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# Looming earthquake risk: How prepared are we?

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Bangladesh is among the 20 most vulnerable countries to earthquake. According to experts, 65% area of Bangladesh is under the threat of extreme earthquake as Bangladesh is situated between three plate boundaries. One of these boundary lines is connected to the foothill of the Himalayas and is marked as the most dangerous source for severe earthquake. One CDMP study identified several active faults within Bangladesh based on historical events and evidence from geological investigations. In addition, inside the country and in the surrounding areas, there are numerous geographic scratches which are also the sources of earthquake. Among the scratches the most dangerous one is Rakhain Scratch, which is within 300 km of Chittagong, and the Madhupur and Dauki faults are about 90 and 230 miles away from Dhaka respectively. Due to the geographical orientation, Dhaka, Chittagong, Sylhet, Mymensing, Rangpur and north-eastern extended areas of Bangladesh are under constant threat of earthquake.

According to geologists, if an earthquake of magnitude 7 takes place near Dhaka, about 72000 buildings among 3,26,000 buildings will be severely damaged and about 0.184 million people will instantly become homeless which will cause minimum 70,000 people's death and at least 1,86,000 families will severely suffer as electricity, water and gas lines will be damaged. Urban planners worry that in this case about 16,000 electric poles among 55,000 will fall down, 191 metre gas lines among 834 km will break down, 272 km of 1,118 km water supply will stop working and 360 km of 630 km waste management system line will collapse because of unplanned system. It will consequently create a crisis of pure drinking water as there is no alternative emergency service supply system developed in Dhaka. In addition, there is a high possibility of bursting of sewerage pipelines situated underground, which surely will create an unhealthy environment. Also, chances are high that right after an earthquake the gas lines might explode causing severe fire outbreaks.

Dhaka city has not gone through a comprehensively planned urbanisation process and due to lack of supervision from the authorities concerned, numerous unauthorised buildings and structures have been built defying proper approvals. Over 5000 buildings in Dhaka were built without any proper design and about 15,000 more built without any permission. As a result, we might see more cases like Begunbari collapse where the building was built on marshy land. Over the last 7 years, 103 people died in five such incidents.

A recent study by Comprehensive Disaster Management Program (CDMP) on the liquefaction susceptibility of Dhaka indicates that the city's eastern and south-western parts lie within the high to very high liquefaction susceptibility range. These parts are recently filled and developed on marshy lands. Liquefaction is a physical process of ground failure that takes place during earthquake. In Dhaka, an earthquake from either Madhupur or Dauki fault might cause severe liquefaction effects to buildings, especially those developed on marshy lands on the eastern and western fringes, and even within the city in the infill areas like Begunbari and parts of Mirpur.

As per the Town Improvement Act 1953 (TI Act 1953), RAJUK is the legitimate authority to prepare land use plan, take care of implementation process and to control development and manage the growth of Dhaka. But in reality, RAJUK only ensures whether the designs and plannings are being followed during a construction. They never investigate the quality of construction materials used.

In the fast tempo of urbanisation, Dhaka city has turned into a concrete jungle. Every available vacant land in and around the metropolis is being used for constructing buildings, in most cases, violating building codes. Considering the current context, the need for a national institute to enforce the national building code can hardly be overemphasised.

Soil-testing, a mandatory part for building a structure is rarely done by any developer or owner. As a result, it is creating a situation where buildings are being constructed filling up water bodies and marshy lands. Sixty percent of the buildings are being built on hard soil and forty percent on soft soil. All these factors are adding to the threat of larger impacts in an earthquake.

Now Dhaka is congested with thousands of risky high-rise buildings. There is very narrow space between the buildings which is not enough to allow a fire truck or an ambulance during an emergency. Comprehensive rescue operation is also impossible during an emergency like earthquake in areas like Old Dhaka. According to RAJUK, there have been nearly 50 incidents of building collapse or tilting since 1997 to till date. There were life casualties in eight such major accidents. Moreover, 95% buildings in Dhaka are constructed violating building construction rules. Statistics show that in 1951, population of Dhaka City was 276033 while in 1991, it stood at 6950920 and in 2001 it stood at 9672763. There are estimates that unless effective measures are taken to intervene about this population burst, the population in Dhaka will exceed 20 million by 2025. This will make a significant effect on underground water level. Overuse of the underground water to meet the demand will create empty space under the ground level which will increase the risk of an earthquake.

Risk and vulnerability to an earthquake is higher compared to natural hazards as it does not provide any early warning. Response to earthquake is also difficult as it requires high-tech machineries and technologies to conduct a post earthquake search and rescue operation. Though in recent years some modern instruments and equipment have been added to the fire stations such as smoke ejector, breathing apparatus, turntable ladder, emergency tender, lighting unit, snorkel, special water tender, foam canon etc., these are not enough to meet the demand of a major city like Dhaka. There is also lack of trained local community members who would act as the first responders in an emergency before the service providers arrive to the scene. Unless the necessary community-based response groups are formed and proper response mechanism is developed, the damage in an earthquake will be catastrophic.

Considerations for earthquake safety:

* Community has to be sensitised about the threat and vulnerability of an earthquake.
* Community-based first responder groups have to be formed and trained on risk and resource assessment, risk reduction measures and emergency response mechanism.
* The community representatives and groups have to be involved in the preparedness planning and implementation process.
* Earthquake preparedness has to be included in the text curriculum from the school level and mainstreamed at institutional level through formation of task forces.
* Earthquake resilient construction has to be promoted to mass people and relevant stakeholders like developers.
* Strict policy and monitoring mechanism has to be enforced to ensure implementation of guidelines under Bangladesh National Building Code should be ensured in all constructions.
* Mass important and service delivery institutions/structures should be built in such a way that they become earthquake-resistant and accessible even after an earthquake.
* All infrastructural development initiatives have to take earthquake resilience into consideration. Old and risky infrastructure should be identified immediately and appropriate action should be taken.
* The infrastructure of the emergency service providers and probable shelters after an earthquake such as hospitals, fire stations, schools etc. has to be built and reconstructed in a way so that these are not damaged and remain accessible after an earthquake.
* Interdepartmental body should be formed by the government to ensure all necessary services during and post-earthquake period.

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