

Letting nature heal itself

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中文版本

The ecosystems destroyed by the deadly earthquake in May formed over the course of millennia. But their natural recovery will take only decades, writes ecologist Jiang Gaoming.



The May 12 earthquake in Wenchuan killed more than 69,000 people. The tremors also caused landslides, uprooted vegetation and destroyed natural ecosystems. The government not only has to rebuild homes, but also repair damaged ecosystems.

Plant populations develop in one of two types of [succession](#) (the process by which ecosystems develop and change over time), those of dry or moist environments. These types of succession both create soil through physical, chemical and biological processes, before diversifying and ultimately forming a robust ecosystem. But this takes time: it can take two millennia or more to

create a centimetre of soil. The ecosystems in the quake-hit area of Sichuan date from ancient times, and are the result of [xerarch](#), or dry, succession. But ecosystems – like biological organisms – can adapt to their environments and help themselves. Even after an earthquake, as long as there are seeds, roots and soil, an ecosystem can quickly restore itself. And these secondary successions require decades, rather than millenia. All it requires is “enclosure”, which keeps the soil secure, while seeds and spores take root. Nature can heal itself.

On September 21, 1999, over 2,000 lives were lost to the 7.3 magnitude Chichi earthquake in Taiwan. By November 2001, areas with thick soil around the base of the hills were already covered by grass and bushes. Trees were starting to appear and plants were growing from crevices in the rocks. The local government had decided to let nature take its course. Some badly damaged buildings were even left as a memorial and a museum was constructed as a centre for research and education.

There are many other examples of damaged ecosystems healing naturally. Forty-five years ago in Hong Kong, agricultural activity stopped on a hillside farm and a luxuriant forest grew in its place. This is now [Kadoorie Farm and Botanic Garden](#). At the turn of the twentieth century a town in Shaanxi province was home to 10,000 people and a major producer of food steamers made from local wood. But transportation problems meant the town was abandoned and the trees grew back naturally until forests covered the entire area. It is now part of the Foping Nature Reserve, where trees grow to a half-metre in diameter and pandas feast on the abundant bamboo. After an area in the Taixing Mountains, Shanxi province, was enclosed for five years, natural vegetation recovered, at 5.8% of the cost of creating an artificial forest. Enclosure creates mixed forests of grass, bushes and trees that are able to better absorb water, prevent soil loss, improve the local climate, reduce the risk of flooding and landslides and protect biodiversity.

For the last eight years, my research group has been studying the recovery of a damaged ecosystem in on the edge of the desert in Inner Mongolia. An area of 40,000 *mu* (around 27 kilometres) of sandy grasslands have now been restored to its condition in the 1960s. As the vegetation recovered, wild animals returned. Surrounding areas followed suit and the sand dunes are now covered with a healthy layer of vegetation. Earlier this month a group of Al-Jazeera reporters visited the site to find an example of a damaged ecosystem, but they spent the whole day driving and could not find one. In the end they had to use a small sand dune as a background. We tried planting trees and aerial seeding, but ultimately gave up. Instead we worked on changing the habits of local herders, improving land productivity and providing more employment opportunities – leaving nature to take care of the ecosystem.

Restoring the quake-hit ecosystems is a question of balancing the interests of the local people and the environment. Rural methane projects can reduce the number of locals taking firewood from the mountainsides. The use of straw as fodder will reduce the use of land for grazing and ensure that vegetation can grow. In Sihai township and Dazhuangke village, in Beijing, they now have forestry coverage of 85% or more, compared to the 30% they had 15 years ago. Back then, land was used very inefficiently: one person would use 20 *mu* of forest just for firewood. With those pressures on the ecosystem, no amount of spending on reforestation will succeed. Then the government opted to relocate the population and pay those who remained to tend the forest and provide coal. This reduced the pressures on the ecosystem and it was able to recover naturally.

When an ecosystem has not been pushed past certain limits, it is able to recover on its own. Human intervention should only be supplementary, including after an earthquake. This is particularly the case for sandy grasslands, grasslands, deserts, the mountains of the south and the northern sides of mountains in the north. In these areas soil remains and the water, light, heat and nutrients needed are available. It is even more appropriate in sparsely-populated areas, where it can avoid money being wasted on ineffective manual efforts, such as creating forests in arid areas.

The creation of nature reserves should be model to allow damaged ecosystems to recover. Funding can start at the national level; centrally-funded nature reserves can enforce environmental protection laws and spur the local economy. This will solve the problems of reserves being run commercially. When national reserves are funded, local governments will be able to adopt the same model and provide the funds for nature reserves from their own budgets. The first projects should be established in nature reserves hit by the quake; these can then become models for other areas.

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