

RESILIENCE SOURCEBOOK

INSPIRED BY THE 2013 MILSTEIN SCIENCE SYMPOSIUM
UNDERSTANDING SOCIAL AND ECOLOGICAL RESILIENCE IN ISLAND SYSTEMS
INFORMING POLICY AND SHARING LESSONS FOR MANAGEMENT



CASE STUDIES OF SOCIAL-ECOLOGICAL
RESILIENCE IN ISLAND SYSTEMS



AMERICAN MUSEUM OF NATURAL HISTORY

**CENTER FOR BIODIVERSITY
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A RESILIENT RESPONSE TO A CATASTROPHIC DISTURBANCE: IMMEDIATE & MIDDLE-TERM RECOVERY FOLLOWING THE 2007 SOLOMON ISLANDS TSUNAMI

SIMBO, WESTERN PROVINCE, SOLOMON ISLANDS

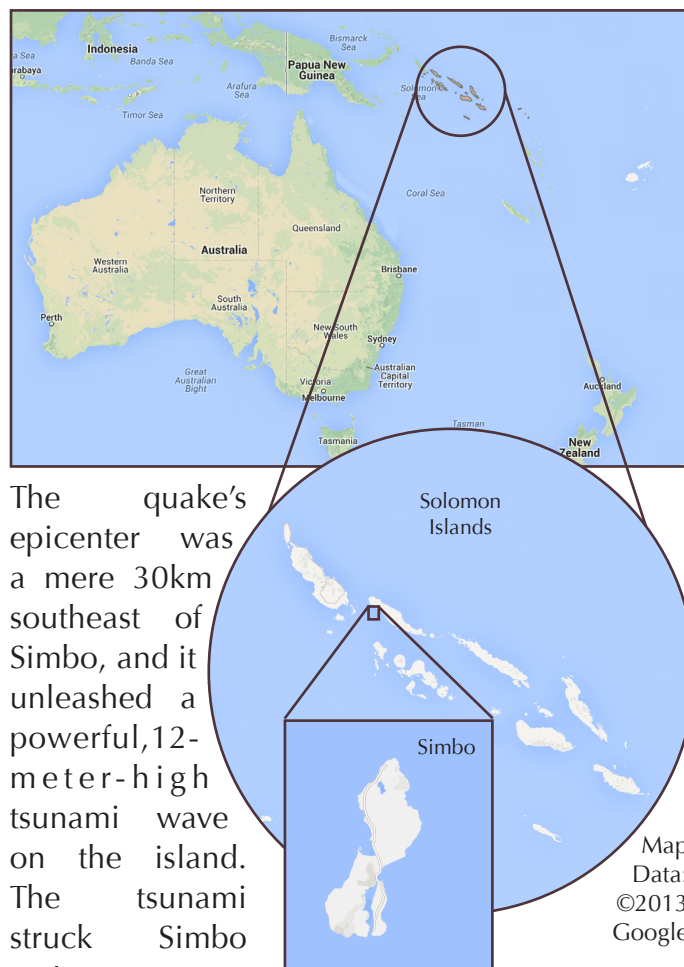
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LOCATION

The island of Simbo, located at 8° 17' 30" S. Latitude and 156° 31' 0" W. Longitude, is a small island (~10km²) of the New Georgia Group of the Solomon Islands. The Solomon Islands are renowned for their rich biodiversity as well as their linguistic diversity. Simbo is emblematic of this diversity, supporting both rich biodiversity and an endemic local language. In terms of livelihoods, Simbo is in an intermediary position: it has relatively good access to markets but livelihoods are primarily subsistence-based. Located only about 35km from Gizo, the provincial center of the Western Province and the third-largest town in the country, Simbo has better access to markets than most communities in the Solomon Islands; Simbo Islanders earn a large portion of their income from the sale of the eggs of large, ground-nesting birds (Megapodes) in Gizo. Otherwise, however, Simbo communities' economic activities are primarily subsistence driven. Simboans rely on marine resources (primarily fish) and produce from upland gardens. The population has grown dramatically in recent decades, from 376 people in 1930 to 1,782 in 2009. Today Simbo is one of the most densely populated islands in the Solomons, particularly remarkable in the otherwise sparsely populated Western Province. There is also a considerable diaspora, with about 30% of Simbo-born people living off the island.

THE DISTURBANCE

On Monday, April 2, 2007, an 8.1-magnitude earthquake shook the Solomon Islands region.



The quake's epicenter was a mere 30km southeast of Simbo, and it unleashed a powerful, 12-meter-high tsunami wave on the island. The tsunami struck Simbo within 3-4 minutes

of the earthquake, and hit the island's northern tip. The villages of Tapurai and Riquru – with 63 and 34 households, respectively – were destroyed. The villages suffered human losses, with seven deaths in Tapurai and two in Riquru. Most structures in both villages were completely leveled. The tsunami also affected other parts of the island, but most other villages are located further away from the coast, and suffered comparatively little damage.

THE IMMEDIATE RESPONSE

The response of the people of Simbo to the tsunami was, as they described it, intuitive rather than calculated. When the Simboans observed unusual currents in the ocean, which exposed the reef, they knew not to go in the water to harvest the fish, and almost immediately went uphill. The Simboans exhibited this adaptive response

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The monument commemorating the 2007 tsunami in Tapurai, Simbo. Photo credit: Matthew Lauer

despite the lack of cultural memory of tsunamis or an official tsunami warning system.

The absence of cultural memory of tsunamis can be explained by the historical patterns of settlement in Simbo. Prior to the 20th century, settlements were primarily located on defensible upland sites, which would have buffered inhabitants from tsunamis. During the 20th century, first missionaries, and later, the British colonial government, moved the villages of Simbo to more accessible sites on the coast. In addition, there was no official governmental monitoring system that could warn the villagers in advance about the tsunami. Instead, Simboans intuitively knew how to react and were also able to call on some oral history and the knowledge of a few community members who knew that after a large earthquake you should expect a large wave.

Global historical and economic forces affected the vulnerability of Simboans to the tsunami. Not only were villages located in more exposed, coastal sites, but the vulnerability of individuals to the tsunami can also be attributed to social changes relating to globalization. As eyewitnesses observed, the majority of the people who died in the tsunami were those who returned to their houses to gather valuables, despite their initial response to go uphill. These individuals' responses reflect the social change created by

increased integration with global markets and the desire for money and material goods.

THE TSUNAMI'S EFFECT ON SUBSISTENCE

The tsunami damaged the reef's coral structure, affecting the marine environment surrounding the island. Although there is no formal, recorded monitoring system for the reef, Simbo's fishermen know the ecosystem well and were cognizant of which areas of the reef were most affected and which were recovering more rapidly than others.

Usually, fishing contributes 70% of the protein intake on the island. The effects on the marine environment had serious consequences for the communities on the island, but thankfully upland gardens and orchards were untouched by the tsunami. The gardens and orchards provided an important source of nutrition following the tsunami (see below for further details).

THE RESPONSE

SIMBO COMMUNITIES' RECOVERY EFFORTS

Shortly following the tsunami, Tapurai and Riguru community members set up temporary housing in upland garden sites. This move was possible due to the communal tenure system; there is almost no private property on the island and all members of the community had some level of access to the gardens and orchards. In addition, food was widely shared; even storeowners



A submerged wharf on Simbo. The island sank nearly one meter during the 2007 earthquake. Photo credit: Matthew Lauer

shared commercial food. The community members were able to build shelters using sago palm leaves, until aid arrived to the island. For 2-3 months, these orchards and gardens became resettlement camps, and, due to a tradition of communal tenure and sharing, there were not many conflicts. These social institutions enabled the communities to adapt in the short term.

Immediately after the tsunami, the communities of Simbo organized themselves and formed a disaster committee, the Simbo Disaster Management Central Committee (SDMCC). Educated individuals that had come back to the island after having lived and worked in urban settings led these efforts and were supported by the traditional leadership (e.g., village chiefs). They anticipated a need to create a mechanism to interface with incoming aid. SDMCC quickly made an assessment of the entire island, wrote a report, and sent it to the national disaster committee. SDMCC also recognized that this moment following the tsunami was an opportunity to promote the long-term basic development needs of the island. And so, through its interactions with the national disaster committee, SDMCC was able to lobby for the construction of four schools on the island. In addition, SDMCC used the radio to dispel rumors and misinformation that surfaced in the recovery period. After performing these roles in the recovery period, SDMCC dissolved one year later. SDMCC members have continued to play leadership roles in the community; one leader was elected in 2010 as Simbo's representative in the provincial government of the Western Province.

The fishermen on Simbo adjusted their fishing efforts following the tsunami for two main reasons. First, the fish that they harvested soon after the tsunami had an odd flavor, (possibly due to changes in the fish's food resources), which was off-putting. Second, fishermen were reluctant to go into the ocean because they feared another catastrophic event. Fishing activities were thus suspended for about six months, which allowed the reef time to recover. The reef was very resilient; marine science surveys of the reef in 2009 showed that the majority of massive corals were undamaged by the tsunami and branching



Underneath a local diver, young coral growth on a reef that was wiped clean of coral by the 2007 tsunami
Photo credit: Matthew Lauer

corals had exhibited significant regrowth.

The loss of fish protein following the tsunami was buffered by reliance on an alternative food source, ngali nuts. Ngali orchards (*Canarium* spp.) cover the northern tip of the island. Ngali nuts are rich in protein and were once a staple food in the Simboan diet. Different species of ngali nuts can be harvested throughout the year, which allowed community members access to a nutritional, traditional food source during the time when fishermen did not enter the waters.

Although overall, there were minimal conflicts in Simbo in the post-tsunami period, some tensions did arise. The community of Tapurai, which was hit most severely, felt that SDMCC was not adequately considering their needs, and so they created their own group, which was able to channel aid directly to Tapurai.

Conflicts also arose over the building of a new school in Tapurai. The Simboans could not agree where to build the new school for Tapurai. In this case the traditional system of land tenure generated conflicts. Villagers who had land rights to a potential school site but did not have children attending the school demanded that they be compensated monetarily for the use of their land. Ultimately the conflict couldn't be resolved and the school was re-constructed on the original, highly vulnerable site.



Sunset in Simbo

Photo credit: Matthew Lauer

ASSISTANCE FROM THE CENTRAL GOVERNMENT AND WORLD VISION

Within 3-4 days following the tsunami, aid from both the central government and World Vision, a global NGO, reached Simbo. This aid included rice, water, and tents for shelter. While not critical to community members' survival, this assistance was welcome. In 2009, World Vision supplied materials to rebuild the villages, while the provincial government paid for the construction labor in 2010. Every household that was destroyed was rebuilt on a different, more protected site. However, as the central government and World Vision worked closely together, they did not focus on building local capacity.

LESSONS LEARNED AND RECOMMENDATIONS

- Resilience is a complicated concept that can be interpreted in different ways with implications for how it is promoted on the ground. For some, resilience may mean the ability of a system to absorb a shock and return to a previous state. Others may want to promote the capacity of a system to thrive off disturbances and change accordingly. For example, the Simboans were able to take advantage of the situation post-tsunami to achieve longer-term development goals for the island, such as the construction of schools.
- When you talk about resilience you have to be very specific in terms of resilience to what? When you examine resilience through these specifics, you find there are many trade-offs relating to temporal scale. For example, the traditional land tenure system generated resilience in the short-term and vulnerabilities over the longer-term. It allowed the survivors to resettle immediately after the tsunami,

boosting the island's short-term resilience. But it also created conflicts during the rebuilding of the school, resulting in a longer-term vulnerability to future tsunamis. Due to land conflicts the school was rebuilt on the original vulnerable site. This is an example of how the traditional land tenure system generated short-term resilience while also generating longer-term vulnerabilities.

- A key service a researcher, outsider, or NGO can provide is to know and present resilience trade-offs to local communities so they can decide how to navigate these pathways. For example, in the case of Simbo, if they move towards private ownership of land, how will that affect their resilience?
- A major source of resilience for the Simboans was the ability to accept novel leadership (i.e., SDMCC) in a new situation. The new leadership enabled a resilient response to the catastrophic event of the tsunami.
- The rapid formation of the SDMCC was integral to the resilience of the Simboan response to the tsunami. It enabled them to define for themselves what they wanted rather than just taking what was offered from outside agencies. In addition, they were able to achieve long-term as well as more immediate community objectives.

FUNDING SUMMARY

- National Science Foundation
<http://nsf.gov>

LEAD ORGANIZATIONS

- University of California, Santa Barbara
<http://www.ucsb.edu>
- San Diego State University
<http://www.sdsu.edu>

PARTNERS

- Local leadership
- Ministry Of Environment, Climate Change, Disaster Management & Meteorology
<http://www.met.gov.sb>

RESOURCES

- Matthew Lauer – SDSU Anthropology
<http://lauer.sdsu.edu>

As told to Christopher Filardi and Nadav Gazit, with contributions by Georgina Cullman.

THE MILSTEIN SCIENCE SYMPOSIUM

The collection of this case study and others like it results from the April 2013 Milstein Science Symposium, Understanding Ecological and Social Resilience in Island Systems: Informing Policy and Sharing Lessons for Management. Held at the American Museum of Natural History, the Milstein Science Symposium convened local resource managers, researchers, educators, island leaders, policy makers, and other leading conservation practitioners to examine characteristics, qualities, and processes that may foster resilience for coastal and marine systems as well as explore interactions, linkages, and feedback loops in complex social-ecological systems and what this means for management. The Milstein Science Symposium was organized in collaboration with The Nature Conservancy, the Gordon and Betty Moore Foundation, the National Science Foundation, The Christensen Fund, the Coral Reef Alliance (CORAL), the Scripps Institution of Oceanography at the University of California San Diego, the University of California Santa Barbara, the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States (UN-OHRLS), and the Wildlife Conservation Society.

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<http://www.nature.org>



<http://www.moore.org>



<http://www.nsf.gov>

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