

Nature News Feature 'Japan faces up to failure of its earthquake preparations' (*Nature* **471**, 556-55; 2011) suggests the importance of further engineering control of nature, such as creation of artificial coastlines to prevent tsunami attacks (1). The devastation by the 2011 Great East Japan Earthquake and tsunami was undoubtedly a disaster for society. This may cause the public to consider that all natural events, which surprise society, are “bad” for society. However, infrequent catastrophic events, such as tsunami, wildfire, flooding, volcanic eruption, and so on, are inevitable in nature. Although the 2004 Indian Ocean tsunami resulted in a massive loss of life, as well as the destruction of homes and infrastructure, this played an important role in restoring beach environments that provide nesting habitats for several threatened sea turtle species (2). This indicates that natural events, while being socially disastrous, may have some (mostly unknown) positive impacts on ecosystems, especially for systems whose resilience has been largely eroded by a number of human activities. Here, my intention is not to focus on their unknown restoration effects. I am concerned that natural disturbances are not appropriately regarded by the society and governmental policy, which may lead to further unforeseen disasters. Past failures of attempts to control nature can be seen in many places in the world. For instance, flood control, which has been extensively conducted throughout Japan, has caused many environmental problems. Recently, Opperman *et al.* (3) proposed that, compared to using traditional flood-control infrastructures, large-scale reconnection of floodplains will be much less vulnerable to flood damage, and therefore less likely to require the magnitude of disaster relief payments. This flood-resilient land use would also increase various ecosystem services (3). Humans are a part of ecosystems, which means that the ability of ecosystems to absorb natural disturbances and the ability of society to resist and recover from natural disasters are not exclusive, but rather have some similarity in terms of adaptation to surprise. History shows that social-ecological systems resilient to hazards are less devastated by natural events (4). Adger *et al.* (4) indicated that human action could determine the consequences of social devastation during and following natural disasters. During recovery from the devastation in

Tohoku Region, I suggest that the Japanese government should start to think about how society can live with changes caused by natural events (so-called as *resilience thinking* (5)), rather than just only try to surpass and eliminate them.

1. Cyranoski, D. *Nature* **471**, 556-557 (2011).
2. Lindenmayer, D. B. & Tambah, C. R. *Conserv. Biol.* **19**, 991 (2005).
3. Opperman, J. J. *et al. Science* **326**, 1487-1488 (2009).
4. Adger, W. N. *et al. Science* **309**, 1036-1039 (2005).
5. Walker, B. & Salt, D. *Resilience Thinking* (Island Press, Washington, DC, 2006).

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