>
<td>Use of community radio</td>
<td></td>
</tr>
<tr>
<td>Support for the elderly and people with disabilities</td>
<td></td>
</tr>
<tr>
<td>Cleaning and maintaining the shelters</td>
<td></td>
</tr>
<tr>
<td>Community-based preparedness</td>
<td></td>
</tr>
<tr>
<td>Developing more infrastructure for resilience</td>
<td></td>
</tr>
<tr>
<td>Arranging local transport for moving to shelters</td>
<td></td>
</tr>
<tr>
<td>Building appropriate infrastructure</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

### After the disaster

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Priority rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livelihood</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td></td>
</tr>
<tr>
<td>Recovery policy</td>
<td></td>
</tr>
<tr>
<td>Health care</td>
<td></td>
</tr>
<tr>
<td>Credit of the local government</td>
<td></td>
</tr>
<tr>
<td>Children’s education</td>
<td></td>
</tr>
</tbody>
</table>

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### Part VIII: Overall Satisfaction

53. What is your overall assessment of sense of safety/confidence?

1 = Very low, 2 = Low, 3 = Medium, 4 = High, 5 = Very high

<table>
<thead>
<tr>
<th>Aspect</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural environment</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Current living place</td>
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<tr>
<td>Drinking water</td>
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<tr>
<td>Community public safety</td>
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<tr>
<td>Future of the family</td>
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<tr>
<td>Government policy</td>
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<tr>
<td>Local government</td>
<td></td>
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<td></td>
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<tr>
<td>Community leadership</td>
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<tr>
<td>The whole society</td>
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</tbody>
</table>
54. How would you rate your overall satisfaction about the performance of the following organizations?

1 = Not satisfied at all, 2 = Somewhat satisfied, 3 = Neither satisfied nor dissatisfied, 4 = Satisfied, 5 = Highly satisfied

<table>
<thead>
<tr>
<th>Organization</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central government</td>
<td></td>
<td></td>
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<tr>
<td>Provincial government</td>
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<tr>
<td>Municipal government</td>
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<tr>
<td>Local government</td>
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<td></td>
</tr>
<tr>
<td>Community/village leadership</td>
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<tr>
<td>NGOs</td>
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</tbody>
</table>

55. How would you rate your overall satisfaction on the performance of the following organizations as regards disaster management/mitigation?

1 = Not satisfied at all, 2 = Somewhat satisfied, 3 = Neither satisfied nor dissatisfied, 4 = Satisfied, 5 = Highly satisfied

<table>
<thead>
<tr>
<th>Organization</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central government</td>
<td></td>
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<tr>
<td>Provincial government</td>
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<tr>
<td>Municipal government</td>
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<tr>
<td>Local government</td>
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<tr>
<td>Community/village leadership</td>
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<tr>
<td>NGOs/GONGOs</td>
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</tbody>
</table>

56. How would you rate your overall assessment of the institutional features of local government?

1 = Very low, 2 = Low, 3 = Medium, 4 = High, 5 = Very high

<table>
<thead>
<tr>
<th>Institutional features</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corruption</td>
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<tr>
<td>Quality of service delivery</td>
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<tr>
<td>Politicization of service delivery</td>
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<tr>
<td>Resource mobilization capacity</td>
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<tr>
<td>Resource management capacity</td>
<td></td>
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</tr>
<tr>
<td>Institutional features</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>---------------------------------------------------------------------------------------</td>
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<tr>
<td>Equitability of resource distribution</td>
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<tr>
<td>Capacity to plan</td>
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<tr>
<td>Work efficiency</td>
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<tr>
<td>Adequacy of manpower</td>
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<tr>
<td>Transparency of activities</td>
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<tr>
<td>Level of accountability</td>
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<tr>
<td>Community participation</td>
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<tr>
<td>Level of trust by community members</td>
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<tr>
<td>Gender sensitivity</td>
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<tr>
<td>Responsiveness to special needs of marginalized groups</td>
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</tr>
<tr>
<td>Overall image</td>
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</tbody>
</table>

57. Please respond to the following questions using the following scale:

1 = No; 2 = To a very limited extent;
3 = Some activity, but significant scope for improvement;
4 = Yes, but with some limitations in capacities and resources;
5 = Yes, with sustainable and effective measures in place;
X = Don’t know

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Before the disaster, did the local government have any process or mechanism to involve all people, especially vulnerable and marginalized groups, in disaster prevention decision-making and implementation?</td>
<td></td>
</tr>
<tr>
<td>b. Before the disaster, did the local government ensure that women and men participated equally in disaster prevention decision-making and implementation?</td>
<td></td>
</tr>
<tr>
<td>c. Before the disaster, did local government disaster prevention practices take into account the specific needs of children and young people?</td>
<td></td>
</tr>
<tr>
<td>d. Does the local government support the participation of local volunteers in disaster prevention measures?</td>
<td></td>
</tr>
<tr>
<td>e. Does the local government regularly review disaster prevention policies to protect vulnerable people from disasters (elderly, ethnic minorities, children and youth, people with disabilities, migrants)?</td>
<td></td>
</tr>
<tr>
<td>f. Does the local government disaster prevention practices take into account local (indigenous) knowledge, skills, and resources?</td>
<td></td>
</tr>
<tr>
<td>g. Does the local government have a plan of action to turn disaster prevention policies into practice?</td>
<td></td>
</tr>
<tr>
<td>h. Does the local government have an adequate budget for disaster prevention?</td>
<td></td>
</tr>
<tr>
<td>i. Do local government officials have clear roles and responsibilities for</td>
<td></td>
</tr>
<tr>
<td>Questions</td>
<td>Response</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>j. Does the local government have sufficient expertise to carry out disaster prevention?</td>
<td></td>
</tr>
<tr>
<td>k. Does the local government provide disaster prevention training for government officials, the community, and civil society leaders?</td>
<td></td>
</tr>
<tr>
<td>l. Does the local government regularly monitor and report on progress concerning disaster prevention?</td>
<td></td>
</tr>
<tr>
<td>m. Does the local government involve communities and civil society in monitoring of disaster prevention?</td>
<td></td>
</tr>
<tr>
<td>n. Does the local government provide a mechanism for vulnerable people to make complaints and receive responses concerning lack of progress in disaster prevention measures?</td>
<td></td>
</tr>
<tr>
<td>o. Does the local government regularly collect, review, and map information on disaster risks and climate change?</td>
<td></td>
</tr>
<tr>
<td>p. Does the local government provide vulnerable people with updated, easily understandable information on disaster risks and disaster prevention measures?</td>
<td></td>
</tr>
</tbody>
</table>

--- End of Questionnaire ---
<a>Endnotes</a>

1. Correspondence address: School of Social Development & Public Policy at Beijing Normal University, 19 Xinjiekou Wai Street, Beijing PR China 100875. E-mail: thqz2007@gmail.com.

2. The other two legacies are combining theories with practices (lilun lianxi shiji) and criticism and self-criticism (piping yu ziwo piping). Source: Mao Zedong, “On Coalition Government,” the 7\textsuperscript{th} Congress of the CPC, 1945.

3. “Scientific Outlook on Development” is a national strategy raised by former President Hu Jintao at the Third Plenary Session of the 16\textsuperscript{th} CPC National Congress in 2003. It emphasized putting people first and aiming at comprehensive, coordinated, and sustainable development.


7. At the request of our interviewees, we have maintained the anonymity of the names of townships and governors. We use LS+Number to represent the townships interviewed following the 2013 Lushan Earthquake.

8. A gong is a traditional Chinese instrument that creates a loud noise through striking, and can be regarded as a portable drum.

9. Tianquan County and Ya’an were also affected by the Lushan Earthquake.


11. Disaster-covered farmlands refer to 10\% of the crops being damaged by a disaster, while flood-affected farmlands are 30\% of the crops being damaged.


15. According to “Regulations of Household Registration of P.R.C.” (which took effect in 1958), people in the same household are defined as those registered in the same Hukou book (registered residence certificate).

16. The registered household head as specified in the Hukou book.