

After the Tsunami

10 Years of Recovery and Resilience

Stories by Mary-Russell Roberson

It's been almost 10 years since the Indian Ocean tsunami killed an estimated quarter of a million people. More than 160,000 died in Indonesia's Aceh province, where the tsunami wiped some coastal villages completely off the map — removing every building, every road, every bridge, every tree. In some villages, not a single child survived.

In the immediate aftermath, people worldwide followed the story closely. For most, the fascination was short-lived. But not for Sanford professors **Elizabeth Frankenberg** and **Duncan Thomas**. They began collecting and analyzing data from 30,000 survivors in Aceh soon after the tsunami and are continuing to follow the group today.

Frankenberg is the principal investigator of the Study of the Tsunami Aftermath and Recovery (STAR), which collects data from Aceh tsunami survivors through in-depth interviews at regular intervals, including a 10-year follow-up survey this summer. The project also has access to household data collected about the group shortly before the tsunami. Frankenberg is a professor in the Sanford School of Public Policy. Thomas is the Norb F. Schaefer Professor in the economics department, with a secondary appointment in the Sanford School.

Frankenberg and Thomas have decades of experience working on population-based projects in Indonesia since the mid 1990s. Building on the lessons they've learned and the relationships they've built, they designed a survey and process of unusual depth and breadth (see sidebar page 11). This resulting dataset is fertile ground for researchers. Already Frankenberg, Thomas, and their collaborators have used the data to study a wide range of issues related to the impacts of the tsunami and recovery in multiple dimensions of health and well-being.

Resilience in the Aftermath of Disaster

Among all the results, one characteristic stands out. “The most startling thing we’ve seen is the level of resilience the population has shown,” Frankenberg said.

Thomas added, “There was a huge amount of psychosocial stress, and what’s astonishing is a lot of the people who had high levels of post-traumatic stress reactivity were able to rebuild their lives, broadly speaking, in ways that really surprised me.”



Elizabeth Frankenberg, second from right, with team members in September 2014.

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Interestingly, some of the people who were worst off in terms of psychosocial stress soon after the tsunami were doing the best five years later. In other words, a person’s condition immediately after the tsunami was not predictive of mental health some years on.

“There are very important policy implications,” Thomas said. “If you were to rush in, provide aid, and exit, you might not identify the right people who need assistance. You might not be targeting your resources effectively.”

By providing a scientific description of disaster recovery, Frankenberg and Thomas aim to inform public policy. “Knowledge in service of society is exactly what this is about,” Thomas said. “We stick to the highest quality of science because that’s what we can provide that’s going to matter for future policy.”

Visibly, the region has recovered, Frankenberg said. “If you visit the area, you have to look closely to see visible scars remaining either on landscape or within communities — it looks pretty normal. But there are some aspects that will never recover. It’s not easy to replace the mother for a child. There are missing teenagers and missing old people and missing grandparents.”

Orphanhood and New Babies

Because so many families experienced loss, the project has been able to provide data about survival, fertility following child mortality, orphanhood and remarriage.

Women, children and the elderly died at higher rates because survival required strength. Survey data tell a more nuanced story: people with more strength helped those with less. In households that included a prime-age man who survived, prime-age women were more likely to survive; if a prime-age woman survived then children in the household were also more likely to survive.

It’s long been a question in population science: do high levels of child mortality cause more births?

“The answer is yes,” Thomas said. Mothers who lost a child to the tsunami were more likely to have a child after the tsunami relative to those mothers whose children survived. In addition, in communities highly affected by the tsunami, even women who hadn’t lost a child were more likely to give birth, and women giving birth for the first time did so at younger ages.

Among orphans, the team found that those aged 9-14 were not worse off than non-orphans several years after the tsunami, as described by the measures collected in the survey. However, there were real costs for those orphaned at ages 15-18. Those children were more likely to leave school to marry and/or work. Perhaps communities and extended families are less likely to rally around

Before and after: satellite image of the Aceh coastline in April 2004 and satellite image of the same coastline on January 2, 2005, one week after the tsunami.

The STAR project is funded by the Eunice Kennedy Shriver National Institute of Child Human Development, the National Institute on Aging, the National Science Foundation, the Fogarty International Center, the Hewlett Foundation, the World Bank, and the MacArthur Foundation.

older orphans or perhaps older orphans are more likely to choose to take on adult roles. In any case, Thomas said the result can inform policy.

“It changes the debate on orphanhood,” he said. “Maybe there is a group that is very vulnerable and we can do something to help them.”

Among people who lost a spouse, a much higher percentage of men have remarried than women.

“That’s not going back to normal,” Thomas said. “The survey is raising lots of questions to which we do not have answers, but we will after 10 or maybe 20 years. Our goal is to follow them for 100 years, forever. What will happen to these kids, these women who got married, the ones who didn’t, and what will happen to their children?”

Collaboration Crucial to This Long-term Project

Longevity is one of the features that sets this project apart from others. In the absence of longitudinal data from other disasters, such as Hurricane Katrina or Hurricane Sandy, data from the tsunami project can inform disaster recovery in other parts of the world.

“Culture matters immensely,” Thomas said, “but there are very basic results that have to be taken seriously as being potentially generalizable.”

Still, Frankenberg and Thomas hope to inspire more studies like theirs. “We’d love to help someone else get this type of project under way,” Frankenberg said.

Working with others is second nature to Frankenberg and Thomas, who have collaborated widely on the tsunami project, particularly with colleagues in Indonesia and at the University of California-Los Angeles, the University of Pennsylvania, and the University of Southern California.

“Without that, this project never would have been anywhere near as productive or successful,” Thomas said. “We really needed their expertise.” Collaborators include experts in mental health, epidemiology, demography, and even satellite imagery, which was used to help quantify damage from the tsunami.



Mike Burrows MPP’12, center, and Cecep Sumantri, SurveyMETER project director (left) conducting interviews in 2011



STAR health check in spring 2014.

They also collaborate with students and post-docs. **Michael Burrows** began working with Frankenberg and Thomas while earning his master’s in public policy from Sanford and is now a research manager with the project; he’s currently in Aceh working on the 10-year follow-up survey.

Nicholas Ingwersen began working with Thomas on another Indonesian project as an undergraduate at UCLA. After graduation, he began working on the tsunami recovery project and consulted for the World Bank. In 2009, he came to Duke to pursue a PhD in public policy in part to deepen his work on the tsunami project.

“It’s been an incredible experience,” he said. “The project itself is really interesting and — having seen a lot of work in developing countries — the quality of the work is phenomenal.”

Passing on Opportunities to Students

The work that Frankenberg and Thomas do with students is largely inspired by the way early experiences in their own lives shaped their careers.

Thomas was born and raised in Zimbabwe, living on the same farm where his mother was born and raised. After graduating from high school, he went to college in England.

“I had the incredible good fortune of having a faculty member tell me I should go do a PhD in America,” he said. “I didn’t have any concept of what it was to be an academic. It’s these very fortuitous events that motivate my teaching — my goal is to try to open doors for people reaching for things that don’t seem reachable.”

Frankenberg first went to Indonesia as an undergraduate at UNC, to do a research project on development. “I certainly didn’t think 30 year later I’d still be working there,” she said. “But the questions that seemed like they needed answering were so intriguing — that’s what pulled me in.”

“Our goal is to follow them for 100 years, forever. What will happen to these kids, these women who got married, the ones who didn’t, and what will happen to their children?”

STAR staff member interviews a family in Aceh in a tent city created in the aftermath of the tsunami in 2005.



Survey of Tsunami Aftermath and Recovery (STAR): Breadth and Depth

After the 2004 Indian Ocean tsunami, **Elizabeth Frankenberg** and **Duncan Thomas** collaborated with their colleagues at SurveyMETER, an NGO in Indonesia, to develop a longitudinal survey in Aceh to study the impacts of the tsunami and to track recovery. In developing the project, they worked with a government institution called Statistics Indonesia, which provided access to household data collected shortly before the tsunami.

The resulting project, called the Study of the Tsunami Aftermath and Recovery (STAR), has been following 30,000 survivors ever since. The team conducted surveys every year for the first five years and is currently conducting a 10-year follow up.

Out of that group of survivors, 96 percent have participated in at least one follow-up survey, despite the fact that many lost their homes in the tsunami and have moved more than once since then.

PhD student **Nicholas Ingwersen** visited Aceh with Frankenberg in 2005.

"We went to this one place where we were having trouble finding anybody," he said. "On the map, what was a road is now the sea; where the house was is now a beach. It was an



Duncan Thomas, right, and researcher Peter Katz at the Duke economics department.

extraordinary effort to try to find these people."

In fact, that first survey took almost a year. But Frankenberg and Thomas were persistent because they believed that the people who were hardest to find included those who had been most affected. "We put our resources into turning over every last stone," Frankenberg said.

In the years since, the team has continued to refine the survey and the process. Local interviewers — 250 of them — are trained to interview with precision, patience and empathy, spending 4-5 hours with each household. The interview data is entered into a secure computer system, which includes features to

help keep track of respondents. For example, if an interviewer discovers a respondent has moved, the new address is automatically shared with the interviewer of the appropriate territory.

The dataset allows comparisons between people from communities that were affected to different degrees. The team used satellite images and on-the-ground interviews to categorize each community as heavily affected, somewhat affected, or not directly affected.

The robustness and sheer volume of the survey data create opportunities for research into a wide variety of topics. Ingwersen's PhD work illustrates the range: he's doing one project on economic choices among adult survivors, and another on the growth of children who were in utero during the tsunami.

"We went to this one place where we were having trouble finding anybody. On the map, what was a road is now the sea; where the house was is now a beach. It was an extraordinary effort to try to find these people."

"It's neat to be able to work on a project where you can do all these different things [with the data], especially from the point of view of policy," he said. "There are all these different ways these people's lives can be affected and they're all really important."

Frankenberg and Thomas plan to make all the data publicly available to the scientific and policy communities.