

The Indian Ocean Tsunami: A preliminary Assessment of Societal Impacts and Consequences

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This work was supported primarily by the Engineering Research Institute (EERI), funded by the National Science Foundation, and the Sea Grant College Program at the University of Puerto Rico-Mayagüez. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author (s).

The Great Sumatra Earthquake of December 26, 2004

- Magnitude of about 9.0 to 9.3 on the Richter Scale*
- Longest in duration in recorded history (about 500 seconds)
- Led to one of the largest ruptures (about 1,200 kilometers in length)
- Led to a massive tsunami traveling across the 4,500 km. wide Indian Ocean in about 7 hours
- One of the worst disasters in recent history in terms of the loss of life and impact across a number of countries

*The information on this slide is based on presentations by H. Kanamori and P. Liu:
EERI Technical Briefing, GWU, Washington, DC, May 23, 2005

Societal Impact

- Deaths estimates range close to 300,000*
- Missing: about 142,000
- Displaced: Over 2 million
- Billions of dollars in economic damages
- Extensive suffering of millions of people
- Communities shattered and families destroyed

*These statistics are subject to rapid and continued change; the "final" impact of the tsunami in terms of the loss of life and economic losses may never be known. Also refer to http://www.eeri.org/life/clearinghouse/sumatra_tsunami/overview.html

Preliminary Estimates of Tsunami Impact in Four Countries*

	Indonesia	Sri Lanka	India	Thailand
Death Toll	166,760	30,974	10,872	5,305
Missing	127,773	4,698	5,752	3,498
Displaced	811,409	553,287	647,556	8,500

*Source: <http://www.e11th-hour.org/resources/timelines/tsunami.2004.countries.html>; March 20, 2005. These statistics are subject to rapid and continued change; the “final” impact of the tsunami in terms of the loss of life and economic losses may never be known.

Social Science Reconnaissance Team

- Within a month of the Sumatra earthquake and the tsunami it generated, researchers from the University of Delaware's DRC and the Emergency Administration and Planning Program at the University of North Texas participated in an EERI social science reconnaissance team to India and Sri Lanka
- Two-week field research expedition yielded important data on disaster preparedness, response, and recovery from this devastating tsunami

Reconnaissance team's Objectives

- Collect perishable data
- Identify communities particularly hard hit by the tsunami
- Observe methods being used to restore lifeline facilities
- Identify local and state agencies as well as local and international NGO's taking part in the recovery and relief efforts
- Establish contacts with local researchers and practitioners

Expected Outcomes

- Establish long-term collaborative relationships that will contribute to a better understanding of the:
 - Disaster's social and physical impacts
 - Complexities of disaster response and relief across many nations
 - Issues that will affect the physical, social and economic recovery of the region in general
 - How these experiences can help us develop enhanced mitigation, preparedness, response and recovery strategies and initiatives

The Funders



**Earthquake Engineering
Research Institute**



National Science Foundation
WHERE DISCOVERIES BEGIN



The Team



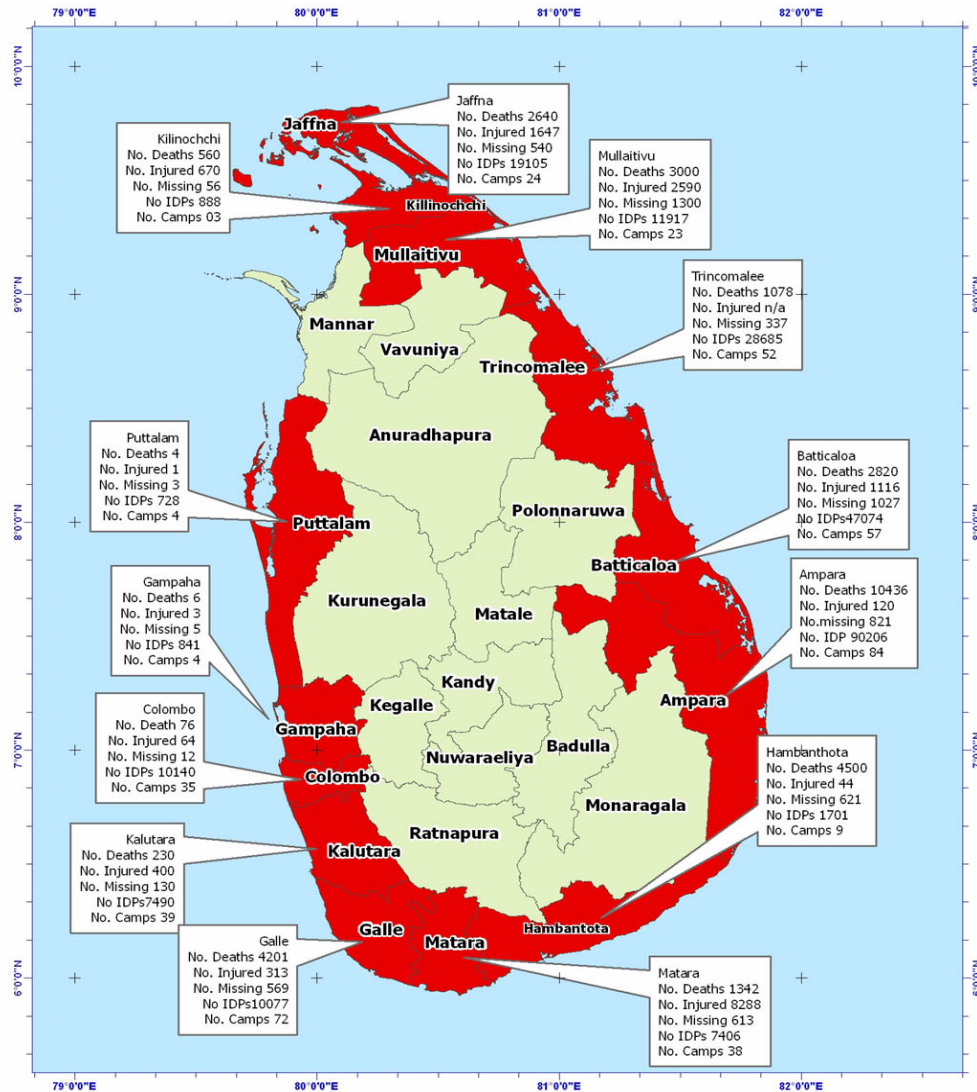
James Kendra (UNT), Tricia Wachtendorf (DRC), Joseph Trainor (DRC) Havidán Rodríguez (DRC Director),
Dr. A. Subramanian (Madras Christian College, Chennai), Dr. Ram Alagan (ICES), The DMI Team

Field Observations

Affected Persons Situation Map

Source Date: 13 Jan 2005 1700 Hrs

Please Note: Not all districts have reported all required information. The values on this map should be read as minimum values only.



Data sourced from CNO, Ministry of Women Empowerment & Social Welfare
Created: 13 Jan 2005 19:00 Hrs

Printed versions of this map may have been updated.
Check with Mapping Desk, Centre for National Operations (CNO),
Presidential Secretariat, Colombo, Sri Lanka.
Survey Department, Sri Lanka.
Tel No: +94112587957, E-Mail: ssgis@slt.net.lk

CENTRE FOR NATIONAL OPERATIONS
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Disclaimer: Use this information with caution. MapAction cannot be held responsible for the reliability or content of this map.

Sri Lanka

Source:

<http://www.reliefweb.int/rw/RWB.NSF/db900SID/LDOK-698LEH?OpenDocument>

Demographic Profile: India and Sri Lanka

	India	Sri Lanka
Total Population (in millions)	1,086.6	19.6
Total Fertility Rate	3.1	2
Crude Death rate	8	6
Infant Mortality Rate	64	10
Life Expectancy	62	72
Percent Urban	28	30
GNI PPP Per Capita	\$2,650	\$3,510
Population Density	856	772

Source: 2004 World Population Data Sheet, Population Reference Bureau (PRB), Washington, DC.

**Who did we collect
information from?**

- Men (primarily fishermen) and women in different communities
- Community and organizational leaders
- Representatives from NGOs
- Disaster relief aid workers both local and international
- Government representatives
- People in different types of industries
- Researchers

The Tsunami and its Consequences: A Snapshot

The Tsunami: A Series of Waves



The Devastation





The Devastation



India



Where once
communities
stood





Sri Lanka

Where once
communities
stood



The Memorials India



Sri Lanka

Impact on Fishing Communities





Coastal Erosion: India



**Environmental
Impact was
Significant**



Coastal Erosion: Sri Lanka



Temporary Shelters





Improvisation

← Sri Lanka

India →



"Temporary" Shelters: India





01/24/05

“Temporary” Shelters: Sri Lanka



Community Based Response and Recovery Efforts



Disaster Relief Aid: Local and International Efforts

India



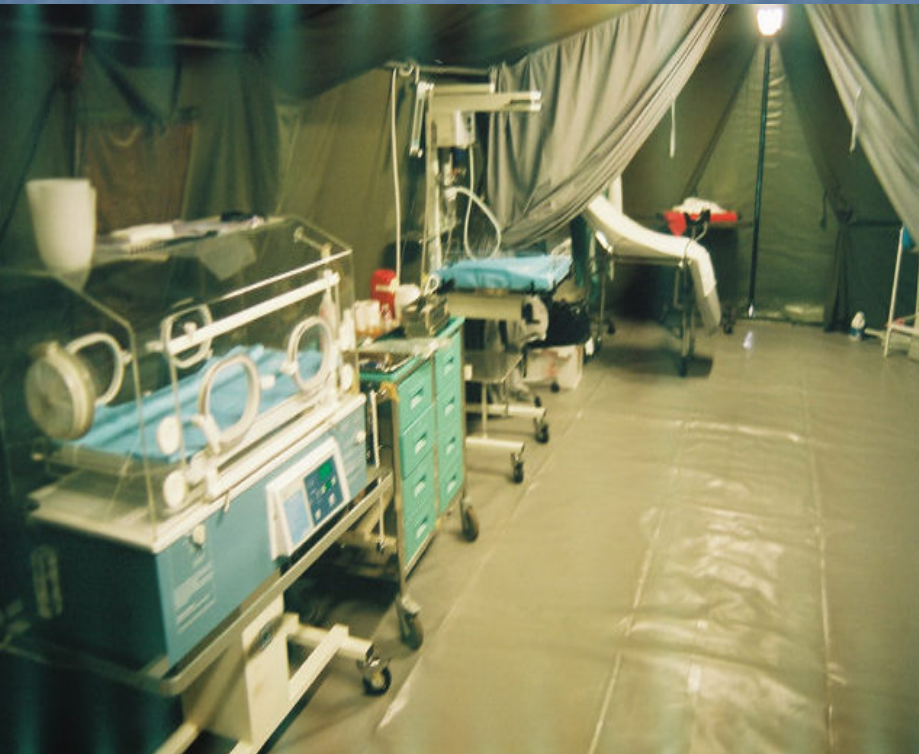
Sri Lanka



Sri Lanka

Temporary
Medical Unit

Water
Purification Unit



Inequities in the Distribution of Disaster Relief Aid: Protest in Karaikal, India



Rebuilding: India



Rebuilding: Sri Lanka



The People: India



The People: Sri Lanka



The Generosity



Emerging Issues

● Lack of education and knowledge regarding tsunamis:

- Low levels of awareness at all levels* (government, general public)
- Lack of previous experience; no reference points for appropriate action/response
- Did not recognize the warning signs (large earthquake, receding ocean)
- No advanced warnings by government: little or no communication
- Incorrect information provided by government representatives and “experts”

**There is an impending
need for transferability of
knowledge: information
sharing and capacity
building**

● Economic Issues:

- Loss of livelihood: People wanted boats, motors and nets in order to “return to the sea”
- Government aid is critical but insufficient
- Loans may create even greater economic problems for local fishermen and their families
- Impact on industry: agriculture, fishing, salt industry, tourism
- Development, Poverty, and Vulnerability

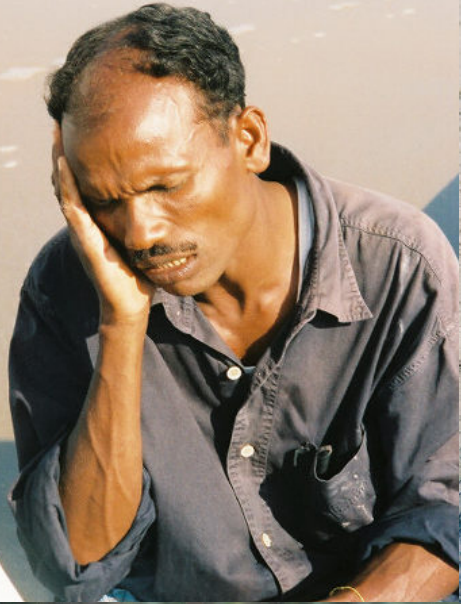
Improvisation and Community Support



● Health & Mental Health Issues:

- Loss of loved ones, neighbors, and friends
- Inability to recover dead bodies and carryout burial rituals
- Inability to provide sustenance, to protect or provide "security" to families
- Despair, uncertainty, fear of the unknown of the next tsunami

01.26.105



The Anguish



● Irregularities or Inequities:

- Organized community recovery efforts vs. none
- Have gender inequities been exacerbated?
 - Did the tsunami have a disproportionate impact on females (e.g., excess mortality)?
- Business recovery efforts and opportunities: recovery varies by type and size of business and its resources

● Irregularities or Inequities:

- Differences in government coordination of NGOs and disaster relief
- Distribution of disaster relief aid: Extensive, Some, None
- In Sri Lanka, the ongoing conflict between the government and the Liberation Tigers of Tamil Elam (Tamil Tigers) generated a variety of concerns regarding how aid was distributed. How will political tensions impact the recovery process?

● Changing gender roles?

- Men as caretakers of their children
- Women's chores and responsibilities within their communities
- What are the short- and long-term demographic and socio-economic effects and impacts, particularly for women?

● Relocation and Housing/Shelter Issues :

- Implementing government policies on buffer zones
- Relocation of fishing communities
- Land tenure
- Construction of temporary shelters and housing in high risk areas

Impact of Relocating fishing communities?

Fishing is a
community
activity



The Road to Recovery Requires...

- Integrated warning systems, emphasizing communication, education, raising awareness, and responding to the needs of the population at risk: “People Centered” Warning Systems
- Reducing societal vulnerability and enhancing disaster resiliency is key
- Enhancing communities’ economic capacity, which requires that we pay attention to issues such as poverty, inequality, and sustainable development

**What is returning to
“normalcy”? Is this or
should this be our
goal?**

Back to “normal”?



Back to “normal”?





Hope for the Future?



Sunset in Sri Lanka: Hope in the Horizon?



For Additional Information

- Visit the DRC facilities at:
 - ❖ 87 E. Main Street, Newark, DE
(302) 831-6618
- Visit the DRC webpage:
 - ❖ www.udel.edu/DRC/
- Visit the EERI webpage:
 - ❖ <http://www.eeri.org/>