

The Assumption of Natural Disasters & How to Prepare for Them

By Kazumasa Kusaka

*Wringing tears from our sleeves,
did we not pledge never to part,
not even if the waves engulfed
the Mount of Forever-Green Pines?
What caused such a change of heart?*

(From the anthology "One Hundred Poets, One Poem Each",
translated by Peter MacMillan)

In this poem by Motosuke Kiyohara composed during the Heian Period in the 10th century, the memory of the Jogan Earthquake of 869 in the Tohoku region was evoked in reference to the long-standing belief that the waves would never go beyond the cliffs.

Eight years have passed since the Great East Japan Earthquake on March 11, 2011 and subsequent tsunami that caused unprecedented destruction in Tohoku, claiming the lives of 18,000 people. Since then, public awareness of natural disasters has increased, and storms, torrential rains and flooding caused by typhoons over the past few years that hit Kyushu, Hiroshima, Tokyo and Tohoku, claiming many lives and destroying local communities, have been major news stories. The Great East Japan Earthquake prompted the idea that such a disaster was beyond the scope of assumption. The claim was that an event of such magnitude occurred only once in a millennium. Since then, the several natural disasters of the last few years have invited the same claim – that they were events occurring only once in a century or two. But is this explanation legitimate?

There is a well-known expression that "Disaster strikes when we least expect it." This raises an alarm about the short memory of human beings and human society and institutions. However, as the poem records, the Jogan Earthquake and tsunami changed that region to something similar to the ocean. And in 1896, the Meiji-Sanriku Great Tsunami claimed 22,000 lives. The previous Tohoku disaster before the Great East Japan Earthquake was the 1933 Showa-Sanriku Great Tsunami, in which only four people survived out of a community of several thousand. The height of the tsunami at that time reached 38 meters above sea level. The survivors built a memorial stele which bears the inscription:

*A home built high is a relief for children.
Remember the disastrous giant tsunami.
Do not build homes below here.*

It was only eight years ago that this tsunami memorial in the heart of the mountains came to be remembered in the broader region.

Catastrophes have come down to us throughout history in the form of myths and folk tales. Analysis of recent disasters indicates that areas where people have lived for several hundred

years are less susceptible, while newly developed areas where, with some reason, villagers had not resided tend to be hit with mudslides, or places with names related to water located in lowlands have soft ground susceptible to earthquakes and liquefaction. This shortness of memory is not limited to Japan but is common in countries with continuing urbanization and expanding residential areas. Accordingly, the memories of traditional communities often fail to come down to the current generation.

The good news is technological innovation. Lost memory can be complemented by AI-assisted flood forecast models, satellite observation and analysis of water immersion areas. Rapidly progressing hazard maps based on these scientific analyses will become modern versions of mythology. How to utilize our newly acquired knowledge and findings in investment and management of smart infrastructure is now a policy issue. In addition to the provision of hardware, how to communicate the knowledge and emergency information promptly to residents to enable them to act is the real challenge.

Attributing the increasing frequency of natural disasters to global warming issues has served to accelerate mitigation efforts. Ironically, the major contributing factors to the economic damage caused by hurricanes are the increase in wealth and populations, i.e. urbanization, according to a European reinsurance company analysis of natural events and damage over the last 100 years. But this alarm from the environmental perspective has brought a significant by-product, as national and local governments are now enhancing their risk reduction efforts in city planning and capacity building.

A tail risk is an event with only a small probability of happening but with severe critical consequences. The question is how to prepare for such an unlikely event. Will taxpayers be convinced to invest huge financial resources in infrastructure in thinly populated regions and keep paying the maintenance costs?

The 2004 Indian Ocean earthquake and tsunami, which originated off the coast of Sumatra, took 220,000 lives. Forecasts and warnings had not been given to neighboring countries, which led to further destruction. In 2015, World Tsunami Awareness Day was created by the United Nations, and in 2019 it focused on reducing disaster damage to critical infrastructure and disruption of basic services. This is an effort in which the experiences of Japan, Indonesia and other countries can be shared in order to create safer areas to live.

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