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IMPLEMENTATION OF THE HYOGO FRAMEWORK FOR ACTION IN ASIA AND THE PACIFIC: CASE STUDY: THE NATIONAL DISASTER MANAGEMENT SYSTEM OF CHINA AND ITS RESPONSE TO THE WENCHUAN EARTHQUAKE

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Note by the secretariat

SUMMARY

The present document briefly describes the policy and administrative framework of the national disaster management mechanism of China, illustrated by its response to the catastrophic Wenchuan earthquake in May 2008. The case study is intended to stimulate policy debate by the Committee on Disaster Risk Reduction regarding the development of national disaster management mechanisms, related issues to be addressed and regional cooperation to assist the development and improvement of the emergency response capacities of member countries.

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Introduction

1. China is among the countries that are most seriously affected by natural disasters of many types: floods, droughts and meteorological, seismic, geological, maritime and ecological disasters, as well as forest and grassland fires. Due to its geographical location and meteorological conditions, more than 70 per cent of cities and 50 per cent of the population are located in areas that are often afflicted with major meteorological, geological and maritime disasters.[1]

[1] China, *National Comprehensive Disaster Reduction Plan for the Eleventh 5-year Plan Period* (State Council, 14 August 2007), accessed from www.gov.cn/zwgk/2007-08/14/content_716626.htm on 17 November 2008 (Chinese only).

2. Of the world's 10 deadliest natural disasters throughout history, 6 have occurred in China, including the top 3: the 1931 floods, with a death toll of 1 million-4 million; the 1887 Huang He (Yellow) River flood (0.9 million-2.0 million); and the 1556 Shaanxi earthquake (0.83 million).[2]

3. In recent years, improved disaster prevention measures and emergency response capacity have greatly reduced the casualties caused by many types of natural hazards. However, the economic losses caused by them, particularly those occurring in the increasingly developed eastern areas of China, have increased dramatically. For example, the back-to-back blizzards and icy rains that affected 20 southern, central and eastern provinces in January and February 2008 had a relatively low death toll of 1,295 compared with the enormous direct economic losses of 152 billion Chinese yuan (around $19.4 billion); about 1.66 million people were evacuated and more than 1.9 million travellers were stranded on their way home for the Chinese New Year.[3] During the period 1990-2005, an average of 370 million people were affected by disasters each year and direct annual economic losses amounted to $25 billion, on average.[4]

4. China has been making disaster management one of its priorities at policy, institutional and operational levels. It has invested in the world's largest flood control project, the dam on the Yangtze River. Meanwhile, work is under way to channel water from the Yangtze River to arid regions prone to drought about 1,000 kilometres to the north. China has been improving its technical systems for monitoring and forecasting disasters, and it has established emergency response plans.

5. The present document provides a brief description of how China responded to the recent Wenchuan earthquake on 12 May 2008 and of its disaster management mechanisms and related policies, institutional arrangements and technical support capacities, which are the result of Government efforts to implement the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.[5] The response to the Wenchuan earthquake is the largest disaster response action in Chinese history, and assessments of it may be useful to countries in the region for their own disaster management planning.

I. THE WENCHUAN EARTHQUAKE AND GOVERNMENT RESPONSE

A. The most serious disaster in the recent history of China

6. The earthquake on 12 May 2008, the epicentre of which was in Wenchuan County in the south-west of Sichuan Province, ranked as the most devastating disaster in the 59-year history of China. With a magnitude of 8.0 on the Richter scale, the earthquake brought a quake intensity of between VIII and XI to an area of 13,000 square kilometres, in which 29.6 million people live and where most of the casualties occurred. About one third of the 4.56 million people living in the 440,000 square kilometre area impacted by the quake were relocated.[6] By 25 September, the losses

[2] Jessica Rowe, "Nature's deadliest disasters", *Associated Content*, 2 November 2007, accessed from www.associatedcontent.com/article/431483/natures_deadliest_disasters.html?cat=58 on 17 November 2007.

[3] XU Fuhai, National Disaster Reduction Centre of China, e-mail and telephone communications, September to October 2008.

[4] JIA Zhibang,Vice Minister of Civil Affairs, China, cited in JIANG Yanxin, "Disaster losses average more than 100 billion yuan over the last 15 years", *New Jingbao Daily*, 28 September 2005, accessed from www.chinaxinjiang.cn/news/gnxw/t20050928_59185.htm on 17 November 2008 (Chinese only).

[5] A/CONF.206/6 and Corr.1, chap. I, resolution 2.

[6] China, "Announcement on the current situation and the next steps to take in the Wenchuan earthquake response" (State Council, 30 May 2008), accessed from www.gov.cn/zwgk/2008-05/30/content_999288.htm on 17 November 2008 (Chinese only).

had been put at 69,227 deaths, with 17,923 missing and 374,643 hospitalized. In addition, 6.52 million rooms had collapsed in buildings. The city of Beichuan in Beichuan County and the town of Yinxiu in Wenchuan County had been totally razed to the ground. Road, electricity, water supply and communications infrastructures were paralysed over large areas, and 154 major roads and 5 railway lines were broken. Direct economic losses were estimated at a total of $125 billion.[7]

7. The following factors made the rescue and relief effort one of the most challenging in Chinese history but they are also characteristic of some other major disasters, such as the Kashmir earthquake of 2005:

(a) The most seriously affected areas were mountainous, with deep valleys, and were frequently marked by significant secondary geological disasters, which caused one third of the total earthquake deaths;

(b) The quakes and consequent landslides destroyed, damaged or blocked roads, bridges and waterways, which made the transport of required rescue personnel and equipment to many areas hit by the quake and urgently in need almost impossible;

(c) Telecommunications facilities were disrupted throughout most of the area affected by the quake, particularly in the eight most damaged cities and towns, where telecommunications were totally disabled for at least 30 hours. No information could be sent out of these areas and rescue teams could not be deployed in a timely manner. In areas where satellite mobile handsets became available, the sharp increase in the number of calls jammed the systems;

(d) Unrelated heavy rainfall and dense fog further impeded the deployment of rescue personnel, equipment and vehicles, particularly to areas where airdrop and helicopter were the only means of delivery.

8. By 27 May, more than 8,668 aftershocks had occurred, including 28 above magnitude 5.0 and 5 above magnitude 6.0. Many secondary geological disasters, such as landslides and mudflows, had been triggered and the devastation they caused was intensified by heavy rains.[8] They also led to the formation of 35 high-risk quake lakes that were in danger of collapsing and causing more casualties and damage. In addition, 2,385 reservoirs had been reported to be in dangerous condition. These potential risks posed grave threats to evacuated people and rescue teams, and consumed resources that were used to prevent those situations from becoming disasters themselves.[9]

9. Throughout this challenging and extremely stressful situation, Chinese leaders and institutions quickly pulled together to assess situations and mobilize resources for an effective response. Many senior officials from outside China visited quake sites to better understand the situation, express their sympathies and assess the potential for cooperation. Many of them commended the leadership and efforts that were taking place. The Secretary-General of the United Nations and the Executive Secretary of the Economic and Social Commission for Asia and the Pacific (ESCAP)

[7] China, "Response to the Wenchuan earthquake as of 25 September 2008", press release (State Council Information Office, 26 September 2008), accessed from www.41744.cn/gzdt/ldhd/200809/t222722.htm on 17 November 2008 (Chinese only).

[8] China, "Announcement on the current situation and the next steps to take in the Wenchuan earthquake response" (State Council, 30 May 2008), accessed from www.gov.cn/zwgk/2008-05/30/content_999288.htm on 17 November 2008 (Chinese only).

[9] YANG Sanjun and YAO Runfeng, "Statistics of Ministry of Water Resources: 2,385 reservoirs damaged by Wenchuan earthquake" (Xinhua News Agency, 28 May 2008), accessed from www.gov.cn/jrzg/2008-05/28/content_995821.htm on 17 November 2008 (Chinese only).

each visited the site and were impressed by the Chinese leaders, people and organizations.

10. Rapid responses were demonstrated by many people, from the highest Government officials to volunteers from all over the country and the world.

11. Immediately after the quake, China began high-level response actions, as specified in level I of the National Emergency Response Plan for Earthquake Disasters and the National Emergency Response Plan for the Relief of Natural Disasters. Within 2½ hours after the quake, China's Premier boarded an aeroplane to the quake-hit areas in his capacity as Director of the newly established Cabinet Headquarters for Earthquake Response. He quickly established eight working groups, which comprised major Government departments, the military and local governments and were responsible for efforts in: field rescue and mitigation; emergency medical treatment and public health; evacuation, displacement and relief; logistics; infrastructure restoration; the restoration of productive capacity; public security; and public relations.[10] The China Earthquake Administration's first field team of 33 persons and a national earthquake emergency rescue team of 183 persons were dispatched to the disaster area.[11]

12. It is worth noting the key role played by the Chinese armed forces, including the police, when disasters occur. They are organized and prepared and they act quickly. Within a few hours of the Wenchuan earthquake, army rescuers had arrived at the scene, and on the second day, 20,000 more were in place. In one week's time, more than 113,000 soldiers had been deployed; 1,069 flights had taken off; 15 medical treatment, epidemic prevention and psychological intervention teams had been deployed; and 78,000 tons of rescue and mitigation materials had been shipped. The rescuers pulled 21,560 people from the rubble, some still alive. They also treated 34,051 injured persons; relocated 205,370 residents and tourists; and restored 557 kilometres of roads. In the operation, seven soldiers died from the rubble when an aftershock struck.[12]

13. For the first time in history, professional search and rescue teams from abroad joined Chinese rescue efforts, with teams from Japan, the Republic of Korea, the Russian Federation and Singapore coming to the disaster site. Teams from Hong Kong, China and Taiwan Province of China also assisted. In addition, medical assistance teams were sent by the Governments of Cuba, France, Indonesia, Italy, Japan, Pakistan, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland and the United States of America and by the German Red Cross Association.[13]

14. By 4 June, provisional statistics issued by the Ministry of Civil Affairs indicated that the donated cash and goods (including those committed but not delivered) amount to $5.57 billion. Among those donations, $5.08 billion in cash and

[10] LI Bin and LI Dadong, "Premier WEN Jiabao arrived in Sichuan to direct quake responses" (Xinhua News Agency, 12 May 2008), accessed from http://news.cnwest.com/content/2008-05/13/content_1237085.htm on 19 November 2008 (Chinese only).

[11] JIANG Jianke and LIAO Wengen, "Announcement of the China Earthquake Authority on the Wenchuan Earthquake" (People's Net, 12 May 2008), accessed from www.china.com.cn/news/txt/2008-05/13/content_15179853.htm on 19 November 2008 (Chinese only).

[12] China, "China announced its armed forces deployment for disaster response for the first time", *China Review News*, 19 May 2008, accessed from http://gb.chinareviewnews.com/doc/1006/4/9/4/100649415.html?coluid=7&kindid=0&docid=100649415 on 19 May 2008 (Chinese only).

[13] BAI Ying and FENG Leilei, "Exhibit on international rescue and medical teams responding to the Wenchuan earthquake" (Xinhua News Agency, 5 August 2008), accessed from www.china-embassy.or.jp/chn/zt/kzjzzzcc/t481177.htm on 17 November 2008 (Chinese only).

$115 million in goods were donated by the international community. More than 5,000 tons of goods were delivered from overseas.[14]

15. Tens of thousands of ordinary people joined the volunteer teams assisting in the quake-hit areas.

16. As announced by the State Council Information Office on 25 September, government spending on immediate disaster responses topped 80.936 billion yuan (about $12 billion), with 90.8 per cent of that amount coming from the central Government and the rest from local governments. Domestic and foreign donations reached 59.468 billion yuan in cash and goods. Of the 53,295 kilometres of roads damaged by the quake, 53,020 kilometres were cleared; 128,163 of the 138,960 business outlets damaged by the quake were reopened; 215,851 quake-affected people found new jobs outside of the quake zone; and another 856,560 people resumed work in their hometowns.[15]

B. Greatly improved response efficiency due to high-tech tools

17. Effectiveness in disaster response relies greatly on the management of relevant information. During the response period, many high-tech tools were used for field actions or deployed to quake-hit areas, mostly for disaster information management.

18. Within two hours of the quake, a map indicating basic information about the epicentre and major affected areas had been prepared by the National Disaster Reduction Centre and submitted to the highest level of decision makers. The map integrated information on earthquake intensity levels and demographic, transport and other background information, as well as satellite images.

19. In the following days, 120 maps and reports derived from satellite and aeroplane images were submitted by the Centre and its cooperative partners. They provided critical information on the severity of the catastrophe, including updates on collapsed buildings, quake-lakes and roadblocks and the identification of relocation sites. During this response period, more than 1,300 images from 23 satellites, including foreign satellites, were provided by space agencies, most of them free of charge. Manned aeroplanes and unmanned micro aeroplanes equipped with remote sensors flew over the areas hit by the quake to collect field information with a view to more effectively deploying rescue and mitigation forces and relocating affected people.[16]

20. Emergency response relies heavily on telecommunications. Urgent needs for telecommunications were first met by satellite-based means, as 25,000 persons were mobilized to restore telecommunications facilities that had been seriously damaged. A total of 383 emergency telecommunications vehicles were dispatched, many of them equipped with satellite communications facilities, but due to road damage, they could not reach some of the most seriously hit areas. More than 2,000 satellite mobile handsets were deployed. The first call from the epicentre was made by a satellite mobile phone 30 hours after the quake. By 16 May, cellular mobile services in some of the most seriously hit areas had been restored via satellite. Broadband links were established by more than 1,300 satellite terminals, some of which had to be carried by

[14] China, "MCA/MFA/MOB briefing on the acceptance of international donations", press conference (Xinhua News Agency, 4 June 2008), accessed from http://news.xinhuanet.com/politics/2008-06/04/content_8312408.htm on 4 June 2008 (Chinese only).

[15] China, "Announcement: status of responses to the Wenchuan earthquake", (State Council Information Office, 26 September 2008), accessed from www.41744.cn/gzdt/ldhd/200809/t222722.htm on 17 November 2008 (Chinese only).

[16] XU Fuhai, National Disaster Reduction Centre of China, e-mail and telephone communications, September to October 2008.

pure manpower. They were used for networking, transmitting remote sensing images, holding videoconferences among decision makers and using telemedicine among field teams and major supporting hospitals.[17, 18]

21. Many thematic maps dedicated to emergency response were produced by survey and mapping authorities. While more than 53,000 hard copies were disseminated among field workers, electronic maps were also produced for decision makers, including the three-dimensional digital model of the Tangjiashan quake-lake, which presented the greatest risk. The electronic maps contributed to a major mitigation effort during the response period, which eliminated the risk.[19]

22. Beidou satellite positioning handsets, which were provided to most rescue teams, also provided the use of short message services (SMS), which were extremely important for the timely deployment of rescue teams when other means of communication were not available. Three kinds of life detectors were provided to rescue teams to search under rubble for the timely rescue of those who had been buried.

23. Within the National Research and Development Programme, funds were urgently allocated to enhance response-related technical support activities in the following priority areas: a comprehensive assessment of the formation mechanism of the Wenchuan earthquake and the damage and loss it caused; the monitoring and prevention of secondary disasters; and other research and development projects supporting the rehabilitation and reconstruction effort.

C. Post-earthquake rehabilitation and reconstruction

24. The Regulations on Post-Wenchuan Earthquake Rehabilitation and Reconstruction were promulgated on 8 June 2008 by the State Council[20] to ensure an effective and orderly post-earthquake rehabilitation and reconstruction and a stable resumption of normal life and economic activities. The regulations emphasized that the following guidelines should be followed throughout the rehabilitation and reconstruction period:

- People-oriented actions to ensure a safer environment;
- Scientifically sound and comprehensive planning;
- Phase-by-phase implementation;
- A joint funding mechanism combining self-reliance, government subsidies and social donation assistance.

25. Under the regulations, a survey would be conducted to assess the damage and the resource needs for rehabilitation and reconstruction.

26. The central Government, in addition to the assistance it provided to the quake-hit areas for rehabilitation and reconstruction, also promoted the establishment

[17] China, “Telecom operators sent 25,000 people to restore services in quake-hit areas”, *Nanfang Dushi Daily*, 20 May 2008, accessed from http://tech.163.com/08/0520/15/4CD9FNKF000915BE.html on 17 November 2008 (Chinese only).

[18] China, “Briefing on the telecom support situation for earthquake responses” Ministry of Industry and Information (Xinhua News Agency, 30 May 2008), accessed from http://news.xinhuanet.com/politics/2008-05/30/content_8281788.htm on 30 May 2008, (Chinese only).

[19] China, “Survey and Mapping Department provided 53,000 maps supporting disaster response” (Bureau for Survey and Mapping, 17 June 2008), accessed from www.gov.cn/gzdt/2008-06/17/content_1019098.htm on 17 November 2008 (Chinese only).

[20] China, *Regulations on Post-Wenchuan Earthquake Rehabilitation and Reconstruction* (State Council, 9 June 2008), accessed from www.gov.cn/zwgk/2008-06/09/content_1010710.htm on 17 November 2008 (Chinese only).

of a paired assistance mechanism via which 19 provincial level administrations were assigned to establish one-to-one paired relations with a specific one of the 19 most seriously affected counties. The modalities of the paired assistance included the following:[21]

(a) Providing services such as reconstruction planning, building design and expert advisory, construction and supervision services;

(b) Building and repairing residential buildings and public service facilities such as schools, hospitals, broadcasting and television facilities, and cultural, sports and welfare facilities;

(c) Building and repairing infrastructures for services such as roads, water and gas supply, drainage, sewage and garbage disposal;

(d) Building and repairing the agricultural infrastructure and providing agricultural technical services;

(e) Providing machinery, tools, equipment, building materials and other support goods;

(f) Providing teachers and medical personnel, organizing training and assisting in the provision of human resources and in job placement;

(g) Encouraging investments in industrial and commercial service facilities and in commercial infrastructure development.

27. By 5 October, the resources committed for the mechanisms had reached 22.7 billion yuan for the subsequent three years.[22]

II. NATIONAL DISASTER MANAGEMENT SYSTEM OF CHINA

28. The response to the Wenchuan earthquake was the result of the Government's disaster management process (called the disaster emergency response in official documents), a comprehensive system involving various central and local government sectors.

29. The process covers the following disaster risk reduction phases:

(a) Disaster preparedness, including risk assessment, institutional and technical arrangements for emergency response, mitigation, monitoring and early