TEWS Governance in Indonesia:

The Role of Risk Governance, Multi-Institutional Arrangements and Polycentric Frameworks for a Resilient Tsunami Early Warning System in Indonesia

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Outline of presentation

– Statement of the problem
– Main research question & research sub-questions
– Key Research Concepts and Theoretical Frameworks
– Research Methodology

– Results and Discussions
– Conclusion
– Recommendations
Statement of the problem

• So far, little attention has been paid to the cross-cutting issues of governance and institutions in the context of EWS

• Lack adequate attention to the socio-ecological resilience attributes.

• Lack of an integrated and comprehensive governance framework in the context of EWS.
Main Research Question & sub-questions

• The central question addressed in this research is 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.

  – Sub-Research questions

  • What were the prevailing tsunami warning capacities before December 2004 and how were the capacities exceeded?
  • What were the hindering factors and driving forces for institutional change?
  • What are the prevailing systems of governance and capacities to implement and support TEWS in Indonesia?
  • What are the governance, institutional-arrangements and structures to support the TEWS?
  • How is the performance of institutions affected by being embedded in larger architectures?
  • Who are the actors-agents of TEWS and how are they exercising governance/agency?
  • What is the TEWS performance to this end?
  • What are the incentive mechanisms to effect changes for TEWS effectiveness and sustainability?
Key Research Concepts

Main research areas relevant to the study

*Source: Author*
A NEW INTEGRATED EWSG Framework

“From System perspective to a Governance of System of Systems”
-A concept of four frameworks towards Environment & Human Security and a pathway towards sustainable development founded on plurality, complex mix of formal and informal institutions.

Source: Author
Supporting Institutional Analysis 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

ANALYSIS OF CHANGE

PROCESS LEVEL
POLICY LEVEL
OPERATIONAL LEVEL

LEVEL
- GLOBAL
- REGIONAL
- NATIONAL
- LOCAL

INCENTIVE CHANGE

OUTCOME
- Effective and Sustainable Resilience

Source: Author, based on modified extended IAD Framework of Fischer et al., 2007
Research Methodology

• The study focuses on Padang coastal city and Bali in Indonesia. The rational for selecting these two sites are as follows:

   (1) Tsunami hazard and disaster risk profile
   (2) Major contrast in socio-economic & demographic characteristics
   (3) Pilot study areas of GITEWS

Source: National Geographic Society 2003

Padang Tsunami Hazard Map
High tsunami hazard probability along the coast

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

Source: DLR in the framework of the GITEWS project 2009
Data and Data Analysis

• Data
  – The various data collected is summarised in the Figure

• Data Analysis
  – Mostly qualitative data analysis is employed using a five steps procedure (Powell and Renner 2003).

Source: Author
Results and Discussions
Earlier TEWS Capacities & Driving Forces for Change

• The coping capacities in Indonesia were severely exceeded on the 26\textsuperscript{th} December 2004, not only because there was no EWS for tsunami but also due to:

  – poor attention and recognition of resilience capacities from a socio-ecological perspective

• Major institutional changes in Indonesia is argued to be driven by the tsunami disaster shock and the HFA (2005-2015).
Systems of Governance to Implement and Sustain TEWS in Indonesia

• Emerging strong economic system of governance

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

➢ Indonesia will face tough challenges to implement and sustain an effective TEWS
# TEWS Related Architectures and Structures:
## Evolution of Institutional Changes Related to DRR in Indonesia

### Table: Legal Basis

<table>
<thead>
<tr>
<th>Year</th>
<th>Law/Decree</th>
<th>Goal</th>
<th>Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>Constitution</td>
<td>Manage Induced Disasters and Social Unrest</td>
<td>NatDM CoordBoard BAKORNAS PBA</td>
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<tr>
<td>1966</td>
<td>Pres Decree No. 28 / 1979</td>
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<td>Manage Induced Disasters and Social Unrest</td>
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<tr>
<td>2006</td>
<td>Pres Decree NO. 19 / 2006</td>
<td>Manage Induced Disasters and Social Unrest</td>
<td>NAT DM Coord Board BAKORNAS PBP</td>
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<tr>
<td>2007</td>
<td>DM Law NO. 24/ 2007</td>
<td>Manage Induced Disasters and Social Unrest</td>
<td>NAT DM Coord Board BAKORNAS PBP</td>
</tr>
<tr>
<td>2008</td>
<td>*Creation of Multi-Level DM Agencies</td>
<td>Manage Induced Disasters and Social Unrest</td>
<td>Nat DRR Platform</td>
</tr>
<tr>
<td>2009*</td>
<td>Pres Decree: No. 8 / 2008*</td>
<td>Manage Induced Disasters and Social Unrest</td>
<td>Nat DRR Platform</td>
</tr>
</tbody>
</table>

### Diagram: Structural Change

- **Emerg Relief**: Coordination of Disaster Response
- **Coordination of Disaster Response**: Manage Induced Disasters and Social Unrest
- **Steering Committee**
  - Formulate Policies, Monitoring and Evaluation
  - DRR Action Plan 2006-2009
- **Executive Board**
  - Coordinate Command and Execute
- **Multi-Sector Participation**

### Timelines

- **1945**: Constitution
- **1966**: Pres Decree No. 28 / 1979
- **1979**: Pres Decree No. 43 / 1990
- **1990**: Pres Decree NO. 106 / 1999
- **2005**: Min Decree NO. 21 / 2005 HFA initially signed
- **2006**: Pres Decree NO. 19 / 2006
- **2008**: *Creation of Multi-Level DM Agencies
- **2009***: Pres Decree: No. 8 / 2008*

### Notes

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

*Full implementation (institutionalized in 2008)
TEWS Related Architectures and Structures (Cont)

- Embedding and institutionalising the INATEWS within the DM Agency (BNPB) as a larger architecture is a key step towards multi-hazard approach, improved institutional coordination and sustainability.

- However, attention has to be paid to creeping bureaucracy and poor effective governance.
TEWS Related Architectures and Structures

• There are also 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
  – Government bureaucracy
  – Lack of financial resources and specialised human capacities.
A key aspect of the TEWS Architecture in Indonesia is the relatively high degree of multi-stakeholder participation. This involvement is manifested in several key areas:

- TEWS action arena
- New steering committee of the Disaster Management Agency (BNBP)
- DRR platform

Moreover, the mixture of multilateral and bilateral participation in governance has a profound impact on the final outcome. This collaborative approach ensures that various stakeholders, from local communities to international organizations, have a significant role in shaping the TEWS initiative.

Source: Updated version by author based on BNPB 2008
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)

• However, budget allocation is:
  – Significantly spatially variable leading to unjust allocation of funds
    ➢ Key institutional weaknesses in the DM financial mechanisms
  – Mostly for post disaster response.
  – DM financing is an issue that is constantly contested and negotiated.

Data source: Ministry of Finance, Indonesia 2009
The TEWS System at the Level of Padang and Bali

- 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)

Source: Author
The TEWS System at the Level of Padang and Bali

- 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 especially 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.
Agency in TEWS Development

• 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

- INATEWS has progressed mainly in terms of being fairly effective in seismic observation and forecasting.

- Overall, the TEWS effectiveness is not satisfactory yet.

- New incentives are identified and proposed to change prevailing unsatisfactory outcome:
  - Multi-hazard-risk approach
  - New innovative and creative partnerships especially with the private sector
  - Factor gender issues in the TEWS
  - Enhanced bilateral and multilateral cooperation
  - Integration of the INATEWS with IOTEWS (Regional – global governance and Coordination)
  - Sharing and exchange of local experiences (replicated and inclusive),
  - DRR and CCA and making optimum use of the HFA
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).
Towards a Future Effective and Sustainable TEWS

• 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
The Local Tsunami Early Warning Model: Adaptive-People Centred Approach

- Socio micro-level reaction –Non-linear behaviour

• Response of EOC and other local structures
  - In the case that a significant earthquake is felt for long enough duration, the EOC should independently have the mandate to activate the alarms to lead the local TEWS process.

Source: Author
Towards a Future Effective and Sustainable TEWS
Integration of the Local Approach into the National EWS

Source: Author
Towards a Future Effective and Sustainable TEWS
A Mixed Model Approach

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
Conclusion

• The role of risk governance, multi-institutional arrangements and polycentric frameworks in the context of the TEWS 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 both system and people-centred approaches and a broader coastal city planning and governance strategy to build effective and sustained resilience to the uncertain tsunami risks.
END

THANK YOU