



## **The role of Coastal Ecosystem Degradation in Tsunami Damage**

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### Summary:

In the aftermath of the 2004 Indian Ocean tsunami disaster, media accounts indicated that the clearing of coastal mangrove forests for tourism and aquaculture may have greatly exacerbated the human and physical damage caused by the tsunami. Indeed, there was compelling anecdotal and scientific evidence to support the hypothesis that both corals and ecologically intact coastal mangrove ecosystems provide significant insurance against storm surges and other marine high-water events in the South Asia context. The disaster mitigation benefits of ecosystem services is an important research issue, but had primarily been studied in the context of hurricanes and flood hazards. Very little was known about the energy dissipation potential of coastal forests and their potential as part of a tsunami hazard mitigation strategy. Given the vast geographic area affected by the tsunamis in this recent catastrophe, remote sensing imagery provided an important tool for scoping and targeting an investigation into the linkages between coastal ecosystem degradation and tsunami damage.

An exploratory study was conducted on the role of coastal ecosystems in protecting communities from the December 2004 Indian Ocean tsunami, focusing on mangrove forests on the Andaman coast of Thailand and how well villages were undertaking environmental conservation. Remote sensing analysis identified pre-disaster mangrove change and post-disaster structural damage and landscape changes. Field data from five sites, 20 villages, gathered via the VIEWS™ data collection system, validated and supplemented this analysis. Key informants at several of these villages were also interviewed. A preliminary comparison of villages that otherwise faced similar tsunami exposure suggests that the presence of healthy mangroves did afford substantial protection. Village performance in mangrove conservation and management efforts, and thus the presence of healthy forests, is influenced by both social capital and the design of external aid delivery programs.

### Publications resulting from this study:

Chang, S.E., B.J. Adams, J. Alder, P.R. Berke, R. Chuenpagdee, S. Ghosh, and C. Wabnitz. 2006. "Coastal Ecosystems and Tsunami Protection," *Earthquake Spectra*, Vol.22, No.S3, pp.S863-S887.



Berke, Philip R., Chuenpagdee, Ratana, Juntarashote, Kungwan and Chang, Stephanie (2008)  
'Human-ecological dimensions of disaster resiliency in Thailand: social capital and aid  
delivery', *Journal of Environmental Planning and Management*, 51:2, 303 — 317  
URL: <http://dx.doi.org/10.1080/09640560701864993>