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Shelter from the Storm

Students from Harvard and MIT create a safer home on the Sri Lankan coast.

By Maria Finn



The Tsunami-safe(r) house prototype sits perpendicular to the shore.
Courtesy Tsunami Design Initiative

In the months following the devastating tsunami that leveled communities along the Indian Ocean in December 2004, the Sri Lankan government decided that the best solution was to move coastal villagers inland. But architects, engineers, and students at MIT and Harvard who had watched the storm from afar were already busy working on an alternative.

Last winter students from Harvard's Graduate School of Design formed the Tsunami Design Initiative to explore how to rebuild communities in storm-ravaged areas. They presented their ideas at an MIT workshop and won first place for their project, which employed local materials to build affordable dwellings. Carlo Ratti, whose SENSEable City Laboratory had almost simultaneously begun working on a house designed to withstand tropical storms, saw their presentation and immediately invited them to collaborate on the Tsunami-safe(r) house project, being implemented in Sri Lanka this year in partnership with a Buddhist nonprofit that has an institute at MIT.

One of the main goals of the project was to convince authorities that there were viable alternatives to resettlement. "The people there are reluctant to leave the coast because fishing is their livelihood," Harvard student Ellen Chen says. "Government re-settlement

housing was built inland, so fishermen were being bused to the water or had to stay in temporary shelters on the beach in order to start work at five a.m."

Combining high-tech design with low-tech production using only local materials, the team looked for inexpensive ways to rebuild the villages so that they would survive future storms. "Surveys showed that houses built parallel to the coast collapsed during the tsunami," says Ratti, who managed the project. "But many that are perpendicular to the coast are still standing, so that was our starting point."

With help from engineers at Buro Happold, the students ran computer simulations to test the placement of four core concrete blocks that would serve as anchors and found that the homes would be five times more resistant to tidal waves than a typical local building. The concrete blocks would be further reinforced with metal rods, a low-cost way of increasing their strength. Inside, the team opted for partitions made of permeable materials such as bamboo; these would most likely be lost in a storm, but the structures would be left standing.

Last August the Harvard students went to Sri Lanka to install the first prototype. Built 100 meters from the coast--closer than the original buffer zone proposed by the government--the house was greeted with enthusiasm by villagers, according to Chen. While the team continues to collect feedback from residents, a community center using a similar design broke ground in January.

The designers acknowledge that the Tsunami-safe(r) house won't protect villagers or their belongings from the storm; an early warning system must be in place for them to escape in time. The project has also run into problems in terms of affordability. The price has more than doubled from an initial budget of \$1,500 per house due to heavy demand for building supplies. But by creating homes with core elements that will survive the ravages of a major storm, they've made one of the strongest arguments yet for the widespread reconstruction of fishing communities on the coast.

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