EDITORIAL

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When nature gets angry: devastating earthquake in Nepal, 2015

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Earthquake is a natural catastrophe recurrent different part of the globe; afflict human life and causes mass devastation to properties. Due to massive urbanization and increase in the population density, earthquakes are becoming more devastating. Like other natural calamities, earthquake can't be predicted [1]. Seismic activity below the 4.0 M_W is a common event occurring different parts of the earth crust. When the quake is more than the 5 M_W, it can be felt and may damage property, and cause death mainly from collapsed buildings. One of the most seismically active regions in the world is the Ring of Fire, which is a string of around the edges of the Pacific Ocean. As estimation, this region is responsible for 90% of all earthquakes, consisting of 75% of all active volcanoes on Earth. It is a horseshoe shaped area more like a 40,000-kilometer. There are numerous examples of devastating earthquake worldwide which is accounted for millions of deaths, severe economic damage and creating a long term psychological trauma among the survivors. In 1976 a 7.8M_W quake hit in Tangshan, China claimed 242,000 lives. In the same year, 7.5M_W macroseism in Guatemala took 22,778 lives. 8.1M_W earthquake in 1985, Mexico City, killed 10,000 residents. In 1988, an earthquake of 6.9M_W in Armenia took 24,944 lives [2, 3]. Geologists across the globe measure the seismic activities by Richter scale and modern instrument like Global positioning system (GPS) stations across different parts of a country. Nepal is the world's 93rd largest country, landlocked between China and India situated in the Himalayan range. The Himalayan range is surrounded by Tibetan Plateau (North), Indo-Gangetic Plain (South), Karakoram and Hindu Kush ranges (Northwest), Assam and Arunachal Pradesh (East). This region is seismically active because of the movement of the Indian plate into the Asian plate. To be more clear Himalayan earthquakes are driven by the release of compression strain which gradually accumulates near Greater Himalaya. Tibetan reservoir of elastic strain energy is considered for the consequent growth of continental plate slip and MW intensity of the earthquakes, which takes around 500 years for devastating consequences [4]. There are two historic evidences of disastrous earthquakes in Nepal in past 1,000 years. 7th June AD 1255, the valley of Kathmandu was demolished by an earthquake which took life of several thousands and mortally wounded Nepalese King Abhaya Malla. The second disaster occurred on 15th January 1934, with a magnitude of 8.2 severely damaged Kathmandu, Bhaktapur and Patan. Bihar state of India also affected by this shake. This is a well-known fact that earthquakes are inherently unpredictable, but considering the previous events; calculating the gradual accumulation of energy in the continental plates, scientists may predict the increase in risks of a particular region. An interesting study by Murphy et al in the year 2013 predicted the potential risk of earthquake in Nepal. Radiocarbon dating was used in their study to confirm

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the past earthquakes created 10 m of surface displacement on the fault between AD 1165 and 1400 [5-8]. They concluded with an alarm of potential seismic hazard in the region which requires proper attention [5]. Their predictions came as a nightmare on 25th April 2015 around 11.56 am when a massive 7.8MW earthquake hit just 80 kilometers northwest of the capital Kathmandu, killed more than 9,000 people and injured around 23,000. Epicenter of this devastation was east of the district of Lamjung. According to geologists, Indian tectonic plate is gradually moving north at about 45mm, pushing under the Eurasian plate beneath the Himalaya mountain. This earthquake was a result of the movement of Indian plate and the overriding Eurasia plate to the north. Thousands of death, billions dollar damage occurred in the city of Kathmandu, Bhaktapur, Gorkha district and some areas in the periphery.

Another most pitiful fact was, several UNESCO World Heritage sites in the Kathmandu Valley was demolished completely or partially. Kathmandu Durbar Square, the Patan Durbar Squar, the Bhaktapur Durbar Square, the Changu Narayan Temple and the SwayambhunathStupa were few of them. This had a great impact on the tourism business, made several thousands of people unemployed. This earthquake also caused severe psychological distress among the survivors – a leading cause of development of post-traumatic stress disorder (PTSD). After 18 days of the first quake on 12 May 2015 at 12:51pm another major earthquake ($7.3M_W$) hit about 40 kilometers west of Kathmandu. Although it was not as devastating as the first, still it has brutally injured and taken lives of several hundreds. Namche Bazaar, in Solukhumbu District was the epicenter of this. Several aftershocks continuously came in Ramechhap and Dolakha - the worst hit districts. Sindhupalchok was also affected. Several aftershocks continuously came around Kathmandu, Gorkha, Dolakha, Dhading, Sindhupalchowk, Humla. According to the National Seismological Centre (NSC), Lainchour, Kathmandu, Gorkha Earthquake is followed by 395 numbers of aftershocks with Local magnitude>= 4, until 20th September 2015. In order to monitor the crustal shortening, 29 GPS Stations were installed in technical collaboration with Caltech/USA and DASE/France across the Nepal Himalaya. These aftershocks increased the risk of landslides. This earthquake damaged partially or completely the houses of the residents of the affected places. Although helps came from different countries, but it was not sufficient for this mass devastation. Nepal is a seismically active region; so more attention should be given and proper strategic plans are required to combat with this type of natural calamity [9-11].

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