Outline of presentation

- Main research question
- New Early Warning System (EWS) Framework ➔ Beyond four components
- Application / Research Data
- Results and Discussions
- Conclusion
Main Research Question

- How do certain attributes of governance and institutions function and how should they function in society to enhance the capacity to manage resilience in the case of uncertain tsunami risks.
The New Integrated Early Warning System – Governance Framework

**System of Governance**
[Political, Economic and Social Systems]

**Governance Actors**
(Participation, mediation, negotiation, deliberation, cooperation, partnership, transparency, accountability, equity..)

**Architecture**
(Institutional arrangements (formal & informal) frameworks, norms, structures, polycentric-multi-layered systems.)

**Ecosystem Resilience Capacity**
(Self organise, Learn and Adapt, Scale, Fit, Threshold, Knowledge..)

**Risk Knowledge**

**Response**

**Monitoring & Warning**

**Dissemination & Communication During Event**

Source: Author 2010
Analytical Steps

PAST and PREVAILING SITUATION ANALYSIS

ARCHITECTURE
- Institutional arrangements
- Frameworks
- Norms
- Structures
- Polycentric-multi-layered systems

ACTORS and THE COMMUNITY
- Participation
- Networks
- Mediation
- Negotiation
- Deliberation
- Cooperation
- Partnership
- Transparency
- Accountability
- Equity

SYSTEMS OF GOVERNANCE
- Political
- Economic
- Social

INCENTIVES
- Economic
- Scientific
- Research and Development
- Human Security
- Damage cost-reduction

PROCESS LEVEL
- Political
- Economic
- Social

POLICY LEVEL
- Global
- Regional
- National
- Local

OPERATIONAL LEVEL

OUTCOME
- Effective and Sustainable
- Resilience

Source: Author 2010
The study focuses on Padang coastal city and Bali in Indonesia.

Source: National Geographic Society 2003

Padang Tsunami Hazard Map
High tsunami hazard probability along the coast

Source: DLR in the framework of the GITEWS project 2009

South Bali Tsunami Hazard Map
High tsunami hazard probability at certain parts of the coast
Data

- Actor Expert Interviews
- Informants Interviews
- Focus group discussions
- Surveys
- Technical papers and documents
- Media material
- Other secondary quantitative data
Emerging strong economic system of governance in Indonesia

Wide governance gap between Indonesia compared to the United States and Japan.

Indonesia will face tough challenges to implement and sustain an effective TEWS

Source: Author 2010
## TEWS/ DRR Related Architectures and Structures

### Evolution of Institutional Changes Related to DRR in Indonesia

<table>
<thead>
<tr>
<th>Time (Years)</th>
<th>Goal</th>
<th>Structural Change</th>
<th>Legal Basis</th>
<th>Steering Committee</th>
<th>Multi-Sector Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>Emerg Relief</td>
<td>Coordination of Disaster Response</td>
<td>Constitution</td>
<td>Pres Decree No. 28 / 1979</td>
<td>*Creation of Multi-Level DM Agencies</td>
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<tr>
<td>1966</td>
<td></td>
<td>Manage Induced Disasters and Social Unrest</td>
<td></td>
<td>Pres Decree No. 43 / 1990</td>
<td>Nat DRR Platform</td>
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<tr>
<td>1979</td>
<td></td>
<td></td>
<td></td>
<td>Pres Decree NO. 106 / 1999</td>
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<tr>
<td>1990</td>
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<td>Min Decree NO. 21 / 2005 HFA initially signed</td>
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<tr>
<td>1999</td>
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<td>Pres Decree NO. 19 / 2006</td>
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<tr>
<td>2007</td>
<td></td>
<td></td>
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<td>Pres Decree: No. 8 / 2008*</td>
<td></td>
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<tr>
<td>2009*</td>
<td></td>
<td></td>
<td></td>
<td>*Full implementation (Institutionalized in 2008)</td>
<td></td>
</tr>
</tbody>
</table>

**INATEWS**: Indonesian Tsunami Early Warning System  
**Dev**: Development  
**Nat**: National  
**Pres**: Presidential  
**Min**: Ministerial  
**Coord**: Coordination  
**Emerg**: Emergency  

**Source**: Author 2010
There are many challenges in implementing the polycentric-multi-layered architectures and structures.

- Few provinces and districts have actually completed the DM local regulation and established the sub-national DM agencies and EOCs.

The key obstacles include:

- Multi-level commitment
- Bureaucracy
- Lack of financial resources and specialised human capacities.
Actors Interaction with the TEWS / DRR Architecture in Indonesia

- Relatively high degree of multi-stakeholder participation

- New steering committee of DM Agency (BNBP) consisting of professional citizens
Disaster Management Financing

- The DM financing:
  - Increased (2.1% national budget)
  - Integrated in the government annual plans
  - Increased at the local level (i.e. financial decentralisation)

Data source: Ministry of Finance, Indonesia 2009
Disaster Management Financing

- However, budget allocation is:
  - Significantly spatially variable leading to unjust allocation of funds
  - Mostly for post disaster response.
    - DM financing is an issue that is constantly contested and negotiated.
Similar polycentric-multi-layered architectures are being developed and implemented in Bali and Padang.

- Governor Decree to legitimise the establishment and functions of the local BNPB and EOC.

A tsunami warning chain is gradually emerging

- Province and districts with EOC have the mandate to make decisions what to do according to the SOPs once tsunami information is received (Governor Decree)
The key contrasts between the development of tsunami resilience in Padang and Bali are as follows:

- Political commitment and participation are perceived to be higher in Padang.
- Risk knowledge generation has been a highly contested area in Padang.
- Padang has made more progress in institutional disaster preparedness.
- The emerging multi-stakeholder partnership and institutional arrangements with the tourism sector, the traditional and cultural structures are far more complex in Bali.
At least two non-state actors have emerged as agents and have exercised agency beyond the state where and when the state was unable to effectively respond.

- MPBI (Indonesian Society for DM) exercised agency in institutional change in DM Indonesia.
- KOGAMI (Tsunami Alert Community) exercised agency in community disaster preparedness in Padang, Indonesia.

The underlying conditions of their authority and legitimacy include:

- A mix of knowledge base
- Consent and trust from the state
- Support from the community
- Extensive network at multiple levels and scales
- Flexibility
Towards a Future Effective and Sustainable TEWS

- There is sufficient evidence to suggest that the current TEWS which relies on a technocratic approach and follows a multi-level linear warning chain process would be partially or completely ineffective in dealing with the earthquake-tsunami risks as revealed in the case studies.

- Tensions arise and there is constant debate about the actual mode of TEWS governance

  ➢ “...Official earthquake-tsunami information was largely absent in the first 30 minutes after the earthquake in Padang” (GTZ-IS 2010).
From a resilience point of view it is argued that there is a problem of the fit and adaptability of the existing TEWS to the ecological challenge.

Hence, a theoretical basis of a TEWS framework is proposed.

The key idea is that EW starts not only with the instruments but also the people!
Towards a Future Effective and Sustainable TEWS

- Micro-level reaction – Non-linear behaviour

In the case that a significant earthquake is felt for long enough duration, the EOC at provincial and district level should independently have the mandate to activate the alarms to lead the local TEWS process. (NOT THE CASE NOW)
Towards a Future Effective and Sustainable TEWS
A Mixed Model Approach-Linking at Different Levels and Scales

IOC-UNESCO GLOBAL-REGIONAL TEWS Coordination Framework

[+Far field tsunami]

INATEWS (SYSTEM APPROACH)
[Local earthquake tsunami.
Leads after T>5-10 min]

LOCAL PEOPLE-CENTRED (ADAPTIVE APPROACH)
[Local earthquake-EQf>15S,
Initiated T<5-10 Min]

Source: Author 2010
Conclusion

- Risk governance, multi-institutional arrangements and polycentric frameworks has strengthened the resilience capacities of Indonesia but are strongly affected by institutional path dependencies;

- Systems of governance strongly drives TEWS effectiveness and sustainability, however multi-level incentive mechanisms operating at different time and scales are needed to effect the desired change;

- The future of the INATEWS should rest on:
  1. Both system and people-centred – Mixed model approach and
  2. A broader city planning and governance strategy

- New proposed framework provided an in-depth understanding in TEWS- governance and links to DRR

Way Forward

- Application of the new EWSG Framework in the context of Climate Change
THANK YOU

UNUNITED NATIONS UNIVERSITY

Institute for Environment and Human Security (UNU-EHS)

Hermann-Ehlers-Str. 10
D-53113 Bonn, Germany
Phone: ++ 49 (0) 228 815-0200
Fax: ++ 49 (0) 228 815-0299
E-Mail: info@ehs.unu.edu
www.ehs.unu.edu