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Earthquakes and Environmental Refugees: Time for ‘Green’ Engineering

By Tamara Nair and Alan Chong

Synopsis

The 7 December 2016 earthquake that struck Aceh was the closest repeat of the infamous 26 December 2004 Indian Ocean earthquake that struck the very same province of Indonesia. Thankfully, fewer lives were lost due to vastly improved warning procedures. There are some practical solutions to cope with the ephemerality of quake-prone housing zones.

Commentary

IN A deadly encore to the December 2004 earthquake that struck the Southeast Asian portions of the so-called Pacific Ring of Fire, a magnitude 6.5 temblor struck the very same province of Aceh on Indonesia’s Sumatra Island on 7 December 2016. The death toll was reported in the media to be a grand total of 103, with some 932 people being injured and 88,133 persons displaced from their homes. This was a far cry from the human losses in 2004. But the more urgent signal for observers and officials studying humanitarian relief governance is the fact that within a space of 12 years, the physical buildings that had replaced those felled in 2004 had been decimated by nature once again.

A spokesperson for BASARNAS, the Indonesian National Disaster Management Agency, reminded the world that 148 million Indonesians, or more than half its population, live in quake-prone areas. Subsequent situation reports generated by BASARNAS and the ASEAN Humanitarian Coordination Centre up till the 12th day of the aftermath point to the fact that the most immediate palliative task lay in building temporary homes and other shelters.

A Sense of Home, a Sense of Place

The 7 December earthquake's principal effect is the trigger of large-scale displacement from homes. This sketch poses one salient contention for observers of humanitarian disaster relief: one cannot thwart the recurrence of earthquakes but might one not design measures to mitigate the loss of homes? We offer two suggestions for a forward looking and practical home restoration plan in the aftermath of the next quake.

It is often taken for granted that home is where the heart is. A physical expression of home features fixtures and decorations that attest to a family's varied personalities. Additionally, in coastal communities or rural areas across the world, people are not only attached to their own homes but also homes of their families and community members that share the same lived experiences as them. It is not uncommon to find family members eating, sleeping or working together in each other's homes within their 'space'.

In such areas the sense of home and family are much stronger and rooted to the land. Recovery in distant areas in the event of natural calamities, away from a familiar sense of place and community, prolongs suffering and makes it difficult for victims to move forward in life. Their social, economic, and oftentimes, spiritual fabric is tattered.

Living in temporary shelters, most likely tents or various undisturbed buildings or structures, does little to build resilience in these communities. The sense of loss is also directly proportional to the length of the recovery process, how long before they return to some sense of normalcy? In many cities across the globe a home is a fixed asset into which one invests savings, time, and memories. In an earthquake-prone zone such as Aceh, it might be possible to creatively re-conceive the idea of a home that is mobile while also integrating the utilities, memories and the sentimentality of a lived experience.

Pre-Fabricated and Mobile Housing

The pre-fabricated housing solution is one possibility worth looking at. Here we see the potentiality of private sector involvement in humanitarian assistance. There are plenty of these companies that operate across Asia's booming economies, from India to China. R.S. Company, of Haryana, India for instance specialises in manufacturing mobile toilets, schools, and steel structures. The company boasts successful projects across six states in India and proudly proclaims on its website that 'prefab' structures offer flexibility, durability and lightweight construction.

The advantage of constructed homes of this modality is that they can be vacated at short notice and replaced quickly in the context of post-disaster clean-up. There is also significant logistical potential for trucking these prefab homes to safe areas whenever a pre-emptive earthquake warning might be issued. Of course there is disruption to one's sense of place but to be able to live in one's own home, where the ability to lock one's door and see a roof over one's head gives a sense of security and a hope that disruptions to one's life will be righted soon.

With very little overhead costs, existing prefab housing manufacturers might be

encouraged by government funds to offer a wheel or rail assisted version of their existing prefab homes. By rendering homes as ‘mobile assets’, the destruction visited by earthquakes could be minimised. In tandem, residents must be prepared to reinvent their attachment to a physical home for the sake of ‘earthquake-proofing’.

Floating Houses and Nomadic Survival

A longer shot solution – though by no means feasible in tsunami-prone coastal areas – is to adopt the structure of a floating home that can be towed out to non-earthquake prone water bodies upon pre-emptive warnings being issued. Boat houses, decommissioned floating homes and wheeled caravans have been the fashion in many riverine and coastal cities in both the Global North and Global South. These can surely be invoked to cope with the recurrence of damage to physical structures wrought by earthquakes.

More recently, the Dutch architect Koen Olthuis has been celebrated as the innovator of a new ‘design language’: constructing floating buildings to enable coastal centres to cope with rising sea levels. In an eco-friendly demonstration project scheduled for completion next year, offshore from Korail Bosti, Bangladesh’s largest slum, Olthuis will showcase a viable home adapted from a modified cargo container fastened upon a floating foundation of plastic bottles salvaged from recycling collections.

This is obviously more than an architectural statement; it is ‘green’ engineering. It could potentially offer a climate-friendly way of mitigating earthquake destruction if affected populations are willing to adopt the time-honoured practice of people voluntarily displacing themselves to either stay away from nature’s wrath, or to seek temporarily greener pastures. All this in the name of intelligent survival in the new millennium.

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