TC21 Transdisciplinary Approach (TDA) for Building Societal Resilience to Disaster

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Tsunami DRR Through Social Capital - Case of Indonesia

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How Science, Technology and Socio Culture Approach on Tsunami DRR could Influence Social Capital in Enhancing Community Resilience – Case of Padang City

Who am I ?

Affiliation:

1. Bandung Institute of Technology:
   - Academic Faculty of Urban and Regional Planning Department – School of Architecture, Planning, and Policy Development
2. Chair of Working Group 1 ICG IOTWMS - Intergovernmental Coordination Group on Indian Ocean Tsunami Warning and Mitigation System: Tsunami Risk, Preparedness and response (2015-2019)
3. Vice Chair I of Indonesian Association for Disaster Expert IABI

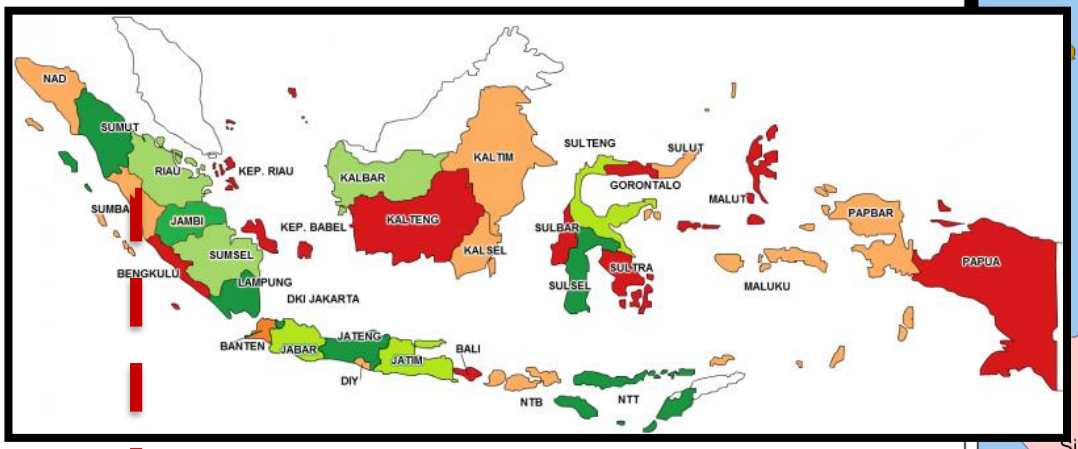
Education:

- PhD from Kochi University of Technology, Japan

Experiences:

- Development of several Technical Guidelines for Tsunami Countermeasures since 2005
- National Task Team for Indonesian Tsunami Early Warning System Indonesia (2005-2008)
- Coordinator for National Tsunami Exercise in 2006 and 2007
- Several works on earthquake disaster mitigation since 1997

West Sumatera Prov.



Research Case Study (4/7):

1.Agam Regency

2.Pariaman City

3.Padang City

4.Painan Town – Pesisir Selatan Reg

Padang City Profile

Population : 1 million
Location : 0°54° s/d 1° 08°SL
Area : 694,96 KM2
Coast line : +/- 84 Km
Surrounded islands : 19
Rivers (big & small) : 21
Sub-districts : 7 out of 11 (64%)
Villages : 58 out of 103 (58%)

Challenges for Coastal Communities Toward Tsunami

Earthquake and Tsunami Impacts: 2004, 2009 and 2012

Story of 2010 Mentawai Tsunami - West Sumatera Prov:

"I was watching television (MetroTV) when the earth swung. I went out, saw many people did so but no body escaped from their houses. I *got back* in my house, made a cup of coffee and back to the television and *saw the running text of tsunami warning*. I went out home in a *hurry to escape*. I had been outside for a while when the wave swept Me and brought me to the forest. I lost my consciousness till the next morning" (Fredi 23 years, Muntei Baru-baru - Mentawai).

Lesson Learnt → Challenges for Building Community Resilience through Preparedness and Education → *Needs for TDA in DRR*

Example of Transdisciplinary Tsunami DRR in Enhancing Community Resilience

Lesson Learnt → National Action

April 11, 2012
Aceh

Aim:

to have integrated National Action among national stakeholder to reduce tsunami disaster risk

Focus:

TEWS – improve continuously

Structural mitigation and prevention

Non-structural mitigation and prevention

Stakeholders involved:

NDMA, PW Ministry, National Planning Agency, Ministry of Higher Education and Research Tech, BMKG, Universities, others

Need for Improvement of Preparedness

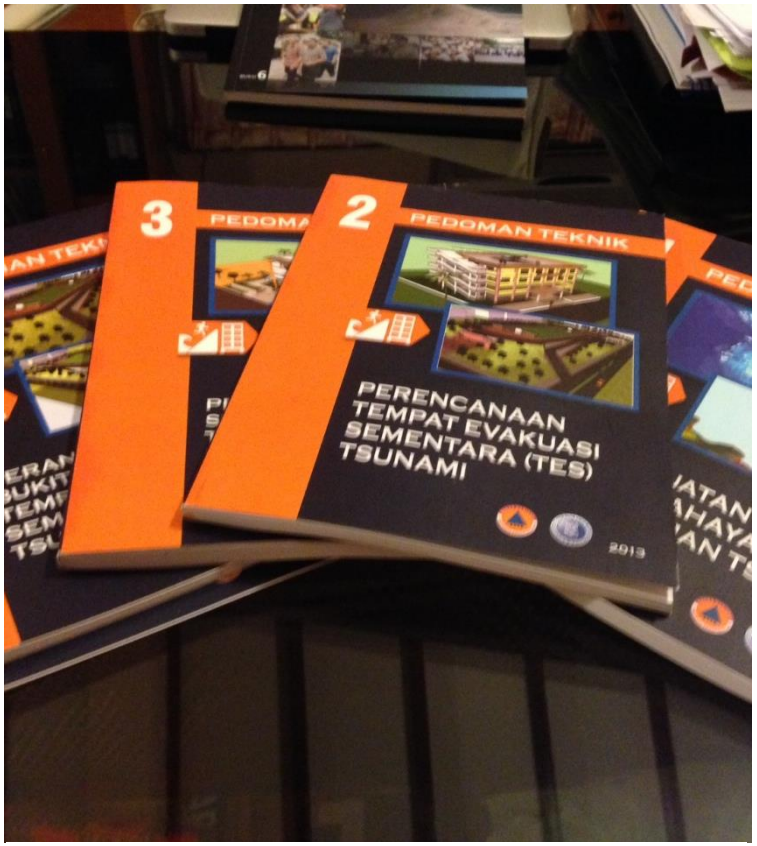
Tsunami Disaster Risk Reduction National Master Plan (DRRMP)

Implemented

Tested

Improvement of Evacuation Capacity

(sources: Harkunti P. Rahayu et al, 2014)

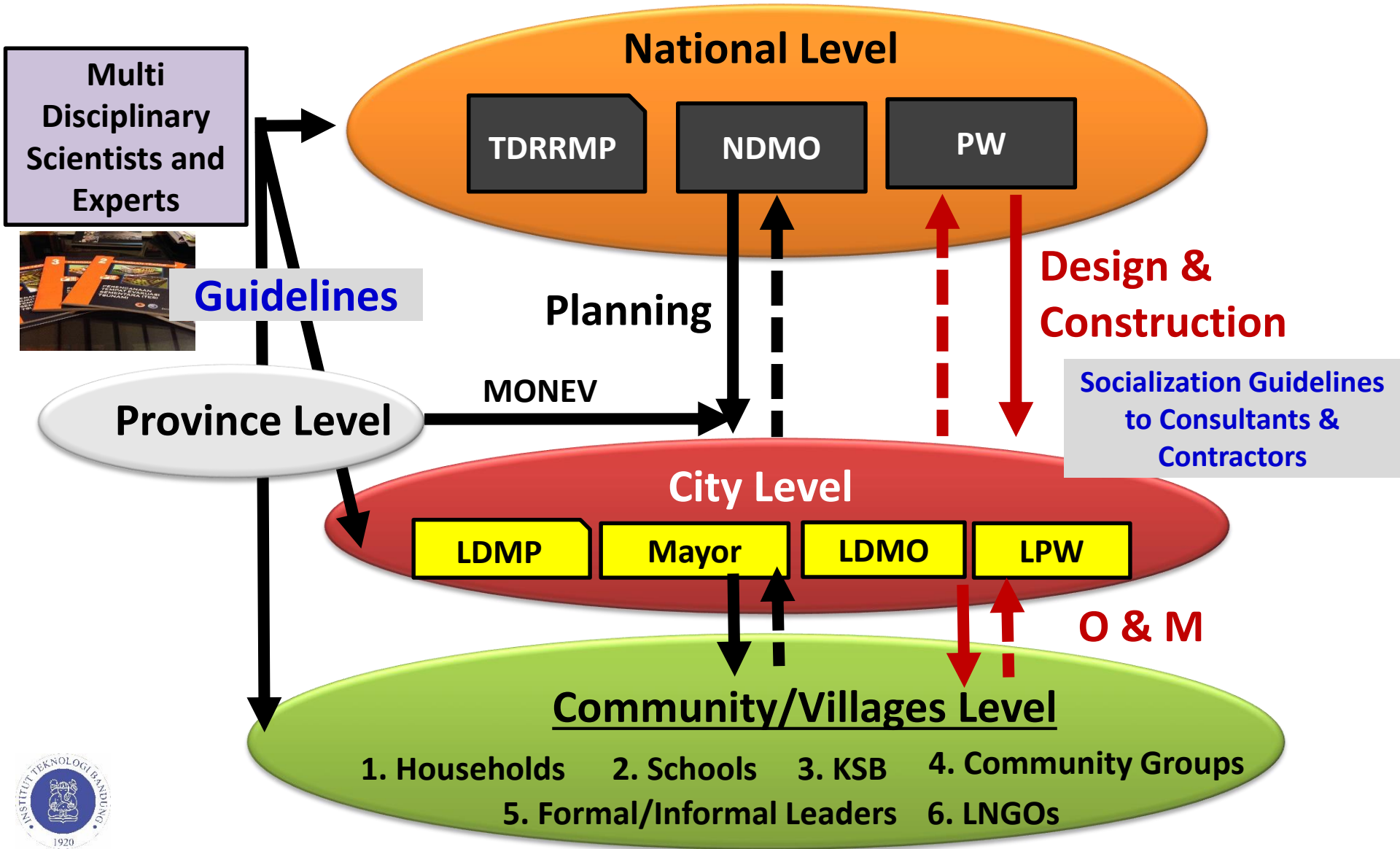


Guidelines on Tsunami Evacuation and TVES

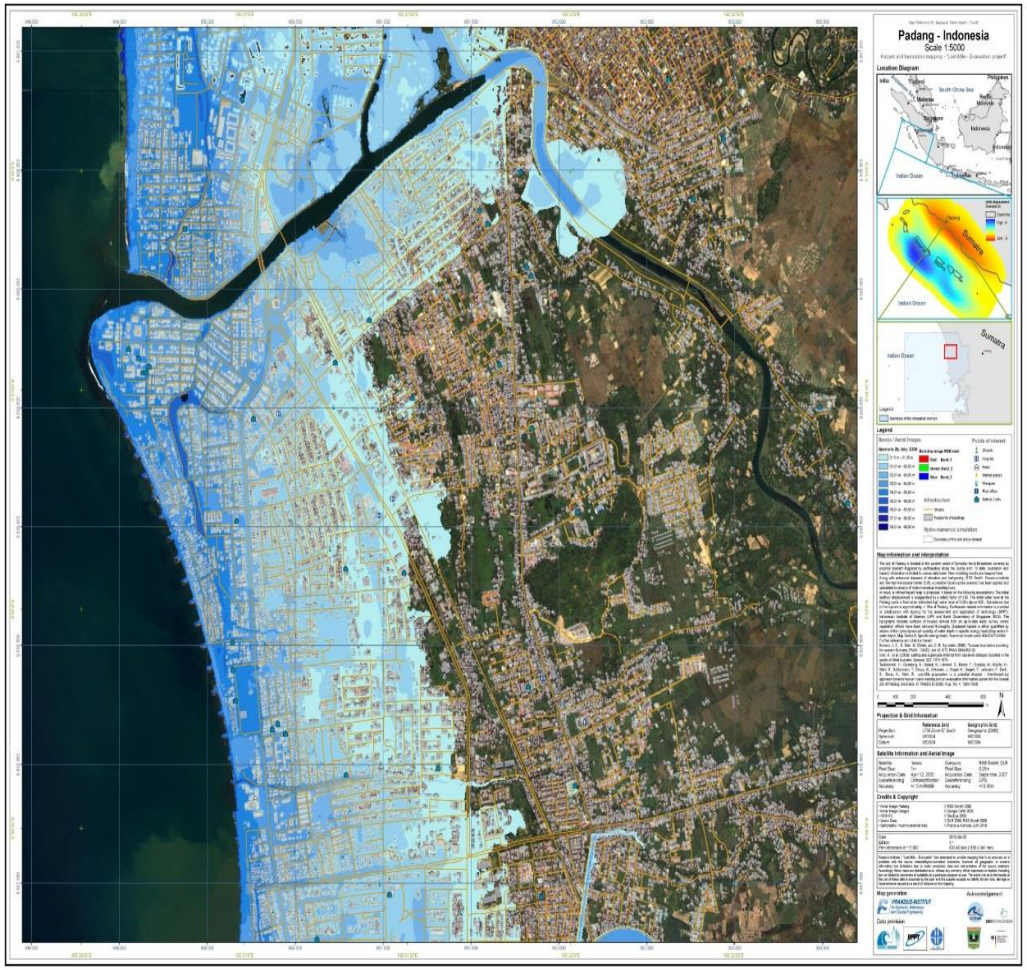
1. Public Engagement in planning, design and constructions → *participatory approach*
2. Evacuation Plan → *Consider social behavioral science*
3. Revitalize road function: remove obstacle → law enforcement on road parking, street parking
4. Vertical Evacuation Shelter (Building and/or Artificial Hill) → need assessment analysis for capacity of shelter and location
5. Tsunami signage → need assessment analysis for number, type and location
6. Improve traffic management in chaotic situation
7. many other

Example of TDA in Development of TVES

Multi-stakeholders and Inter-sectoral Participatory Process



Tsunami Risk and Evacuation Map of Padang City → *Open to Public*

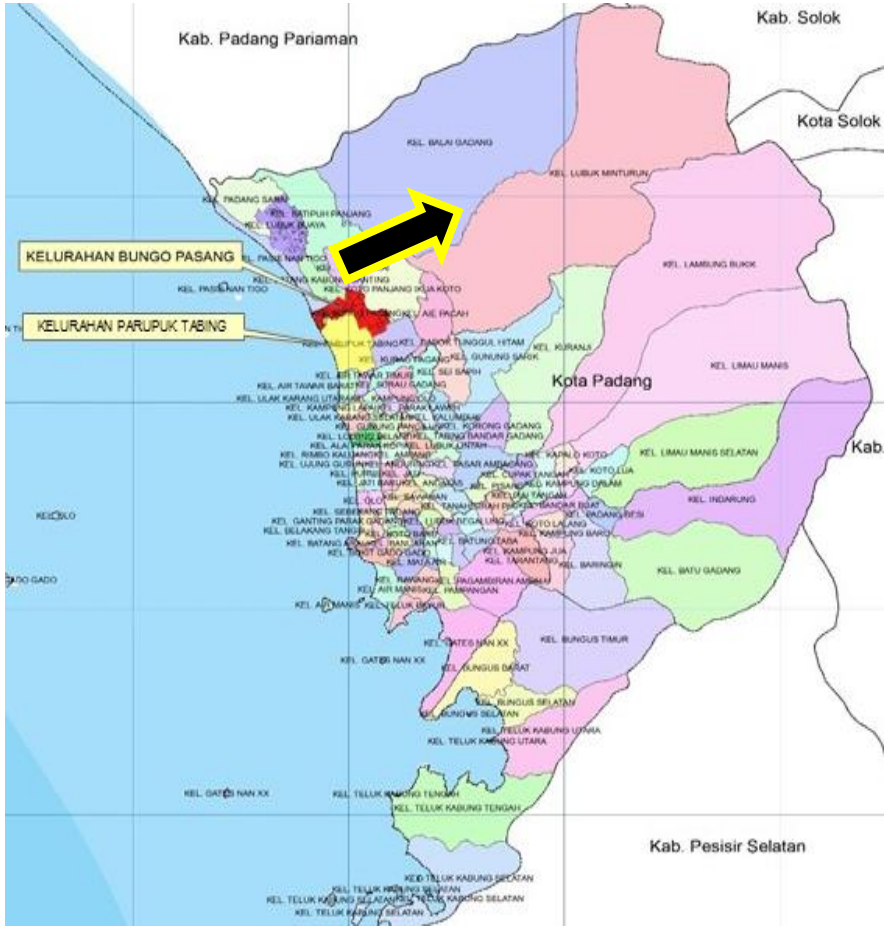


Inundation Map of Kota Tangah and Padang Barat Sub-Districts (Sources: Hamzah Latief, 2015)

Evacuation Map of Padang City showing the Tsunami Prone and Safe Area (Sources: City Government of Padang)

Migration Issues – Facts Before TVES Built in 2015

Documents: Harkunti P. Rahayu (2016)

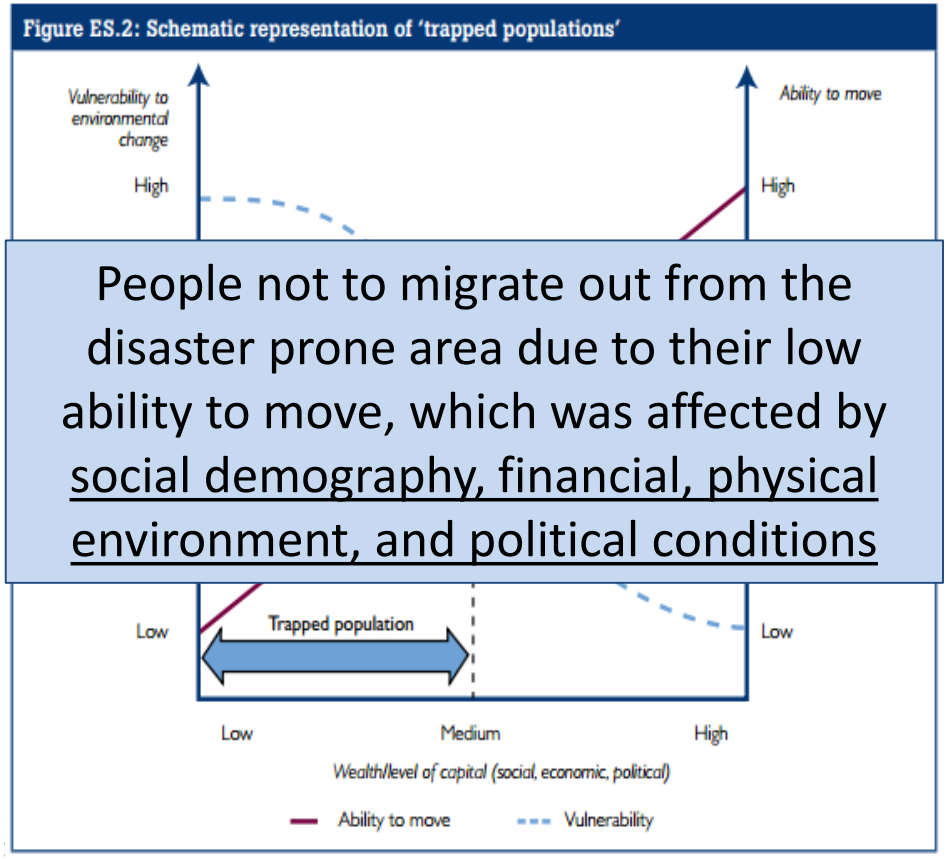


Empty Houses Before 2015 in Red Zone of Tsunami Inundation Area

Disaster vs. Migration

Documents: Harkunti P. Rahayu (2016)

"through migration → people attempt to avoid their disaster prone environment"
(Foresight: Migration and Global Environmental Change, 2011)

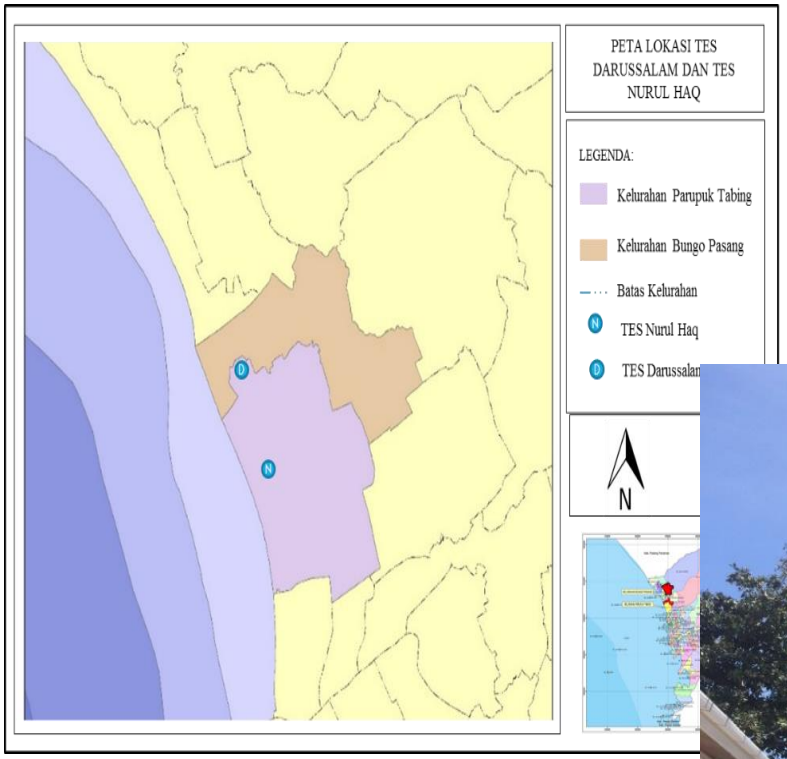


People not to migrate out from the disaster prone area due to their low ability to move, which was affected by <u>social demography, financial, physical environment, and political conditions</u>

Typology of People At Risk

Choose to stay	*Trapped*
Having capacity/ability to move out but decided to remain staying in disaster risk area.	Having no capacity/ability to move out and willing to move out to safer place but decided to remain staying in disaster risk area.
<u>High Trust to Their Safety of Land and Environment</u>	<u>Low Trust to Their Safety of Land and Environment</u>

3 Newly Built TVES (2013-2015)



NURUL HAQ TVES

Documents: Harkunti P. Rahayu (2016)

Impact of DRR (TVES) on:

Trust, Land Use and Land Price → Revise Spatial Plan

Science Technology and Socio Culture (IPTEKS) becomes Input for Local Policy and Regulation:

1. Disaster Management Plan
2. Spatial Plan (20 years)
3. Mid Term Development Plan (5 years)

Channel through:

1. closely working with local government and dialogue with people
2. Focus Group Discussion (Multi Stakeholder and Inter-sectoral Participatory)
3. Public Engagement using Media/Social Media
4. Personal networking
5. Opportunity to International Exposure

Before 2015 After 2015

Other Example of TDA: From Science to Policy and Implementation

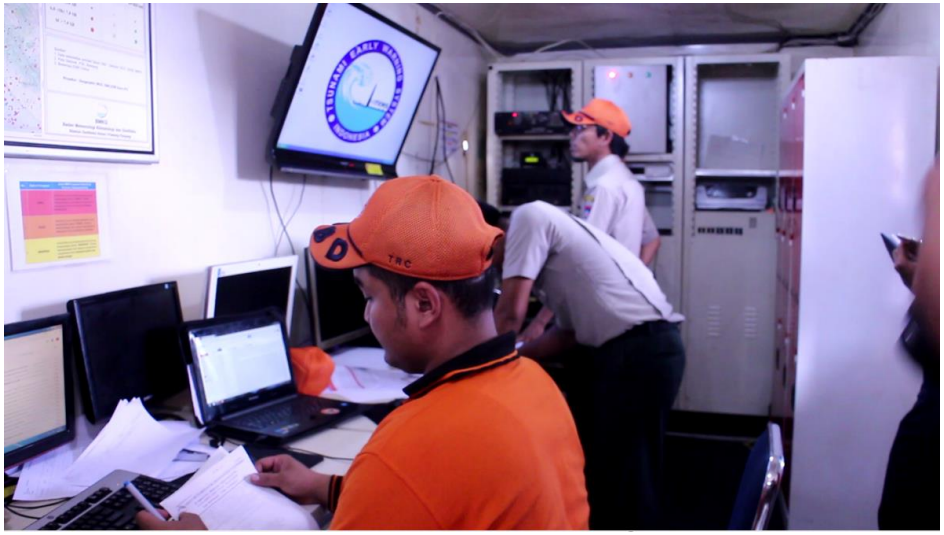
c. focus group discussion

Focus Group Discussion (FGD) and Table Top Exercise (TTX) September 2016

RESULT: *Improved SOP of Downstream TEWS and ER* → **tested during IOWave16 Implementations**

warning chain.

IOWave 16 SOP - Reaching the Very Last Mile



Science Based Policy Development

Documents: Harkunti P. Rahayu (2016)

MoU Signed Padang City Government and ITB based on the Works Done by ITB PEER

Bandung, 5-6 December 2016

Concluding Remark:
Beyond Scientific and Engineering Judgment

- Multi level and multi stakeholder participatory planning, Design and implementation of TDRR
- Need assessment analysis to obtain the realistic capacity, number and location of vertical shelter
- Building Trust of community to building as well as to government
- Institutionalize tsunami exercise into local policy and regulation → Conduct tsunami public education and tsunami exercise in regular bases to anticipate high mobility people
- Public engagement in maintaining and optimizing TDRR intervention
- Identify DRR focal points across government agencies and strengthen intra and cross-sectoral coordination mechanisms.
- Institutionalize the improvement of downstream warning chain into local policy and regulation of Local TEWS → Mayor Decree and/or Local Regulation

IOWAVE 16 → Testing Improved SOP

https://www.youtube.com/watch?v=fnlLHh0e1S4

Thank you

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