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Letter to the Editor

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Lessons Learned from the Khoy Earthquake, Iran, 2023

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Khoy County is in West Azerbaijan Province and the northwest of Iran. The population of this city is approximately 350,000 people and 102,000 households, based on the last census conducted in 2016. At 21:44 local time on Saturday January 28, 2023, an earthquake with a magnitude of 5.9 on the local wave scale (M_L) occurred at a depth of 10 km. The epicenter of the earthquake was located 5 km west of Khoy city at the coordinates of 38.55 degrees north latitude and 44.90 degrees west longitude near the Sieh-Cheshme-Khoy fault. Based on the latest published statistics, 3 people were killed and 1167 people were injured. A total of 9250 residential units were damaged, of which 1750 units were destroyed and 7500 units needed repairs.

The actions taken for responding to the earthquake and mitigate its effects comprise rapid initial assessment by the Red Crescent community; calling operational forces from the provincial capital and neighboring provinces; emergency aid to the injured of the accident; establishing emergency housing camps for families whose houses were cracked because of the earthquake and were unsafe to live in; distribution of tents and relief items such as blankets, carpets, covering nylons, heating devices and food packages, electricity supply; and building toilets and bathrooms in emergency accommodation camps.

The most significant strong point of incident management was (1) the division of Khoy county into 5 different operational centers. The management of each of these centers was entrusted to 1 of the neighboring provinces of Khoy province, and as well as coordinating with different regions, West Azerbaijan province also managed the central region of the city. (2) An initial rapid assessment by the operational forces of the Red Crescent Society was done to assess emergency needs, (3) establishing 40 emergency camps to accommodate families whose houses were uninhabitable, (4) using the capacity of villagers and the city council to distribute tents and relief items in some areas where it was not possible to establish a camp, (5) participation of non-governmental organizations in collecting public donations and distributing relief items among the injured of the accident, (6) accommodation of the injured in hotels, mosques, and benefactors' homes in nearby cities and meeting their nutritional needs with the cooperation of donors and non-governmental organizations.

There were numerous weaknesses in the accident management process: (1) lack of a unified command, (2) dispatch of operational teams without needs assessment and numerous operational forces in the region, (3) influence of provincial officials in critical relief decisions regardless of the ICS process, (4) weak security in the disaster area, (5) \ spread of rumors and not managing it, (6) political figures in the disaster area, (7) lack of planning for camp accommodation, (8) lack of management and the security unit in the emergency accommodation camps, (9) which sometimes caused people to move the tents from the camp area, (10) distribution of biological items and relief tents without need assessment, (11) improper meal plans of the rescuers and not paying attention to the basic needs and recovery of rescuers, (12) failure to divide tasks properly with job descriptions and organizational positions, and (13) use of professional operational teams as low-level operational forces.

Additionally, over 35 aftershocks above 3 Richter in the earthquake-affected area, along with threatening the safety of cracked houses, had intensified the fear of various people so that even those whose houses were habitable also requested tents for accommodation. Moreover, according to the snowfall and extreme cold in the region, the supply of heating equipment has become very difficult. Numerous people tried to light coal and gas heaters in the tents, which caused over 100 people to be gassed and 2 people were killed because of improper ventilation. Because the indirect distribution method was used to distribute tents and relief items in different areas of the city, the inappropriate monitoring of the distribution of items and the absence of representatives from organizations in the matter of distribution, have hindered the delivery of various items to the needy ones. The distribution of items and tents was not uniform, so people who had access to distribution centers and distributors received more items than other people. The distribution of hygiene items was rare and very little. Many people could not evacuate their

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houses and live in camps because of the partial destruction of their homes and reduced security, and they prefer to set up tents in front of their houses. This was not possible because of the small width of the passages and the possibility of buildings collapsing on the tents.

The challenges created in this accident can be a valuable lesson for the optimal management of accidents in the future. The lessons learned from this accident are (1) culturalization and empowerment of people to take part in the distribution of items, especially the marginalized residents; (2) empowerment and development of Red Crescent houses to quickly assess the accident in rural areas and cooperation in setting up camps and distribution of relief items; (3) planning for emergency accommodation in cases where it is not possible to set up camp and accommodation on site because of the narrow width of the roads and the possibility of destruction of buildings; (4) establishing a unified command structure can be very useful, especially when there is a need to establish security in the distribution of items; (5) management of operational forces present in the region and planning for the call-up of forces based on the extent of the accident; (6) consolidating and organizing volunteer forces and non-governmental organizations for greater participation in the distribution of items; (7) establishing a unit spokesperson and communication channel to inform the process of incident management and prevent the spread of rumors; (8) using centralized distribution methods and setting up specified centers in different parts of the city to facilitate the access of the injured and help in the uniform distribution of items.

Regarding the high risk of Iran and especially the high frequency of earthquakes, it is recommended to conduct a comprehensive plan for disaster management in the underprivileged and marginalized areas of the cities. In these areas, as well as the high volume of destruction and high population density, in the event of an earthquake with a magnitude close to 6 on the Richter scale, even if the amount of destruction of buildings is small, because of the reduction of structural safety, it is not possible to live in these houses. As a result, a large population will need accommodation. This situation indicates the necessity of planning and preparing emergency accommodation programs in these areas. In the decentralized distribution method, because of the need to ensure the access of all victims to relief items, the participation of volunteers as representatives of relief organizations is essential.

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