

PRB Discuss Online: The Tsunami, Six Years Later: Results of a Large-Scale Longitudinal Study in Aceh, Indonesia

(December 2010) Dec. 26, 2010, will mark the sixth anniversary of the earthquake that spawned a tsunami on the coastlines of countries bordering the Indian Ocean. In collaboration with the Indonesian NGO SurveyMETER, Elizabeth Frankenberg, Duncan Thomas, and colleagues designed a survey to study how the disaster affected villagers living in areas heavily damaged by the tsunami (www.prb.org/Articles/2010/environmentalmigrants.aspx). They collected data from a sample of 40,000 people in Aceh before the tsunami, and afterward tracked them for five years. How has the population of Aceh been affected by the 2004 tsunami, and how has the recovery process unfolded? In a PRB Discuss Online, Elizabeth Frankenberg, professor of public policy and sociology at Duke University; and Duncan Thomas, professor of economics at Duke University, answered questions from participants about the short-term and long-term consequences of the 2004 tsunami.

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Transcript of Questions and Answers

Dr. Gunaselvam: How were the fishermen in Aceh relocated as they always prefer to live near the coast?

Elizabeth Frankenberg: Some fishermen and their families moved inland to refugee camps in the period shortly after the tsunami, but some never left at all. In general, those who lived near the coast before the tsunami moved back to the coast, because they wanted to return to their home areas. Thus, for the most part, fishermen did not permanently relocate.

Grace Larobina: How has the basic social unit of the family survived? What has happened to the children orphaned by the disaster? What has been the incidence of mental health amongst survivors?

Elizabeth Frankenberg: Family has been an extremely important element in the process of recovering from the tsunami. In the most heavily damaged areas, around one in five children lost one parent and one in 20 lost both parents. Those who lost one parent continued to live with the surviving parent and many of those parents, particularly fathers, have remarried since the tsunami. The vast majority of children who lost both parents in the tsunami are living with other relatives. In some cases, older orphans are at boarding school. In other cases, orphans have been taken in by families from the same community they were living in at the time of the tsunami. In the heavily damaged areas, survivors suffered symptoms of post-traumatic stress after the tsunami. These symptoms were also experienced, though to a lesser degree, among residents of areas with moderate and light damage. After two or three years, the symptoms have diminished for the majority of the people. There remains a significant subset of people who have recovered less successfully.

Geoff Dabelko: What has been the relative balance of long versus short term thinking in building back and restoring livelihoods? How much evidence of more sustainable/lower vulnerability approaches such as mangrove regeneration, moving structures back from the coast, diversifying livelihood from fishing etc?

Elizabeth Frankenberg: This is an important question, but it and its answer are complicated. On many dimensions of physical infrastructure, attention has been paid to building back "better"; and roads, bridges, and facilities such as health clinics and schools are of better quality. This includes housing. In some areas

mangroves have been planted. Although there was some consideration of protecting a zone along the coast, there does not seem to have been a systematic effort to prevent rebuilding close to the coast. A lot of employment opportunities were generated from the reconstruction effort, and some four years after the tsunami employment levels were higher than before the tsunami, but we don't know yet whether levels will stay high as the reconstruction effort subsides. One positive feature has been that cessation of the civil war has made farming more feasible, because one can work in the fields more safely than when the conflict was at its height.

Sushmita Mukherjee: How successful was the longitudinal study as a methodology? What proportion of population you could track down in these six years? Please elaborate on the success of the methodology to study at a emergency site.

Elizabeth Frankenberg: We believe that a longitudinal methodology is extremely important to understand the impact of the tsunami precisely because of all the upheaval that occurred. Because we have a sample of the population prior to the tsunami, we are able to measure the impact of the tsunami on these people and figure out how they have adjusted to the tsunami. We followed people to emergency sites such as refugee camps and interviewed them there. But many people moved to homes of friends and family. These people are systematically different from those who we found in emergency sites—both before the tsunami and after the tsunami. Focusing only on those who went to emergency sites would provide a biased picture of who was affected by the tsunami and its impact. Moreover, some people did not leave their home sites but camped among the ruins—and these people are also different from those who were displaced. Developing a full picture of the impact of the tsunami would be very difficult without the longitudinal design. That said, longitudinal designs are challenging to implement. We started with a (pre-tsunami) sample of over 40,000 individuals of all ages who are representative of the population living along the coast of Aceh and North Sumatra provinces. We were able to ascertain survival status for more than 95 percent of those people. We have conducted an interview with each of the people in our study about once a year since the tsunami. In each survey round, we have completed interviews with roughly 90 percent of the households. The household-level interviews give us some information on all household residents, including those who have moved out, but the rates of recontact for individuals vary from year to year. Working age males are the most difficult group to talk to face-to-face. It is important to emphasize that our team, from SurveyMETER (an Indonesian NGO), Statistics Indonesia (the Indonesian Bureau of Statistics), and Duke-UCLA, was beginning with information on a representative sample BEFORE the tsunami, so we knew whom to look for. With that foundation in place, arguably the most important elements of success are having a deeply committed team that builds a very good rapport with the people in our survey. In addition, the interviewers are committed to doing everything they can to locate the people in our study, including those who have moved. This commitment, in combination with a sophisticated data management system that enable us to send clues about where someone has moved to interviewers working in that area means that we have been exceptionally successful in interviewing the people who have been good enough to participate in this study.

Rune Slettebak: Theories within research on post-disaster behavior range from expecting increased levels of aggression due to (among other things) relative deprivation and post-traumatic stress, to increased social cohesion and solidarity. Do the data give any clues on how individuals in Aceh have responded in terms of cohesion/aggression/no difference?

Elizabeth Frankenberg: Civic participation is an important part of life in Aceh. We designed the study to provide insights into the role civic participation played in the aftermath of the tsunami. In many communities it appears that residents did work together successfully to address needs for clean up and rebuilding that emerged in the tsunami's aftermath. The combination of the cessation of the civil war and the availability of funds for reconstruction seem to have helped pave the way for social cohesion to play a role. But this dynamic is not likely uniform across all villages, and the story may be different particularly in communities where the civil war had taken a toll before the tsunami. Unfortunately, we have little information about civic participation prior to the tsunami. The baseline survey was part of the annual national socio-economic survey, SUSENAS, conducted by Statistics Indonesia. Since that survey did not collect information on aggression, we did not attempt to collect information that would provide insights into whether levels of aggression have changed for individuals.

Dr. Yasmin Siddiqua: Please explain little bit about the survey before Tsunami and the way the surveyed people were tracked for five years. I assume the changes are captured in terms of their social status (e.g., economic status, hygiene behavior, etc.) as well as their health behavior. Please shed a light on these issues, if the study have captured these. Does the study also covered their family structure and norm and gender issue? How can we get a summary or main report?

Elizabeth Frankenberg: After the tsunami, our team from SurveyMETER Indonesia and Duke-UCLA worked with Statistics Indonesia to try to relocate a subset of households that were part of their annual socioeconomic survey, SUSENAS, conducted in February 2004. SUSENAS is widely regarded as an

extremely high quality survey that is nationally representative and provides on-going information on the socio-economic well-being of the Indonesian population. The collaboration between Statistics Indonesia, SurveyMETER and ourselves is unique and a testament to our common goal of providing evidence on the impact of the tsunami for future planning and mitigation efforts. Our first step, in 2005, was to return to each community to try to find information about all the members of the 2004 households. If information in the local area suggested that a household (or an entire group of households) had relocated, either because of the tsunami or for other reasons, we recorded that information, and made visits to the destination areas. A lot of effort was spent in visiting and revisiting origin areas and destination areas, searching for informants who could provide clues, and then organizing and transmitting that information. We collected information about household composition, multiple dimensions of socioeconomic status including work and earnings, self-employment activities, assets and spending, physical and psychosocial health status, use of health services, schooling, migration, and so on. The short term implications of the tsunami for most of these dimensions of well-being were strong and negative in heavily damaged areas, but over time improvements in both community-level infrastructure and household-level assets has been substantial. The study covers household composition, family formation, and fertility, but does not ask many questions about gender norms, per se.

Puneet: How much difference has aid from external sources helped in rehabilitation as compared to local ones? And what are both immediate and long-term implications of such aid?

Elizabeth Frankenberg: It is difficult to draw a distinction between the effectiveness of assistance from external versus local sources. This is for two reasons. First, in many instances, assistance from different sources tends to be co-mingled. Second, in other cases, anecdotal evidence suggests that a donor provides funds to an area or for a project because funds from another donor are provided to a different project. Our sense is that the external and local sources of aid have tended to play a complementary role. The large inflow of external aid into heavily damaged areas has made it possible for Indonesian assistance to provide assistance in other parts of Aceh where infrastructure needed attention in the aftermath of the conflict. Overall, the assistance has made a tremendous difference with respect to improving the physical infrastructure with respect to roads, bridges, health facilities, schools, and also housing. The long term implication is that the physical infrastructure of many parts of Aceh has improved. How the structure of the economy will evolve as aid spending diminishes is less clear.

Global Health: How many residents of Aceh province lost health care access following the 2004 tsunami? Many thanks!

Elizabeth Frankenberg: In the immediate aftermath of the tsunami, a substantial proportion of Aceh's population experienced disruptions in access to care, because population density is higher in the coastal areas, where the damage occurred, than in inland areas. In the communities we surveyed, nearly two-thirds of those in heavily damaged areas had health facilities that were damaged or destroyed, and nearly three-quarters of those communities experienced damage or destruction of elementary schools. In some instances residents could use the facilities of nearby communities where damage was less extensive. We have not done a projection from our sample to the total size of the population affected by reduced access to facilities.

Ghazy Mujahid: The Tsunami provided a lot of lessons. Hope we will learn from it particularly because of the enormous cost of the lessons. Does this study throw light on the impact on the elderly population? In disasters they usually suffer relative neglect in rescue, relief & rehabilitation work. I had coordinated the production of "Older Population in Indonesia: Trends, Issues and Policy Responses" issued as Papers in Population Ageing No. 3 by the UNFPA Bangkok Office in 2007. The author (Professor Abikusno) devoted an entire section to the issue. He had done a paper on the issue and for those interested the details are: "Needs and Follow Up of Older Persons and Disabled Tsunami Victims in Nias Island," presented at Women Empowerment Policy Development Meeting, Ministry of Women Empowerment, Hotel Acacia, Jakarta, 24th March 2004. I hope this longitudinal study has also paid special attention to the elderly population. It would also be useful to have the views of participants in this discussion today.

Elizabeth Frankenberg: Thanks very much for your comment and for pointing us to this report. We have done some analysis of outcomes for older adults relative to younger adults. The older population was clearly disadvantaged with respect to survival, but for other outcomes the results are more nuanced. Mental health outcomes, and the recovery trajectory with respect to symptoms of post-traumatic stress, do not appear to be worse for older adults, and older adults may have been sheltered a bit from living in camps. Older men who lost a wife have remarried, but older women who lost a husband have not remarried. Older men do not appear to reentered the labor market to the same extent as older men, but their consumption patterns have recovered to the same degree as other demographic groups. For the most part our results suggesting that the family has been an important safety net for older individuals.

Nose: In my previous post, I wanted to ask if you can know the pre-tsunami baseline family status in the longitudinal data, and study the change of family characteristics after the tsunami.

Elizabeth Frankenberg: The baseline for our survey was a survey conducted by Statistics Indonesia in 2004, which provides information on the demographic composition of households, and on the socioeconomic status of those households. We are able to study how households changed after the tsunami because of death of members, and with respect to who moves in and who moves out to establish a new household. We can also examine changes in characteristics of the designated household head, and phenomena such as remarriage and fertility after the tsunami.

Qudratullah: How much the land and the people have gone back to what was their pre-tsunami state of conditions?

Elizabeth Frankenberg: Impressive. The debris from the tsunami's destruction has been removed and plants have grown up on land that the tsunami denuded. In many areas crops and fishponds are back in place, although sometimes a different crop has been planted. Much of the physical infrastructure has been rebuilt and is of improved quality relative to before the tsunami. Because the conflict has ended people have much more freedom of movement, which has been important for well-being. For a period there was extensive rebuilding, which generated many jobs, but much of this work has subsided. Meanwhile, many people who lost spouses have remarried. Aceh has experienced tremendous change over the past six years. Although for many people "normal" life has been largely restored, it doesn't seem accurate to say that Aceh has returned to its pre-tsunami state—rather it is in a different state.

Bruce Potter: As a former employee of Mobil Exploration & Producing, which has one of the world's largest gas fields in Aceh since 1978, I'm curious if the tsunami and recovery process has changed local perceptions of the multinational corporate interests in the region. Also, did the tsunami change perceptions or support for Aceh Merdeka or other movements supporting regional autonomy or independence?

Elizabeth Frankenberg: The combination of the peace agreement and cessation of the conflict, the inflow of assistance from national and international sources, and the direct election of a governor (a former Aceh Merdeka supporter) have changed the political/economic landscape of Aceh considerably. Our sense is that tensions involving multinational corporate interests have diminished, but there is likely considerable regional variation to this dynamic, and we expect it will continue to change over time.

Rajesh Kumar Rai: First round of DHS data for maldives has been released recently. They have captured the component of Tsunami. My question is how the effect of Tsunami differs from Maldives to Indonesia on elderly's health?

Elizabeth Frankenberg: Thank you for mentioning the DHS information on the Maldives. We have not seen any results from that survey. We have examined outcomes for older adults relative to younger adults. The older population was clearly disadvantaged with respect to survival with older women being the most likely to have died in the tsunami. For other outcomes the results are more nuanced. Mental health outcomes, and the recovery trajectory with respect to symptoms of post-traumatic stress, do not appear to be worse for older adults, and older adults may have been sheltered a bit from support received by living in camps. Many of the older men who lost a wife have remarried, but few of older women who lost a husband have remarried. Older men do not appear to reentered the labor market to the same extent as younger men, but the consumption patterns of older adults have recovered to the same degree as other demographic groups. To a large extent, our results suggest that the family has been an important safety net for older individuals.

Laurette Cucuzza: I would be interested to hear about whether there have been changes in gender norms or dynamics over the years at the individual or household level?

Elizabeth Frankenberg: It is very likely that there have been changes, as a result of a variety of different dynamics. For example, some women became head of household when their husbands died, and female-headed households were particularly likely to receive assistance. Young girls who lost both parents were more likely to marry (over the course of the study) than girls who had at least one surviving parent, and so earlier entry to marriage may affect dynamics. Likewise, boys who lost both parents were more likely to serve as household heads, changing their responsibilities and perhaps the gender dynamics in their household. Although we can speculate on the likelihood that circumstances have produced changes in gender norms and dynamics, it is difficult to pinpoint the precise nature of such changes in our survey data, particularly as we have little to no information about the operation of these dynamics before the tsunami.

Cynthia Green: Is there a report or summary available of the main study findings?

Elizabeth Frankenberg: There is not an overall report, but we have published papers in the American Journal of Public Health (2008) on mental health and on service delivery (in the World Bank publication

"Are you being served") and would be happy to send you some additional working papers as they are finalized.

Godswill James: What are the implications of Tsunami experience for African countries, particularly Nigeria (the most populous countries in Africa)?

Elizabeth Frankenberg : There are several implications of our study. First, the family and community has played a critical role in the response to the tsunami. Starting right when the tsunami hit, we see evidence that the family was key for survival—a person was more likely to survive if there was a strong, prime-age adult in the family who could help during the onslaught of the water. Second, the resilience of children, prime-age and older adults in the face of the devastation of the tsunami is extremely impressive. Many people needed a helping hand—and the family and the community stepped up to help. However, there are people who needed more help and it is extremely important to identify those groups of people, and the assistance they need. These include, for example, communities that were wiped out or were cut off from the rest of Aceh because the roads were devastated; people who lost their families, especially children who lost one or both parents; those who lost their houses, arable land, boats or other sources of livelihoods. Support came in many forms. Camps were opened about three months after the tsunami. Schools were started in camps to help children adjust. Counseling was provided to those who sought it out. Re-building provided jobs, especially for prime age males. And funds were provided for reconstruction. There may be a role for organizations to be better prepared to identify needs, deploy the resources quickly and, importantly, track the impact of the resources that are deployed so that, going forward, we can build a better understanding of what is needed and what deployments are most effective. While many of the implications of our study apply to large-scale devastating events (such as earthquakes), we think these more general implications are likely to be applicable to broader class of settings, including, perhaps, disasters in Africa and possibly Nigeria.

Isa Baba: I would like to know the extent of psychological trauma suffered by the young victims of the catastrophe, and whether the longitudinal survey shows any significant adjustment on the part of those children?

Elizabeth Frankenberg: We have not completed an analysis of the degree of psychological trauma for the youngest victims, in part because in many cases their parents answered for them and it's difficult to accurately assess psychological response from parental reports. We have analyzed young people's time use in order to understand outcomes such as school enrollment and labor force participation. In the heavily damaged communities, many children missed some school after the tsunami, and indeed many schools were closed during this period. A key component of the relief effort was getting schools up and running again, and by the date of first interview (five to 17 months after the tsunami) school enrollment rates among respondents ages 8 to 18 did not appear to be depressed because of the tsunami. On the other hand, for girls who lost parents there was a tendency to increase time spent on household chores and work for pay. For boys we see the same impact on household chores. Over the longer term, girls who lost parents are more likely to leave school and to get married than girls who did not.

Nose: What did you find about the impact of aid reconstruction projects on families' income or consumption? What have they been working for primary or secondary jobs since the tsunami, and can you look at their earning in your data? Has the income distribution changed over six years? Also, can you track the baseline family status in your longitudinal data?

Elizabeth Frankenberg: Family income and consumption has returned to above pre-tsunami levels. We have looked at earnings data and we find that there has been little change in the overall income distribution but a shift away from older workers towards younger workers. We think this is a reflection of the impact of demand for manual labor in reconstruction which tends to favor younger men. We do track family status and the demographic composition of households from the baseline through each of the five waves of the survey.

Sushmita Mukherjee: What is the situation of single women or the children who were in the tsunami?

Elizabeth Frankenberg: Children and women were more likely to be killed in the tsunami, in part because they had less strength with which to withstand the force of the water. Female headed households (which are mostly headed by unmarried women) were particularly likely to receive assistance in the aftermath of the tsunami. Some women who lost husbands remarried after the tsunami. Many children received scholarships after the tsunami, and this was especially true if they lost a parent. Most children who lost parents continue to live with family (either the surviving parent, or if both parents died, other family members). Some older children entered boarding schools.

Sushmita Mukherjee: What are the challenges you found that these people are still struggling with?

Elizabeth Frankenberg: Some people still experience psychological symptoms and grief for lost loved

ones. It is unclear how the economy and job opportunities will evolve now that most of the reconstruction activities have ended.

CJ Bahnsen: Can you talk more about the history of this Aceh civil war? How bad was this conflict before tsunami versus the post-tsunami years? Thank you.

Elizabeth Frankenberg: I had not worked in Aceh prior to the tsunami, and so I can answer only in terms of other work I have read on the subject. There is a long history of conflict in Aceh, with flare ups at various points, including the years just before the tsunami. The conflict was accompanied by deaths, disappearances, and destruction of property. When our survey began, after the tsunami, the political security was still an issue, and many respondents and survey staff were nervous about security. In Sept 2005 a peace agreement was reached and the situation changed a great deal. Residents of Aceh had much more peace of mind as they went about their daily activities, and aid operations (and our survey) could occur with less disruption. Eventually Aceh held elections. Security issues became a much less pressing concern, which seemed to have many benefits.

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