

## 2008 Sichuan Earthquake and Role of the Chinese Defence Forces in Disaster Relief

*Kamlesh K. Agnihotri\**

*The People's Republic of China has been afflicted by natural calamities right from its inception in 1949, including severe river flooding, excess snowfall, cyclones, tsunamis and earthquakes. The consequential human suffering is further aggravated by the heavy population density. The mammoth 2008 earthquake in Sichuan province and the resultant loss of life and property exposed the ill-preparedness of the Chinese government machinery like never before. Nevertheless, the Chinese State Council rose admirably to the occasion. The Peoples' Liberation Army (PLA) composed of military, armed police, militia and reserve troops was the single largest contributor to the emergency rescue, response and subsequent mitigation efforts. In the process, it encountered many obstacles, faced severe shortcomings, learnt valuable lessons and initiated measures to incorporate these lessons for better disaster preparedness in future. The PLA internalised disaster relief as one of its major tasks under the "military operations other than war" role. The situation in India—large population density and frequent occurrence of natural disasters—is similar to that of China. Thus, there are valuable lessons to be learnt from the Chinese experience of having suffered this earthquake and the methodology adopted, particularly by their armed forces, in disaster response, mitigation and capacity building for better management of mega disasters in future.*

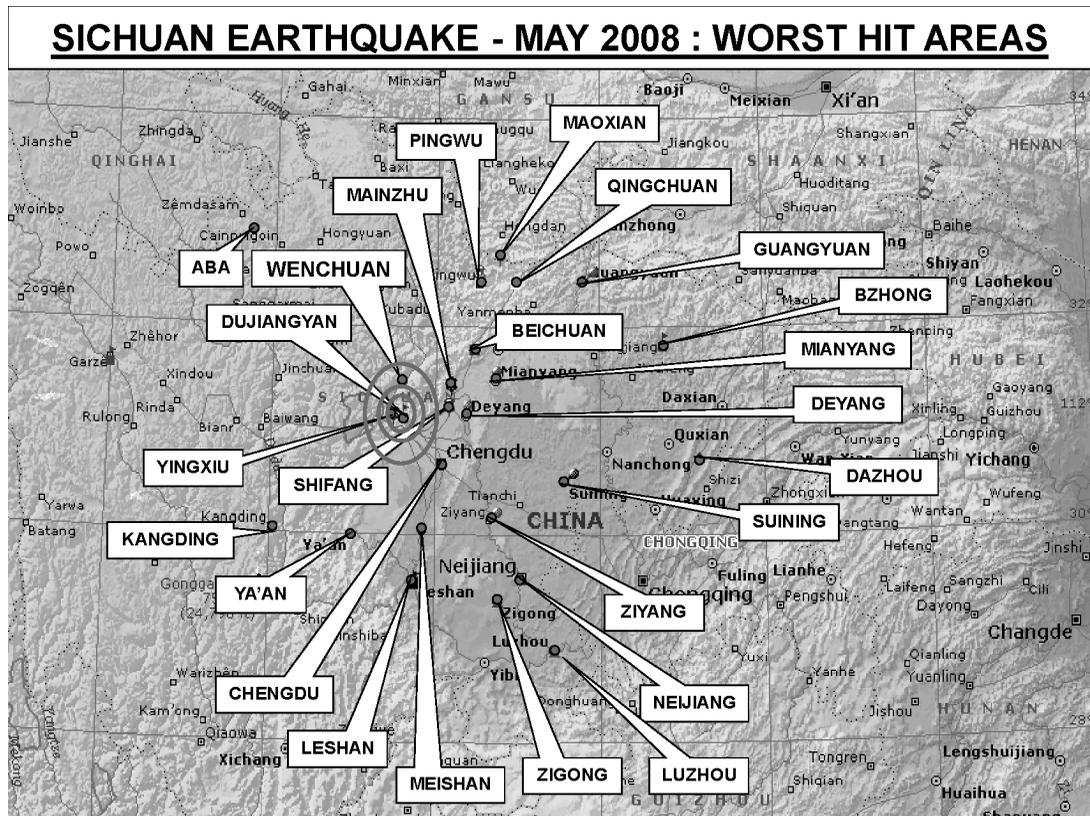
### Introduction

On May 12, 2008, at about 1430 hours, a major earthquake measuring 8.0 on the Richter scale jolted Wenchuan County of south-west China's Sichuan Province. The epicentre of the quake was located at 31° N Latitude and 103°40' E Longitude, about 80 km north-west of the provincial capital, Chengdu. As the epicentre was at a relatively shallow depth of about 19 km, the earthquake generated very strong surface waves with considerable energy<sup>1</sup>, leading to huge loss of life and

\* **Commander Kamlesh Kumar Agnihotri** is a Research Fellow with the China Cell of the National Maritime Foundation, New Delhi. The views expressed in this article are his own and do not reflect the official policy or position of the Indian Navy or the National Maritime Foundation. The author can be reached at [kkagnihotri@maritimeindia.org](mailto:kkagnihotri@maritimeindia.org).

property. As per China's National Quake Relief Headquarters, approximately 10 million people were directly affected by the quake. More than 87,000 people were reported killed or missing and another 374,640 persons were injured.<sup>2</sup> Figure 1 shows a map of the region indicating the affected areas.

**Figure 1:** Sichuan Earthquake, May 2008: Worst Hit Area



Source: Author.

The earthquake caused widespread damage to the infrastructural facilities within 100 km of the epicentre. The State Grid Corporation of China stated that about 5.5 gigawatt of electricity generation capacity (almost 1 per cent of China's generation capacity), was rendered non-operational in Sichuan and Shaanxi provinces as the plants were disconnected from the national network.<sup>3</sup> The State Council of China reported that 803 hydropower stations were damaged nationwide, including 481 in Sichuan Province.<sup>4</sup> This province has approximately 40 per cent of China's natural gas reserves. Work at chemical plants, coal mines and oil and natural gas wells in the area, was halted. The earthquake also damaged many dams in the region. The Zipingpu Dam was reported to have developed

cracks.<sup>5</sup> It must be noted that had the Zipingpu reservoir burst, it would have wreaked enormous damage on the downstream city of Dujiangyan.

### **Damage to Military and Strategic Assets**

Many defence-related assets are located in the Chengdu Military Region (MR). The Headquarter of the 13th Group Army is located at Chongqing, about 250 km south-east of Chengdu. The Chengdu Aircraft Corporation manufactures J-10, JF-17, and J-7 fighter aircraft. In addition to the above, the Chengdu Aircraft Engine Company manufactures WP-6 and WP-13 aircraft engines. There are many 'HQ-2' Surface-to-Air Missile (SAM) sites around the city of Chengdu. Though the extent of damage to these assets and facilities was not made public, these would certainly have been affected to varying degrees. For instance, it was reported that the prototype production of the JF-17 aircraft, a joint venture between China and Pakistan was affected, thus causing considerable delays in the introductory stages of the programme itself.

Critical installations related to the Chinese nuclear programme, weapons-grade uranium and plutonium production facilities, weapons design, development, test and assembly facilities are located around Mianyang, Chengdu, Guangyuan, Heping, and Yibin.<sup>6</sup> There are possibly four operational research reactors under the Southwest Reactor Engineering Research & Design Academy that use weapons-grade fissile material. The disaster area is also home to China's main nuclear weapons research laboratory in Mianyang as well as several other secret atomic sites. Although the official Chinese sources announced on May 23, 2008 that all nuclear facilities in the earthquake-hit areas were safe<sup>7</sup> and some military facilities were only slightly affected, the experts deduce that the intensity of this earthquake had the potential to cause serious damage to installations up to a radius of 100 km from the epicentre. It is noteworthy that Mianyang and Chengdu are much closer to the earthquake epicentre than the atomic energy complex of Guangyuan, nuclear facilities at Heping and the large-scale nuclear fuel complex at Yibin. An examination of the damage template from the south-west to the north-east vis-à-vis the damage reports of housing infrastructure by the US Geological Survey, corroborates greater damage in Mianyang and Guangyuan as compared to other locations.<sup>8</sup> It was also fleetingly reported that China had recovered 30 of the 32 radioactive sources that were buried during the earthquake and had managed to locate the remaining two, which they retrieved subsequently.<sup>9</sup>

## **Commencement of Disaster Relief Effort**

The Chinese Premier Wen Jiabao rushed to Sichuan Province within two hours of the earthquake.<sup>10</sup> He set up an advance disaster control centre and took over all charge of the emergency relief effort, with the following organisations working under him:

1. China Earthquake Administration Institution
2. China International Disaster Reduction Commission
3. National Disaster Reduction Committee
4. State Flood and Drought Relief Headquarters
5. State Council for Earthquake Relief

A large number of military personnel were mobilised for the search and rescue effort. Those military formations closest to the scene of the earthquake were the first to be mobilised. Within two hours of the earthquake on May 12, 2008, 6,100 troops of Chengdu MR and 40 members of a specialised earthquake relief team from a Yunnan field engineer regiment were mobilised.<sup>11</sup> At the same time, 150 members of the earthquake disaster emergency rescue team of a field engineer regiment under the Beijing MR were transported by two IL-76 transport aircraft along with 10 search and rescue dogs and 22 medical personnel from the general hospital of the Peoples' Armed Police Force (PAPF).<sup>12</sup>

On May 13, 2008, 20,000 PLA and PAPF troops reached Chengdu. 24,000 PLA troops were en-route via airlift and 10,000 via rail to Chengdu. A task force of 300 hundred troops from 127th Light Mechanised Infantry Division from Jinan MR reached Chengdu in 30 vehicles and an additional 5,000 troops were en-route aboard seven civilian chartered flights. Four helicopters from a light helicopter Regiment were also deployed at the disaster zone. By 1800 hours on the same day, 22 PLA Air Force (PLAAF) and 9 civilian aircraft, 30 plus helicopters, 1,400 airborne troops and additional 4,600 general troops were en-route to the disaster zone.<sup>13</sup> A further 2,500 members of PLA Navy marine force along with 200 engineering, rescue and other vehicles were readied for dispatch to the affected zone. An additional 30,000 troops were en-route via rail.<sup>14</sup> Twelve and a half tonnes of supplies were airdropped by 18 helicopter sorties and 28 aircraft sorties.

## **Subsequent PLA Contributions towards Earthquake Relief**

Six army aviation detachments, including an army aviation regiment each from Jinan and Chengdu MRs, started airlifting the rescue material, medicines, and communication equipment from May 17, 2008 onwards. Supported by 300-odd personnel of the PAPF, nearly 2,000 regular troops of a division and six army aviation units of the Jinan MR advanced forward, by air and by land, along a canyon north west of Yingxue town to rescue almost 10,000 local people who had been stranded for over 150 hours. On May 19, 2008, 500 soldiers of another regiment of the same division, rapidly moved on to Shuimo town at the southern end of the canyon, and from there they marched on to Sanjiang town after trekking over difficult terrain. The two columns closed in from the opposite ends of the canyon.

A Group Army of the Chengdu MR dispatched army aviation helicopters on the afternoon of May 19, 2008 to Xingwenping village located on the eastern bank of the Minjiang river, about 44 km from Wenchuan town, and successfully rescued 217 students and 14 teachers. On the morning of May 19, 2008, the troops of an Army Division of the Jinan MR carried out dragnet-like search-and-rescue operation in Fangshi Town of Qingchuan County. The Division combed 300-odd villages and eventually evacuated 6,000 people, and provided medical treatment to more than 1,000 victims. A sudden landslide on both sides of the Minjiang River damaged the emergency helipads built by army commandos, preventing five trial landings. On May 20, 2008, the helicopters made emergency landings directly in Xingwenping village.

In order to enable the earthquake relief troops to keep abreast of events, the General Staff Headquarters of the PLA decided to distribute 170,000 radio sets to the frontline relief troops. The first batch of 62,000 sets was delivered in the quake-hit area on May 19 and 20, 2008.<sup>15</sup> The remaining sets were delivered subsequently in other quake-hit areas in Chengdu city and rest of Sichuan Province in the shortest possible time.

The PLA put many of the newly developed epidemic prevention kits to use in quake-hit areas. A special 'food physical and chemical kit', was used extensively to ensure that infected food was not consumed by survivors and relief personnel. The kit could check 18 kinds of food items like meat, poultry, eggs, marine products, foodstuff, edible oil and vegetables for pollution by bacteria, nitrite, or deleterious pigments. The results were available within 30 minutes, with a high degree of accuracy. The reliable performance of the portable kit operable by one person was a great resource in enabling the control and avoidance of the possible post-calamity epidemic diseases. The 'Water and Poison Examination Kit' was widely utilised for ensuring the safety of drinking water for the servicemen as

well as local people. This advanced test device could examine water quality for 29 health quarantine standards and judge water treatment, thereby maintaining drinking water sanitation. In addition, the rescuers who were working in the rain for prolonged periods were issued individual-soldier “specialised skin cleansing packs” developed by the Hygiene and Environmental Medicine Research Institute of the Academy of Military Medical Sciences, for avoidance of skin diseases.

Approximately 148,000 military men, armed police, militia, and reservists including 130,000 PLA troops were eventually engaged in rescue operations in areas ravaged by the earthquake.<sup>16</sup> Military transport aircraft and helicopters operated more than 300 sorties to bring in and/or airdrop rescuers and relief supplies. Fifty-six trains carried 28,000 troops to quake-hit areas by May 15, 2008. The PLA dispatched 72 medical teams with over 2,160 doctors.<sup>17</sup> More than 6,800 PLA parachutists were deployed in Wenchuan to help in relief work.

### **Shortcomings of the Military Relief Effort**

Relief operations in Sichuan also exposed certain weaknesses in the PLA’s disaster management effort and in its relief and rescue organisation. Such a large-scale mobilisation of military personnel, sourced from all sectors and departments of the armed forces—from paratroopers to the strategic-missile divisions—was coordinated by a central authority constituted in an ad-hoc manner. Moreover, the non-traditional nature of the mammoth task which was totally different from the troops’ conventional role of war fighting, posed new and hitherto unencountered challenges to the disaster mitigation effort. The disaster put the PLA, which has not been involved in active combat for more than three decades, to a severe and highly visible test. Certain shortcomings most apparent during rescue and relief work by the Chinese armed forces, are enumerated below:

1. The most apparent shortcoming was the inadequacy of the aerial heavy load transportation effort. The fourteen IL 76 Russian transport aircraft were just not sufficient to handle the heavy lift requirements commensurate with the scale of the calamity.
2. The helicopter force, which could provide more effective localised rescue and relief effort, was not used to full potential leading to reduced effectiveness. In fact, the PLA used only about 150 helicopters out of an inventory of about 500 and so had to prioritise tasks between air-dropping critical stores, transporting relief workers and casualty evacuation.<sup>18</sup> The helicopters used for relief and rescue were also of older vintage, with outdated technology.

3. Poor training of PLA pilots was also apparent. The PLA twice failed to land a helicopter at the epicentre. An attempt to drop paratroopers at the epicentre was also abandoned. Thus, the first batch of rescue troops had to enter on foot, delaying the rescue effort in the most critical golden hours. One rescue helicopter also crashed on May 31, 2008 while ferrying injured personnel.
4. The PLA carried out extensive air dropping of equipment, food and water to soldiers and refugees in the disaster zone. However, most of the relief goods were dropped in the wrong places. Soldiers had to spend hours retrieving them. Other supplies were dropped in areas that were simply inaccessible.
5. Poor communication amongst different units posed a major information flow challenge as many communication devices held by them were not compatible.
6. Military trucks were either stuck in mud or had broken down on the winding roads blocking the relief chains for long durations, as untrained drivers from the plains found driving on mountainous roads too difficult.
7. Very limited satellite imagery of the affected areas was available and the photo-reconnaissance effort, was inadequate because there were only two aerial photo aircraft in service with the Surveying and Mapping Bureau of the PLA. The Chinese government had to requisition imagery and GIS information of the affected region from the Indian Space Research Organisation (ISRO), the European Space Agency (ESA), the US Geological Survey (USGS), the Canadian Space Agency (CSA), and the Japan Aerospace Exploration Agency (JAXA).<sup>19</sup>
8. Joint Earthquake Relief Command of Chengdu MR reported a number of malpractices by military/para-military personnel. Personnel of some military units allegedly took away livestock belonging to local people in the earthquake-affected villages by force. It was also revealed that some members of a military unit diverted the relief material for sale in the market for personal gains. This reportedly led to angry protests by the local people who surrounded and attacked such personnel. Some military vehicles also blocked/monopolised the road leading to the earthquake affected areas for long durations, despite requests from the local joint relief command teams, resulting in avoidable hold-ups in the movement of other relief teams.

## Lessons Learnt and Remedial Measures

One of the most widely acknowledged and appreciated aspect of the post-quake relief operation was the speed and the scale with which the Chinese government and the PLA forces responded. The sincerity of the whole nation was apparent from the fact that more than 200,000 people from all over the country descended on the affected areas, to supplement the efforts of the Chinese armed forces and provided food, shelter and medical treatment to the needy. The Chinese relief teams—mainly comprising the security forces—managed to reach all the 3,669 affected villages within five days of the earthquake. However, the scale of the disaster, tough terrain, scarcity of infrastructure, and harsh weather conditions, all combined, far exceeded all the efforts that the Chinese could make towards mitigation. The earthquake exposed the ill-preparedness of the PLA—the best equipped and organised force capable of dealing with such incidents—for effectively managing a disaster of this magnitude. The disaster areas presented a real battlefield-like scenario which required good coordination, communication and cooperation amongst different force components for delivering effective results. However, the forces were often found to be struggling with many tasks that would be considered standard and routine in modern warfare.

The PLA did the best it could under the circumstances, but there were many lessons to be learnt and many aspects of disaster relief that had to be improved upon, both in terms of organisation and capability enhancement. Having realised the significance of long-range airborne transportation after the Sichuan quake, when most of the relief teams could not access the affected areas quickly enough because of damaged roads, railroads and tracks, the PLA carried out its first long-range air drop exercise on June 19, 2008 itself. The stated aim of the exercise was “... training and testing the ability of the PLA to mobilise military and civilian aircraft to transport and air drop materials and rescue forces in emergency situations...”<sup>20</sup> The Central Military Commission (CMC) decided to review the ‘Master Scenario for Emergency Response’—a document that it had issued in November 2006, which requires all PLA units to take immediate action on occurrence of a disaster and simultaneously report to the higher authorities<sup>21</sup>—in order to make it more relevant in the face of large-scale disasters. The Chinese government designated May 12 as “Disaster Prevention and Reduction Day” to commemorate the Sichuan quake and published a White Paper on “Disaster Prevention and Reduction” on May 11, 2009, to mark the first anniversary of the calamity.<sup>22</sup> Nationwide contingency exercises directed by the National Training Base for Seismic Rescue in Beijing, involving search and rescue after earthquakes, transportation of relief troops and stores, and evacuation of people were held.<sup>23</sup>

In April 2010, the Central Military Commission (CMC) directed the PLA to establish eight state-level specialised emergency rescue units comprising a total of 50,000 dedicated servicemen.<sup>24</sup> The eight units would be armed with core emergency rescue capabilities by the end of 2010.<sup>25</sup> The PLA also decided to focus on the following seven measures to enhance its emergency response and disaster relief capabilities:<sup>26</sup>

1. Strengthen the military–civilian disaster information sharing mechanism for rapid coordinated response.
2. Reinforce the Emergency Response Control Authority of the General Service Headquarters by recruiting more staff and defining responsibilities of subordinate organisations more clearly.
3. Establish a robust military–civilian interaction mechanism connecting the Ministry of National Defence in a joint conference system with more than 20 departments under the State Council.
4. Establish a large Emergency Response Special Force. The ‘Plan on PLA’s Capacity Building in Military Operations other than War’ issued on January 5, 2009 specified the guidelines, principles, objectives and measures for training of the forces designated to perform military operations other than war (MOOTW).
5. Formulate laws and regulations on emergency response. The “Regulations of the PLA on Emergency Command in Handling Contingencies” would be promulgated, laying down detailed stipulations on the guiding principles, contents, procedures and requirements of various MOOTW situations including disaster relief.
6. Review and increase the capability of disaster-relief equipment and material.
7. Strengthen the political work structure while conducting MOOTW.

To complement and support these eight state-level specialised emergency rescue units, eight state-level emergency mobile communication support teams were also formed from within the PLA. Their specific tasks were to cope with major communication accidents and grave natural disasters leading to disruption of social security and ensure rapid, effective, uninterrupted and orderly communication command and control, provide communication support on

demand and enable communication restoration during emergency.<sup>27</sup> The teams have since provided the much needed connectivity in many disaster-related emergency services.

The Chinese government formally published a set of regulations for natural disaster relief in July 2010, clearly laying down the roles and the responsibilities of various government departments as also those of the provincial governments in disaster relief work. The regulations stipulated that the nation wide relief work would be coordinated by the central National Disaster Reduction Authority. The government machinery at the county level and above would be responsible to the National Disaster Reduction Authority, for working out emergency response plans, providing transportation and communication facilities for disaster relief work, designating emergency shelters and training disaster relief teams. These regulations became effective from September 1, 2010.<sup>28</sup> Instructions for establishing systems to prevent abuse of donations and relief material, dealing with complaints and safeguarding the interests of the whistleblowers were also incorporated in these regulations.<sup>29</sup>

The 2010 White Paper on China's National Defence also mentions that participating in the national construction, emergency rescue and disaster relief as part of MOOTW was an important task for the Armed Forces under their Social Stability responsibilities. Accordingly, the PLA has been tasked with "... flood control and emergency rescue, earthquake rescue, nuclear, biological and chemical emergency rescue, urgent air transportation, rapid road repair, maritime emergency search and rescue, emergency mobile communication support, and medical aid and epidemic prevention."<sup>30</sup> Subsequently, the PLA officially put the emergency command charts for military operations other than war (MOOTW) into use on May 19, 2011. These charts have integrated vital lessons learnt and experiences gained from previous incidents with the critical knowledge base, and contain check-off lists and collated vital information on various MOOTW scenarios for PLA personnel. These charts provide background information and check-off lists as aid to decision-making during emergency situations related to earthquake rescue and relief, flood prevention and emergency rescue, forest fire fighting and anti-terrorism and stability maintenance. The chart sets consist of seven sub-charts—each of which is 2.9 metres high and 3.5 metres wide, providing a panoramic display of the seismic activity zone, water basin, forest distribution and military transportation.<sup>31</sup>

### **Chinese Experience and Response: Vital Lessons for India**

The Chinese PLA, by and large, gave a very good account of itself in the earthquake response effort and far exceeded its means despite insurmountable difficulties,

shortcomings and the capability deficit in many cases. However, nobody doubted their sincere efforts and they were wholly deserving of the worldwide appreciation accorded to them, notwithstanding the humongous fatalities which they could not prevent. The Indian Navy carried out a similar relief and rescue operation post the 2004 Tsunami that struck off the Indonesian coast in the Indian Ocean. Twenty-seven Indian Navy ships were employed for the relief mission within the first 12 hours. A total of 36 ships, a large number of aircraft, and about 5,000 naval personnel were eventually deployed, not only on India's east coast and island territories, but also in Sri Lanka, the Maldives and Indonesia.<sup>32</sup> Similarly, the other Indian defence forces have also contributed in a major way as part of their "aid to civil power" task during major and minor disasters, close to their location or area of deployment. The 2001 Bhuj earthquake, 2005 Kashmir earthquake, and the 2011 earthquake in Sikkim witnessed huge deployment of armed forces personnel for disaster response.

However, there is a great difference between the role, responsibilities and tasks of the PLA and the Indian armed forces in their respective countries' disaster management mechanisms. While the emergency rescue teams in the Chinese disaster management system mainly comprise the armed forces<sup>33</sup>, armed police and the public security forces, the entire Disaster Management Response Force (NDRF) under the National Disaster Management Authority (NDMA) of India comprises of eight battalions drawn only from the Para-military forces—two each from the Border Security Force (BSF), Central Reserve Police Force (CRPF), Central Industrial Security Force (CISF), and the Indo-Tibetan Border Police (ITBP).<sup>34</sup> A sample comparison of these forces itself brings out the stark difference in the number of frontline specialised emergency rescue and relief teams. As against the 50,000 strong specialised emergency rescue troops of the PLA<sup>35</sup> alone, the Indian teams comprise about 9,300 paramilitary personnel of NDRF battalions only.<sup>36</sup> It is believed that there would be similar capacity differences in various dimensions of the disaster management mechanisms of the two countries. The most important lesson to imbibe from the Chinese experience is that no amount of capacity building would be sufficient for a satisfactory response to a large-scale calamity. However, systematic capacity building after a comprehensive and realistic risk appraisal of various disasters and their possible damage potential will definitely go a long way in enhancing preparedness and limit casualties and damages.

## **Conclusion**

China has acknowledged in its "Disaster Relief White Paper" that it is a disaster-prone country, with earthquakes forming an important and recurring component of all possible natural calamities. Such disasters have very serious humanitarian fallout in most cases, on account of the heavy population density. The Sichuan

earthquake brought this ugly and unavoidable truth to the fore by causing colossal casualties and immense damage on the ground. The long-term reconstruction and rehabilitation efforts are still going on. Sichuan, for instance, is one of the main “food baskets” of China, producing 11 per cent of its pork, 7 per cent of its rice and 4 per cent of its wheat, in addition to cooking oil and other agricultural produce. It was estimated that the earthquake set the Chinese GDP back by 0.2 per cent and fuelled the 2008 year-end inflation to more than 8 per cent.

The Chinese government and the PLA, as the most capable instrument of the State, learnt valuable lessons in disaster relief and rescue management the hard way during the handling of this mega calamity. The State Council led by Prime Minister Wen Jiabao, announced the establishment of a 30-member experts committee from 22 disciplines, including seismology, geology, civil engineering and hydrology in the immediate aftermath of the earthquake. The Committee was tasked to take scientific advice on the quake relief work and reconstruction and assist China’s earthquake administration in forecasting aftershocks as well as to be on guard against secondary disasters. The most heartening and positive outcome of the colossal tragedy was that Beijing decided to holistically study and analyse the post-quake situation, promulgate appropriate regulations and seriously implement various measures for capacity building and inter-agency coordination. The PLA on its part, came up with own set of guidelines with clear objectives, chain of command, responsibility structures and implementation strategies in consonance with the national directives.

The positive effects of this fundamental restructuring effort were realised soon enough when a 7.1 intensity earthquake struck the Yushu county of Qinghai Province on April 14, 2010 and left at least 1,706 dead and more than 12,000 people injured. The lessons learnt by the rescue agencies post the Sichuan calamity were implemented and the entire effort proceeded with reasonable efficiency, aided and abetted by the new procedures and command structures put into place. As a result, the casualties and damages could be limited to a great extent and the post-quake rehabilitation could progress effectively. The preparedness for disaster mitigation is, however, an ongoing work and the PLA, as the major contributor to the nation-building, has internalised this social responsibility by identifying disaster relief as one of the main components of its role under the MOOTW, in its Defence White Papers of 2008 and 2010.

There are lessons to be learnt by all developing countries, their armed forces and other disaster relief agencies from the case study of Sichuan earthquake and the role of PLA in disaster mitigation effort. India, in particular, could benefit from the Chinese experience as it is equally, if not more densely populated vis-à-vis China. With about 58.6 per cent of its landmass prone to earthquakes, 12 per cent prone to floods and river erosion, and more than 7,500 km of coastline, India

is equally a victim of recurring disasters. The creation of the National Disaster Management Authority (NDMA) after the enactment of the Disaster Management Act in December 2005, and its gradual empowerment is a very desirable positive step. It is considered that the capabilities of the Indian effort will definitely get enhanced by emulating the best practices followed by the Chinese government during and after the Sichuan earthquake and incorporating and implementing them holistically.



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## 2008 Sichuan Earthquake and Role of the Chinese Defence Forces in Disaster Relief

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