



# Collaborative Proposal for Earthquake/Tsunami Risk Analysis and Microzonation of Banda Aceh, Meulaboh, and Gunung Sitoli

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A Collaborative Proposal for a Seismic Hazard and Microzonation Study of  
Aceh, Meulaboh, and Gunung Sitoli

Prof. Bendimerad



Collaborative Proposal for Earthquake/Tsunami Risk Analysis  
and Microzonation of Banda Aceh, Meulaboh, and Gunung Sitoli

INTERNATIONAL WORKSHOP ON TSUNAMI  
RECONSTRUCTION  
Kobe University

March 7-8 2006

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RCUSS

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## Introduction

A Proposal has been developed for collaborative seismic and tsunami risk analysis and microzonation study for the cities of Banda Aceh, Meulaboh, and Gunung Sitoli

1. Institute of Technology Bandung is the Lead Research Institution
2. Syiah Kuala University (Banda Aceh) is local research institution
3. Kobe University (RCUSS) is advisor and technology support institution
4. BRR and UNDP (Banda Aceh) are the sponsoring and dissemination agencies
5. Local planning agencies and agencies in charge of reconstruction (e.g., ADB) are also partners

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2

## Objectives

To develop critical engineering parameters to quantify hazards and vulnerability information from potential future earthquakes and tsunami needed for the safe reconstruction of buildings, infrastructure and critical facilities

But also ...

To enhance scientific and technological capabilities of local and national researchers

To involve local, national and international experts in the collaborative effort in support of reconstruction

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3

## Tasks

- Conduct seismic hazard assessment and tsunami hazard assessment of Nanggroe Aceh Darussalam (NAD) province, particularly city of Banda Aceh and Meulaboh and the city of Gunung Sitoli in NIAS.
- Develop seismic criteria for buildings, infrastructure, and critical facilities reconstruction as well as input to the city building codes.
- Develop seismic microzonation maps, liquefaction potential maps for input to spatial planning, redevelopment and reconstruction of the cities. Microzonation maps will be developed specifically for Banda Aceh, Meulaboh and Gunung Sitoli.
- Provide recommendations for more detailed spatial planning, seismic building codes and guidelines for rehabilitation and reconstruction of the cities

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4

## Expected Outcomes

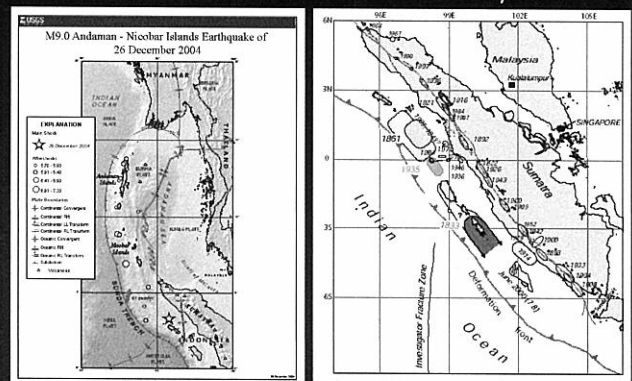
- Seismic and tsunami criteria for new development and construction of buildings, critical facilities and infrastructures.
- Input to seismic NAD province and Nias building codes and guidelines.
- Several hazard maps such as microzonation, tsunami inundation and liquefaction potential maps.
- Seismic risk assessment involving vulnerabilities of the existing buildings, critical facilities and infrastructure
- Technical specifications related to seismic hazards recommendations for future spatial planning, and seismic scenarios for long-term mitigation

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5

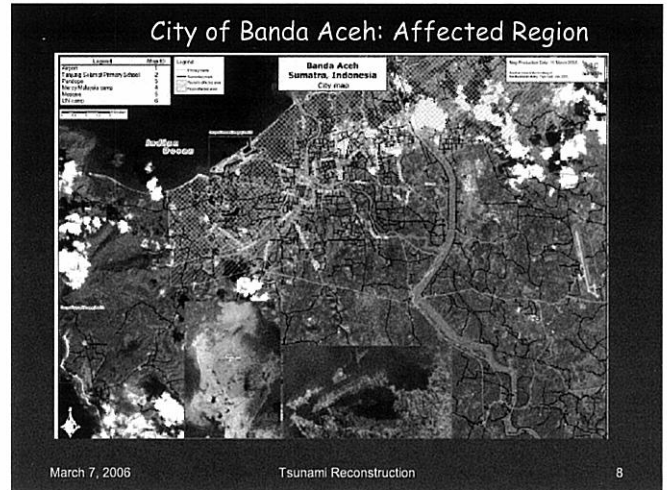
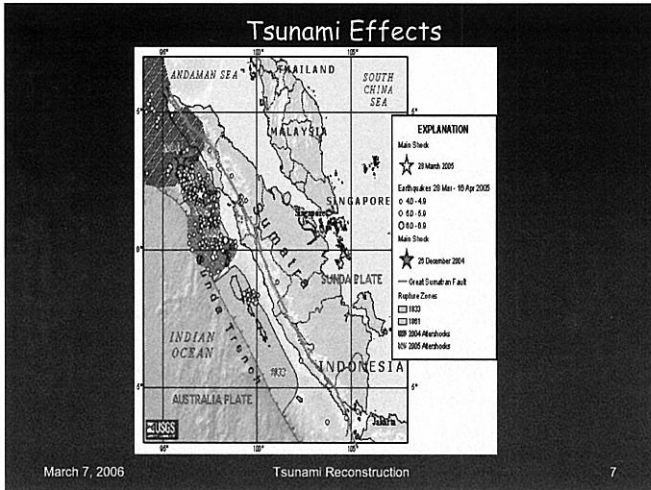
## Seismo Tectonic and Seismicity



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6



### Important technical factors

- Drop in land resulted in lower water table and low land areas are like marsh land saturated with water
- Very poor soil conditions that create particular challenges to the reconstruction

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### Engineering Issues

Massive concrete building collapsed due to shaking

The collapse of this concrete building from strong shaking prevented the debris flow from slowing

- The need to design buildings and structures properly in order to avoid the same mistake in the future

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### Shelter Design

Lhoknga Mosque

- Several tsunami shelters need to be designed and build
- Design of mosques could serve as an example to shelter design - They can serve both a religious/social function and a emergency function
- Other potential candidates such as 2-story high-occupancy halls with open first floor (for markets or pumping stations, etc.) can be adequate
- IN MY OPINION THE CONCEPT OF "ESCAPE HILL" NEEDS TO BE EVALUATED IN VIEW OF POOR SOIL CONDITIONS BEFORE DECLARED A VIABLE SOLUTION

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### Example of housing reconstruction

*Be careful with the permanently temporary conditions!*

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## Conclusions

- The proposed study will provide critical information in support of safe and sound reconstruction
- Further it will build "high-end" expertise locally and nationally
- It will involve local, national and international expertise in support of the reconstruction
- It will save valuable money in the long term by avoiding duplication and facilitating reconstruction intervention
- Kobe University is committed to supporting the study
- We hope that the funding will be mobilized to start this project as early as possible

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13

*Thank You*

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14