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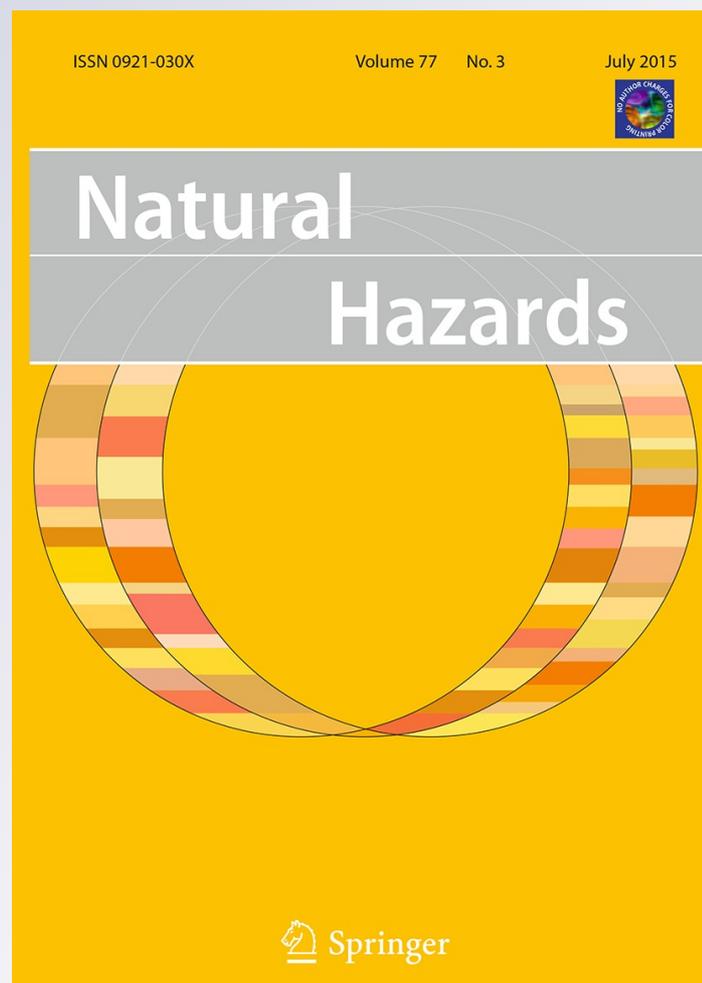
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# What constrained disaster management capacity in the township level of China? Case studies of Wenchuan and Lushan earthquakes

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**Abstract** Mega-disasters appeared in the twenty-first century highlighted the importance of strengthening local disaster management capabilities to cope with risks more effectively. Despite the occurrence of Wenchuan (2008) and Lushan (2013) earthquakes, local capacities in managing disaster in China remained largely unexplored. Given the scant empirical attention given to township level, we focus our study on assessing the disaster management capacities through seven indicators in the affected townships of Wenchuan (2008) and Lushan (2013). After interviewing 32 townships executives, the finding suggests that although substantial progress has been achieved in strengthening the overall disaster management capacity in townships by 2013, pronounced challenges remained. We argue that the restrained disaster management capacity in Chinese townships was attributed to three factors. First, the top-down institutional framework has limited the autonomy of township governments from ensuring disaster-related policy to be executed effectively as it induced a shortage of funds and undermined incentives for officials to enforce policies. Second, the failure of township governments to pursue external collaboration with local and social organizations has impeded the mainstreaming of key disaster management components into local level. Finally, national development strategies, and the by-product of rapid urbanization processes, have caused the lack of human resources that prevented effective mechanisms of disaster preparedness and responses as well as post-disaster reconstruction from developing.

**Keywords** Disaster management capacity · Emergency management system · Township · Wenchuan earthquake · Lushan earthquake · China

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## 1 Introduction

The capacity of China's disaster management system is frequently tested as the country is one of the most disaster-prone nations in the world. After the mishandling of the SARS epidemic in 2003, the government created the emergency management system (EMS) in an endeavor to build an effective structure that is capable of coping with disasters which entail cascading effects that spread across geographical borders and policy boundaries. A decade later, the system survives and has proven itself with flexibility and vitality through numerous floods, earthquakes, and terrorist attacks. But it was not until the occurrence of mega-disasters that a real assessment test could be put upon the competency of the disaster management system of a country, as policy failures are more likely to reveal themselves in such a situation, and existing norms and practices are subjected to being called to question.

The Wenchuan earthquake in 2008 provided both the government and academia a valuable opportunity to reflect and contemplate in-depth on the adequacy of the established disaster management mechanisms. This assessment of the system led to a renewal of policy, focusing on disaster management on one hand, embodied in greater emphases on disaster prevention and reduction programs in the 12th Five-Year Plan (Zhang et al. 2013:2222). On the other hand, scholars now had more confidence in discussing the pros and cons of the EMS. This can be seen in the literature published, where there was a surge of empirical studies discussing the effectiveness of the EMS in coping with disasters of the scale of the Wenchuan earthquake (Deng et al. 2010; Zhang et al. 2011; Meng and Xu 2014; Zhang et al. 2013).

Assuming that the adjusted government policies and the growth of disaster reduction programs nationwide would have enhanced the government's capacity in coping with disaster, the occurrence of the Lushan earthquake in 2013 thus served as an experiment to test the extent to which relevant policies and programs were effective and appropriate. It is observed that the scope of relevant comparative analyses remained limited. They mainly focus on either evaluating changes in the capacities of the EMS in 2013 on a national level or examining similarities and differences between 2008 and 2013 on specific but varied aspects, such as policy development of disaster management and education (Song 2014); disaster preparation and planning (Yang et al. 2014); emergency responses (Zhang 2015). The overall disaster management capacity on a local level during 2008 and 2013 in China was left unexplored. Therefore, questions such as "how were the townships organized to respond to disasters?" "What did they have in the way of training, personnel, equipment, and procedures?" and "If they lacked some of these, how did they improvise after the earthquakes?" will be subjected to our investigation in this paper.

Hence, the purpose of this research is twofold: first, to draw upon interviews conducted with townships executives, including both the leader of the township government and the party secretary for the township, upon the overall disaster management capabilities in the lowest formal level of China's five-tier government system in Wenchuan (2008) and Lushan (2013). Second, through evaluating what lessons were learnt over a 5-year period after Wenchuan and the way these lessons were applied (or not) in the Lushan earthquake, we seek to analyze the underlying factors that facilitate or hinder these changes.

Our findings suggest that although substantial progress had been made in strengthening the overall township disaster management capacity by 2013, pronounced challenges and problems remained. We argue that three underlying factors contributed to the existing problems. First, the top-down institutional framework limited the autonomy of township governments from ensuring disaster management policy to be executed as it induced a

shortage of funds and undermined incentives for officials to enforce policies. Second, the failure of township governments to pursue external collaboration with local and social organizations impeded the process of mainstreaming key disaster management components into the townships. Finally, national development strategies, and the by-product of rapid urbanization processes, created a shortage of human resources which in turn hindered effective mechanisms of disaster preparedness and responses as well as post-disaster reconstruction from developing.

## 2 The Chinese Emergency Management System

The outbreak of SARS in 2003 was a milestone in the establishment of the present EMS in China. The inappropriate management of the epidemic and its subsequent development as a political crisis (Fewsmith 2003) affirmed President Hu's determination to search for a scientific approach to address future contingencies.<sup>1</sup> Pillars of EMS—*Yi An San Zhi* was crystallized by the General Secretary of the State Council in 2003. It refers to creating contingency plans, arranging the corresponding institutional structure, clarifying mechanisms of the management process as well as drafting the related laws and regulations.

Subsequently, the Master State Plan for Response to Public Emergencies was promulgated on August 7, 2005 by the State Council. The aim of the plan was to enable the smoothing of transitions from a normal situation to an emergency situation and to ensure effective and efficient responses in order to prevent further deterioration following disasters.<sup>2</sup> This policy corresponded with the larger vision of the Chinese government that:

A complete, reasonable and effective disaster response system should outline, in advance, plans and arrangements for actions prior to, during and after major disasters and should take into consideration all relevant factors that may influence the response process. Such a plan should focus on early detection, early reporting, early control and early response, and it must be scientifically sound and technically flexible.<sup>3</sup>

To that end, the policy standardized the assignment of duties and responsibilities of departments and agencies. It specified implementation procedures of the system that enabled contingency plans to be adopted across levels of government, governmental departments, and enterprises to ensure public security.

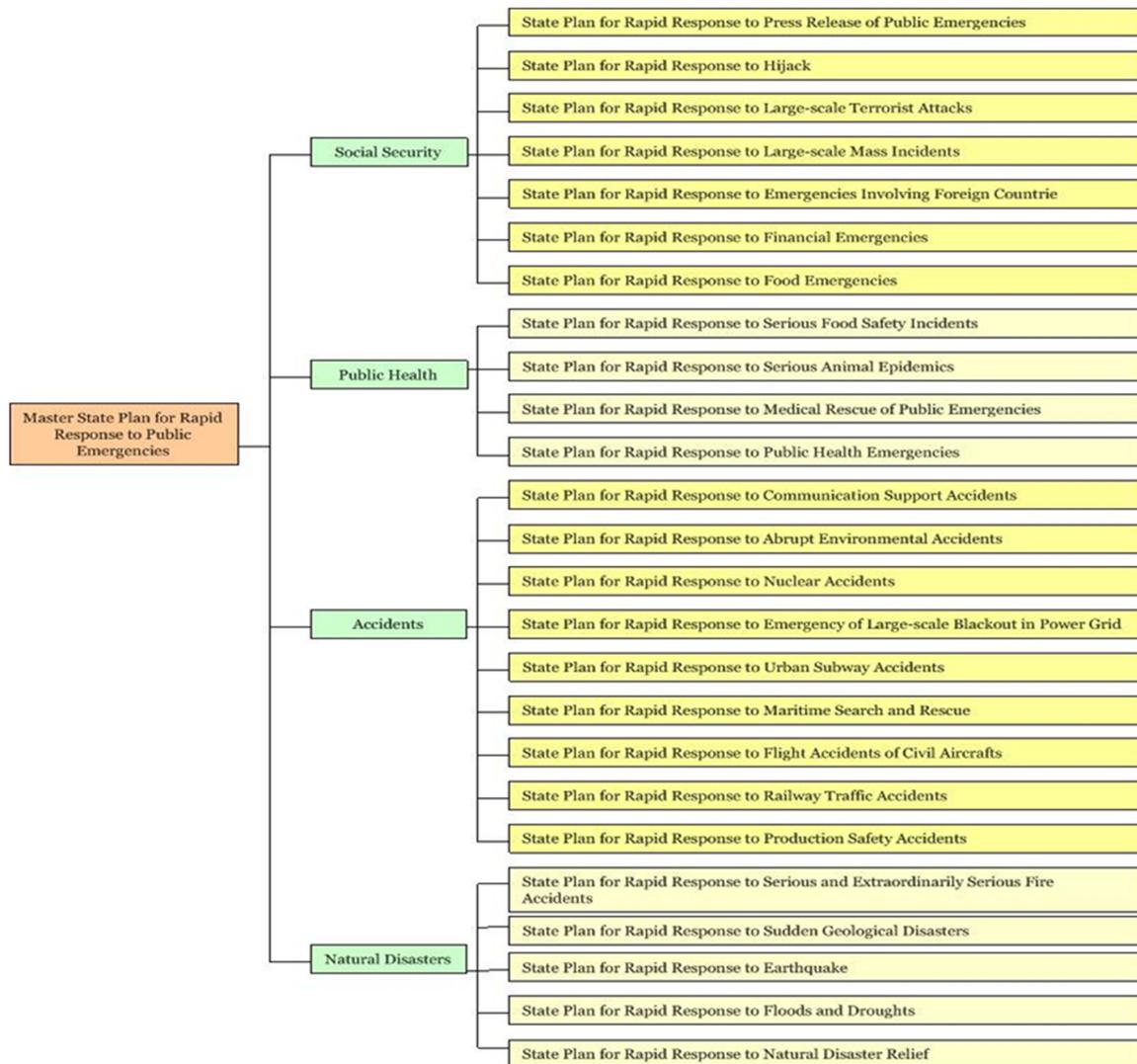
As shown in Fig. 1, the Master State Plan for Response to Public Emergencies is composed of contingency plans of all kinds. These hazard-specific plans embodied the efforts of the government to anticipate all imaginable uncertainties. Owing to the diverse nature and purposes involved, the government categorized these contingencies into four general kinds of public emergencies for the sake of facilitating coordination efforts: natural disasters, accidents, public health events, and social security events.<sup>4</sup> Additionally, based on the nature of emergency events—that is, their severity and uncontrollability—and the area affected by them, events are classified into four response categories: (a) Level I for the

<sup>1</sup> For more information refer to: <http://www.china.com.cn/chinese/OP-c/374564.htm>.

<sup>2</sup> For more information refer to: [http://www.gov.cn/yjgl/2005-08/07/content\\_21048.htm](http://www.gov.cn/yjgl/2005-08/07/content_21048.htm).

<sup>3</sup> For more information refer to: [http://www.gov.cn/test/2008-08/13/content\\_1071062.htm](http://www.gov.cn/test/2008-08/13/content_1071062.htm).

<sup>4</sup> Social security events is intended to mean physical security from terrorism, civil disorder, or other threat in this context.



**Fig. 1** Master state plan for response to public emergencies. *Source* adopted from Chunchang Shan's presentation on Public Security and Emergency Response Plan in China on 20.5.2008, Beijing

very severe situation, where the response is organized directly by the Central Government, together with the affected provincial and local governments; (b) Level II for severe events, where the relevant provincial governments are primarily responsible for organizing responses with the assistance of the Central Government; (c) Level III for serious events, where municipal and county governments are responsible for responses; and (d) Level IV for general public emergencies, where events should be dealt with mainly by township-level governments.

## 2.1 Institutional structure

The EMS has yet to produce a centralized and independent organization that functions specifically to coordinate emergency responses to disasters. Rather, the responsibility to administer and coordinate the issues and activities pertaining to public emergencies falls onto various leading departments, ministries, and agencies. These are of different scale and scope and lie within both the vertical and horizontal levels of the governmental system. In spite of the breakthrough of this system in standardizing institutional procedures, the organizations assigned responsibility remain unaltered. The system is shaped by obsolete

higher-level goals that put economic development above all other purposes, including emergency preparedness and response. Consequently, without reconstructing organizational power in a way that could generate greater governance incentives, the contemporary disaster management system remains unsynchronized, even contradicting to some of the fundamental principles that it outlined at the outset. Given the existing performance evaluation system, institutions are more driven by development-oriented goals than staying focused on cultivating a safety-oriented EMS.

With the aim of enhancing emergency management, the Emergency Management Office (EMO) of State Council at the national level establishment was set up in April 2006. And it is generally regarded to be the “one office” in the understanding of “one office and four committees” structure where the EMO, at a national level, is the coordinator of the four corresponding organizations—China National Commission for Disaster Reduction (NCDR); the State Administration of Work Safety (SAWS); the Ministry of Public Safety (MPS); and the Ministry of Health (MOH), in times of emergency.

However, as the Emergency Management Office (EMO) is only one of several internal organizations of the General Office of the State Council that fulfills the function of information aggregation, assisting leadership with decision-making processes and so on; it is invalid to equate the idea of “one office, four committees” to the institutional structure of China’s disaster management system.

This inappropriate description stems from two discrepancies in terms of how contingencies are actually tackled in practice. On one hand, the EMO is not at all an independent governmental office, which was empowered to handle direct emergency responses across leading departments (in conjunction with other ministries and agencies). On the other hand, practically speaking, the four committees are not actually fully aligned with the corresponding type of public emergency for which they should be responsible, owing to the inherent problems with the way that power and capacity are arranged. As the current EM framework continues to be dominated by these residual institutional structures, none of the contemporary departments or ministries has sufficient authority and capacity to serve as the primary coordinator when disaster of catastrophic-scale occurred. Therefore, immediately after the occurrence of Wenchuan and Lushan earthquakes, the conventional way of setting up a command center, directed by the Premier at the State Council on the national level setting, has continued to be used to respond to contingencies.

## 2.2 Mechanisms of the management process

A wide range of emergency management mechanisms are affirmed and specified in the Master State Plan for Response to Public Emergencies. In spite of the disaggregation of the institutional structure, the growing encompassment of an extensive range of mechanisms within the system seems to suggest that crisis management in China is no longer limited to emergency response and disaster recovery phases; its scope has been expanded. Delineating mechanisms for emergency monitoring and early-warning management, the changes in the way that information is communicated have vividly expressed the message that preparedness and risk management are of equal importance under this system.<sup>5</sup>

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<sup>5</sup> The following is the rest of the list of mechanisms mentioned regarding the policy: emergency decision-making and coordinating mechanism; responsibility and response mechanism on a level-to-level basis; social mobilization mechanism; emergency management resources allocation and requisition mechanism; rewards and punishment mechanism; integrated governance mechanism for public security; management mechanism for urban and rural communities; linkage mechanism for governments and the public and international coordination mechanisms.

### 2.3 Law and regulations

The Law of the People's Republic of China (PRC) on Emergency Responses was promulgated on August 30, 2007 as the leading legal document governing all emergency responses in China.<sup>6</sup> According to this law, the EMS was institutionalized with legal support from all levels of authority, ranging from the central to local government, and it confirms the integration of contingency plans into the system. More importantly, this law clearly delineates rights and obligations among individuals, government, enterprises, NGOs and so on at times of disaster, and it sets out principles and processes for property reimbursement. Wang argues that this law actually symbolizes an institutional innovation of the EMS in the sense that it mandates a “circular model” which makes preparedness, mitigation, response, and recovery phases equally important, as opposed to the traditional “reactive approach” that focuses on responses only after a disaster occurred (Wang 2008: 8).

Despite its comprehensiveness, the Law of the PRC on Emergency Responses failed to produce a comprehensive basic law that could serve as coordinating mechanism among competing regulations. The available laws in China at the moment are independent or unconnected in nature. They all pertain to a specific subject or topic, as illustrated in the following examples: “Flood Control Law of the PRC,” “Law of the PRC on Safety in Mines.” Given the often dynamic and interdependent character of disasters, the concurrent application of numerous independent laws is troublesome as jurisdictional overlap and duplication of responsibilities are highly likely to occur.

### 3 Research methodology

The Wenchuan and the Lushan earthquakes were selected as our case studies for evaluating changes in the overall disaster management capacity in the local level of China. It should be noted that although the interviews in the two time periods were conducted in two different locations, they were somewhat similar as Wenchuan and Lushan counties are both situated in the seismically active Sichuan Province where the Longmenshan fault runs through part of the area; hence, the counties were both subject to regulation and oversight by the Sichuan government, and more importantly, they were both severely, though differently, affected by earthquakes in 2008 and 2013 respectively (See Table 1).

Despite the geographical differences, it is assumed that the townships' capacities in both counties had reached a similar standard by 2013. There are two rationales for this assumption: the demographic and socioeconomic conditions were very similar and, more importantly, they were both required to follow the same government legislation to strengthen disaster preparedness and response capacities after the 2008 Wenchuan earthquake. Therefore, the gap of 5 years between these two waves of interview offers us a lens to capture both what has changed in the townships' disaster management capabilities and what has remained the same.

The focus of our study is on the township level in China. Instead of choosing province or county as the unit of analysis, townships were selected because of their specific position within the Chinese governmental structure. As shown in Fig. 2, townships are ranked at the bottom of China's public administration system. Positioning at this level was found to face with two practical challenges.

<sup>6</sup> For more information refer to: [http://www.gov.cn/jffg/2007-08/30/content\\_732593.htm](http://www.gov.cn/jffg/2007-08/30/content_732593.htm).

**Table 1** Details of the 2008 and 2013 earthquakes

Category	Wenchuan earthquake	Lushan earthquake
Time	14:28 (GMT + 8), May 12, 2008	08:02 (GMT + 8), April 20, 2013
Magnitude	8.0 Ms	7.0 Ms
Epicenter	Yingxiu Township, Wenchuan County, Sichuan Province	Longmen Township, Lushan County, Sichuan Province
Depth	10 km	13 km
Intensity	11 degrees	9 degrees
Casualties	69,227 killed, 17,923 missing, 374,643	196 killed, 2 missing, 14,785 injured
Affected population	Over 10 million	2184 thousands
Direct economic loss	RMB 845.1 billion	RMB 50–100 billion

*Source:* Regulations on post-Wenchuan earthquake rehabilitation and reconstruction; Regulations on post-Lushan earthquake rehabilitation and reconstruction

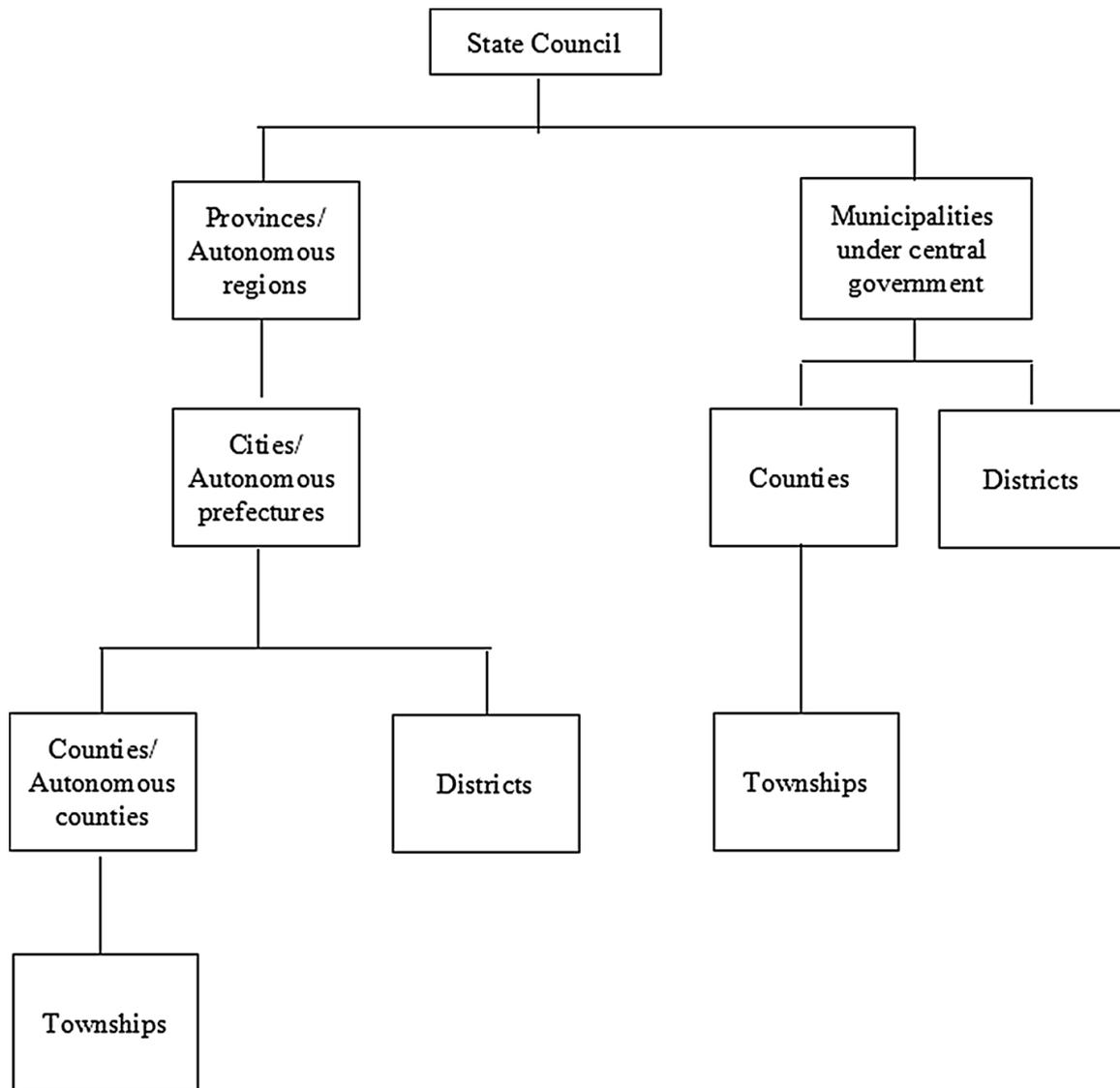
Although township governments function as a bridge between the state and society and are directly accountable to their villages and individuals within their administrative regions, they are only authorized to implement policies but not to engage in the legislative process itself. This lack of legislative power is attributed to the traditional top-down approach and the fact that the decentralization of power in China did not reach to the township level.

As a result, the majority of township governments do not obtain sufficient resources to perform administrative tasks adaptively for which they are responsible and to deliver social services to their villages. Under the current fiscal structure, township governments count almost entirely on their county government for funding in developing areas. In most cases, the amount of funding can only afford a township government with limited capacity of human capital to run a four-department governmental structure consisting of the Office for Administrative Affairs, Office for Economic Development, Office for Social Affairs, and Branch of Finance and Budget.

We conducted semi-structured interviews with 32 township executives. Township executives emerged as the only subject for this research owing to the limited accessibility of information and data related to government policies for local people and NGOs. It should be noted that although the interviews in 2008 and 2013 were conducted with township executives in different locations, 16 from Wenchuan and 16 from Lushan, the significance of the comparison was similar in the sense that each group of township executives had recently led their communities through the experience of a major disaster.

The interview guide was composed of questions regarding disaster management capacity that were based on several indicators and sub-indicators (as shown in Table 2). The components of the framework take into account townships' responsibilities, and we have therefore excluded legislative elements, as township executives are not authorized to participate in decision-making processes related to policy.

The design of the assessment indicators in Table 2 is derived from a combination of indices specified in government policies such as Policy Recommendations for the Enhancement of Community-based Emergency Management and the Master State Plan for Response to Public Emergencies. For information regarding the components of the latter policy, refer back to Session 2: The Chinese Emergency Management System. For the former policy, its aim was to enhance community-based emergency management capacity, which required the strengthening of the comprehensive contingency plans system and the



**Fig. 2** Government structure under the State Council of China. *Source* Adopted from Article 30 in Constitution of the People's Republic of China, December 4, 1982

creation of a systematic and organized institutional framework for disaster management in the local community. At its initial stage of development, the main goals of the policy also included improvements in a wide range of aspects, such as enhancing social participation, the precision of preparedness arrangements and, additionally, that locals' risk perceptions were to be enhanced and the community's capacity for self-help were to be strengthened.<sup>7</sup>

The two rounds of interviews were conducted around 3 months after the disasters. Our main township sample selection criteria were based on the severity of damage in the areas affected by the earthquakes. In our case, the study sites were located in the hardest-hit regions within the disaster area. We selected 16 township samples from Beichuan in 2008 and 16 from Lushan and Baoxing in 2013, where Beichuan, Lushan, and Baoxing are counties where which the township reside. The population in Beichuan, Lushan, and Baoxing were 241,100 (as of 2013),<sup>8</sup> 120,864 (as of 2012), and 58,729 (as of 2012) (Ya'an

<sup>7</sup> For more information refer to: [http://www.gov.cn/jrzq/2007-08/07/content\\_709112.htm](http://www.gov.cn/jrzq/2007-08/07/content_709112.htm).

<sup>8</sup> The source is from the website of Beichuan government: [http://www.beichuan.gov.cn/html/2014/bmdt\\_0429/20848.html?cid=12](http://www.beichuan.gov.cn/html/2014/bmdt_0429/20848.html?cid=12).

**Table 2** Framework of emergency management capacity assessment for townships in China

Indicators	Sub-indicators
Contingency plans	Content of contingency plans Mechanisms of contingency plans Impact of contingency plans
Early-warning systems and risk analyses	Resources available to conduct risk analyses Mechanisms of early-warning systems
Emergency response	Institutions and mechanisms of first responders during rescue and relief phase Participation and coordination of involved groups
Logistics management	Available resources and infrastructure Mechanisms of logistics management
Social participation	Participation of local residents, private and social sector at post-disaster phases
Education and training	Impact of the available forms of education and training
Recovery planning	Township governors' anticipated challenges Impact of recovery planning policy

*Source:* Federal Emergency Management Agency & National Emergency Management Association (2001), Zhang (2010)

Bureau of Statistics 2013:54), respectively. The size of townships varied across these three counties; some ranged from few thousand to over ten thousand people. Their geographical locations are shown in Fig. 3, and details of our field visits are reported in Table 3.

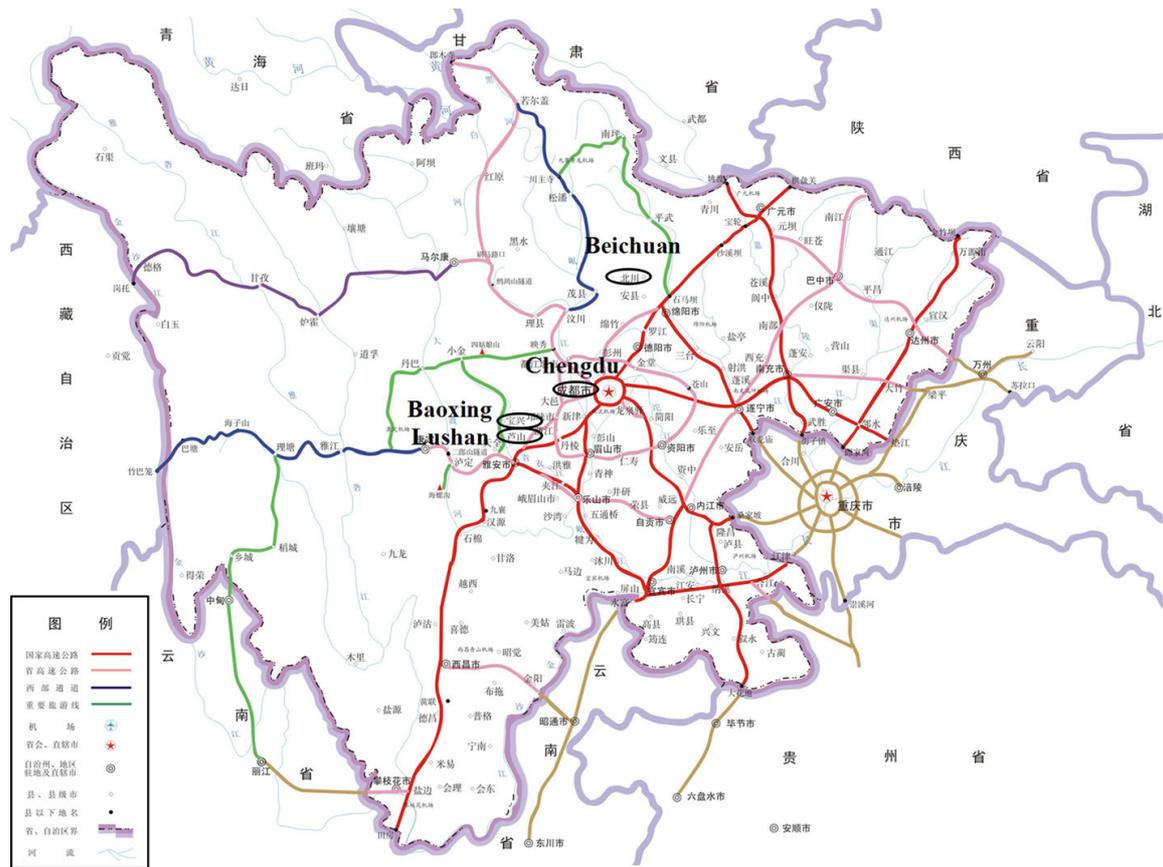
## 4 Disaster management capacities in Wenchuan (2008)

### 4.1 Contingency plans (CPs)

Although CPs in all the townships we interviewed were adapted to local conditions, township executives had only ambiguous ideas about the functions of the CPs. Their comments on the impact of CPs implicitly suggested that scenario planning was absent during the design process and that the available CPs were only capable of dealing with “normal-scale” disasters, but not catastrophes like the Wenchuan earthquake.

All township executives assured that the structure of the CP system was the least complicated at the township level because its structure was solely determined by local demands. One disclosed “we have 9 different types of CPs for each village...and 12 for the township. The design [of CPs] is dependent on the unique local situation that ...take into account specific types of hazards that we are exposed to” (BC009, 2008). Specifically, two-thirds of the townships we visited had a hazard plan for earthquakes. “The reason why we have a specific contingency plan for earthquakes is that ...Beichuan County is located in an earthquake zone. We have earthquakes measuring magnitude 3 to 4 on the Richter Scale occurring every year” (BC004, 2008).

The majority of the executives perceived that the CPs were binding and literal documents. One respondent stated “CPs list principles of response to be taken and duty of assignments amongst us.... For how we utilize CPs immediately after the earthquake...we simply remembered the agendas by heart” (BC009, 2008). In contrast, a couple of interviewees considered the value of CPs as a set of interpretable guidelines. “The utilization of



**Fig. 3** Geographical locations of Baoxing, Beichuan, and Lushan. *Source:* The Transportation Bureau of Sichuan, 2010. Ministry of Transport Website: [http://www.moc.gov.cn/xinxilb/xxlb\\_fabu/fbpd\\_sichuan/201001/t20100113\\_651241.html](http://www.moc.gov.cn/xinxilb/xxlb_fabu/fbpd_sichuan/201001/t20100113_651241.html)

**Table 3** Details of field visits

Interview time	County	Townships
June–July, 2008	Beichuan	Guixi, Chenjiaba, Kaiping, Qingpian, Baishi, Guanling, Yuli, Xuanping, Baini, Duba, Dunshang, Xiaoba, Qushan, Tongkou, Leigu, Badi
August, 2013	Lushan	Luyang, Feixianguan, Shuangshi, Taiping, Dachuan, Siyan, Qingren, Longmen
August, 2013	Baoxing	Muping, Lingguan, Fengtongzhai, Qiaoqi, Yongfu, Mingli, Wulong, Daxi

CPs is all about...repeated practices and a dynamic management of it. Through conducting drills and trainings of various kinds ... to accumulate experiences. Conducting trainings regularly produce a more systematic and quicker activation process of CPs. In case of emergencies, we know what to do and how should we get organized immediately. The function of CPs is to guide us to execute the procedures ... rather than simply having CPs per se” (BC010, 2008).

The implementation of CPs in actual practice was perceived as problematic. An interviewee criticized the usefulness of CPs for providing “limited flexibility and adaptability”. “Although the available CPs cover a wide range of potential hazards, we are unable to implement most of them.... As telecommunication and transportation cut-off

after the earthquake, how were we supposed to communicate and go through the agenda of the CPs immediately after the quake in the first place?” (BC011, 2008).

## 4.2 Early-warning system and risk analyses

Early-warning system in Beichuan townships were generally ill-functioning. The use of conventional instruments and low-tech infrastructure and the heavy reliance on a non-scientific hazard-monitoring system and methods were observed. It is thus logical to deduce that the impact of both early-warning system and risk analyses in townships remain limited. Moreover, despite professionals did risk evaluations after the quake and reported to the upper-level governments, adjustments on related policies or actions did not make to orient specific local conditions into considerations, implying that there was an absence of participatory approach in disaster management system in the township level.

When asked to describe the hazard alarm system in a township, one executive reported that “each courtyard assigned a person specifically to be responsible for the safety and security of the area... He or she ought to go around the nearby households and alert everyone in times of emergency” (BC008, 2008). Traditional instruments, in many cases gongs, were commonly utilized to alarm neighborhoods.

Monitoring personnel, who assessed the geological conditions through their personal experience, was the main source of hazard-monitoring system in Beichuan. Each village has one monitoring personnel and their responsibility was to observe vulnerable areas. The choice of personnel was determined by their home distance from locations with hazard threats, rather than by the level of professionalism. A township executive explained that [such setting] “can facilitate the alarming process” (BC006, 2008). These monitoring personnel were mostly “local residents who work voluntarily or as a part-time job with around 1 RMB of stipend per day” (BC006, 2008).

It was also found that although the upper-level governments sent external specialists to conduct risk assessments in the hardest-hit townships after the catastrophe, questions and suggestions brought up by local experts and residents were mostly neglected or ignored. For example, a township executive complained “[during a quake dam incident], the height of the flood would have only reached as high as our local experts predicted, but all residents were told only to follow external professionals’ assessment and to resettle on grounds under their advice. [Thus], we are in need of combining both professional evaluation and local experience into our risk analysis system” (BC015, 2008).

## 4.3 Emergency responses

Although local officials served as the first responders to the disaster, their abilities and performances during the “golden 72 h” were severely hampered by the lack of emergency hardware, making them heavily reliant on external aid, particularly from military forces, be it the armed police, PLA or firefighter, as well as medical personnel. In addition, the practical impact of social efforts during the emergency response phase was narrow.

Township governments implemented centralized management in their respective jurisdiction swiftly after the quake. One explained “during a disaster of this scale, it is difficult to ensure everyone around has an unselfish motive... [Thus], it is imperative to enforce an authoritative management” (BC002, 2008). The mechanisms of implementing “centralized management” were that around 30 township officials were categorized into three main forces to be responsible for supporting rescue and relief operations; collecting information and handling communications; managing and distributing emergency supplies. They then

evolved into subgroups to take care of the sanitation, relocation, and public security operations. They adjusted their responsibilities accordingly depending on the circumstances.

Local officials indicated that even though they responded quickly, they only had limited capacity to save lives because “our equipment was just our hands, we used all kinds of accessible material like wooden sticks to attempt to get the trapped people out.... [Even those we managed to pull people out from debris,] transfer vehicles were inadequate. We had a large amount of injuries...with only two military trucks, we could only send 6 people out at each time” (BC003, 2008).

Even though the affected townships were flooded with organizations and individual volunteers, their usefulness was limited due to the absence of systematic coordination. A respondent observed “volunteers took assisting jobs, they were motivated and well-performed, but to do something constructive, it was not easy at all because they were too occupied to think about getting organized .... But we appreciated their participation. They energized us and the victims spiritually and emotionally ... volunteers were among the first external groups reaching us on the 17<sup>th</sup> of May, even earlier than the military groups” (BC009, 2008).

#### 4.4 Logistics management

The urgently needed materials such as emergency supplies, electricity, and transportation were either insufficient or being cut off. Contingency funding in townships was also strained because their corresponding county governments did not provide this funding in addition to the already limited supply of financial support. Therefore, township officials had to improvise to “seize” resources from local stores and to get them reimbursed later.

With regard to emergency supplies, stockpiles of emergency resources of all kinds, ranging from food and water, tents, and medical supplies to rescue equipment, were scant. “Neither township authorities nor local residents had a reserved enough amount of inventories.... The entire township with over 3000 people had only 7 boxes of instant noodles, some cookies and small amount of bottled water” (BC003, 2008). Another stated “we only had few vehicles and little fuel reserved.... There was no workable equipment at all. Iron wire and sacks then became our main tools for flood control” (BC011, 2008). Problems with infrastructure, especially roads, were also reported. All interviewees mentioned “immediately after the quake, electricity, transportation, telecommunication... basically infrastructure of all kinds had been cut-off... but we could do nothing about it” (BC004, 2008).

Township officials reached out for resources immediately after the quake in the form of “acquiesced seizure” from local stores, which they indicated could be reimbursed. “Soon after medication or medical supplies ran out in hospitals, we expropriated inventories from individual stores.... Owners recorded the amount the government took and they would get reimbursed later.... We did the same at the gas station” (BC013, 2008).

All respondents concurred that their efforts and capacities to prevent and react to emergencies were strained by the limited contingency funds they obtained. “We suffered from a shortage of viable fund and support... that can promise our work on flood control. It prevented our emergency responses from being effective.... We are also not capable of supporting specialists to stay on-site in a long-run” (BC010, 2008). The reason behind the limited supply of contingency funding in townships was that “the fiscal situation in the township level of government is fragile. The source of contingency fund is totally counted

on the upper level...who transferred and supplied us with only very limited amounts” (BC005, 2008).

#### 4.5 Social participation

Not only had a large number of assorted groups and individual volunteers flooded to the scene and helped out with their time and efforts, private enterprises also donated in the form of physical objects which the townships lacked. In addition, it was observed that there was an absence of systematic coordination among volunteers on the one hand and of formal collaboration between the social sector and township governments on the other.

All respondents observed a strong presence of social capital among victims of the catastrophe. Local residents were seen to be “very self-motivated...under the circumstances without government officials to mobilize, they brought along their farming tools and started building sheds spontaneously. They shared whatever they had with one another in the interim settlement, be they relatives or friends” (BC002, 2008).

Township executives indicated that the private sector donated not only in the form of money but also products and useful tools which they specialized in. “The four siblings who are the owners of a renowned private enterprise from the Anhui province...were here to help us with their machines and gadgets. They were large enough to move us away from the dangerous zone” (BC007, 2008). Another recalled that “there was a company from Chongqing that specialized in producing assault boats. We had two usable assault boats but without engines.... They did not only transport us the engines swiftly...they also gave us three satellite phones.... We had our telecommunication and transportation problems solved all at once” (BC009, 2008).

Although individual volunteers, university students, veterans, and non-registered social organizations were actively involved in several phases, their usefulness only became apparent in the recovery period. “They participated in a wide range of tasks, namely, building tents, managing students.... Those with rescue experiences took part in rescue efforts; intellectuals served to gather information and reported to us; those with professional qualifications like nurses then worked in hospitals” (BC001, 2008). However, the 16 executives we interviewed recalled only established and external social organizations, like China Foundation for Poverty Alleviation (CFPA) and the Buddhist Association of China (along with a couple of registered NGOs), as being present.

There was an absence of mechanism from the part of the government to manage volunteers and systematically coordinate participating groups. “Volunteers were self-motivated and self-organized.... We had no one to manage them, no one cared...either during the rescue and relief phase or during resource collection and distribution” (BC010, 2008).

#### 4.6 Education and training

It is indicated that drills and public meetings were the main source of disaster education and training to the public prior to the earthquake. And some of the township executives admitted that these forms of information diffusion had generally failed to raise the risk perception of locals.

When asked about disaster education and training they had in Beichuan before the quake, it was found that they were mostly in the form of drills and the holding of public meetings. One reported “we had drills designed for distinctive types of hazard at various locations during different seasons.... Regarding preparedness to natural disasters, such as

landslides and debris flows, we organized trainings for the public to tell them where to escape and how to resettle” (BC003, 2008). A couple of respondents had a more critical attitude when they spoke about the impact of the available forms of education: “we held public meetings to diffuse information about the type of natural hazards that we were prone-to, and also some basic instructions about what to do in case of emergencies.... But these were only voluntary events.... Moreover, there were CPs for schools, yet teachers only indoctrinated students about the related information, namely routes to escape in case of earthquake” (BC002, 2008).

Township executives accounted for the low-risk perceptions toward earthquakes among the public as “even though Beichuan is located in an earthquake-prone zone, the impact of earthquakes occurred before 512<sup>9</sup> were relatively weak, it did not feel strong enough to be a matter” (BC007, 2008). Another stated “our township did not organize any drills concerning earthquakes.... It is in fact more appropriate to say no townships in the entire country had ever done drills for earthquakes” (BC016, 2008). In addition, “the mode of publicizing related knowledge was defective and unengaging.... The locals knew very little about their exposures to hazards of all kind.... We tried all methods to convince residents who lived on or near areas with hazard threat to resettle, but they just never moved. They were very stubborn” (BC001, 2008).

#### 4.7 Recovery planning

Three emerging problems and challenges for post-disaster reconstruction were commonly identified by township executives. They are: the inadequate financial resources, the shortage of human resources, and the imposition of reconstruction policies and regulations from the upper levels of government.

Township executives perceived that inadequate financial resources, due to local impoverishment as well as the insufficient funding provided by the county level, hindered the reconstruction and resettlement process in the townships. One pointed out that “we were not well-off at all, and now the distribution of government subsidy for housing resettlement or refurbishment to locals is also bogged down.” And the rationale was that “the evaluation process takes very long and the examination of the extent of the damage of a house is difficult, yet the amount of subsidy allocation is dependent upon how damaged the house was” (BC005, 2008). In addition, “the breakdown of transportation infrastructure...incurred a much higher reconstruction cost for us.... The biggest challenge of post-disaster reconstruction is to enhance our capacity to connect with external areas... but we don’t have sufficient financial capital to maintain and restore them” (BC013, 2008).

The insufficient human resources, including both skilled and unskilled labor, also slowed down the pace of the restoration and reconstruction processes. A respondent recalled “we have in total 3700 people in our township, yet the available labor force is only about one-third of the amount, around 1200 people. And among them, 300 are migrant workers, 100 are domestic workers... leaving only 800 of those in town to do all the reconstruction work” (BC004, 2008).

Furthermore, implementing orders imposed from the higher-level governments were seen as problematic and a conundrum for township executives. It is because they could not decline the orders at the same time knowing those policies imposed from above does not

<sup>9</sup> Throughout the paper, 512 also refers to the Wenchuan earthquake as it occurred on 12th May, 2008. Whereas 420 refers to Lushan earthquake where it happened on 20th April, 2013.

actually fit their specific local circumstances. As an interviewee stated “the superiors know just pushing us to speed up our pace to complete the permanent housing projects...our community will totally get dysfunctional if we are to follow the latest regulations about the model of rural reconstruction .... We cannot build houses in a concentrated area.... We are not given the conditions to meet the requirements because our land distribution is scattered.... The cost will be extremely high if we are to follow the instructions” (BC007, 2008). “The decision makers simply did not know our local customs that we do not chop wood until September or October to guarantee the quality of building material .... In that case how are we supposed to meet the requirement to complete the permanent relocation by Chinese New Year in 2009?” (BC011, 2008).

## 5 Disaster management capacities in Lushan (2013)

Having studied the situations in Beichuan back in 2008, it would be interesting to know what remained unchanged or had changed after 5 years in Lushan, where the townships' capacities were assumed to have improved owing to the introduction of a series of policies and regulations targeting specifically the strengthening of disaster management capacities in Sichuan.<sup>10</sup>

### 5.1 Contingency plans

By comparison to 2008, changes were noted in terms of the content of CPs and the way township executives utilized them. The executives learned from the experience of the quake in 2008 that on the one hand, a wide range of secondary hazards was incorporated into the CPs, and on the other, township executives found repeated executions improved their flexibility of CPs. The township executives also emerged with an awareness of the importance of raising the public's risk perception.

When asked whether there were changes in the structure or content of CPs since 2008, a majority commented that “surely there was a certain degree of changes after the Wenchuan earthquake. Secondary hazards were added into our hazard-specific plans...as we learnt that after the 2008 earthquake, the structure of mountains became fragile or were even crumbled, landslides were very likely to happen.” (YA002, 2013) Another stated: “the CPs had been enriched, it included debris flows also.” (YA015, 2013)

The emerging awareness on the importance of raising risk perceptions in the locals was reflected. One elaborated: “we conducted drills regularly to educate local people what to do during an emergency and to raise their awareness on potential risk.... Personally speaking, raising the public's risk perception is vital for disaster preparedness.... I believed after 512 and 420, our locals were more sensitive to risks.” (YA006, 2013)

The adaptability of CPs was internalized in the sense that township executives treated them more as guidelines to be interpreted, and as something they can learn more through repeated implementations. “No one could really recite the content of the CPs, but through repeated practices and experiences in executing them, every one of us was able to react instantly without instructions. These accumulated experiences taught us what and how to do at different occasions. In fact, after the quake, none of us ever made a call to tell each

<sup>10</sup> For more information, please refer to <http://www.sc.gov.cn/10462/10758/10759/10764/2012/7/26/10219700.shtml>.

other what to do, we were all conscientious in our duties and responsibilities. I didn't have to command at all." (YA004, 2013)

## 5.2 Early-warning system and risk analyses

The character of the early-warning system and risk analyses in townships remained conventional and haphazard in nature. Despite the presence of periodic risk assessments conducted by professionals sent by upper-level governments, the resulting policy changes did not improve much of local situation from threats.

When asked about their early-warning signals and methods, one described: "we used gongs, whistles. I was one of the monitoring personnel, if I noticed anything abnormal in locations with hazard threat that we monitor, we ran around our courtyard with gongs to alert people." (YA011, 2013). We also found that the daily stipend of these monitoring personnel increased from 1 RMB in 2008 to 3–10 RMB in 2013. In addition, a relatively organized management on these personnel was also observed. "We organized meetings with monitoring personnel regularly, and provided them with trainings.... We did random inspection on them and checked whether they actually worked properly." (YC007, 2013)

Risk analyses continued to be conducted in a haphazard way. A respondent noted "after 512, we got to have a discussion with the Ministry of Land and Resources. They briefly spoke about introducing an automatic landslide inspection apparatus in our township... yet they never mentioned it again thereafter." (YA003, 2013) It was also discovered that after the 2008 quake, each township was supposed to be allocated with two professional monitoring personnel who specialized in geology as well as transportation and communication. Our interviewees confirmed that this policy did not get implemented before the occurrence of the quake.

Township executives indicated that having professional scientists conducting risk assessments periodically was good but not enough. "The external scientists did not go through all hazard threatening locations to evaluate and assess at all. They only roughly and compartmentally reported our local situation. They did not really provide us with constructive advice.... Well they did, but only in general terms. We had a far greater demand in professional guidance than what we were provided, we hoped he or she could have offered us more details .... For instance, we have debris flow problems, and we wanted them to tell us precisely how threatening they are to our township. We need scientific advice with greater accuracy." (YA008, 2013)

## 5.3 Emergency responses

The first responders to the Lushan earthquake were not limited to government officials but also local emergency rescue teams from each village organized after the Wenchuan quake. Moreover, the growth of collaborative interactions between township governments and the social sector implied that emergency rescue and relief operations were no longer solely dominated by a government-led model.

Similar to the Wenchuan quake, centralized management was quickly imposed after the disaster. However, it is found that township governments created some forms of "community response grids"<sup>11</sup> (YA002, 2013) to ensure their management was responsive and effective.

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<sup>11</sup> This management method was first appeared in Beijing in 2004, a method of social service delivery based on the grid plan system.

There was a growth of emergency capacities of township officials and local emergency rescue teams after the Wenchuan earthquake. Officials revealed they had greater confidence and efficiency in activating CPs as they were more familiar with the corresponding procedures. Even though emergency resources remained insufficient, township governments found themselves in possession of useful rescue tools and gadgets to make an immediate impact on saving lives. A township executive described: “we had three loading machines, two digging machines (to help save people who got trapped beneath the debris more efficiently).” (YC008, 2013) In addition, local emergency rescue teams were also reported to react swiftly in an organized fashion. “Each village in our township has a local emergency rescue team constituted by young and healthy locals.... They received trainings and conducted drills regularly.” (YA002, 2013)

Township executives agreed that there were more collaborative interactions with the social sector during this phase. One noted that “social organizations proactively contacted us. After we communicated and introduced them our situation, for instance, areas that needed help the most, we cooperated or just counted on them to get to the need in certain areas.” (YA004, 2013)

#### 5.4 Logistics management

The amount and variety of emergency reserves stocked by township governments were substantially higher in 2013 compared with 2008. However, the availability and accessibility of resources, particularly in financial terms, remained far from sufficient. Moreover, new forms of mechanisms to acquire emergency supplies in a sustainable fashion and to distribute emergency supplies were observed.

One respondent commented “our emergency capacity was still fragile. Our equipment remained underdeveloped and ineffective. For example, under the circumstances of electricity, transportation and water supply cut off, we were unable to recover them within a short period of time. In addition, our township should really have had a land cruiser, but we just never got to have one.” (YA004, 2013). Furthermore, problems beyond the accessibility of emergency materials emerged. One executive reflected that “indeed almost all officials were given a satellite phone, but I still have no idea how to use it.” (YA013, 2013)

The problem of inadequate township contingency funds persisted in 2013. “The upper level only provided us with 20,000–30,000 RMB per month. The amount was only just enough to sustain our daily administrative tasks. Contingency fund is an independent subject... yet it never existed.” (YA002, 2013)

Similarly, the demand for better infrastructure in townships remained high. “There were indeed changes [from the 2008 earthquake], but the extent [of change] was limited. Roads in rural areas are still very narrow, yet we did not get to do maintenance on them. In case of emergency, rescue vehicles cannot get into us, so we cannot receive emergency supplies from outside. If the roads remain unimproved, it will only get worse in the future when disasters hit us again.” (YA010, 2013)

Half of the interviewees noted that they signed public–private partnerships (PPP) contracts with local stores periodically as a way to ensure there will be sufficient usable commodities available during a disaster. When asked about the significance of PPP, one stated “generally local stores have more space than us to stock up a larger amount of inventories. This way, the government does not have to bear additional costs on food with an expiry date.” (YA015, 2013). Similarly, a more organized and systematic mechanism for distributing emergency supplies was recognized. “Each village had an authorized

supervisor under the inspection committee...to sign for confirmation when resources were received and distributed.” (YA008, 2013)

### 5.5 Social participation

Social participation was perceived as more professional compared with that in 2008. Although the social sector was more systematic in coordinating and managing voluntary efforts and resources, township executives were ambivalent toward their performance.

More organized mobilization efforts among locals, and a growing number of professional social organizations participated alongside the government in 2013. Organizations that had been established as the result of the 2008 disaster, such as One Foundation, Ping'anxing, were seen actively participating in Lushan. Moreover, the private and social sectors were provided with more opportunities and ways to donate and/or contribute supplies by means of the growing number of philanthropic organizations that emerged after 2008.

The ability to coordinate and manage voluntary efforts and incoming resources had also improved. The Non-profit and Volunteer Service Centre for the Ya'an<sup>12</sup> Disaster Relief was jointly established by the Sichuan Provincial Government and the Ya'an Municipal Government on May 12, 2013. Branches in Lushan County and Baoxing County served as platforms for not only collecting and providing information, but also for coordinating and organizing voluntary efforts and resources from charities in a more systematic fashion.

However, some township executives remained doubtful about non-profits and certain volunteer efforts. One expressed “we did have a better integration of social participation this time but it was a failure! Those NGOs came and distributed resources or money without going through us... This created an imbalance situation in the community and was unfair to those who did not get any supplies. And the residents thought it was all the government's fault. The fact that these non-profits worked only according to their own ways without getting consent or communicating with us was not okay. They were not as familiar with local situations as us.” (YA003, 2013)

### 5.6 Education and training

Changes in terms of the frequency and variety of drills were indicated in 2013, although drills and public meetings continued to be the main form of disaster education and training to the public prior to the earthquake.

Some commented that “we conducted drills more regularly after 512... that we involved more local residents and government officials and conducted on more different sites that we believed to have threats...such as earthquake, debris flows, forest fire and so on.” (YA010, 2013)

Some expressed a more critical view on the form of training townships had: “drills were still done without much professional guidance or technical props.... As a result the locals remains indifferent and uninterested in the related issues.” (YA004, 2013) Furthermore, some indicated that the public was still not aware of the risks they were exposed to. “The locals asked why they have to do drills repeatedly... as they claimed they know where to go and what to do when they hear the alarming sound.... They just didn't want to participate.” (YA006, 2013)

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<sup>12</sup> Ya'an is the prefectural municipality that governs counties including Lushan and Baoxing.

## 5.7 Recovery planning

The challenges faced by township executives identified in 2008 still prevailed in 2013. The insufficient financial capital once again obstructed the reconstruction and resettlement processes. The shortage of both skilled and unskilled labor also adversely hindered the pace of reconstruction in the Lushan and Baoxing counties. Township executives remained excluded from the decision-making process for reconstruction policies, creating only a model of one-size fits all and non-adaptable policies imposed on townships.

Insufficient financial capital provided to township governments was perceived as the main source of obstruction to the reconstruction and resettlement processes. One stated “we have got a rural area reconstruction policy that each household is entitled to 30,000 RMB of government subsidy .... But building a house needs approximately 200,000 RMB, so how much can the locals do with that amount of subsidy after all? It is true that the locals can get microfinance, but their debts for the 2008 earthquake have yet not been fully recovered...it is just extremely challenging for them.” (YA010, 2013) Our interviewees also revealed that the lack of township financial resources, too, hindered their efforts to repair damaged transportation infrastructures. The consequences would be the soaring costs for importing reconstruction materials and recovering local economic development of the townships.

In terms of the shortage of human resources, the absence of skilled labor was particularly serious. “We just do not have enough skilled labor, but the government regulations stated each house should involve a skilled laborer who was accredited with related knowledge.” (YA008, 2013) Another described: “although we offer trainings to locals for construction, they are not aware of them.... Trainings are indeed not compulsory. It is just a vicious cycle that they are now only building houses with the method and materials they used to build those collapsed in the earthquake.” (YA010, 2013)

Township executives noticed that local conditions did not allow townships to live up to policy expectations, yet they were still ordered to complete reconstruction projects within a 3-year time period. Policy demands and local conditions were seen as conflicting. A respondent stated “the projects we planned ourselves and the actual arrangements are irreconcilable.... Even though we have a good blueprint, whether we have the capacity to apply it is solely determined by the decisions from upper levels .... Otherwise we do not have the financial source to implement them.” (YA004, 2013) Similarly, another noted “the biggest challenge is to upgrade and transform our roads.... This road links 3 of the 16 villages in our township, and it is our main resources of financial income if we want to develop our economy.... But the county and provincial governments had just never taken our request into consideration.” (YA001, 2013).

## 6 What constrained township’s disaster management capacity?

Our examination of emergency management capacities in Wenchuan and Lushan suggest that the disaster in 2008 offered valuable learning experiences to both township executives as well as local residents in terms of disaster preparedness and emergency response. Most of our interviewees agreed that after experiencing the isolation in 2008 as a result of the breakdown of transportations and telecommunications, they were more mentally and physically prepared for the next one. Broadly speaking, substantial progress was made in strengthening township capacities by 2013, namely: a more systematic organization of township officials and local emergency rescue teams; an inclusion of a wider range of

secondary hazards in contingency plans; an increase in the level of public's risk perception; the use of PPPs and so on (Table 4).

While these positive changes are undeniable, there remain reasons to be critical to the extent of which these improvements were sustainable and whether these changes were enough to put townships in a better position to cope with the next disaster. In fact, pronounced problems and challenges remained as of 2013, including: the uncertainty about the functions of contingency plans among township executives; the continued use of conventional and non-scientific early-warning methods and the disorganized risk analyses; the lack of local engagement in trainings and drills. Among these problems, they are in fact associable with factors such as the lack of human and financial resources, the inadequate public participation and mobilization and so on. We attempt to explicate in greater detail the dynamics underlying these changes and the causes of persistent problems and challenges in the following.

First of all, it seems that the top-down institutional framework has severely impeded disaster management policies implementation at a township level. As shown above in Fig. 2, the fact that township governments are located in the lowest position within the vertical governmental structure had a direct impact on causing a situation where the township government's responsibilities outweigh the capacity they possess. This limited degree of autonomy of township governments is restricted not only by the existing fiscal system, but also their exclusion from the legislative process.

On one hand, the elimination of tax collection after the Wenchuan earthquake at the village level meant that township governments suffered a loss of the main source of revenue since 2008. As a result, township governments had to be completely reliant on budget allocations from their corresponding county governments to sustain their administrations. Under this financial allocations structure, the township governments were provided with no standardized amount of funding, but depended instead on local situations. Under normal circumstances, townships are given only just enough financial resources to cover their daily administrative tasks. In addition, with no contingency funds independently provided, this left township executives not much available as contingency funds and to enforce disaster management policies.

The consequence of the lack of independent contingency funding was reflected in the inability of local communities to upgrade their early-warning systems with more scientifically sound and customized instruments. Similarly, township governments were seen incapable of offering an adequate stipend to train and motivate monitoring personnel. As a result, a township-level government possesses only limited ability to adapt and implement, in an optimal fashion, policies that were imposed from above under the present institutional arrangement.

On the other hand, the fact that township governments are excluded from any higher-level policy decision-making process has compounded township officials' incapability to enforce disaster management policies. Reflected from both the recovery planning process in 2008 and in 2013, townships were required to implement policies and practices that had not adequately taken local needs and realities into account, and that township executives only possessed a pessimistic attitude toward the recovery. Consider for instance that the Wenchuan and Lushan Reconstruction Plans were designed and organized solely by central government authorities and experts, no township officials or local residents were engaged in the policy decision-making process.<sup>13</sup> The failure to incorporate local aspects (i.e.,

<sup>13</sup> For more information refer to: [http://www.gov.cn/zwggk/2013-07/15/content\\_2445989.htm](http://www.gov.cn/zwggk/2013-07/15/content_2445989.htm).

**Table 4** Summary of changes and implications

	Disaster management capacities in Wenchuan (2008)	Disaster management capacities in Lushan (2013)
1. Contingency plans (CPs)	<p>CPs adapted to local conditions</p> <p>Ambiguous functions of CPs</p> <p>Absent of Scenario planning during the design process</p>	<p>Changes in the content of CPs and the way township executives utilized CPs</p> <p>Incorporated a wide range of secondary hazards into CPs</p> <p>Maneuverability improved through repeated practices</p> <p>Emerged awareness of the importance of raising public's risk perception</p>
2. Early-warning system and risk analyses	<p>Equipped only with conventional instruments and low-tech infrastructure</p> <p>Heavy reliant on non-scientific hazard-monitoring system and methods</p> <p>Policies or actions adjustment did not orient to specific local conditions</p>	<p>The character of early-warning system and risk analyses remained conventional and arbitrary</p> <p>Professional scientists' did not improve much of local situation from threats</p>
3. Emergency responses	<p>Local officials served as first responders</p> <p>Poor performance of local officials due to the lack of emergency hardware</p> <p>Heavy reliance of external aid during the "golden 72 h"</p> <p>Narrow impact of social efforts during this phase</p>	<p>First responders were local officials and local emergency rescue teams</p> <p>Growth of collaborative interactions between township governments and social sector</p> <p>Emergency rescue and relief operations not government-monopolized</p>
4. Logistics management	<p>Emergency supplies were insufficient, electricity and transportation were cut off</p> <p>Township governments only had limited funding for contingency use</p> <p>Township officials improvised to "seize" resources from local stores and to get them reimbursed later</p>	<p>A substantial increase in the amount and variety of emergency reserves</p> <p>Availability and accessibility of resources remained far from sufficient</p> <p>New forms of mechanism for acquiring emergency supplies in a sustainable fashion and for distributing emergency supplies</p>
5. Social participation	<p>Extensive amount of volunteerism</p> <p>Private enterprises donated in the form of physical objects and money</p> <p>Absent of a systematic coordination among volunteers</p> <p>No formal collaboration between social sector and governments</p>	<p>More professional performance of social participation</p> <p>More systematic coordination and management of voluntary efforts and resources</p> <p>Township executives had ambivalent toward social sector's participation in affected communities</p>
6. Education and training	<p>Drills and public meetings were main source of disaster education and training to public prior to the earthquake</p> <p>Available forms of information diffusion failed to raise the risk perception of locals</p>	<p>Changes in the frequency and variety of drills</p> <p>Drills and public meetings remained as main form of disaster education and training to the public prior to the earthquake</p> <p>Township executives were more critical toward the available form of disaster education</p>
7. Recovery planning	<p>Three emerging problems and challenges for post-disaster reconstruction were identified: inadequate financial resources; shortage of human resources; imposition of reconstruction policies and regulations by upper levels of government</p>	<p>Same challenges prevailed</p>

insights and resources) had aggravated pressures and the level of challenge faced by township executives in reacting to the related policies.

It is also clear that the failure of township governments to develop a robust external collaborative mechanism with local and social organizations exacerbated their already limited capacity to cope with emergencies. Given the meager resources with which they were provided, collaborating with actors in the larger social environment (domestic and international) is valuable for township governments to cultivate a systematic and sustainable support. As Abarquez and Murshed (2004) noted: the involvement of the most vulnerable is paramount and the support of the least vulnerable is necessary because it enables the generation of community resilience against disasters in a much cost-effective fashion.

Problematically, as our findings suggest, of the 32 township executives we interviewed, most of them attributed the prevalence of shallow risk perceptions to the unwillingness of local people to participate in drills, trainings, and public meetings they provided. These government officials neither appeared to have any idea about how to engage local people further or more effectively nor did they mention anything that could link to the concept of empowerment. In addition, the mechanism of public–private partnership indeed existed in 2013. Although it reflected that there were opportunities for greater integration between township governments and external sectors, it should be noted that only a few townships actually pursued these innovative means of cooperation.

Similarly, it is true to say that the establishment of the Non-profit and Volunteer Service Centre for the Ya'an Disaster Relief was a breakthrough of producing a formal collaborative relationship between the government and the social sector. In this case, however, governments that were engaged in the center came mostly from the provincial or county level. There were no obvious interactions between township governments and social organizations despite a growth of the latter by 2013. With a township executive commenting the integration of social participation during the Lushan earthquake as a “total failure,” it is logical to presume that there might be a lack of communication and persisting misunderstanding between government and social organizations.

Also noteworthy is the fact that while the participation of the social sector in both Wenchuan and Lushan was active and diverse, locally based NGOs were almost unnoticeable in 2013. It is safe to assume that in the aftermath of these disasters, social organizations that helped shoulder the township government's social service delivery costs were mainly external organizations that were not familiar with local conditions at all and, hence, their impact remained finite. However, this limitation was seemingly spotted by the government in 2013. Perhaps, it was the emerging awareness of the need and importance of social organizations that led to the government institutionalizing 100 local NGOs to be incubated in Ya'an within 3 years under the supervision of the provincial government on the Lushan Reconstruction Plan.

Finally, it is argued that an imbalance of socioeconomic development within China had produced and reproduced the lingering challenges that townships faced in the recovery process of both earthquakes. Under the current national development strategy, the distribution of human resources within the nation has become increasingly uneven as the gap between rural and urban areas has substantially widened. Moreover, the process of rapid urbanization in China could also explain the aggravation of the lack of professional or skilled labor in townships. Being the transitional zone between villages and cities, townships fall into the gray area that is characterized by poor infrastructure, slow economic growth, labor shortages, and insufficient public services. As was clearly illustrated in the aforementioned areas, townships were left behind with mostly elderly folks and children;

neither of whom are skilled or capable of contributing to local resilience by serving as first responders or monitoring personnel.

In addition, although the Wenchuan Reconstruction Plan incorporated disaster preparedness elements and the simultaneous development of urbanization in townships, including infrastructure improvements ranging from roads, dams to emergency shelters, the key reconstruction blueprint failed to address the lingering social issues in townships: foremost, among these, the migrant problem. Within the population of the 51 impacted counties and municipalities of the Wenchuan Earthquake zone, nearly 3.6 million were migrant workers, accounting for just over 18 % of the total population (Fang et al. 2009). It is hence safe to assume that unless there is a management system in place to reconcile the contradictory goals of pursuing economic development and building a safety-oriented country, effective disaster management capacities and local resilience could hardly be built in the way that mainstreams in the overall national disaster management system.

## 7 Discussion and conclusion

The disaster management system in China has been undergoing steady evolution and the dynamics underlying these changes and the capacity to handle contingencies have long been the subject of study. Our research contributes to the literature on disaster management in China by examining disaster management capacities in the lowest formal governmental level—township. We presented details on our interviews conducted with townships executives, including both the leader of the township government and the party secretary for the township, in 2008 and 2013 separately. This 5-year gap enabled us to notice positive changes, areas for improvement, lingering challenges and new problems. We analyzed three main underlying causes that could account for the central problems and challenges. First, we argue that inadequate funding and proper incentives to enforce policies at the township level could be attributed to the top-down institutional framework. This structure not only adversely affected the fiscal system in townships but just as importantly, limited their legislative power. Second, we suggest that the impact of disaster management policies on townships was limited due to the failure of township governments to develop effective collaborative mechanisms with local and social organizations. Finally, we assert that the lack of human resources, particularly skilled labor, at the township level was caused by the national development strategy to stress development on the eastern regions. This phenomenon was then exacerbated by the urbanization process, which encouraged human capital to move away from townships to cities or provinces as migrant workers.

The hope is that these field studies will stimulate discussion about why the disaster management system developed the way it did and will encourage better understanding of its existing strengths and weaknesses, as well as the structural context in which it is embedded. There is ample evidence from international experiences that when an “off-the-shelf” model (in response to a calamity) fails to account for local vulnerabilities and capabilities, it results in inappropriate relief and reconstruction efforts that have damaging repercussions for the already impacted populations. As the lingering challenges and problems discovered in the Lushan townships have illustrated, the results inappropriate relief and reconstruction efforts can in the best case be ineffective and, in the worst, insulting and damaging.

As China undergoes a series of transitions, enhancing its disaster management capacity should be prioritized in one of its reform agendas. To achieve this, it requires the leadership to look beyond its own disaster management system and learn from international

experiences. Academia has long suggested the idea of governance might be effective in not only implementing disaster management policies at both national and local levels, but also in enforcing it as it promotes local resilience in coping with risks (Tierney 2012). Undertaking this direction of change in China will be particularly complicated given the implications of decentralization of power and reconstruction of institutions, as well as reorientation of national development strategies. Nevertheless, with the new Chinese leadership led by Xi introduced “social governance” into the new series of policies, the concept of “governance” will no longer be a taboo. Yet, the way the government practices governance and the extent to which governance models are applicable in disaster management should be closely monitored and vigorously discussed.

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## References

- Abarquez I, Murshed Z (2004) Community-based disaster risk management: field practitioners' handbook. Asian Disaster Preparedness Center (ADPC), Klong Luang
- Deng Wugong, Yu Ge, Gu Yongtao (2010) Evaluating China's National Post-Disaster Plans: the 2008 Wenchuan earthquake's recovery and reconstruction planning. *Int J Disaster Risk Sci* 1(2):17–27
- Fang C, Li M, Wu F (2009) Analysis on urbanization and the spatial differentiation and flow of the migrant workers in Wenchuan Earthquake-stricken regions. *J Mt Sci* 126(4):482–489 (in Chinese)
- Fewsmith J (2003) China's response to SARS. *China Leadersh Monit* 7:1–10
- Meng QX, Xu WY (2014) Ya'an Earthquake of 20 April 2013: introduction and reflections. *J Nat Hazards* 70:941–949
- Song YC (2014) The policy development of disaster management and education in China—the comparison between policy expectation and actual implementation in earthquake preparation demonstration schools. A thesis submitted in partial fulfilment of the requirements of University of Pittsburgh for the Degree of Doctor of Philosophy, Pittsburgh. <http://d-scholarship.pitt.edu/21332/>. Accessed 2 Jan 2015]
- Tierney K (2012) Disaster governance: social, political, and economic dimensions. *Annu Rev Environ Resour* 37:341–363
- Wang YC (2008) Several problems concerning the Law of the PRC on Emergency Responses, China. *Chin Publ Adm* 12:8–11 (In Chinese)
- Ya'an Yearbook (2013) Ya'an Bureau of Statistics (in Chinese)
- Yang J et al (2014) Comparison of two large earthquakes in China: the 2008 Sichuan Wenchuan Earthquake and the 2013 Sichuan Lushan Earthquake. *Journal of Natural Hazards*. 73:1127–1136
- Zhang HB (2015) Collaboration in Emergency Response in China: Evolution from the Wenchuan Earthquake, May 12, 2008 to the Lushan Earthquake, April 20, 2013. In: Brassard C, Giles D, Howitt A (eds) *Natural disaster management in Asia-Pacific*. Springer Japan, Tokyo
- Zhang Q, Qibin L et al (2011) An outlook on Chinese Model of Emergency Management Based upon the review of Wenchuan earthquake response: an interactive perspective of strong state and strong society. *Chin Publ Adm* 5:50–56 (in Chinese)
- Zhang X, Yi L, Zhao D (2013) Community-based disaster management: a review of progress in China. *J Nat Hazards* 65:2215–2239