20TH ACEH TSUNAMI Commemoration 26 Dec 2004- 26 Dec 2024

WCU World Class University

TDMRC TSUNAMI AND DISASTER MITIGATION RESEARCH CENTER

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

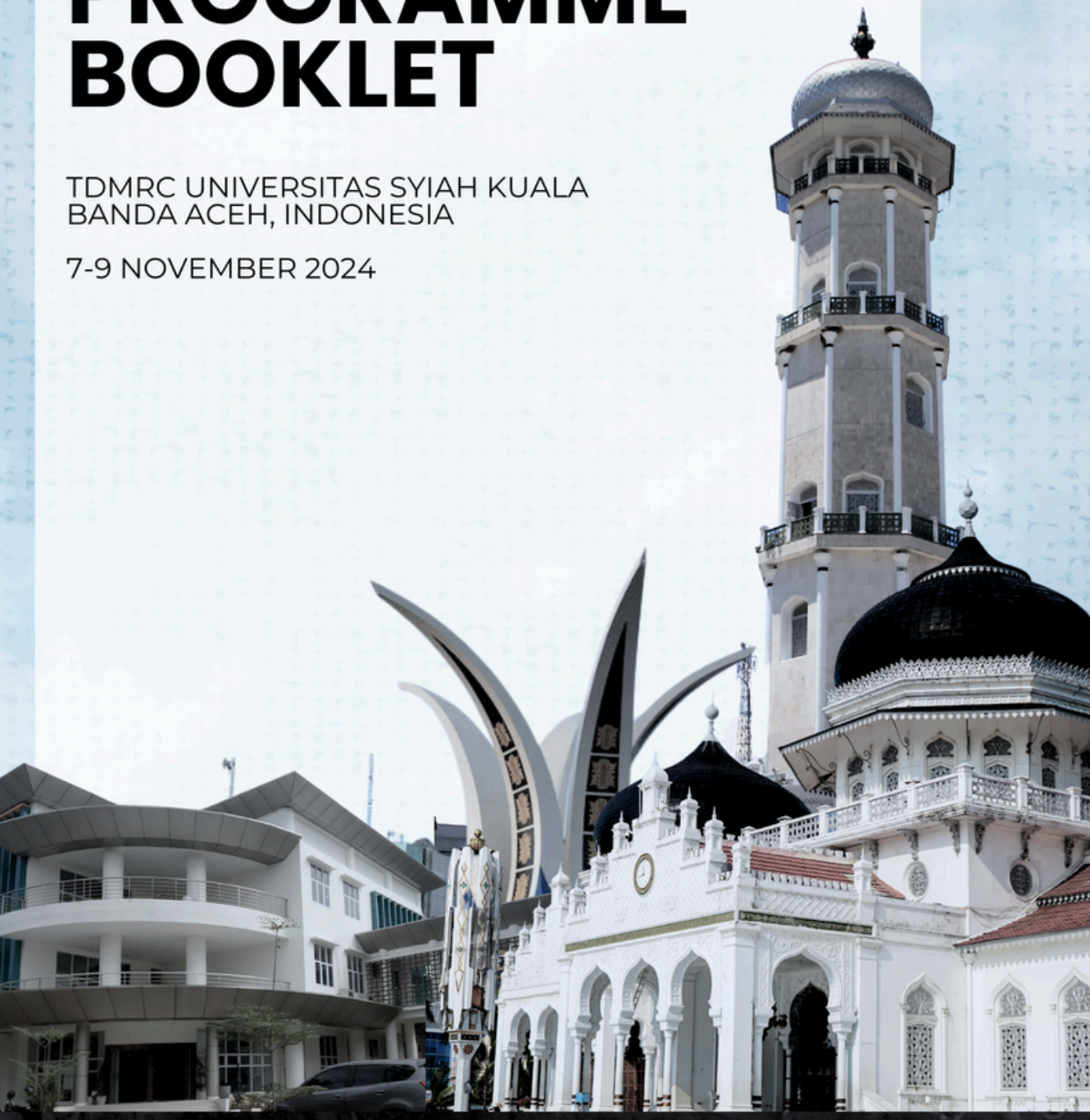
in CONJUNCTION

PIT IABI 8th
Ikatan Ahli Kebencanaan Indonesia

PROGRAMME BOOKLET

TDMRC UNIVERSITAS SYIAH KUALA
BANDA ACEH, INDONESIA

7-9 NOVEMBER 2024



Welcoming Speech
Rector Universitas Syiah Kuala

Assalamu'alaikum warahmatullahi wabarakatuh.

Good evening, everyone.
Let me extend a warm welcome and express our appreciation to:

- Minister of Higher Education, Sciences, and Technology, Prof. Dr. Ir. Satryo Soemantri Brodjonegoro,
- Interim Governor of Aceh, Dr. H. Safrizal ZA,
- The representative from the National Agency of Disaster Management of Indonesia,
- The keynote speakers:
  - Prof. Tiziana Rossetto, Professor at the Department of Civil, Environmental, and Geomatic Engineering, Faculty of Engineering Sciences, University College London,
  - Prof. Sunichi Koshimura, from the International Research Institute of Disaster Science (IRIDeS), Tohoku University, Japan,
  - Prof. Ir. Dwikorita Karnawati, M.Sc., Ph.D., Head of Meteorology, Climatology, and Geophysics of Indonesia.
- The invited speakers:
  - Prof. Anawat Suppasri, Ph.D., IRIDeS, Tohoku University, Japan.
  - Prof. Dr. Irwan Meilano, S.T., M.Sc., Dean of Faculty of Earth Sciences and Technology, ITB.
  - Prof. Dr. Muksin, S.Si., M.Si., M.Phil., Coordinator of Graduate Program in Physics and TDMRC, Universitas Syiah Kuala.
- Vice Rectors, Universitas Syiah Kuala.
- Head of Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala: Prof. Dr. Syamsidik, S.T., M.Sc.
- Chairman of the Institute for Research and Community Service, Universitas Syiah Kuala: Prof. Dr. Mudatsir, M.Kes.
- Representatives of the media and news agencies,
- Participants and committees of the 16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery 2024 (the 16th AIWEST-DR 2024) and in conjunction with the 8th PIT IABI.

Praise and gratitude be to Allah SWT, as we have been brought together in this scientific forum by His grace. Shalawat and greetings I uphold to the Prophet Muhammad SAW.

I wish to thank the keynote speakers and presenters for accepting our invitation to share their experiences. I recognize the time and extra effort they have put into preparing their presentations, and for this, I am truly grateful.

This December, we will commemorate the 20th anniversary of the 2004 Aceh Tsunami, which significantly impacted the world's disaster management paradigms. In December 2004, the earthquake and tsunami killed more than 220,000 people. Our university lost at least 111 academic staff, 102 administrative staff members, and 1,426 students, and encountered massive damage to facilities such as buildings, classrooms, labs, and other academic facilities. Thus, we are committed to hosting the 16th AIWEST-DR 2024 in conjunction with the 8th PIT IABI. The strong collaboration from all organizations related to disaster has exhibited solid efforts in communicating sciences to enhance resilience, which is the motto of TDMRC USK.

One important lesson we have learned from this mega-disaster is the need to increase our knowledge capacity to face various disaster risks. Technological advancements offer excellent opportunities to make our community more resilient to any future disasters. We have also witnessed the important roles of education and technology in serving our community and government agencies, especially in science-based disaster management.

Ladies and gentlemen, TDMRC was founded in 2006, two years after the 2004 Indian Ocean tsunami. TDMRC now has several exciting scopes of disaster research clusters. As one form of our contribution to the world of research, since 2009, we have held international conferences every year, involving researchers from Indonesia and various other parts of the world.

In 2023, we managed the 15th AIWEST-DR 2023, which was held in UGM, Yogyakarta, with our collaborator from Tohoku University, Japan, University of Sydney, Australia, UPNM Malaysia, and UGM, Indonesia. On this occasion, I would like to thank IRIDeS, Tohoku University, Japan, for their continuous support in organizing and co-organizing this conference.

Once again, I would like to acknowledge the generous contribution of the supporting institutions: University College London, UNESCO, University Pertahanan Nasional Malaysia (UPNM), BMKG, BNPB, ITB, Ikatan Ahli Kebencanaan Indonesia (IABI), EPI-Centre, and Forum Perguruan Tinggi Penanggulangan Bencana Indonesia.

We hope that the research network that has been built can be expanded and strengthened in the future. Hopefully, world problems, especially those related to disaster impacts, can be resolved with our research innovations.

Happy presentations to all! We apologize for any shortcomings and inconveniences during this activity. Thank you.

Wassalamualaikum warahmatullahi wabarakatuh

Prof. Dr. Ir. Marwan
Rector of Universitas Syiah Kuala

Remarks Director of TDMRC of Universitas Syiah Kuala

Assalamualaikum wr. wb.

It is a great honor to welcome all esteemed guests, speakers, participants, and presenters to the 16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery (AIWEST-DR), held in conjunction with the 8th PIT IABI. Since its inception in 2006, AIWEST-DR has continued to attract an increasing number of presenters and contributions from scientists and disaster management practitioners, not only from the Asian region but also from other continents.

The Tsunami and Disaster Mitigation Research Center (TDMRC) of Universitas Syiah Kuala would like to extend sincere gratitude to all our partners and campus leaders for making this meaningful event possible. Over the years, these events have generated numerous publications, some of which have been featured in prestigious international journals. This achievement would not have been possible without the collaboration of our partners from Indonesia, Japan, Singapore, Australia, the United Kingdom, the USA, Thailand, Malaysia, and many other countries.

This year's event holds special significance as we commemorate the 20th anniversary of the Aceh tsunami. The event is further enhanced by its conjunction with PIT IABI and is organized back-to-back with the 2nd IOC-UNESCO meeting in Aceh. The Aceh tsunami profoundly changed disaster paradigms, not only in Indonesia but worldwide.

The TDMRC, with its new facilities and buildings at the main campus of Universitas Syiah Kuala, aspires to serve as a beacon for disaster research, contributing to advancements and innovation in this field. We would like to reaffirm our commitment to collaboration with all partners attending this event as we work together, hand-in-hand, to strengthen our global preparedness in an increasingly challenging world.

We extend our heartfelt appreciation to IRIDeS Tohoku University, University College London, Universitas Gadjah Mada, University of Sydney, Universiti Pertahanan Nasional Malaysia, and our close contributing partner in AIWEST-DR since 2016. We also wish to thank other universities and institutions that have supported this event. Special thanks to all keynote speakers, invited speakers, and moderators who have graciously agreed to share their valuable time and insights.

Finally, we thank the participants and the organizing committee of the 16th AIWEST-DR 2024. Without your dedicated efforts and contributions, this event would not be possible.

Thank you very much.

Banda Aceh, November 7, 2024
Wassalamualaikum wr. wb.

Prof. Dr. Syamsidik
Director of TDMRC
Universitas Syiah Kuala

Remarks Chairman of the 16th AIWEST-DR 2024 in conjunction with 8th PIT IABI

Assalamualaikum wr. wb.

Alhamdulillah, all praise is due to Allah, and blessings be upon Muhammad, the Messenger.

On behalf of the entire 16th AIWEST-DR 2024 in conjunction with the 8th PIT IABI committee, it is with great pleasure that I welcome you to the 16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery (AIWEST-DR) 2024, in conjunction with the 8th PIT IABI. AIWEST-DR is the most comprehensive conference on issues surrounding disaster risk reduction.

This year, the conference is hosted by the Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala, and the Aceh Disaster Management Agency (BPBA), with the theme: "Bridging History and Horizons Towards a Sustainable, Resilient, Adaptive, and Inclusive World: Commemorating 20 Years of the 2004 Aceh Tsunami." It will provide an opportunity to increase participants' awareness and understanding of disaster recovery toward a sustainable, resilient, adaptive, and inclusive world, two decades after the Aceh tsunami.

Today, we are featuring prestigious speakers in keynote, panel, special, and parallel sessions, with distinguished scientists of international standing. These sessions often lead to thought-provoking insights into many problems, so I am convinced that, like me, you are very much looking forward to these stimulating talks.

This year, we received 208 submissions. Each submission received two or more reviews, and the technical program committee thoroughly analyzed the scores and comments of the reviewers to create as compelling a program as possible. This careful selection process was organized into seven major technical areas: Hazard, Technology, and Infrastructure; Inclusive Community Resilience and Disaster Education; Urban Planning, Reconstruction, and Recovery; Disaster Society, Culture, and History; Human Security, Pandemic, and Communicable Diseases; Disaster Governance and Diplomacy; and Disaster Risk Financing and Insurance.

As mentioned earlier, organizing the 16th AIWEST-DR 2024 in conjunction with the 8th PIT IABI requires numerous contributions from many individuals, many of whom offer their services freely despite other demands on their time. I would like to express my sincere gratitude to the many colleagues whose dedication and commitment to excellence made this event possible: the Rector of Universitas Syiah Kuala; the Institute for Research and Community Service, Universitas Syiah Kuala; our co-organizer, the Aceh Disaster Management Agency (BPBA); the supporting institutions, including IRIDeS, Tohoku University, University College London, the University of Sydney, Universiti Pertahanan Nasional Malaysia (UPNM), UNESCO, BMKG, BNPB, Universitas Gadjah Mada (UGM), Institut Teknologi Bandung (ITB), Ikatan Ahli Kebencanaan Indonesia (IABI), EPI-Centre, and Forum Perguruan Tinggi Penanggulangan Bencana Indonesia; the keynote and invited speakers, who are sharing their expert views on unique topics of interest.

I would also like to thank the committee for their hard work and total commitment to a top-quality program, the reviewers who diligently evaluated all submissions, often on very short notice, and the session chairs and moderators for their essential role in ensuring the smooth running of the conference itself.

And last but not least, thank you to everyone who submitted a paper to the conference and to all participants. I sincerely hope that you enjoy the conference and wish everyone a successful event.

Wassalamualaikum wr. wb.

Haekal A. Haridhi, Ph.D
Chairman of the 16th AIWEST-DR 2024
in conjunction with the 8th PIT IABI

Guidelines for Presenters

A. Offline Presentation Guidelines

1. **Session Structure**
   - Presentations are organized into parallel sessions grouped by conference topics.
   - Each session includes:
     - A session chair (moderator)
     - An administrator for technical support
     - Presenters and participants

2. **Presentation Timing**
   - Please find your schedule according to the schedule of book of abstract or the program schedule from the following link: https://aiwest-dr.usk.ac.id/parallel-session-day-3/
   - Each presenter is allocated 10 minutes for their presentation, followed by 5 minutes for discussion.
   - Moderators will strictly enforce these time limits to maintain the schedule.
   - If you encounter any technical problems before or during your presentation time, please contact the operator or moderator in your room.

3. **Preparation and Attendance**
   - Presenters should be present in the assigned room at least 10 minutes before the track begins.
   - The moderator will briefly introduce each presenter before they begin.
   - Presentation materials will be managed by an assigned operator; ensure your materials are prepared accordingly.

4. Dress Code
   - Presenters may choose to dress in smart casual.

5. Presentation Materials Submission

- All presenters must submit their presentation slides in PPT format by November 7, 2024.
- **File Naming Convention:** Name your PPT file as Track_AbstractID_Presenter.
  - Examples:
    - Track1_50_JohnDoe
    - Track5_12_JaneRoe
- **File Size Limit:** Ensure the PPT file size does not exceed **100 MB.**
- Upload your presentation to:
- https://forms.gle/yGdYfT81id1V16Ue6

6. **Presentation Timing**

- Please find your schedule according to the schedule of book of abstract or the program schedule from the following link: https://aiwest-dr.usk.ac.id/parallel-session-day-3/
- Each presenter is allocated 10 minutes for their presentation, followed by 5 minutes for discussion.
- Moderators will strictly enforce these time limits to maintain the schedule.
- If you encounter any technical problems before or during your presentation time, please contact the operator or moderator in your room.

7. **Preparation and Attendance**

- Presenters should be present in the assigned room at least 10 minutes before the track begins.
- The moderator will briefly introduce each presenter before they begin.
- Presentation materials will be managed by an assigned operator; ensure your materials are prepared accordingly.

4. Dress Code

- Presenters may choose to dress in smart casual.

B. Online Presentation Guidelines

1. **Zoom Access and Username Format**
   - Zoom links for both Plenary and Parallel Sessions are available in venue section in this book of abstract.
   - Username Format: Upon your login, please adjust your Zoom username to the following formats:

   Track_AbstractID_Presenter.
     - Examples:
       - Track1_50_JohnDoe
       - Track5_12_JaneRoe

2. Presentation Timing and Flow

- Please find your schedule according to the schedule of book of abstract or the program schedule from the following link: https://aiwest-dr.usk.ac.id/parallel-session-day-3/
- We urge you to check the online schedule frequently for any updates.
- Each presenter is allocated 10 minutes for their presentation, followed by 5 minutes for discussion.
- Moderators will strictly enforce these time limits to maintain the schedule.
- If you encounter any technical problems before or during your presentation time, please contact the operator or moderator in your room.

3. Technical Recommendations

- Make sure your devices audio and video are function normally.
- Virtual Background: Use the official virtual background provided on the conference website under the "For Authors" section: https://aiwest-dr.usk.ac.id/.
- Audio: Keep your microphone muted when not speaking. Using headphones is recommended for better sound quality.
- Video: Avoid excessive or rapid movements during your presentation.

4. Preparation and Attendance

- Log into your assigned Zoom session and locate your breakout room at least 10 minutes before the track begins to address any technical issues in advance. The breakout room number and schedule can be found in the program.

5. **Presentation Materials Submission**

- Submit your presentation slides in PPT format by November 7, 2024.
- File Naming Convention: Name your PPT file as Track_AbstractID_Presenter.
  - Examples:
    - Track1_50_JohnDoe
    - Track5_12_JaneRoe
- File Size Limit: Ensure the PPT file size does not exceed 100 MB.
- Upload your presentation to: https://forms.gle/yGdYfT81id1V16Ue6.

6. Presentation Template

- Please use the official PPT template available on the conference website under the "For Authors" section: https://aiwest-dr.usk.ac.id/.

Etiquette & Useful Tips

Aceh has strong cultural and religious traditions, with a special emphasis on **Peumulia Jamee**, or **"honoring guests"**. This tradition reflects the Acehnese people's deep-rooted hospitality and their appreciation for visitors who show respect for their way of life. Small adjustments to your behavior can make a big difference in expressing this respect. Here are some helpful tips on how to "blend in" and show respect:

- **Body Language:** Avoid placing your hands on your hips, as this can be seen as a sign of anger or arrogance.
- **Foot Etiquette:** Do not point your feet towards others; showing the soles of your feet is considered rude.
- **Passing Items:** Instead of throwing objects to someone, it's more polite to hand them over directly, even if it means moving closer to the person.
- **Touching Norms**: Same-gender physical contact, like men touching men or women touching women, is normal. However, touching between the opposite sexes in public is rarely done.
- **Entering Homes:** Remove your shoes when entering a home.
- **Timing Visits:** Avoid visiting Muslim homes during prayer times.
- **Using the Right Hand:** Always use your right hand when giving or receiving items, and when eating.
- **Dress Code:** Your attire significantly affects how you're perceived. Dressing appropriately can earn you respect and better service.

·In government offices, wear long trousers, a collared shirt, and shoes to convey respect.

·Aceh is a province in Indonesia with rich Muslim traditions. We encourage participants to respect these customs, one of which suggests that women wear a headscarf.

LIST OF CONTENT

ABOUT USK

Universitas Syiah Kuala (USK) is the oldest public university in Aceh. It was established on September 2, 1961 with the Decree of the Minister of Higher Education and Science Number 11 of 1961, dated July 21, 1961. The establishment of USK was confirmed by the Decree of the President of the Republic of Indonesia, number 161 of 1962, dated April 24, 1962 at Kopelma Darussalam, Banda Aceh. USK is domiciled in the capital of Aceh Province with the main campus located in the Student City (Kopelma) Darussalam, Banda Aceh. Currently, USK has more than 30,000 students studying in 12 Faculties and Postgraduate Programs. in achieving its vision of becoming an innovative, independent, and leading socio-technopreneur university at the global level. USK continues to develop its potential, especially in the field of research, one of which is disaster research.

ABOUT TDMRC

TDMRC has been established since 2006. The Indian Ocean Tsunami in 2004 has inspired the establisment.
Under a number of projects, TDMRC has been involving in protecting communities from disaster through science and technology approaches.
Institutional capacity building, Development of Disaster Regulation Frameworks, Community's Preparedness, and disaster risk mapping are part of deliverable items produced by TDMRC in recent years.

TDMRC
TSUNAMI AND DISASTER MITIGATION RESEARCH CENTER

"Communicating Science, Enhancing Resilience"

VENUE

Online

Topic: Plenary Session & Parallel Session
Join Zoom Meeting
https://zoom.us/j/92771616723?pwd=raR4pS1SCUseaaFsj2G8InKClAx7bW.1

Meeting ID: 927 7161 6723
Passcode: aiwest24

In Person

Welcoming Dinner

Anjong Mon Mata

Address :
Jl. Japakeh, Peuniti, Kec. Baiturrahman, Kota Banda Aceh, Aceh 23116
G-Maps : https://maps.app.goo.gl/XrGLLsFz4hVncLwv7

Plenary Session

AAC Dayan Dawood

Address :
JlH9C9+8CR, Kopelma Darussalam, Kec. Syiah Kuala, Kota Banda Aceh, Aceh 24415
G-Maps : https://maps.app.goo.gl/QWvceXv41kTTDwLh6

Parallel Session

TDMRC USK

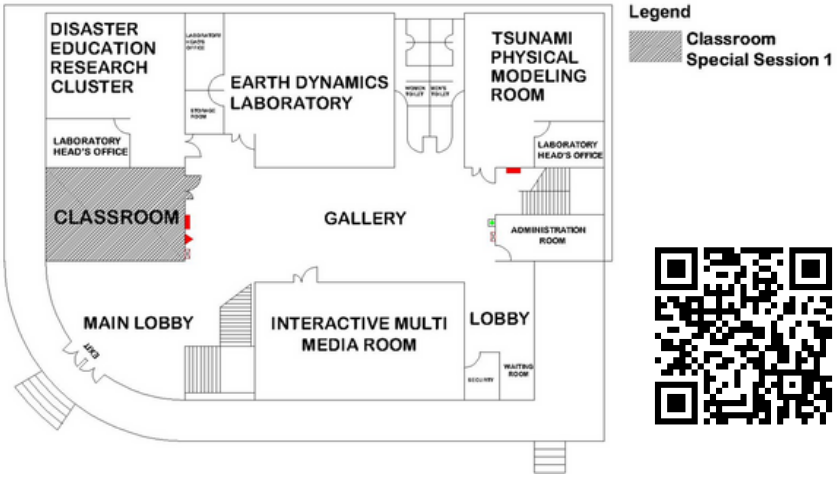
Address :
Jl. Hamzah Fansuri No.8, Kopelma Darussalam, Kec. Syiah Kuala, Kota Banda Aceh, Aceh 23111
G-Maps : https://maps.app.goo.gl/vCnyvLY5XehHVHvJ8

SPECIAL SESSION

Map of Special Session 1

Disabilities, Inclusion, and Disaster Education in Banda Aceh: Learning from the 2004 Indian Ocean Earthquake and Tsunami

Level 1



Map of Special Session 2

Thinking With Tsunamis and the Impossibilities of Governing the Earth

Gedung Magister Ilmu Kebencanaan

SPECIAL SESSION

Map of Special Session 3

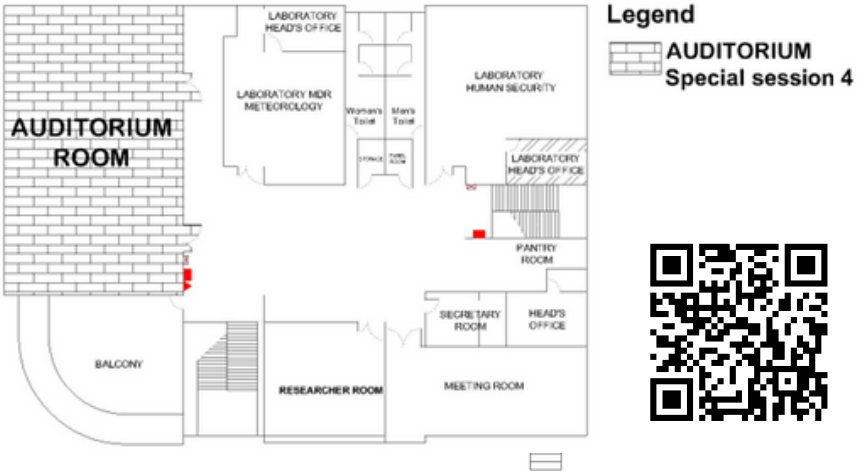
Communicating Risk and Disaster

Gedung Magister Ilmu Kebencanaan

Map of Special Session 4

A New Era of Coastal Disaster Prevention and Mitigation
Integrating Nature and Technology

Level 3



SPECIAL SESSION

Map of Special Session 5

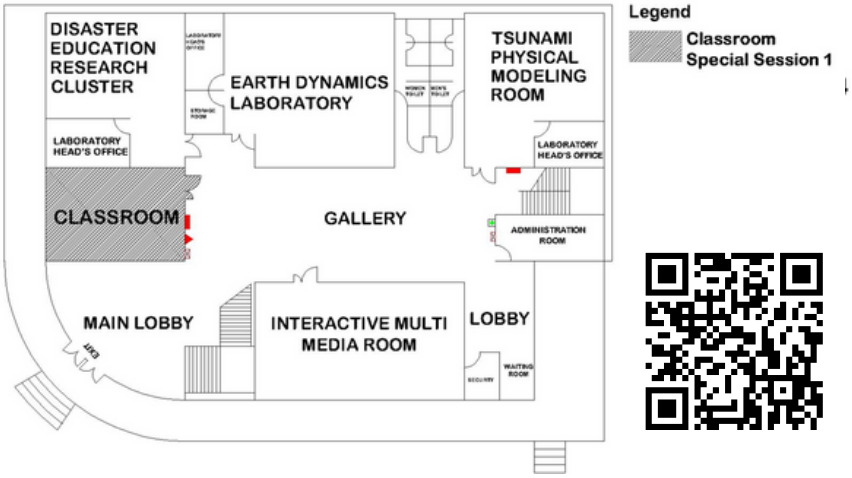
Building mental health resilience after Tsunami: 20 years on

Gedung Magister Ilmu Kebencanaan

Map of Special Session 6

Remembering the Tsunami: After 20 Years

Level 1



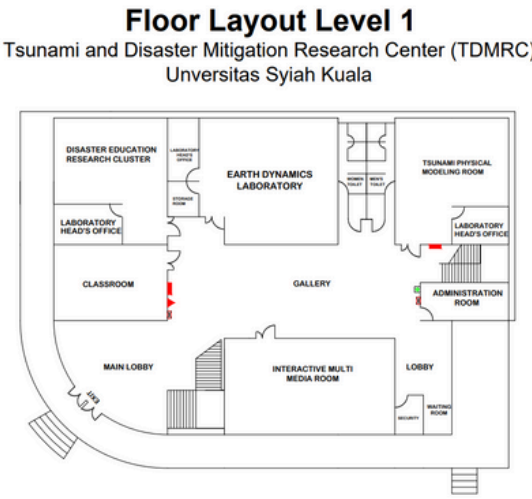
Farewell Dinner

Joel's Bungalows Lampuuk

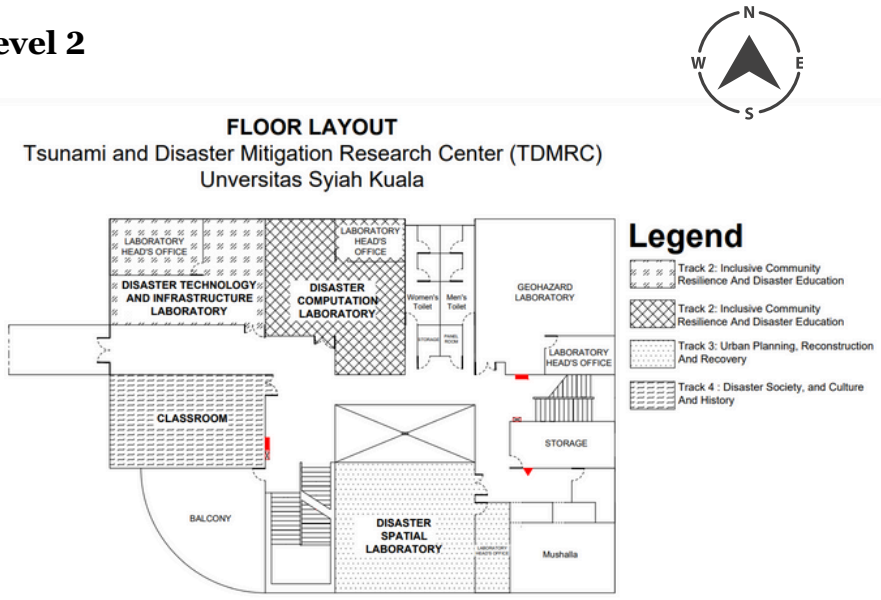
Address :
Jalan Irwandi Yusuf, Lampuuk, Meunasah Lambaro, Lhoknga, Aceh Besar Regency, Aceh 23353
G-Maps : https://maps.app.goo.gl/WKjuJNejzZBeyCG19

Floor Plan of TDMRC Building for Parallel Session

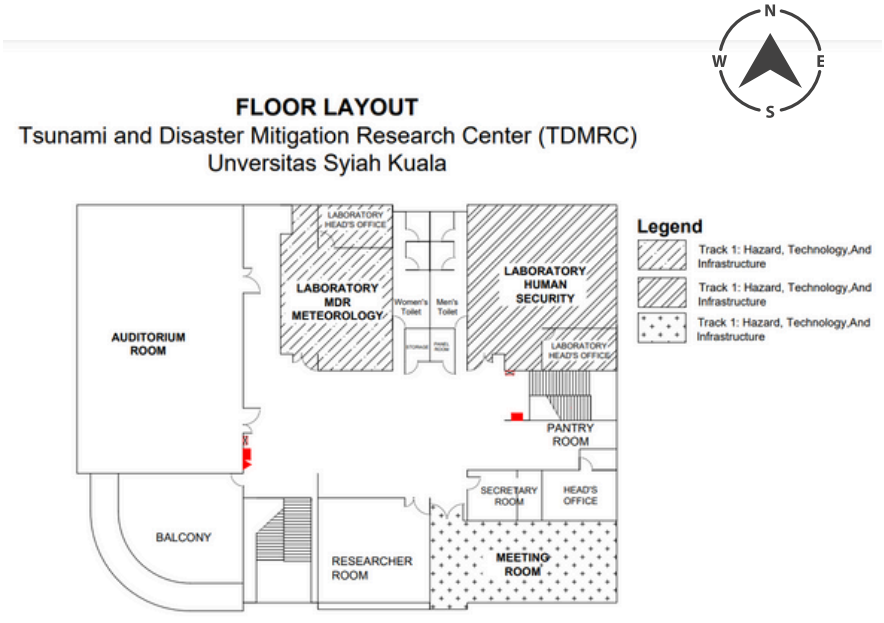
Level 1



Level 2



Level 3



OPENING CEREMONY

TIME	Duration	PROGRAM	DESCRIPTION
DAY 1 - 08 Nov 2024 OPENING CEREMONY - AAC DAYAN DAWOOD			
08.00 - 08.30	30'	Registration	Registrasi peserta oleh Panitia
		Safety Induction Video	Event Organizer
08.30 - 08.35	5'	Opening Ceremony	Led by MC
08.35 - 08.40	5'	Recitation of Holy Quran and Shalawat	Mr. Ghufran
08.40 - 08.45	5'	Indonesian National Anthem	Led by MC
08.45 - 08.50	5'	Promotional Video	Event Organizer
08.50 - 09.00	10'	Ratoeh Jaroe Dance	Event Organizer
09.00 - 09.05	5'	Report from the Chairperson of AIWEST-DR	Haekal Azief Haridhi, Ph.D
09.05 - 09.10	5'	Welcoming Remarks from Main Secretary of BNPB	Dr. Rustian
09.10 - 09.15	5'	Welcoming Remarks from IABI	Dr. Harkunti Pertiwi Rahayu
09.15 - 09.25	10'	Rapa'i Geleng Dance	Event Organizer
09.25 - 09.30	5'	Welcoming Speech from IRIDeS	Prof. Shunichi Koshimura
09.30 - 09.40	10'	Official Opening speech	Rector of USK, Prof. Dr. Ir. Marwan
09.40 - 09.45	5'	Opening Ceremony with Rapa'i	Event Organizer
09.45 - 09.50	5'	Honorary Plaque to Keynote	Led by MC
09.50 - 10.00	10'	Signing MoU between FT USK-School of Engineering Tohoku University	Led by MC
		Signing MoU between FK USK-Psycholgy Faculty UGM	Led by MC
10.00 - 10.05	5'	Photo Session & Closing	Led by MC
10.05 - 10.10	5'	Introduction of Moderator for Panel Session I	by MC
10.10- 10.20	**COFFEE BREAK**		

PLENARY SESSION

PLENARY SESSION - MAIN HALL AAC DAYAN DAWOOD			
10.20 - 10.25	5'	Opening of Keynote Session and Introduction of Speaker 1	Moderator: Prof. Syamsidik
10.25 - 10.37	12'	Keynote Speaker 1	Prof. Tiziana Rossetto
10.37 - 10.42	5'	Discussion Session for Speaker 1	Led by Moderator
10.42 - 10.47	5'	Opening and Introduction of Speaker 2	Led by Moderator
10.47 - 10.59	12'	Keynote Speaker 2	Prof. Shunichi Koshimura
10.59 - 11.04	5'	Discussion Session for Speaker 2	Led by Moderator
11.04 - 11.09	5'	Opening and Introduction of Speaker 3	Led by Moderator
11.09 - 11.21	12'	Keynote Speaker 3	Prof. Dwikorita Karnawati (Online)
11.21 - 11.26	5'	Discussion Session for Speaker 3	Led by Moderator
11.26 - 11.31	5'	Introduction of Moderator for Panel Session I	Led by Moderator
11.26 - 14.00	**BREAK LUNCH & JUMAH PRAYER**		

Panel Session 1: Lessons Learned and Best Practices in Hazard and Technology, Infrastructure Development			
MAIN HALL AAC DAYAN DAWOOD			
14.00 - 14.05	5'	Opening of Panel Session 1	Moderator: Prof. Ella Meilianda
14.05 - 14.17	12'	Invited Speaker 1	Prof. Anawat Suppasri
14.17 - 14.29	12'	Invited Speaker 2	Prof. Muksin
14.29 - 14.41	12'	Invited Speaker 3	Prof. Irwan Meilano (Online)
14.41 - 14.51	10'	Discussion Session	Led by Moderator
14.51 - 14.56	05'	Introduction of Moderator for Panel Session II	Led by Moderator
14.56 - 15.36	40'	Documentary Movie	Rizanna Rosemary, Ph.D & Deni Yanuar, M.Ikom
15.36 - 15.46	10'	Honorary Plaque to Actors	Rizanna Rosemary, Ph.D & Deni Yanuar, M.Ikom
15.46 - 16.00	**COFFEE BREAK & ASHAR PRAYER**		
Panel session 2: Navigating Social Resilience through Economic and Financing Strategy for Disaster Risk Reduction			
MAIN HALL AAC DAYAN DAWOOD			
16.00 - 16.05	5'	Opening Panel Session 2	Moderator: Dr. Syafruddin Chan
16.05 - 16.17	12'	Invited Speaker 1	Prof. Nigel Clark
16.17 - 16.29	12'	Invited Speaker 2	Dr. Dumaria Rulina Tampubolon (Online)
16.29 - 16.41	12'	Invited Speaker 3	Herry Indratno, MPP
16.41 - 16.51	10'	Discussion Session	Led by Moderator
16.51 - 16.56	5'	Announcement of Next Day Program	Dr. Syafruddin Chan
End of the Day 1			

Day 2 – [9 November 2024]
Room 1: Hidrometeorologi Lab, 3rd Floor TDMRC
Track 1: Hazard, Technology,And Infrastructure

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 1A**	**Title**
08.30 - 08.45	10	Anawat Suppasri, Miwako Kitamura, David Alexander, Shuji Seto and Fumihiko Imamura	Lessons from the 2024 Noto Peninsula Earthquake
08.45 - 09.00	16	Admiral Musa Julius, Aditya Setyo Rahman, Ramadhan Priadi, Amelia Chelcea, Jamroni Jamroni and Kaharuddin Kaharuddin	Coastal Evidence and Eyewitness Account Belongs to Tsunami Impact of the 2021 Kalaotoa M 7.4 Earthquake
09.00 - 09.15	45	Rehia Karenina Isabella Barus, Ressi Dwiana and Sinam M. Sutarno	Enhancement of Disaster Risk Reduction Capacities Utilizing Community Radios: A Case Study of Radar Tangguh Program
09.15 - 09.30	51	Eldina Fatimah, Muhammad Fauzi, Abdullah and Qurratul'Aini Benti Nasaly	Numerical Investigation of Extreme Wave Diffraction and Reflection on Porous Pile Cone Breakwaters
09.30 - 09.45	52	Salsa Nazia Putri, Nazli Ismail, Husnul Khatimah and Muksin Umar	Use of GPR and ERT methods to Image Shallow Structures around Paleotsunami Cave in Aceh Besar, Indonesia
09.45 - 10.00	56	Urwatul Wusqa and Reza Syahputra	Multi-Hazard Analysis of Marine Geology in the Banda Sea: A GIS-Based AHP Approach
10.00 - 10.15	118A	Januar Arifin	Improving the Speed and Accuracy of the Tsunami Early Warning System in Indonesia Through Tsunami Gauge Equipment
10.15 - 10.30		**Coffee Break**	
Moderator: Veri yanti			
Notulensi: Dinda Rosalia			
Operator: Muhammad Zawil Kiram			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 1B**	**Title**
10.30 - 10.45	64	Sesa Wiguna, Bruno Adriano, Ruben Vescovo, Erick Mas, Ayumu Mizutani and Shunichi Koshimura	Building damage recognition using remote sensing and semi-supervised learning for rapid assessment
10.45 - 11.00	65	Roudhia Rahma, Mariana Mariana, Asri Gani, Sugiarto Sugiarto and Muhammad Isya	Quantitative Assessment of Carbon Monoxide Emissions from Private Vehicle Utilization in Urban Environments
11.00 - 11.15	70	Erick Mas, Luis Moya and Shunichi Koshimura	When does the shortest path is not the best alternative for a tsunami evacuation?
11.15 - 11.30	72	Ampan Laosunthara, Kumpol Saengtabtim, Takumi Ohashi, Jing Tang and Natt Leelawat	Twitter-based Disaster Situation Analysis of the 2023 Turkey–Syria Earthquake
11.30 - 11.45	79	Ilham Arisbaya, Bambang Sugiarto, Nuraeni Rahma Hanifa, Achmad Fakhrus Shomim and Lina Handayani	Preliminary Investigation of the Relationship Between Gravity Anomalies and Seismic Hazard along Lembang Fault.
11.45 - 12.00	109	Andi Eka Sakya, Jan Sopaheluwakan, Esti Anantasari, Willy Wicaksono, Syarifah Aini Dalimunthe, Willy Wicaksono, Yus Budiono, Rahmat Triyono, Udrekh Udrekh and Dwi Nurcahyadi	Interfingering: Bridging for Effective Tsunami Early Warning and Early Action
12.00 - 12.15	60	Bruno Adriano, Ruben Vescovo, Sesa Wiguna, Erick Mas and Shunichi Koshimura	AI-based Framework for Collapsed Buildings Mapping: Case Study of the 2024 Noto Peninsula Earthquake Using Aerial
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Teuku M. Rasyif, Ph.D.			
Notulensi: Dinda Rosalia			
Operator: Muhammad Zawil Kiram			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 1C**	**Title**
13.30 - 13.45	89	Siti Maryam Purba, Yaumil Farah Alyssa, Nadiatul Asra, Mustika Nadia and Umar Muksin	The Influence of Seismometer Coverage on the Earthquake Focal Mechanism Solution (Case Study: Toba Swarm Earthquake)
13.45 - 14.00	91	Salsabila Zahira Fayzariefta, Muhammad Alif Aufa Putra Aditya, Shigeru Kato, Susania Novita Putri, Ade Asmi and Teuku Muhammad Rasyif	Assessing Economic Losses to Buildings from Tsunami Using Stochastic Rupture Sources: A Case Study of Pelabuhan Ratu, Indonesia
14.00 - 14.15	100	Syafrizal, Alex Kurniawandy and Muhamad Yusa	EFFECT OF SINGLE SYSTEM AND DUAL SYSTEM STRUCTURE ON STRUCTURE PERFORMANCE LEVEL
14.15 - 14.30	101	Muhammad Ibnu H. F. Harahap, Alex Kurniawandy and Muhamad Yusa	BEHAVIORAL STUDIES BUILDING STRUCTURE WITH BASEMENT CONSEQUENCES INFLUENCE OF SOIL-STRUCTURE INTERACTION ON STRUCTURE
14.30 - 14.45	102	Lutfi A. Hanafi, H. C. Hardiyatmo and Fikri Faris	Influence of partial saturation on liquefaction resistance of soil: a case study at Yogyakarta – Bawen toll road
14.45 - 15.00	61	Shunichi Koshimura, Abdul Muhari, Erick Mas, Bruno Adriano, Takashi Abe and Akihiro Musa	Proposal of Real-time Tsunami Inundation and Damage Forecast System in Indonesia
15.00 - 15.15	3	Yuta Hara, Kimiko Takeda, Ryohei Yamashita, Ryo Saito, Daisuke Sasaki and Tatsuto Aoki	The risks of "fallacy of composition" as remaining ethical challenges by scientific research in disaster-affected areas
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
Moderator: Rifqan, S.Si., M.T.			
Notulensi: Dinda Rosalia			
Operator: Muhammad Zawil Kiram			

Day 2 – [9 November 2024]
Room 2: Human Security Lab, 3rd Floor TDMRC
Track 1: Hazard, Technology, and Infrastructure

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 1D**	**Title**
08.30 - 08.45	114	Dedy Wijayanto, Fikri Faris and Wahyu Wilopo	Potential Liquefaction Hazard and Ground Failure Probability Analysis Based on SPT Data in the Relocation Plan of Access Road at Rendani Airport, Manokwari, West Papua
08.45 - 09.00	118	Saut Sagala, Cecilia Nonifili Yuanita, Dekka Dhirgantara Putra and William Harahap	Assessing Nature-Based Solutions (NBS) for Restoring Watersheds: A Case from Brantas River in Batu City
09.00 - 09.15	119	Dita Arif Yuwana, Saut Sagala, Dicky Muslim, Teuku Yan Walliana Muda Iskandarsyah, Kharis Aulia Alam, Muhammad Asa, Akhirul Insan, Wawan Hermawan and Taufiq Wirabuana	Evaluation of land subsidence trends in Pekalongan, Indonesia, through Conventional Deep Pipe Monitoring and Geospatial Data Analysis to guide urban planning strategies
09.15 - 09.30	123	Yasuhiro Soshino, Akira Miyata, Masahiro Nemoto, Yusuke Kato and Kazuhisa Shibayama	Use of Dynamic Population Analysis in Tsunami Evacuation Drill and Disaster Response in Japan
09.30 - 09.45	127	Rifqi Irvansyah, Tiziana Rossetto, Yunita Idris and Jonas Cels	Resilience Assessment of Indonesian School Buildings Against Earthquake and Tsunami Hazards
09.45 - 10.00	128	Mohd Muhaimin Ridwan Wong, Nordila Ahmad, Anawat Suppasri and Syamsidik	Proposal of a Tsunami Intensity Scale Derived from a Tsunami Building Vulnerability Index
10.00 - 10.15	5	Daisuke Sasaki, Yolanda Yolanda, Yuta Hara, Novi Reandy Sasmita, Nudzran Yusya and Hizir Sofyan	How can Local Academic Institutions Play a Key Role in
10.15 - 10.30		**Coffee Break**	
Moderator: Dr. Sylvia Agustina, S.T., MUP.			
Notulensi: Afdila Ramadhani			
Operator: Hadad Rahmat			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 1E**	**Title**
10.30 - 10.45	129	Annisa Sri Sugiarti and Risma Sunarty	The impact of Land-use changes for Flood (Case study in Teunom Sub-District, Aceh Jaya Regency)
10.45 - 11.00	134	Fritz Sihombing	Tsunami Risk Analysis Using Reduced Order Modeling
11.00 - 11.15	138	Akmal Muhni, Dewi Sartika, Bambang Suhaidi, Hidayat Syah Putra, Shanna Hariri Adrian, Maya Safira, Muzakir Zainal and Fajar Fakri	Mitigating Leachate Contamination: Geological Investigations at Alue Lim Landfill Area, Lhokseumawe City
11.15 - 11.30	139	Zahria Zurrah, Suriani Suriani and Muhammad Abrar	Impact of Natural Resources Rents and Human Capital on Ecological Footprint in Indonesia: Technological Innovation as Moderation
11.30 - 11.45	182	Syamsidik Syamsidik, Aulia Khalqillah, Muhammad Daffa Al Farizi, Tursina Tursina, Hayyan Ghifary Armaya, Eldina Fatimah, Muhammad Fauzi and Benazir Benazir	Rapid Estimations of Onshore Tsunami Arrival Times and Flow Depths Based on A Convolutional Neural Network Method: A Novel Approach for Banda Aceh After 20 Years of the 2004 Aceh Tsunami
11.45 - 12.00	142	Khusnul Setia Wardani, Hamzah Haru Radityo Suharyanto, Sigit Sutikno, Ahmad Muhammad, Koichi Yamamoto, Hendra Saputra and R.A. Diah Sulistio Ningrum	Understanding the significance of Coastal erosion pattern along Bengkalis Island due to climate change
12.00 - 12.15	183	Muhammad Daffa Al Farizi, Syamsidik Syamsidik, Anawat Suppasri and Hayyan Ghifary Armaya	Evaluating Tsunami Risk and Economic Loss: Integrating Event Loss Table Methods in Western Coast Part of Aceh, Indonesia
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Dr. Ir. Bambang Setiawan, S.T., M.Eng.Sc			
Notulensi: Afdila Ramadhani			
Operator: Hadad Rahmat			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 1F**	**Title**
13.30 - 13.45	146	Teuku Muhammad Rasyif, Devi Tasya Marisa, Jean Yunita Sumbung and Rifat Santana	The Influence of Sea Level Rise and Land Subsidence on Tsunami Hazard: A Case Study of DKI Jakarta
13.45 - 14.00	147	Kenneth Vinchent Cong and Budianto Ontowirjo	Assessing Economic Losses to Buildings from Tsunami Using Deterministic Rupture Sources: A Case Study of Labuan, Banten, Indonesia
14.00 - 14.15	148	Adnin Musadri Asbi, Djati Mardiatno and Dina Ruslanjari	Tsunami Hazard Area Zonation Using Run-Up Modeling in The Coastal Area of Bandar Lampung City
14.15 - 14.30	166	Haikal Fajri, Irwansyah Irwansyah, Lailissa'Adah Lailissa'Adah, Defry Basrin, Arisna Fauzia, Nova Purnama Lisa and Muhammad Riswandy	Seismic vulnerability assessment of health facility buildings. Case study: Langsa City, Indonesia
14.30 - 14.45	141	Rizka Puspitasari, Connie Cai Ru Gan, Muhammad Yani, Zahrina and Taufik Fuadi Abidin	Location-based Climate-Sensitive Diseases Mapping using Machine Learning for Dashboard Development in Public Healthcare Services (Puskesmas)
14.45 - 15.00	194	Dyah Erti Idawati, Seprina Yana Alidha, Lisa Maharani, Lia Maisari and Atika Aditya	Identification of Housing in Disaster-Prone Locations in Banda Aceh : Case Study Gampong Deah Raya
15.00 - 15.15	4	Daisuke Sasaki, Anawat Suppasri and Fumihiko Imamura	Japanese Foreign Aid to Fisheries in Response to Disaster: The Case of the 2022 Tonga Volcanic Eruption
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
Moderator: Dedy Alfian, M.Sc.			
Notulensi: Afdila Ramadhani			
Operator: Hadad Rahmat			

Day 2 – [9 November 2024]
Room 3: Meeting Room, 3rd Floor TDMRC
Track 2: Inclusive Community Resilience and Disaster Education

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 2A**	**Title**
08.30 - 08.45	2	Herman Rusli, Mu'Jizah Mu'Jizah, Mohd. Harun and Mukhlis Mukhlis	Tsunami Mitigation in Novels Set in Aceh as Disaster Education for Z-Generation
08.45 - 09.00	8	Mari Yasuda and Toshiaki Muramoto	Disaster Prevention Awareness -Based on 10 years practice of the Tohoku University DRR Education "YUI" Project-
09.00 - 09.15	21	Twin Hosea Widodo Kristyanto, Arham Anugrah Bahri, Muhammad Ibnu Hibban, Rani Nabilah, Otniel Junior Palloan, M.M. Lanny W. Pandjaitan and Lukas Lukas	Enhancing Tsunami Disaster Awareness: Evaluating the Impact of the i Share Curriculum in Serang, Indonesia
09.15 - 09.30	27	Syafruddin Chan, Muslim A.Djalil and Kurnia Asni	Gauging Disaster Resilience for Sustainable Tourism in the Banyak Islands: Exploration Business, Government and Local Community Using The Torrens Resilience Institute Framework
09.30 - 09.45	34	Gusti Ayu Ketut Surtiari, Syarifah Aini Dalimunthe, Taro Arikawa, Abdul Fikri Reksa, M Yudhi Rezaldhi and Diah Lenggogeni	How could Virtual Reality Inclusively Improve Disaster Awareness to Tsunami?
09.45 - 10.00	177	Ahmad Nubli Gadeng, Enok Maryani, Epon Ningrum, Iwan Setiawan, Wiwit Artika, Daska Azis and Mirza Desfandi	Development Of A Learning Model Based On Local Wisdom Of The People Of Aceh To Improve Disaster Preparedness In General Courses Of Disaster And Environmental Knowledge At Syiah Kuala University
10.00 - 10.15	24	Jaya Murjaya, Suaidi Ahadi, Petrus Demon Sili, Asdani Soehaimi, Supriyanto, Yedi Dermadi, Putu Hendra Widyadharma and Fauzi :	Reconstruction of Paleoearthquakes Impact and Its Return Period Perspective Study to support Infrastructure Resilience Program (Case Study: Paleoearthquakes inland Sumatra island)
10.15 - 10.30		**COFFEE BREAK**	
Moderator: Dr. Wiwit Artika, S.Si., M.Ed.			
Notulensi: Putri Chairunnisa			
Operator: Nadri Pratama Putra			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 2B**	**Title**
10.30 - 10.45	35	Yuli Arinta Dewi, Koentjoro Soeparno, Praditya Putri Pertiwi and Mizan Bustanul Fuady Bisri	A Bibliometric Analysis on Disaster Volunteer Resilience Research: All Time Period
10.45 - 11.00	42	Aiko Sakurai, Takeshi Sato, Makoto Kumagai and Yoshiyuki Murayama	Supporting for school teachers to update tsunami evacuation plans
11.00 - 11.15	43	Rika Yuliwulandari, Rifda El Mahroos, Debrina Kusuma Devi, Zulfan Febriawan, Johan Danu Prasetya, Tedy Agung Cahyadi, Eko Teguh Paripurno, Reza Pahlevi, Hafiz T.A Khan and I Made Andika Prakosa	Natural Disaster Preparedness Among Elderly
11.15 - 11.30	48	Yifei Wang and Akihiro Shibayama	Consideration of the Use of Hydrogen Fuel Cell Vehicles in the Event of a Natural Disaster
11.30 - 11.45	59	Bethany Meldinger	Disaster Information Seeking and Preventative Behaviors of Foreign Residents in Kobe City
11.45 - 12.00	63	Nurul Sri Rahatiningtyas, Eliya Amilati Hanafi, Wina Natalia, Risye Dwiyani, Said Fariz Hibban, Jessica Novia and Dhinar Riski Linggar Kingkin	Kemitraan dengan Ahli Lokal dalam Pengembangan Inovasi Penanggulangan Bencana Inklusif di Daerah Istimewa Yogyakarta
12.00 - 12.15	67	Takashi Oda, Aiko Sakurai and Takeshi Sato	Leveraging Web-GIS for School Safety: Insights from Japan and Taiwan
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Cut Aprilia			
Notulensi: Putri Chairunnisa			
Operator: Nadri Pratama Putra			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 2C**	**Title**
13.30 - 13.45	76	Irene Sondang Fitrinitia, Mujizah Mujizah, Fakhriati Fakhriati, Erwin Baker, Muhammad Fuad, Trinimalaningrum Trinimalaningrum and Yeni Mulyani Supriatin	Cultivating Synergy between Science and Local Wisdom on Disaster Risk caused by Weber Fault in Maluku
13.45 - 14.00	83	Yulia Direzkia and Nurul Husna Salahuddin	What remains from survivors in the last two decades of the 2004 earthquake and tsunami in Aceh: exploring trauma from the early phase of psychotherapy from case study.
14.00 - 14.15	97	Yenni Oktaviza, Mukhlis Yunus, Mahdani Ibrahim and Syafruddin Chan	Enhancing Healthcare Quality Through Lean Six Sigma Practices
14.15 - 14.30	103	Dwi Abad Tiwi, Diyah Krisna Yuliana, Novian Andri Akhirianto, Ritha Riyandari, Marina C. G. Frederik, Andi Eka Sakya, Zulfa Qonita, Bambang Marwanta, Lian Yuanita Andikasari, Khusnul Setia Wardani, Matheus Souisa and Fretha J. Kayadoe	Resource Mobilization and Tsunami Disaster Preparedness of Ambon Bay Coastal Communities
14.30 - 14.45	115	Eri Krismiyaningsih, Saut Aritua Hasiholan Sagala, Latika Putri Barliani, Iffah Zati Mazaya, Debby Paramitasari, Alifa Zalfa Poetry Wicaksono and Abimanyu Arya Atmaja Abdullah	Adaptive Social Protection as a strategy for enhancing household resilience to various shocks: A case study of national and local initiatives in Indonesia
14.45 - 15.00	125	Bani Bacan Hacantya Yudanagara, Endang Retno Surjaningrum, Achmad Chusairi, Lantip Muhammad Dewabrata, Putu Vidyastitha Wiguna, Nafika Siti Nur Annisa and Anggita Aryo Putri	Community perspective in the integration of mental health and psychosocial support and disaster risk reduction: lesson learned from 20 Disaster-Resilient Villages in East Java Province, Indonesia
15.00 - 15.15	145	Windi Asnita Sari, Wiwit Artika and Rina Suryani Oktari	Correlation of Education for Sustainable Development (ESD) Competencies and Environmental Empathy of USK Disaster and Environment MKU Students in Supporting SDGs 2030
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
Moderator: Putri Syathi			
Notulensi: Putri Chairunnisa			
Operator: Nadri Pratama Putra			

Day 2 – [9 November 2024]

Room 4: Disaster Resilient Infrastructure Lab, 2nd Floor TDMRC

Track 2: Inclusive Community Resilience and Disaster Education & Track 7: Disaster Risk Financing and Insurance

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 2D**	**Title**
08.30 - 08.45	132	Melvina and Sharon Dotger	How is climate change represented in science standards of Indonesian elementary Integrated curriculum?
08.45 - 09.00	136	Aprillia Findayani, Juhadi Juhadi, Satya Budi Nugraha, Vina Nurul Husna and Genta Nakano	Building Resilient Schools: Analysis of Indonesian and Japanese Educational Institutions
09.00 - 09.15	144	Rizanna Rosemary, Nurul Kodriati, Oktomi Wijaya, Ahmad Affan and Ummu Nursholihah	Understanding Tobacco Control in Disaster Mitigation in Indonesia: Progress, Challenges, and Issues
09.15 - 09.30	157	Putri Saleh, Aifi Rahman, Ezri Hayat and Rizanna Rosemary	Empowering Changes: The Impact and Challenges of Women Social Workers in Banda Aceh of Post Tsunami
09.30 - 09.45	159	Tibyan Asyukri, Lisa Hiwasaki and Rina Suryani Oktari	Equitable Coastal Development: Assessing Hazards, Vulnerability, and Capacity through Local Knowledge
09.45 - 10.00	164	Yolanda, Rina Suryani Oktari, Daisuke Sasaki and Hizir Sofyan	Spatial Patterns and Longitudinal Trends of Disaster Losses in Aceh: A Retrospective Analysis
10.00 - 10.15	176	Elizabeth Maly, Julia Gerster, Ryo Saito and Naomi Chiba	Visualizing the Earthquake, Tsunami, and Nuclear Accident: Disaster Images in 3.11 Picture Books
10.15 - 10.30		**Coffee Break**	
Moderator: Assoc.Prof.Yoshimi Nishi			
Notulensi: Wahyu Sandriadi			
Operator: Ulil Amri MC			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 2E**	**Title**
10.30 - 10.45	172	Arisna Fauzia, Cut Mulyani, Iswahyudi Iswahyudi and Haikal Fajri	Adaptation of Coastal Communities in Handling the Disaster-prone Coastal Area in Langsa Municipality
10.45 - 11.00	174	Jakiatin Nisa and Yohana Noradika Maharani	Successes, Challenges and Prospects for Implementing the Comprehensive School Safety Framework (CSSF) in Indonesia: A Narrative Literature Review
11.00 - 11.15	178	Hyejeong Park and Sebastien Boret	Consideration of people with disability in inclusive disaster risk reduction
11.15 - 11.30	181	Yoshimi Nishi and Alfi Rahman	Recording and archiving landscape changes in tsunami-affected areas: an attempt to activate collective memory through a mobile app MemoryGraph for Banda Aceh
11.30 - 11.45	190	Hayley Leggett, Miwako Kitamura, Anawat Suppasri, Fumihiko Imamura and Tiziana Rossetto	Understanding community attitudes and response to tsunami mitigation infrastructure and DRR methods in Kesennuma, Japan.
11.45 - 12.00	208	Semeidi Husrin, Harald Spahn and Irina Rafliana	Assessment of capacities at the local level regarding seismic and non-seismic induced tsunamis in Indonesia
12.00-12.15		Dewi Ummah, Koentjoro Soeparno, Muh Aris Marfai and Praditya Pertiwi	Small Island Communities and Gamalama's Volcano: A Multimethod Analysis of Parents' Disaster Preparedness
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Muhammad Iqbal			
Notulensi: Wahyu Sandriadi			
Operator: Ulil Amri MC			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 7A**	**Title**
13.30 - 13.45	9	Kenichi Kamata and Fumihiko Imamura	The Impact of Major Earthquake Disasters on the Establishment of Earthquake Insurance in Japan
13.45 - 14.00	126	Saut Sagala, Priskila Agatha Sulaiman, Rayinda Putri Meliasari, Wewin Wira Cornelius Wahid, Fachriey Fadhlullah Mungkasa, Cyril Anfasha Firmansyah and Rufaida Nurul Vicri, Alifa Zalfa Poetry Wicaksono	Unveiling Successes and Shortcomings: A Look at Disaster Risk Finance Mechanism in the Aftermath of the 2018 Central Sulawesi Earthquake and COVID-19
14.00 - 14.15	189	Diyatura Syahna, Eldina Fatimah, Muhammad Fauzi, Qurratul'Aini Benti Nasaiy and Arisna Fauzia	Floating Portable Toilet Design In Flood-Prone Areas
14.15 - 14.30	198	Andreanjtk Simanjuntak, Umar Muksin and Kutubuddin Ansari	Spatial time characteristics for the multivariate clustering of devastating earthquake: An example case of 2018 Mw 7.5 Palu earthquake
14.30 - 14.45	73	Alviyanda, Bilal Al Farishi, Rezki Naufan Hendrawan, Zaki Hilman, Imam Achmad Sadisun, Anjar Dwi Asterina Denhi, Deru Arief Wicaksono, Dimas Panggih Amukti, Dini Wulansuci and Yoga Prastio	Stability Analysis and Stability Recommendation Using Slope Mass Rating (SMR) - Case Study: Bukit Barisan Selatan National Park, Lampung
14.45 - 15.00	199	Andreanjtk Simanjuntak, Kadek Palgunadi, Bayu Pranata, Tio A. P. Setiadi, Umar Muksin, Anne Sirait, Rika Oktari and David Sahara	Impact of the 2004 Mw 9.0 Indian Ocean tsunami earthquake on the nowcasting tectonic risk: A new insight from the last two decades of seismic activities in the Sumatra Island
15.00 - 15.15	112	Andi Sakya, Marina C G Frederik, Nurani Rahma Hanifa, Esti Anantasari, Endra Gunawan, Suci Dewi Anugrah and Nurul Sri Rahatiningtyas	From Structural to Cultural Tsunami Preparedness: Insights from the Ten Tsunami-Ready Villages in Indonesia
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
Moderator: Muhaimin Ridwan Wong			
Notulensi: Wahyu Sandriadi			
Operator: Ulil Amri MC			

Day 2 – [9 November 2024]
Room 5: Tsunami Lab, 2nd Floor TDMRC
Track 3: Urban Planning, Reconstruction and Recovery

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 3A**	**Title**
08.30 - 08.45	18	Hiroyuki Miura, Osamu Murao, Ryo Saito, Mizuki Sato, Mufidatun Khoiriyah and Muzailin Affan	Time-series analysis of satellite images for spatially evaluating long-term changes in Banda Aceh after the 2004 Indian Ocean Tsunami
08.45 - 09.00	19	Osamu Murao, Mizuki Sato, Kazuya Sugiyasu, Hiroyuki Miura, Mufidatun Khoiriyah, Ryo Saito and Muzailin Affan	Tsunami Evacuation Risk Change Associated with Urban Recovery in Banda Aceh after the 2004 Indian Ocean Tsunami
09.00 - 09.15	23	Grace Muir and Aaron Opdyke	Methods for Classifying Disaster Risk Creation in Housing Reconstruction Projects
09.15 - 09.30	29	Benazir, Nurkhalis Nurkhalis, Tursina Tursina, Teuku Faisal Fathani and Tantri Nastiti Handayani	A 20-year journey of enhancing community preparedness and early warning systems after the Indian Ocean tsunami in Aceh, Indonesia
09.30 - 09.45	37	Rifdalila Kultsum, Benazir and Tantri Nastiti Handayani	Building Vunerability Tendency Toward Tsunami Parameters
09.45 - 10.00	39	Titaya Sararit and Elizabeth Maly	Roles of disaster museums, memorial places and gathering spaces in long-term community recovery after tsunamis in Thailand and Japan
10.00 - 10.15	186	Yunita Idris, Syamsidik Syamsidik, Muhammad Daffa Al Farizi, Aulia Khalqillah, Sylvia Agustina and Ibnu Rusydy	Trends of Building Development in Banda Aceh-Indonesia After 20 Years of the 2004 Aceh Tsunami: Challenges to Mitigate Impacts of Future Earthquakes and Tsunamis
10.15 - 10.30		**Coffee Break**	
Moderator: Grace Muir			
Notulensi: Anggieska			
Operator: Muhammad Raihan Al farizi			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 3B**	**Title**
10.30 - 10.45	44	Chiho Ochiai	Long-term changes in post-disaster housing and establishment of community relationships
10.45 - 11.00	53	Radianta Triatmadja, Benazir and Athaya Syifa Widha Rana	The Effectiveness of Tsunami Walls in Mitigating Tsunami Impact
11.00 - 11.15	92	Nizam Nizam and Ikaputra Ikaputra	Transitional Settlement Strategy post Disaster - a comparative study of Tsunami and Volcanic Eruption Disaster
11.15 - 11.30	105	Novian Andri Akhirianto, Khusnul Setia Wardani, Anies Ma'Rufatin, Amalia Nurwijayanti, Favian Mafazi Giska Putra and Farikhotul Chusnayah	Sustainable Regional Development Planning Based on Coastal Disaster Risk Assessment (Case Study: North Coast of Central Java)
11.30 - 11.45	116	Saut Sagala, Cecilia Nonifili Yuanita, Tiffany Salikha Dewi and Alifa Zalfa Poetry Wicaksono, Abimanyu Arya Atmaja Abdullah, Dekka Dhirgantara Putra, Kharis Aulia Alam	Reflections on Long-Term Recovery after the 2004 Aceh Tsunami: Sustainability in Spatial Planning and Disaster Risk Reduction in Indonesia
11.45 - 12.00	153	Norazam Ab Samah and Khamarrul Azahari Razak	Advancing Post-Disaster Resettlement after 20-years Indian Ocean Earthquake and Tsunami in Banda Aceh
12.00 - 12.15	156	Muhammad Nazirurrahman, Teuku Aulia Geumpana and Rina Suryani Oktari	Spatial planning strategy for disaster mitigation based on earthquake risk analysis using geographic information system (GIS)
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Arisna Fauzia			
Notulensi: Anggieska			
Operator: Muhammad Raihan Al farizi			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 3C**	**Title**
13.30 - 13.45	143	Naja Asrina, Eldina Fatimah and Ashfa Achmad	Impact of Vegetation Cover Loss on Land Surface Temperature in Sabang City: Implication for Small Island Space Management
13.45 - 14.00	1	Kozo Nagami, Tomoki Miyano and Mohammad Naser Sediqi	Medium to Long-term Impacts from In-situ Housing Reconstruction: Insights from Post-disaster Surveys of the Indian Ocean Tsunami and Nepal Earthquake
14.00 - 14.15	192	Fithria Zahwa Kh, Dyah Erti Idawati and Hilda Mufiaty	Spatial Transformation of Post Tsunami Relief Houses in Ulee Lheue, Banda Aceh
14.15 - 14.30	175	Elizabeth Maly and Tamiyo Kondo	Rooted Placemaking for Long-term Disaster Recovery: Community-based Initiatives in Tohoku after the Great East Japan Earthquake
14.30 - 14.45	180	Alison Raby, Antonios Pomonis, Anawat Suppasri, Keith Adams, Nurullah Açikgőz, Marco Baiguera, Yunita Idris, Panon Latcharote, Francesca Marafini, David McGovern, Ella Meilianda, Harsh Mistry, Sukiman Nurdin, Eyitayo Opabola, Teraphan Ornthammarath and Nattapon Trumikaborworn	Approaches to post-tsunami coastal reconstruction: comparisons across Indonesia, Thailand, and Japan
14.45 - 15.00	17	Mufidatun Khoiriyah and Osamu Murao	A Review of the Effectiveness of Tsunami Evacuation Buildings Distribution in the Government-Designated Planning Area (BWP) in Cilacap Using GIS Simulation
15.00-15.15	187	Nazirah Mohd Apandi and Warid Wazien Ahmad Zailani	POST–FLOOD DAMAGE ASSESSMENT FOR STRUCTURE AND INFRASTRUCTURE: A REVIEW
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
Moderator: Arisna Fauzia			
Notulensi: Anggieska			
Operator: Muhammad Raihan Al farizi			

Day 2 – [9 November 2024]

Room 6: Disaster Risk Management Lab, 2nd Floor TDMRC

Track 4: Disaster Society, Culture and History

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 4A**	**Title**
08.30 - 08.45	12	Muhammad Harvan, Suci Anugerah and Daryono Daryono	Enhancing Tsunami Readiness: The Implementation of the Tsunami Ready Community Program in Deah Glumpang Village, Banda Aceh
08.45 - 09.00	25	Julia Gerster	Food culture and community recovery – a case study from post-3.11 Miyagi and Fukushima.
09.00 - 09.15	26	Miku Okuba, Shoko Araki, Michio Ubaura and Elizabeth Maly	A study on the relocation from Floating Villages to land in Cambodia: focus on the living environment
09.15 - 09.30	55	Turniningtyas Ayu Rachmawati, Dea Saraswati Pramaningrum and Ar. Rohman Taufik Hidayat	A Comparative Study on Tourist Motivation to LUSI Island and LUSI Pond in the Context of Post-Disaster Dark Tourism
09.30 - 09.45	75	Dian Novita Fitriani and Herry Yogaswara	Bibliometric Analysis of Research Trends on Smong Using VOSviewer
09.45 - 10.00	95	Abdillah Imron Nasution and Ridha Andayani	RELATIONSHIP BETWEEN FACIAL MORPHOLOGY AND CEMENTUM THICKNESS: Alternative Identification to Disaster Victim Identification
10.00 - 10.15	155	Uswatun Nisa, Rizanna Rosemary, Deni Yanuar, Zakirah Azman and Alfi Rahman	Media Presentations of Disaster Risks and Psychosocial Conditions
10.15 - 10.30		**Coffee Break**	
Moderator: Fitriyani			
Notulensi: Sabrina			
Operator: Muhammad Naufal Al Ghiffari			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 4B**	**Title**
10.30 - 10.45	135	Eni Maryani and Puji Lestari	Developing Cultural-Based Community Resilience to Disasters in Indonesia
10.45 - 11.00	188	Intan Dewi Kumala, Diana Setiyawati and Pradytia Putri Pertiwi	A Multimethods Exploration of Vulnerability and Capacity Concepts Towards Women as a Vulnerable Group in Disasters: A Study in Bantul District, Indonesia
11.00 - 11.15	195	Elysa Wulandari, Irin Caisarina, Laina Hilma Sari, Atika Aditya, Siti Zahrina Fakhrana and Muhammad Ghufran	Identifying Tourism Attractions' Potentials in Disaster Recovery Area: Case Study Linge, Aceh Tengah, Indonesia
11.15 - 11.30	96	Abdillah Imron Nasution, Ridha Andayani and Ade Lala Affani Br Bintang	THE DIFFERENCES OF LIP PRINT PATTERNS AMONG THE PAK-PAK, ACEH AND SINGKIL TRIBES IN SUBULUSSALAM, ACEH: A Pilot Study for Disaster Victim Identification
11.30 - 11.45	122	Alfi Rahman, Muzayin Nazaruddin, Rizanna Rosemary, Yuva Ayuning Anjar, Rosaria Indah, Syahrul Ridha, Siti Ghaisani Masturah and Alfi Rahman	Sociocultural Interactions with Tsunami Memorials in Aceh: Insights from Diverse Community Perspectives
11.45 - 12.00	33	Ryo Saito, Osamu Murao, Hiroyuki Miura, Mizuki Sato, Mufidatun Khoiriyah4 , Muzailin Affan, Toshiaki Muramoto2 and Pradytia Putri Pertiwi	Memory as Build Back Better and its Spatio-Temporal Change:Measurement and Future Direction
12.00 - 12.15	124	Ferad Pututuhu	Megatsunami Literacy Indonesia In 1674 On the North Coast Of The Leihitu Peninsula, Central Maluku Regency
12.15 - 13.30		**COFFEE BREAK**	
		Moderator: Dinaroe	
		Notulensi: Sabrina	
		Operator: Muhammad Naufal Al Ghiffari	

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 4C**	**Title**
13.30 - 13.45	203	Qomariyatus Sholihah, Widodo Widodo, Tri Wahyu Nugroho, Kristanto Adi Nugroho, Rita Parmawati, Ridwan Danuarta Galisong, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni and Sisilia Puni Suwandi	Campus Sustainability Strategy in Risk Zones: Earthquake Risk Analysis and Technology Integration at Brawijaya University
13.45 - 14.00	204	Rita Parmawati, Qomariyatus Sholihah, Widodo Widodo, Tri Wahyu Nugroho, Kristanto Adi Nugroho, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni, Ridwan Danuarta Galisong and Sisilia Puni Suwandi	Risk assessment as a fire disaster mitigation measure in Educational Institutions (Faculty of Engineering, Brawijaya University)
14.00 - 14.15	205	Qomariyatus Sholihah, Rita Parmawati, Widodo Widodo, Tri Wahyu Nugroho, Kristanto Adi Nugroho, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni, Ridwan Danuarta Galisong, Sisilia Puni Suwandi and Bambang Haryanto	Enhancing Fire Safety in Academic Institutions: A Risk-Based Assessment of Key Faculties at Brawijaya University
14.15 - 14.30	197	Rosaria Indah	May I know your story?: A post-colonial analysis on the application of community-based medical education in post-disaster Aceh, Indonesia
14.30 - 14.45	77	Jędrzej Majewski, Patrick Daly, Adam Switzer, Ismail Nazli, Tomi Afrizal, Margaret Christie, Lillian Pearson, Jessica Pilarczyk and Benjamin Horton	Revealing the Paleotsunami Heritage of Sumatra: Insights from Susoh and Beyond
14.45 - 15.00	200	Patrick Daly, Nazli Ismail, Syamsidik Syamsidik, Benjamin Horton, Ezra Zubrow and Michael Frachetti	Implications of the Recurrence of Paleostsunami Events in the Eastern Indian Ocean for Theorizing Temporal Scales of Societal Resilience
15.00-15.15	121	Mario Antonius Birowo	Disaster Memory Lesson in Reducing Disaster Risk among Residents of Merapi Volcano Slope
15.15 - 16.00		**Coffee Break & Ashar Prayer**	
		Moderator: Dr. Syafruddin	
		Notulensi: Sabrina	
		Operator: Muhammad Naufal Al Ghiffari	

Day 2 – [9 November 2024]
Room 7: Dynamic Earth Lab, 1st Floor TDMRC
Track 5: Human Security, Pandemic and Communicable Diseasaes

PARALLEL SESSION 1			
TIME	**Abstract ID**	**GRUP 5A**	**Title**
08.30 - 08.45	69	Kumpol Saengtabtim, Pantapat Kongpattanayothin, Jirajet Hansithiwong, Theekadhas Chantarasanarm, Nathamon Kongsawat, Thanasit Pakkaananchai, Paranut Prasittipap, Jing Tang and Natt Leelawat	Utilizing Twitter Data for Disaster Management: A Case Study of Monkeypox Outbreak in 2022
08.45 - 09.00	71	Kumpol Saengtabtim, Natt Leelawat, Ampan Laosunthara, Jing Tang, Akira Kodaka, Yasushi Onda and Naohiko Kohtake	Tourism Business Resilience and Sustainability during COVID-19: A Case Study of Nakhon Si Thammarat, Thailand
09.00 - 09.15	87	Izziah Izziah, Cut Dewi and Julie Nichols	Heritage and the Pandemic in Aceh: Rethinking Local Wisdom and Built-Environment for Community Resilience
09.15 - 09.30	94	Prasetyaning Estu Pratiwi and Widyawanto Prastisho	Systematic Literature Review: Health Worker Preparedness Factors in Fire Disasters in Hospitals in Indonesia
09.30 - 09.45	117	Rufaida Nurul Vicri, Saut Aritua Hasiholan Sagala, Abimanyu Arya Atmaja Abdullah, Eri Krismiyaningsih and Ulima Nabila Adinta	Adaptation Strategies and Policies to Address Displacement Risks: A Case of Slow-Onset Disaster in Indonesia's North Coast of Java
09.45 - 10.00	137	Yulia Geubrina, Suriani Suriani and Chenny Seftarita	Does social food aid reduce the prevalence of undernourishment? Evidence from Indonesia using panel GMM approach
10.15 - 10.30		**Coffee Break**	
Moderator: dr. Harapan, DTM&H., M.Infect.Dis., Ph.D			
Notulensi: Cut Nella Assyifa			
Operator: Sutan Sakti Siagian			

PARALLEL SESSION 2			
TIME	**Abstract ID**	**GRUP 6A**	**Title**
10.30 - 10.45	38	Yunita Arafah and Zya Dyena Meutia	The Governance Process Dimension in Building Resilience Disaster Village. Case Study : Gampong Lambung, Meuraxa District, Banda Aceh City
10.45 - 11.00	68	Mizan Bustanul Fuady Bisri	Socio-political setup for Earthquake Early Warning System (EEWS): The preparatory and initial decades of Japan's EEWS and relevance for the current efforts in Indonesia
11.00 - 11.15	88	Eko Setiawan and Denis Reiska	Formulation of Natural Disaster Mitigation Strategies Based on Disaster Risk Assessment for Sukoharjo Regency, Indonesia
11.15 - 11.30	108	Rahma Hayati, Aprillia Findayani and M. Fikri Amrullah	Utilizing the Climate Disaster Resilience Index (CDRI) to Evaluate Semarang City's Resilience to Climate Change Disasters
11.30 - 11.45	149	Charles Ham	Knowledge exchange in disaster risk management: A comparative study between Indonesia and USA
11.45 - 12.00	154	Liky Ledoh, Djoko Santoso Abi Suroso, Saut Aritua Hasiholan Sagala and Suhirman Suhirman	A Review on Disaster Resilience Research from the Perspective of Governance: A Bibliometric Analysis
12.15 - 13.30		**Lunch & Dzuhur Prayer**	
Moderator: Dr. Ir. Benazir, S.T., M.Eng.			
Notulensi: Cut Nella Assyifa			
Operator: Sutan Sakti Siagian			

PARALLEL SESSION 3			
TIME	**Abstract ID**	**GRUP 6B**	**Title**
13.30 - 13.45	60	Prima Denny Sentia, Syaimak Abdul Shukor and Amelia Natasya Abdul Wahab	Risk Modeling for Food Kit Distribution During Malaysia's Monsoon Floods Using System Dynamics Approach
13.45 - 14.00	140	Haliza Mohd Zahari, Ruzaidin Mohamed Zain, Arifiin Ismail, Noor Azmi Mohd Zainol and Safar Yaacob	A Framework for Humanitarian Logistics Support in Disaster Relief
14.00 - 14.15	113	Arismawan Arismawan, Michael Short, M.K.S Al-Mhdawi, Prima Denny Sentia and Cut Maya Aprita Sari	Humanitarian Logistics Management Framework for Earthquake Disaster Mitigation Strategy
14.15 - 14.30	173	Meylis Safriani, Cut Suciatina Silvia, Inseun Yuri Salena, Muhammad Arrie Rafshanjani Amin, Basir Dodi Hardiansyah	THE MAPPING OF FLOOD-PRONE AREAS IN MEUREUBO SUB-DISTRICT USING GEOGRAPHIC INFORMATION SYSTEM (SIG)
14.30 - 14.45	11	Sebastien Boret, Hyejeong Park, Alfi Rahman, Muzayin Nazaruddin, Yulia Direzkia and Pradytia Putri Pertiwi	Disaster Educational Programs for Children with Special Needs: An Interdisciplinary Study of a Special Support School in Banda Aceh in Indonesia
14.45 - 15.00		**Lunch & Dzuhur Prayer**	
		Modertor: Dr. Haliza mohd Zahari	
		Notulensi: Cut Nella Assyifa	
		Operator: Sutan Sakti Siagian	

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 1

08.30 – 10.15

Track 1:
Hazard, Technology & Infrastructure

Room 1: Hidrometeorologi Lab,
3rd Floor TDMRC| Group 1A

Lessons from the 2024 Noto Peninsula Earthquake

Anawat Suppasri, Miwako Kitamura, David Alexander, Shuji Seto and Fumihiko Imamura

Abstract

On 1st January 2024 an Mw7.5 earthquake occurred along an active fault across the Noto Peninsula. The tremors generated a wide range of cascading hazards, including uplift, liquefaction, landslides, fires and tsunamis. It also describes the pattern of casualties and the experience of evacuees and the management of evacuation centers. The hazards caused more than 240 casualties and damage to buildings and infrastructure. As usual, most casualties were caused by building collapse, but there was a high incidence of death by hypothermia and cold, which is different from the impact of the 2011 Great East Japan Earthquake and reflects the harsher winter climate of the Sea of Japan side. Tsunamis killed only two people even though they arrived within a few minutes, which testifies to the high awareness of tsunamis in this area. Severe damage to roads significantly delayed early recovery as transportation was curtailed. This earthquake also showed how the problems of evacuees and evacuation shelters had remained unresolved since the 2011 disaster. The main lessons from this disaster are that improving the earthquake resistance of buildings is still important even in Japan, which has a long history of anti-seismic construction. Special provisions are needed for disasters that occur during peak weather, not only winter but also summer. Special plans are required to repair and reopen roads damaged by earthquake and to support vulnerable people in both the short and the long term after disaster.

Coastal Evidence and Eyewitness Account Belongs to Tsunami Impact of the 2021 Kalaotoa M 7.4 Earthquake

Admiral Musa Julius, Aditya Setyo Rahman, Amelia Chelcea, Ramadhan Priadi, Muhammad Fikri Hayqal Hiola, Ilham, Said Abdurahman Rumy, Kaharuddin, and R. Jamroni

On 14 December, 2021 at 11:05 p.m. local time, an earthquake of magnitude M = 7.4 struck the south part of Sulawesi Island and the neighbouring offshore smaller island in Indonesia. It was accompanied by tsunami waves was generated that struck the offshore island of Kalaotoa. A tsunami survey was conducted by Indonesian Survey team, battling through mud and debris on Kalaotoa island, south of Sulawesi. The measured tsunami runup heights and eyewitness accounts are reported and discussed. This abstract presents post-tsunami survey results describing the impacts of the 2021 Kalaotoa earthquake in Kalaotoa island, Selayar, Indonesia. Tsunami severely damaged one sub-villages Tadu Timur. Field investigations in the end of 2021 confirmed that the tsunami that struck the Sub-village Tadu Timur, Kalaotoa island, South Sulawesi Indonesia. According to survey data from Tadu hamlet, the tsunami is thought to have reached a height of 50 cm and collected 5–10 cm inside the homes. On the coast, sediment transfer takes place. The Tadu Timur building's concrete wall was destroyed because of sediment transport in tsunami waves, which is sand scouring close to a building base. On Kalaotoa Island, tsunami traces are more commonly seen, particularly in the southeast and east of the island.

Keyword: *selayar earthquake, kalaotoa tsunami, field survey*

Enhancement of Disaster Risk Reduction Capacities Utilizing Community Radios: A Case Study of Radar Tangguh Program

Rehia Karenina Isabella Barus, Ressi Dwiana, and Sinam M. Sutarno

During a disaster, infrastructure, including communications infrastructure, will be affected and damaged to varying degrees. Apart from infrastructure damage, during a disaster, specific information is needed for evacuation, distribution of aid and recovery. This article will describe the Radar Tangguh (Emergency Radio for Resilient Indonesia) program initiated by the Indonesian Community Radio Network (JRKI), Combine Resource Institution, Atma Jaya University Yogyakarta, FMYY Radio Japan, and AMARC Asia Pacific. Its ultimate goal is for community radio and emergency radio to become one of the communication systems in reducing disaster risk in Indonesia. This article uses a qualitative case study approach. The Radar Tangguh program was chosen because it is the only enhanced disaster risk reduction program using radio. Research data was collected from documentation, interviews and observations. The research results show that this program has been successfully implemented in several disaster areas. Several emergency radio stations were established in several disaster areas in Indonesia. Apart from that, there are several policies at the regional level (village and district) that introduce the use of community radio for disaster mitigation. However, the use of community radio media is also often hampered due to the difficulty of obtaining broadcasting community radio permits.

Keyword: *disaster risk reduction, community radios, emergency radios, radar tangguh*

Numerical Investigation of Extreme Wave Diffraction and Reflection on Porous Pile Cone Breakwaters

Eldina Fatimah, Muhammad Fauzi, Abdullah Abdullah, Qurratul 'Aini Benti Nasaiy

The extreme waves that are heading toward the port basins will hit the breakwater. In this process, wave reflection and diffraction occur on the body and at the end of breakwater at the mouth of the port. These extreme wave deformations create complex wave patterns and increase wave pressure within the port basin, increasing the risk of damage to infrastructure and disrupting vessel navigation. Although there have been many wave diffraction and reflection studies on solid breakwaters, no research has been conducted on the type of Porous Pile Cone wave breakwater (PoPiCo). It is important to utilize this type of protective basin as an environmentally friendly construction solution. The PoPiCo is an innovative coastal protection structure in the form of hollow poles with open corks at the top that can effectively reduce wave velocity and static pressure, reaching 86.8% and 78.6%, respectively. However, the extent of its influence on extreme wave diffraction and reflection has never been studied. The research aims to conduct a numerical study to obtain an optimal PoPiCo design. The diffraction (df) and reflection (rf) characteristics of waves are investigated based on a 3-dimensional wave hydrodynamics model using Computational Fluid Dynamic (CFD) tools of the open-source software DualSPHysics. Simulated wave parameters are height (H), period (T), and length (L), as well as extreme wave conditions (He) and validated by previous physical model studies. From the simulation results, an effective PoPiCo design can be obtained in reducing the diffraction and reflection of extreme waves in the port basins.

Keyword: *Extreme waves, Porous Pile Cone Breakwaters, wave reflection and diffraction*

Use of GPR and ERT methods to Image Shallow Structures around Paleotsunami Cave in Aceh Besar, Indonesia

Salsa Nazia Putri, Nazli Ismail1, Husnul Khatimah, Muksin Umar

The Ek Leuntie Cave is a prospective paleotsunami geopark that preserved 12 tsunami layers dating back 7500 years in Aceh. Landslides pose many challenges to the development facilities in karst areas. Before development, the area was assessed using high-resolution Ground Penetrating Radar (GPR) and Electrical Resistivity Tomography (ERT). The 700 and 250 MHz of GPR frequencies were used to image shallow subsurface structures, while the ERT method can penetrate deeper. Both data were acquired from a long profile outside the cave. GPR radargram clearly shows three layers to 1.5 m depth. The first and second layers have horizontal and concave reflectors, respectively. The third layer begins to fade due to the limitation of penetration depth. The ERT model images up to 30 m depth with resistivity vary 0 to 1000 Ωm. The uppermost and the second layers have low to medium resistivity values superimposed by a very high resistivity layer. The top layer filled with anthropogenic soil covers the sandy layer at a depth of 0.3 to 0,4 m. While the third layer is interpreted as limestone. The highest frequency of the GPR radargram shows a very clear interface between the sandy and the top soil layers as well as the limestone beneath it. Shallow borehole data drilled along the profile support the interpretation. In contrast, the ERT data penetration is deeper but the interface between layers is blurry due to smoothing effects. Both methods complement each other and can be used for geotechnical assessment of the area

Keyword: *Paleotsunami, GPR and ERT methods, ek Leuntie Cave, Aceh*

Multi-Hazard Analysis of Marine Geology in the Banda Sea: A GIS-Based AHP Approach

Urwatul Wusqa and Reza Syahputra

The Indonesian Ocean region has frequently experienced geological disasters, posing dangers to community life and vital infrastructure such as fiber optic cable in the sea. The increase in population and the need for infrastructure development in the Indonesian maritime region increase the risk of losses due to natural disasters. To protect the population and infrastructure, a comprehensive multi-hazard analysis of the Indonesian seas combined with marine geological disasters is required. This study applies a GIS-based analytic hierarchy process (AHP) to assess the level of marine geological hazard in the Banda Sea, covering an area of 518,400 km^2. Three hazard factors are considered in this analysis: seismic hazards, underwater volcanism, and underwater landslides. All aspects are categorized into five hazard classes based on their relative contribution to the risk. The results show that about 17% and 30% of the study area are in hazardous and moderate hazard conditions, respectively. Meanwhile, regions within the Arafura Sea tend to fall into the non-hazardous class. Moderate hazard classes are found in the waters around the Tanimbar, Kei, and Aru Islands. The areas classified as hazardous in the seas are due to the presence of many seamounts on the seabed of the Banda Sea, west of the Tanimbar Islands. The multi-hazards map provides essential information for identifying the relative risk of an area, which can be used for future management and planning.

Keyword: *Geological disasters, multi-hazard, banda sea, A GIS-Based AHP*

Improving the Speed and Accuracy of the Tsunami Early Warning System in Indonesia Through Tsunami Gauge Equipment

Januar Arifin, M. Syamsu Rosid

Indonesia is a country highly vulnerable to tsunamis, which can be triggered by tectonic, volcanic, or submarine landslide activities. The current tsunami early warning systems predominantly use tide gauges, which are designed to measure sea level changes but have not been optimized for real-time tsunami detection. The limitation of low sampling rates, such as the standard 60 seconds, results in delayed detection and reduced accuracy, especially for non- seismic tsunamis that exhibit faster wave characteristics. This study aims to propose the development of tsunami gauges as dedicated instruments for tsunami detection, with a 1-second sampling rate and support for real-time data transmission. Additionally, the device is optimized with a Tsunami CCTV for visual monitoring and an air pressure sensor to detect meteotsunami phenomena. The research indings demonstrate that tsunami gauges can improve the speed and accuracy of tsunami detection, providing a more effective solution for tsunami early warning systems in Indonesia.

Keyword: *tide gauge, tsunami gauge, tsunami detection, non-seismic tsunami*

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 2

10.30 – 12.15

Track 1:
Hazard, Technology & Infrastructure

Room 1: Hidrometeorologi Lab, 3rd Floor TDMRC| Group 1B

Building damage recognition using remote sensing and semi-supervised learning for rapid assessment

Sesa Wiguna, Bruno Adriano, Ruben Vescovo, Erick Mas, Ayumu Mizutani, Shunichi Koshimura

Building damage information is highly demanded for emergency response as it serves various purposes, including search and rescue and resource distribution. Integrated with satellite imagery, deep learning (DL) techniques have been developed to recognize building damage automatically. Despite reportedly having a high accuracy when a DL model infers in the same domain (in-domain), previous studies show a drop in the performance when the model is applied to an unseen domain (out-of-domain). In fact, since a new disaster generally occurs in a new location and the unavailability of training samples to train a new model, the DL application for disaster rapid assessment would likely fit the out-of-domain settings. Therefore, to be applicable to real-world applications, DL models should be able to generalize in unseen domains, such as a new disaster event. To improve model performance in the unseen domains, we proposed a semi-supervised-based framework utilizing unlabelled data from testing sites. The framework comprises two main features: (1) generating a damage probability of testing sites by utilizing a model trained on a global dataset, and (2) using the high probability samples as pseudo labels to fine-tune the model. We tested our proposed framework in the 2024 Noto Peninsula Earthquake that generates collateral disasters, including tsunamis, fires, and landslides. Our proposed method shows an improvement of the generalization score of approximately 7% from 0.57 to 0.61. The proposed framework offers a promising solution for assisting humanitarian efforts in the disaster emergency response.

Keyword: *Building damage, remote sensing, emergency response*

Quantitative Assessment of Carbon Monoxide Emissions from Private Vehicle Utilization in Urban Environments

Roudhia Rahma, Mariana Mariana, Asri Gani, Sugiarto Sugiarto, Muhammad Isya

The widespread use of private vehicles, particularly motorcycles and passenger cars, has significantly aggravated air pollution—a direct consequence of rising global warming. This research, conducted in Banda Aceh, the capital of Aceh Province in Indonesia, aimed to quantify the carbon monoxide (CO) emissions from various private transportation modes. The primary objective was to collect empirical data to support the formulation of targeted environmental policies and interventions. Utilizing a stratified random sampling method, the study gathered data from 300 private vehicle users, capturing details on fuel consumption and Vehicle Kilometers Travelled (VKT). The analysis employed both Tier I and Tier II assessment methods to perform a thorough evaluation of CO emission sources, which is critical for crafting effective environmental regulations. The findings revealed that gasoline-powered passenger cars and motorcycles are significant contributors to urban CO emissions. Specifically, annual emissions were recorded at 450.25 tons for passenger cars and 350.83 tons for motorcycles, based on fuel consumption data (Tier I). Additionally, VKT assessments (Tier II) indicated that passenger cars were the primary contributors to emissions, with an annual output of 505.94 tons, while motorcycles contributed 474.88 tons. These results underscore the urgency to reevaluate urban mobility paradigms and advocate for a reduction in the reliance on high-emission vehicles to mitigate the hazards of urban air pollution. This research not only highlights crucial environmental challenges but also serves as a pivotal force for advancing more sustainable transportation modalities.

Keyword: *Carbon monoxide emissions, quantitative assessment, private transportation, banda aceh*

When does the shortest path is not the best alternative for a tsunami evacuation?

Erick Mas, Luis Moya, and Shunichi Koshimura

The shortest paths, while often the most logical choice for a tsunami evacuation, can also pose significant risks. Several evacuation models assume that the evacuee will follow the shortest path toward a haven, and evacuation routes are designed with this preference in mind. However, in this study, we aim to shed light on situations where the shortest path option may not be the best alternative for the evacuation of an entire community. We simulated the evacuation of a tsunami-prone area in Kochi City, Japan, to explore the effect of selecting the shortest path or evacuating through alternative routes. To select these alternative routes, we developed a reinforcement learning (RL) model for tsunami evacuation guidance. The model guides the evacuee towards routes that are not necessarily the shortest paths but have high chances of reaching safe points within the time available. Our intention isto compare behaviors that optimize the individual versus the group in the context of tsunami evacuation, emphasizing the need for a balanced approach. We found that using the shortest path leads to stronger congestion in the first minutes of the evacuation process than an alternative RL-based path. In some cases, the congestion was released slowly, and a similar evacuation rate to the RL was obtained. However, for fast arrivals of tsunamis, the RL approach that guides through alternative routes ends up leading to safety for a higher number of people.

Keyword: The shortest paths, tsunami evacuation guidance, alternative RL-based path, Kochi City, Japa*n*

Twitter-based Disaster Situation Analysis of the 2023 Turkey– Syria Earthquake

Ampan Laosunthara, Kumpol Saengtabtim, Takumi Ohashi, Jing Tang, and Natt Leelawat

Earthquakes are among the most severe natural disasters, and most earthquakes occur without warning or time for preparation. Twitter is one type of social media that is considered to be a microblogging platform. One of the key advantages of Twitter is real-time event reporting. Regarding this key advantage, important events, such as disasters, can be reported by Twitter users. The 2023 Turkey–Syria earthquake, based on a magnitude of 7.8, resulted in many casualties and damaged many buildings. This event happened on February 6, 2023. In this study, we analyzed each disaster management cycle phase using data acquired from the Twitter social media platform. The tweets related to this case were collected from February 1 to March 10, 2023. After the collecting process, 449,107 tweets were retrieved based on the use of Twitter API. The acquired text data were then pre-processed and tokenized to group them into the pre-defined keywords related to each phase of the disaster management cycle keywords in the format on an hourly basis. This study aims to define the disaster management cycle phases based on the trend of the keywords according to each phase. The result can be introduced to the disaster-related organization for preliminary scanning of the future disaster situation and effectively acting based on the protocols defined by each disaster phase. The contents based on each disaster phase can also be extracted to understand what are the things that happened during the crisis.

***Keyword**: Earthquake, the disaster management cycle phases, Twitter, microblogging platform, Turkey– Syria*

Group -1B

Preliminary Investigation of the Relationship Between Gravity Anomalies and Seismic Hazard along Lembang Fault.

Ilham Arisbaya, Bambang Sugiarto, Achmad Fakhrus Shomim, Nuraeni Rahma Hanifa, Lina Handayani

The Lembang fault is one of the main active faults on the island of Java, Indonesia. Its location in the Greater Bandung agglomeration area makes it a geological object that deserves attention. Here, we report a preliminary study in the Lembang fault area using published gravity data. We did not find a simple and specific correlation between the Bouguer anomaly pattern and the Lembang fault surface trace. However, there is an interesting correlation between the Bouguer anomaly and local seismicity around the Lembang fault. Most seismic events are in the central and western parts of Lembang fault, where the Bouguer anomaly is low. The eastern part shows a high gravity anomaly, with less seismic events. The low Bouguer anomaly can be interpreted as thick sediment, which may be associated with the potential for ground amplification due to earthquakes. One location in such condition is the Muril village. The village experienced quite serious damage due to the 2011 earthquake, which had a low magnitude (M 3.3).

Keyword: *Lembang fault, gravity anomalies, seismic hazard, Bouguer anomaly, local seismicity, Greater Bandung area*

Interfingering: Bridging for Effective Tsunami Early Warning and Early Action

Andi Eka Sakya, Jan Sopaheluwakan, Esti Anantasari, Syarifah Aini Dalimunthe, Willy Wicaksono, Yus Budiyono, Rahmat Triyono, Udrekh, Dwi Nurcahyadi

Despite the loss of life, two catastrophic tsunamis in 2004 and 2011 in Aceh and Sendai, prompted the rapid development of the Tsunami Early Warning System (TEWS). The system was designed with an end-to-end framework comprising upstream and downstream components. The upstream aspect, starting from monitoring, processing, and disseminating, is primarily technology-dependent, with the output officially disseminated by the state's single authoritative voice. In contrast, the downstream component, which depends on the awareness and response, is ultimately shaped by socio-cultural characteristics and is contingent upon societal factors. The current systems can issue timely tsunami alerts to the public but are hindered by the reliability of quickly deploying the alerts. Independent evacuation, without waiting for official confirmation, is preferable. This represents the most critical phase in assisting people to decide to evacuate before the tsunami waves reach the coast. Using qualitative research methodology, our research identifies the need for an equally robust link between successful Early Warning mechanisms and effective Early Action responses as operationally necessary, although not overly normative, processes that intermingle particularly at this critical period. The fundamental tenet is that each EWS needs to be viewed as a mutually reciprocal social-technological process which often involves both components embedded in their respective social context. Further elaboration of the intermingling concept, which we term as interfingering, necessitates enacting an early warning system based on social, cultural, and physical regionalization features, requiring the production of impact-based and locally customized warning products, ensuring the efficacy of tsunami preparedness and response efforts.

Keyword: *Tsunami Early Warning System, Tsunami Disaster, Preparedness*

AI-based Framework for Collapsed Buildings Mapping: Case Study of the 2024 Noto Peninsula Earthquake Using Aerial

IBruno Adriano , Ruben Vescovo , Sesa Wiguna, Erick Mas, and Shunichi Koshimura

Accurately mapping collapsed buildings is crucial for rescue efforts and recovery planning. Recent artificial intelligence models trained on remote sensing imagery allow accurate recognition of damaged buildings in affected areas. However, there are few cases where these models were successfully deployed in actual emergency response after a major disaster. This work presents an AI-based building damage recognition framework for automatically mapping collapsed buildings from high-resolution aerial imagery. We use the recent 2024 Noto Peninsula Earthquake to test the performance of our methodology by simulating an actual emergency disaster response. Our approach uses an AI-based image segmentation classifier to analyze the land changes from high-resolution optical imagery. The framework is based on a deep convolutional neural network trained using freely available worldwide satellite and aerial imagery. To quantitatively evaluate our method, we also visually interpret damaged buildings at several Noto Peninsula locations. Then, we compare the automatic mapping predictions with the visually interpreted ones. Our method consistently identified damaged buildings with an average accuracy of 90%. Further, our approach accurately recognized about 92% of the collapsed buildings, particularly in the tsunami-affected areas. Thus, these results demonstrate our method's potential to support emergency disaster response efforts for future disasters.

AIWEST - DR 2024
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Paralel Session 3

13.30 – 15.15

Track 1:
Hazard, Technology & Infrastructure

Room 1: Hidrometeorologi Lab,
3rd Floor TDMRC| Group 1C

The Influence of Seismometer Coverage on the Earthquake Focal Mechanism Solution (Case Study: Toba Swarm Earthquake)

Siti Maryam Purba, Yaumil Farah Alyssa, Nadiatul Asra, Mustika Nadia, and Umar Muksin

The focal mechanism of an earthquake is necessary to describe the plane and characteristics of the fault. In the case of local earthquakes, the focal mechanism is often determined based on the first polarity of the primary wave. Therefore, the quality of the earthquake focal mechanism depends on the station coverage and the number of first polarities of primary waves. The purpose of this study is to investigate the solution variation and quality of earthquake focal mechanisms with different station coverage. We conducted experiments on Toba swarm earthquake data for the May-June 2021 period with different gap angles of 90°, 180°, 220°. The location of the earthquake was determined using the HYPO71 program, while the focal mechanism of the earthquake was determined with the HASH program based on the first polarity of the primary wave. The results show that the focal mechanisms with different station coverage have different focal mechanism solutions. High variations in focal mechanism solutions (uncertainty) can lead to fatal errors in determining fault planes and characteristics. Therefore, it is very important to pay attention to station coverage when installing seismometer stations, so that the fault characteristics that cause earthquakes can be properly identified.

Assessing Economic Losses to Buildings from Tsunami Using Stochastic Rupture Sources: A Case Study of Pelabuhan Ratu, Indonesia

Salsabila Zahira Fayzariefta, Muhammad Alif Aufa Putra Aditya, Shigeru Kato, Susania Novita Putri, Ade Asmi and Teuku Muhammad Rasyif

Coastal communities worldwide face a growing threat from tsunamis due to rising populations in these areas, even those previously devastated. The 2004 Aceh tsunami (9.1 Mw), the 2018 Sulawesi tsunami (7.5 Mw) and the 2018 Sunda Strait tsunami, triggered by a volcanic flank collapse, caused billions of dollars in damages, highlighting the urgent need for effective risk assessment and mitigation strategies. Understanding potential economic impacts is crucial for policymakers, urban planners, and disaster response agencies to minimize future devastation. This study focuses on evaluating economic losses from tsunami-related building damage in Pelabuhan Ratu, West Java, Indonesia. The Probabilistic Tsunami Hazard Assessment (PTHA) method was used to estimate potential financial losses over a specific period. The Cornell Multigrid Coupled Tsunami (COMCOT) model was used to simulate a stochastic tsunami source model with magnitude scenarios ranging from M 8.5 to M 9.0 with a 0.1 interval. Building damage probabilities were then calculated based on a fragility curve considering diverse structural characteristics. Damage states, ranging from light to collapse, were determined, and the ratio of building replacements was estimated. Economic loss for each building was calculated by multiplying its replacement value by the corresponding damage state. Simulation results indicate that a tsunami could potentially damage up to 1,118 houses in Pelabuhan Ratu, with estimated economic losses totaling approximately $67.7 million USD. These findings underscore the importance of proactive measures, such as enhanced building codes and early warning systems, to mitigate the economic impact of future tsunamis in this region.

Keyword: *Probabilistic Tsunami Hazard Assessment (PTHA), Economic loss estimation, Cornell Multigrid Coupled Tsunami (COMCOT) model Stochastic tsunami source model*

EFFECT OF SINGLE SYSTEM AND DUAL SYSTEM STRUCTURE ON STRUCTURE PERFORMANCE LEVEL

Syafrizal , Alex Kurniawandy, and Muhammad Yusa

Earthquakes are vibrations caused by the movement of the earth's tectonic plates. In recent years, Indonesia has experienced several strong earthquakes that have resulted in many casualties. These casualties generally occur due to being hit by debris from buildings that collapsed due to the earthquake. Therefore, every building built in Indonesia must be designed to withstand earthquakes. In this study, the structure will be modeled with a single system and dual system, which consists of two types; in the first type, torsional irregularities in the x-direction, and the y-direction only occur on the first floor and second floor, excessive torsional irregularities do not occur, internal angle irregularities occur on the ground floor, first floor and second floor, discontinuity irregularities do not occur, irregularities due to displacement perpendicular to the plane do not occur, nonparallel system irregularities do not occur. Soft level stiffness irregularity does not occur, and excessive soft level stiffness irregularity does not occur, weak level irregularity due to discontinuity in lateral force level does not occur, excessive weak level irregularity due to discontinuity in lateral force level occurs at the ground floor in y direction, while the structural performance level is at Damage Control. In the second type, torsional irregularities occurred in the x-direction and y-direction, excessive torsional irregularities did not occur, internal angle irregularities occurred at the ground floor, first floor, and second floor, discontinuity irregularities did not occur, irregularities due to displacement perpendicular to the plane did not occur, nonparallel system irregularities did not occur. Soft level stiffness irregularity does not occur, and excessive soft level stiffness irregularity does not occur, weak level irregularity due to discontinuity in lateral force level occurs at ground floor in both x direction and y direction, excessive weak level irregularity due to discontinuity in lateral force level occurs at ground floor in both x direction and y direction. In contrast, the structural performance level is Immediate Occupancy.

Keywords: *Single system, Dual system, Structural irregularities, Performance level*

Group -1C

Behavioral Studies Building Structure With Basement Consequences Influence of Soil-Structure Interaction on Structure

Muhammad IbnuHajar F. Harahap , Alex Kurniawandy, and Muhammad Yusa

Although regarding SSI has regulated in SNI 1726-2019 chapter 14 concerning "soil-structure interaction for seismic design" but until now this practice still in Indonesia relatively few and some case planning structure even no consider SSI effect. This study evaluate effect interaction between soil and structure (Soil-Structure Interaction, SSI) in multi-story building with basement use method analysis dynamic time history. The effects of SSI are reviewed from behavior structure to dynamic load that includes natural period structure, base shear, displacement structure and displacement between floor (story drift) is analyzed with compare models foundation rigid and foundation flexible. Research result show that the SSI model can extend natural period structure on the stiff soil and capable reduce base shear up to 28.01%. Models with two basement floor showing more reduction big compared to model with one basement floor, showing that stiffness addition from the basement more effective in reduce inertia force. Additionally, SSI lowers mark displacement and story drift are 12.87 mm and 1.16 mm respectively, this phenomenon give impact positive to integrity and performance structure This study emphasize importance consider SSI in design structure for produce more response accurate and optimal for earthquake load

Influence of partial saturation on liquefaction resistance of soil: a case study at Yogyakarta – Bawen toll road

Lutfi Achmad Hanafi, Hary Christady Hardiyatmo, Fikri Faris

Liquefaction occurs in saturated granular soils. It is common practice in liquefaction assessments to assume soil located below the groundwater table to be fully saturated. However, numerous studies have shown many instances of soil below the water table were only partially saturated. A decrease in the saturation, even in small amounts, can significantly increase the liquefaction resistance of soil. This means that ignoring partial saturation in a liquefaction assessment may lead to an underestimation of liquefaction resistance. This research investigates the degree of soil saturation on the field and its effects on liquefaction resistance at the Yogyakarta – Bawen toll road. The influence of partial saturation in a simplified liquefaction potential evaluation was calculated using the KS correction factor proposed by Hossain et al. Additionally, soil saturation on the field was measured using compressional wave velocity (VP) measurements with seismic refraction method. Liquefaction potentials without considering the effect of partial saturation were calculated for three sites at the Yogyakarta – Bawen toll road. The results indicated the presence of potentially liquefiable layers at all investigation sites. Compressional wave velocity tomograms showed soil layers situated below the water table were only partially saturated. Taking this into account, liquefaction potentials were recalculated with partial saturation correction factor applied. The recalculation produced an increased liquefaction resistance and, consequently, an improved liquefaction safety factor above 1.00 for all layers. These results demonstrated the influence of partial saturation on liquefaction resistance and highlighted the importance of partial saturation investigation in liquefaction potential studies.

Keyword: *Liquefaction, saturated granular soils, Yogyakarta.*

Proposal of Real-time Tsunami Inundation and Damage Forecast System in Indonesia

Shunichi Koshimura, Abdul Muhari, Erick Mas, Bruno Adriano, Takashi Abe, Akihiro Musa

In the aftermath of catastrophic tsunami disasters, identifying its impacts and finding devastated areas are important for disaster response and relief activities. From the lessons of past catastrophic events, the importance of developing technologies to forecast the regional impact of the great tsunami disaster has been raised. Bringing together state-of-the-art high-performance computing and spatial information sciences, we propose a real-time tsunami inundation forecasting and damage estimation system to enhance disaster response in Indonesia. For real-time tsunami inundation forecasting, we first use the information of the Earthquake parameters (focal mechanism) from BMKG (Badan Meteorologi, Klimatologi, dan Geofisika), which consists the fast estimation of earthquake magnitude and the hypocenter to determine the potential tsunami source model. Given the tsunami source, the system moves on to tsunami propagation and inundation model running on several high-performance computing platforms including the vector supercomputer SX-Aurora in Tohoku University to acquire the estimation of time series of tsunami at offshore/coastal tide gauges to determine tsunami travel and arrival time, extent of inundation zone, maximum flow depth distribution. The implemented tsunami numerical model is TUNAMI code based on the non-linear shallow-water equations discretized by the finite difference method. The merged highresolution bathymetry and topography grids are prepared to better estimate the tsunami inland penetration. Given the maximum flow depth distribution, the system performs GIS analysis to determine the numbers of exposed populations and structures using the census data, then estimates the numbers of potential exposure and damaged structures by applying the tsunami fragility curve, which is structural damage probability as a function of tsunami flow depth. The results are disseminated as mapping products to responders and stakeholders, e.g. national and regional municipalities, to be utilized for their emergency/response activities, e.g. identifying the potential damage to houses, road networks, critical infrastructures, search and rescue, and recovery. The prototype system starts trial operation in one of the at-risk coastal cities, which detailed into village level - against the mega-thrust earthquake. In the trial operation, we verify the capability of the method as a new real-time tsunami inundation forecasting, damage mapping and response system for stakeholders and responders. Further implementation by the on-premise system at the BNPB computer center, and its upscaling study area are discussed here in.

Keyword: *Tsunami disasters, damage forecast, indonesia*

The risks of "fallacy of composition" as remaining ethical challenges by scientific research in disaster-affected areas

Yuta Hara, Kimiko Takeda, Ryohei Yamashita, Ryo Saito, Daisuke Sasaki, and Tatsuto Aoki

Research surveys in disaster-affected areas always face the conflict between providing important information and recommendations regarding the actual status of damage and recovery and reconstruction, as well as the need for more careful ethical considerations. It is said that there were cases in the 2011 Great East Japan Earthquake and Tsunami (GEJET) where some research activities caused difficulties for victims and affected areas. The above can be divided into two main categories, one is the problem of the capacity, burden, and exhaustion of the research subjects, and the other is the ethical problem of the methods, content, and approach of individual studies. The latter problem can be resolved by conducting an ethical review at each research institution. However, the former problem is almost completely intact. As of March 2024, the 2024 Noto Peninsula Earthquake and Tsunami (NPET) is the most significant disaster damage that has occurred after GEJET in Japan. In addition, the disaster-affected area in Noto Peninsula is a rural area, with a smaller area, smaller population, and limited transportation routes than GEJET. Thus, it is at higher risk of becoming a "fallacy of composition" even if each researcher observes research ethics. In the field of scientific ethics, the Hibernation method has been proposed as a theoretical ethical review method that can address the above problems, however, there are many barriers. This study will introduce the latest efforts among researchers in response to NPET and consider how the humanities, social, agricultural, and planning sciences should behave, collaborate, and coordinate.

Keyword: *Ethics in research, Responsibility of science, Field survey, Social science, Interdisciplinary research, Reconstruction*

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Paralel Session 1

08.30– 10.15

Track 1:
Hazard, Technology & Infrastructure

Room 2: Human Security Lab, 3rd Floor TDMRC | Group 1D

Potential Liquefaction Hazard and Ground Failure Probability Analysis Based on SPT Data in the Relocation Plan of Access Road at Rendani Airport, Manokwari, West Papua

Dedy Wijayanto, Fikri Faris, Wahyu Wilopo

Based on United States Geological Survey (USGS) data, the Manokwari region in West Papua Province recorded an earthquake with 7.6 Mw in 1944, about 5 km from Manokwari City. One of the consequences of an earthquake is a liquefaction hazard that may occur at the research location in the Relocation Plan of Access Road at Rendani Airport, which has shallow groundwater and loose soil. This study aimed to assess the distribution of the Liquefaction Potential Index (LPI) and Ground Failure Probability (PG) using Standard Penetration Test (SPT) data from 18 locations by comparing Peak Ground Acceleration (PGA) values between Deterministic Seismic Hazard Analysis (DSHA) Probabilistic Seismic Hazard Analysis (PSHA) method. Calculations with determined PGA values of 0.449g (soft soil) and 0.499g (medium soil) show that the LPI varies between 0 – 27.06, consisting of a very high potential category at 9 locations, primarily in the northern area. In addition, the PG > 0.9 is categorized as very high to absolutely certain appears at 13 locations, also mostly in the north region. Based on these results, it is necessary toconsider the liquefaction aspect when planning the design of the infrastructure to be built.

Keyword: *Liquifaction, Ground Failure Probability, Monokwari*

Assessing Nature-Based Solutions (NBS) for Restoring Watersheds: A Case from Brantas River in Batu City

Saut Sagala, Cecilia Nonifili Yuanita, Dekka Dhirgantara Putra, William Harahap

Numerous rivers are impacted by high-intensity activities, with one primary concern being the alteration of land use within their areas. Batu City is renowned for its fertile agricultural land and rapid urban development. However, rapid urban development led to significant degradation and land-use changes, adversely affecting the health of the Brantas River basin. Agricultural land decreased by 24,92% between 2010 and 2020, and around 925 hectares of forest have been converted into agricultural and residential areas. These changes often stem from spatial planning policies that lack environmental sensitivity. This study utilizes advanced machine learning and satellite data analysis techniques to map the Brantas River's morphology changes. By employing the Normalized Difference Vegetation Index (NDVI) and the Normalized Difference Built-Up Index (NDBI) from Sentinel, the research aims to gain a comprehensive understanding of the transformations in the Brantas River basin over the past 20 years. Additionally, the study explores NBS strategies, such as wetland restoration, reforestation, and other interventions, to restore and enhance the resilience of the Brantas River basin. The research findings will provide valuable insights and practical recommendations for spatial and development planning, contingency planning, and adaptation action plan for disasters and climate risk reduction to manage sustainability in the Brantas River basin Batu City by integrating environmental considerations into policy and implementing NBS. This study aims to contribute to the long-term health and sustainability of the river's ecosystem, adaptation to climate-related hazards, and improved water absorption, thereby benefiting the local community and biodiversity.

Keyword: *nature-based solutions, normalized difference built-up index, normalized difference vegetation index, river basin restoration, spatial planning*

Evaluation of land subsidence trends in Pekalongan, Indonesia, through Conventional Deep Pipe Monitoring and Geospatial Data Analysis to guide urban planning strategies

Dita Arif Yuwana, Saut Sagala, Dicky Muslim, Teuku Yan Waliana Muda Iskandarsyah, Kharis Aulia Alam, Muhammad Asa, Akhirul Insan, Wawan Hermawan, and Taufiq Wirabuana

Despite being densely populated and economically thriving, the northern coast of Java, specifically Pekalongan, faces challenges hindering further development, particularly land subsidence and coastal flooding. Since the late 2000s, these hazards have become increasingly evident, causing infrastructure damage, displacing residents, and altering land use patterns. In this study, the Conventional Deep Pipe Monitoring Model (CDPM) was deployed at nine monitoring sites to assess subsidence trends per layer within the Alluvial (L1) and Upper Damar (L2) formations from 2021 to 2024. The analysis incorporates Interferometric Synthetic Aperture Radar (InSAR) data on land subsidence alongside information on coastal flood events, groundwater decline, surface sediment, population density, road networks, and land use. Results revealed variations in subsidence rates across the study area. Layer L1 exhibited the most significant subsidence, with average values ranging from -1.1 cm (Siwalan) to -4.3 cm (Wonokerto) annually. In contrast, layer L2 displayed lower subsidence rates, averaging between -0.4 cm (Wiradesa) and -3.3 cm (Siwalan) per year. Notably, Siwalan and Hoegeng sites deviated from the trend, with subsidence in L2 either exceeding or nearly matching L1. Laterally, areas with high population density and well-developed road networks characterized by flood sediment deposits (Qfl) tend to see higher subsidence. In comparison, swam (Qs) and coastal (Qb) deposits share opposite features and showcase lower subsidence. The findings highlight the correlation between the developed areas and the declining groundwater level in L2 with the dominant spread of subsidence, information for prioritizing areas, and selecting urban planning-related interventions within Pekalongan.

Use of Dynamic Population Analysis in Tsunami Evacuation Drill and Disaster Response in Japan

Yasuhiro Soshino, Akira Miyata, Masahiro Nemoto, Yusuke Kato and Kazuhisa Shibayama

The 2011 Great East Japan Earthquake and Tsunami revealed the challenges in collect the information on the passable roads, the isolated areas, and the on-officially designated shelters, which was very important to offer the immediate relief services. In November 2022, the real-time tsunami evacuation monitoring and the detection of unusual gathering of people participating in the tsunami evacuation drill were carried out by the authors as part of the Japan Cabinet Office's tsunami disaster prevention drills in Nemuro. In the drill, the participants were asked to install a smartphone application for sharing their locations. The results of the dynamic population analysis were shown on two monitors at the disaster response headquarters so that the local authorities and relief agencies could understand the evacuation status. After the evacuation, the participants reflected their evacuation behaviors by watching the results shown in the monitors. Following this field test, in the recent 2024 Noto Peninsula Earthquake in Japan, the dynamic population analysis by the authors identified the impassable roads, isolated areas, and the evacuees's gathering in the non-designated shelters. The information was shared with the Japanese Red Cross and other medical relief teams, and the local authority in the disaster affected areas to support relief activities. In this way, the dynamic population analysis was effective in tsunami evacuation drills and the rapid assessment in emergencies. For the effective and smooth application of the dynamic population analysis by using the mobile phone location data, building up the information sharing system is crucial.

Resilience Assessment of Indonesian School Buildings Against Earthquake and Tsunami Hazards

Rifqi Irvansyah, Tiziana Rossetto, Yunita Idris, Jonas Cels

Indonesia, located on the Pacific Ring of Fire, faces frequent earthquakes and tsunamis, posing significant challenges to its educational infrastructure. The 2004 Aceh earthquake and tsunami, the 2009 Padang earthquake, and the 2018 Central Sulawesi earthquake and tsunami collectively caused extensive damage to thousands of schools, resulting in significant educational disruptions and loss of life. These disasters highlighted the vulnerability of school buildings, with many destroyed or rendered structurally unsound, impacting tens of thousands of students and displacing large populations. Consequently, there is an urgent need for disaster-resilient infrastructure and preparedness plans for schools, which are critical not only for education but also as emergency shelters and aid distribution centres. Ensuring safer school facilities aligns with the Sustainable Development Goals, particularly the right to education and poverty reduction. Fast forward to 2020, the Indonesian Ministry of Public Works and Housing took a proactive step by issuing guidelines for the technical standardization design of school buildings. These guidelines aim to ensure that school buildings, as crucial public facilities for educational activities, are constructed to withstand the threat of earthquakes and tsunamis. It is imperative to conduct a feasibility study on the resilience of school buildings, which serve as vital public facilities, against the dual threats of earthquakes and tsunamis. This study endeavours to guarantee that school building structures are meticulously planned to withstand such natural disasters. This study aims to provide crucial insights by developing an analytical fragility function, depicting the likelihood of damage to school buildings under earthquake and tsunami loading scenarios. By quantifying the probability of building damage, the findings of this analysis can inform proactive measures to mitigate future disasters. This comprehensive approach enables policymakers and stakeholders to gain valuable insights into the potential impact of future seismic and tsunami events on school infrastructure, facilitating the formulation of targeted strategies for disaster risk reduction and resilience enhancement.

Proposal of a Tsunami Intensity Scale Derived from a Tsunami Building Vulnerability Index

Mohd Muhaimin Ridwan Wong, Nordila Ahmad, Anawat Suppasri, Syamsidik

Similar to any other disasters caused by natural hazards, the intensity of a tsunami can be used to categorise and describe the severity of its impacts. Understanding potential intensities, particularly in correlation to a disaster's magnitude and the vulnerability of exposed elements are essential for an effective disaster risk management. This study proposed a tsunami intensity scale with a focus on potential damages to buildings exposed to tsunami hazards. The eight grade scale is derived from the analysis of field survey data from three major tsunami disasters with different source events in Indonesia and Japan using the tsunami building vulnerability index. An expert opinion survey was conducted to refine the weightages and indicators used in the building vulnerability index. Subsequently, linear regression analysis for the different building vulnerability classes is done to identify correlation between probability of damages with tsunami inundation as the hazard parameter. Based on the findings, an 8-grade tsunami intensity scale is constructed with reference to past hazard intensity scales. The study concluded that the proposed scale can be further refined with the availability of more tsunami field survey data particularly from different regions and source events. The study also noted the opportunity to improve the scale through the refinement of the building vulnerability index that was used in its development.

How can Local Academic Institutions Play a Key Role in Disaster Risk Reduction? From the perspective of the involved parties in Aceh

Daisuke Sasaki, Yolanda, Yuta Hara, Novi Reandy Sasmita, Nudzran Yusya, Hizir Sofyan

This study aims to examine a role in disaster risk reduction (DRR) played by local academic institutions (LAIs) through an empirical analysis of the perspective of the parties involved in LAIs in the region of Aceh, which has been severely damaged by the 2004 Aceh Tsunami. A questionnaire survey of 400 respondents in the region was conducted from July 2023 to September 2023. Out of 400 respondents, 262 (65.5%) have the degree of S2 (master), while the rest of the respondents, namely 138 (34.5%), have the degree of S3 (doctor). Furthermore, 195 (48.8%) respondents are female while 205 (51.2%) are male. We applied cross tabulation to investigate basic characteristics among observed variables, followed by structural equation modeling to comprehensively grasp the potential role of LAIs in DRR while utilizing latent variables. In conclusion, we advocate that the LAIs in the region can play a key role in DRR in the future after the 20 years of the 2004 Aceh Tsunami.

Keyword: *governance process, gampong lambung, resilience, sociological institutionalism*

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Paralel Session 2

10.30 – 12.15

Track 1:
Hazard, Technology & Infrastructure

Room 2: Human Security Lab, 3rd Floor TDMRC | Group 1E

The impact of Land-use changes for Flood (Case study in Teunom Sub-District, Aceh Jaya Regency)

Annisa Sri Sugiarti, Risma Sunarty

Floods are one of the most widespread natural disasters that adversely affect human activities. Aceh often experiences flood events, one of which is located in the Aceh Jaya Regency. The Aceh Jaya Regency, notably in Teunom Sub-District has frequently experienced flooding over the years. Land use change allegedly plays an important role in the flood events in the area. This study used a Geographic Information System (GIS), in which spatial data on the land-use change was collected from 2019 to the recent years. The results found in Teunom Sub-District the plantation and settlement areas have increased in recent years, while open land has decreased from year to year. One of the main causes of this increase because of the expansion of plantation areas and population growth. The conversion of forests into agricultural and plantations can reduce the capability of the soil to absorb rainwater, thereby reducing soil stability. This causes floods to become more frequent and can damage agricultural land and infrastructure. It also affected the people who lived in the areas. Sustainable land management in Teunom Sub-District should be carried out to minimize the negative impacts of land cover changes in the area. The implementation of sustainable agricultural practices, forest rehabilitation, and the development of green infrastructure can help restore ecosystem balance and increase environmental resilience to natural disasters.

Tsunami Risk Analysis Using Reduced Order Modeling

Fritz Sihombing

The tsunami impact assessment should be done rapidly and accurately to ensure adequate emergency risk responses and management so the city can recover swiftly. Significant progress has been made in numerical analysis techniques to yield more precise assessments and predictions of tsunami forces. However, this achievement comes with an expensive computational cost, which might hinder their applicability for uncertainty quantification and probabilistic risk analysis. Reduced-order modeling is a numerical approach that attempts to find a model in lower-dimension space but still manages to represent the physical features of the full-order model with acceptable accuracy. Proper orthogonal decomposition is one of the reduced-order modeling methods that has been used in many engineering fields. However, applying a reduced-order modeling approach, precisely proper orthogonal decomposition, in the spatiotemporal analysis of tsunami impact has yet to be extensively studied. In this study, we proposed a risk analysis framework that uses reduced-order modeling to model the spatial distribution of tsunami inundation due to earthquake-induced tsunami events.

Mitigating Leachate Contamination: Geological Investigations at Alue Lim Landfill Area, Lhokseumawe City

Akmal Muhni, Dewi Sartika, Bambang Suhaidi, Hidayat Syah Putra, Shanna Hariri Adrian, Maya Safira, Muzakir Zainal, Fajar Fakri

Geological studies are essential for identifying potential pollution in the Alue Lim Landfill Area, Lhokseumawe City. This research focuses on the physical properties of rocks, soil structure, and specific geological layers that influence water movement. The permeability and porosity of rocks are critical factors determining the ease with which leachate penetrates and migrates through geological formations. The study area encompasses the Idi formation sandstone unit (Qpi) and alluvium deposits (Qh). The Idi formation sandstone unit is characterized by fine to medium grain sizes (0.125 - 0.25 mm), interbedded with coarse sand, and exhibits a range from well to poorly sorted, moderately rounded grains with good porosity and permeability. Conversely, the alluvium deposit unit consists of clay, sand, and gravel, where the clay deposits are well-sorted with grain sizes >1/256mm, displaying poor porosity and permeability, and a clastic texture. The interaction between the permeable sandstone layer of the Idi Formation (aquifer) and the impermeable clay deposits in the alluvium unit (aquiclude) significantly affects leachate movement through the subsurface. Leachate rapidly migrates through the porous materials such as sand and gravel in the sandstone layers, potentially spreading contamination. In contrast, the clay layers act as barriers, limiting and redirecting leachate flow within the alluvium deposits. This research provides crucial insights for recommending management and mitigation strategies to address groundwater pollution in the Alue Lim Landfill Area.

Impact of natural resources rents and human capital on ecological footprint in Indonesia: Technological innovation as moderation

Zahria Zurrah, Suriani Suriani, and Muhammad Abrar

Ensuring a balance between economic and environmental sustainability is challenging for sustainable development. In global economies, particularly in developing countries, there is a strong focus on achieving sustainable growth that balances economic expansion with efforts to limit ecological footprints. In this context, this study investigates the impact of natural resource rents (mineral rent and forest rent), human capital, economic growth, and technological innovation on the ecological footprint in Indonesia using the ARDL model from 1991Q1 – 2021Q4. The results indicated that all variables significantly increased ecological footprint in the short run. On the other hand, technological innovation has been proven to have a moderating effect in lessening the negative environmental consequences of natural resource rents and human capital. The findings of this study have several policy implications for Indonesia. First, technological innovation frequently demands large amounts of energy. When this energy is sourced from non-renewable resources, it can lead to environmental degradation. Therefore, the Indonesian government should develop sustainable solutions with environmental protection policies and use environmentally friendly technologies. Secondly, the interaction of technology innovation on mineral rents and human capital only has a negative impact on ecological footprint in the short term. Hence, the government can develop transition plans towards more sustainable practices, covering the entire product lifecycle from raw materials to disposal. Then, the government can educate public about the trade-off of new technologies. An escalating ecological footprint is strongly associated with a corresponding rise in disaster risk. Understanding these correlations helps us reduce ecological footprint and disaster risk.

Rapid Estimations of Onshore Tsunami Arrival Times and Flow Depths Based on A Convolutional Neural Network Method: A Novel Approach for Banda Aceh After 20 Years of the 2004 Aceh Tsunami

Syamsidik, Aulia Khalqillah, Tursina, Muhammad Daffa Al Farizi, Hayyan Ghifary Armaya, Benazir, Eldina Fatimah, Muhammad Fauzi

After 20 years of the 2004 Aceh Tsunami, providing fast and reliable estimation of tsunami arrival times and flow depths has yet to be widely applied. This research aimed to develop a tool for the local government in Banda Aceh to estimate onshore tsunami arrival times and flow depths using an artificial intelligence method. Eighty tsunami scenarios were simulated using the Cornell Multi Grid Coupled Tsunami (COMCOT) Model. The earthquake magnitudes for the tsunami simulations were between 8.0 Mw and 9.2 Mw with a -0.1 Mw interval. Another variation was made based on tidal level variations when the earthquake occurred. The source of the tsunamis was considered from the Sumatra-Andaman segment, which was similar to the source of the 2004 Aceh Tsunami. Convolutional Neural Network (CNN) was used to develop a rapid estimation tool. A Web-based tool for the estimation was developed to integrate the CNN results into the estimation. This research found that using CNN has provided faster results and made it easier for disaster practitioners to perform the estimation. The tool will be useful for supporting disaster managers in making necessary decisions for evacuation.

Understanding the significance of Coastal erosion pattern along Bengkalis Island due to climate change

Khusnul Setia Wardani, Hamzah Haru Radityo Suharyanto, Sigit Sutikno, Ahmad Muhammad, Yamamoto Koichi3, Hendra Saputra, R.A. Diah Sulistio Ningrum

Bengkalis Island is located in the outer border of Indonesia that face Malacca Strait. The westnorth part of the island, which is predominantly composed of peat soil, was the most severely affected by erosion. The condition is particularly frequent during periods of high rainfall intensity due to climate change. This cause the Landslide towards the sea which triggered by land instability due to the land use changes and the material flow the nearshore as sediment transport material. Understanding the nearshore sediment transport is needed as a base to design a proper coastal protection. To address this phenomena, we investigate a model of the sediment transport pattern along west coast of Bengkalis Island in low and high wave season condition using coupled flow and wave model of Delft3d software. This model use bathymetry data from BATNAS, waves and wind data from ERA-5, TPXO global tides, and sediment properties from secondary data. Model verification conducted using field survey data of Yamaguchi University and Riau University. By investigating two cases, the prone of erosion area occurred in the edge of north-western of Bengkalis while sedimentation occurred in the edge of southern of this island. In addition, in order to achieve an optimal natural base solution (NbS) system for coastal protection, recommendations for determining the appropriate form of coastal protection must consider hydrodynamic characteristics. The appropriate mangrove species for this region is one that possesses the ability to acclimate to elevated salinity levels, intense currents flow and high waves.

Evaluating Tsunami Risk and Economic Loss: Integrating Event Loss Table Methods in Western Coast Part of Aceh, Indonesia

Muhammad Daffa Al Farizi, Syamsidik Syamsidik, Anawat Suppasri and Hayyan Ghifary Armaya

The Province of Aceh was one of the regions in Indonesia that was the worst affected by the Indian Ocean Tsunami 2004. Aceh Barat and Aceh Jaya, has significant damage as the results of the Indian Ocean Tsunami. This is due to the fact that the city is located in the western part of Aceh. To the end, the Government of Aceh in collaboration with academics in Aceh, initiated a series of studies related to the Tsunami that will be occur in the Future. Furthermore, this analysis is including the return period of tsunami and the impact of this event such as the damage to buildings, Probable Maximum Loss of the event and also the Average Annual Loss of the event. The focus of this study is to identify the impact of buildings and Probable Maximum Loss and Annual Average Loss of buildings in Aceh Barat and Aceh Jaya. The methodology to be applied to estimating buildings damage is Fragility Curves method, and to estimating the financial losses result is Event Loss Tables methods to calculate Probable Maximum Loss and Annual Average Loss. The objective of this research is to obtain the Probable Maximum Loss (PML) Curve, and also to the Annual Average Loss (AAL) for Aceh Barat and Aceh Jaya. The curves and result will provide the crucial data on the potential economic impacts. In this Research will contribute to Aceh Government's to preparedness and mitigation strategies relating to economy of Aceh, as specially in Aceh Barat and Aceh Jaya as well as the country areas on the West Coast of Aceh.

Keywords: *Event Loss Tables (ELT), Fragility Curves, Probable Maximum Loss (PML), Annual Average Loss (AAL)*

Group - 1E

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 3

13.30 – 15.15

Track 1:
Hazard, Technology & Infrastructure

Room 2: Human Security Lab, 3rd Floor TDMRC | Group 1F

The Influence of Sea Level Rise and Land Subsidence on Tsunami Hazard: A Case Study of DKI Jakarta

Teuku Muhammad Rasyif, Devi Tasya Marisa, Jean Yunita Sumbung, and Rifat Santana

Jakarta is the capital city of Indonesia and the most populous megacity in Indonesia with a population of DKI Jakarta reaching 10.64 million people. The Jakarta area is located on the island of Java which is close to the Eurasian and Indo-Australian Plate subduction zones which are prone to tsunamis. Not only this problem, but Jakarta also needs a quick solution to overcome the problems of land subsidence and sea level rise. Therefore, this study aims to determine the value of the initial condition (initial condition) of the tsunami generation process, the height and return period of 500, 1000, 2000 and 5000 years of the occurrence of tsunami waves by PTHA analysis and analysis of the effect of sea level rise and land subsidence on height. tsunami waves in the Jakarta area. This research can provide information or knowledge for the community regarding the risks of the tsunami hazard in the Jakarta area. So that the government can make a disaster mitigation plan to protect people in the Jakarta area from the tsunami waves. The research method is based on the Probabilistic Tsunami Hazard Assessment (PTHA) method and simulation is carried out with COMCOT. From the research conducted, the maximum possible height of a tsunami under conditions of sea level rise and land subsidence is 0.9 meters at point 8 at 500-year return period, 2.5 meters at point 8 at 1000-year return period, 3.9 meters at point 8 at 2000-year return period and 5.9 meters at point 8 on the return period of 5000 years.

Assessing Economic Losses to Buildings from Tsunami Using Deterministic Rupture Sources: A Case Study of Labuan, Banten, Indonesia

Kenneth Vinchent Cong and Budianto Ontowirjo

Tsunamis pose a significant threat as devastating natural hazards, with Indonesia exhibiting particular vulnerability. The housing sector is demonstrably impacted by tsunamis, as structures inadequately designed for such events are susceptible to collapse, incurring substantial economic losses. The 2018 Sunda Strait tsunami, triggered by volcanic flank collapse, exemplifies this vulnerability, resulting in billions of dollars in damages. This emphasizes the critical need for robust risk assessment and mitigation strategies to minimize future economic devastation. Understanding potential economic repercussions of tsunamis is paramount for policymakers, urban planners, and disaster response agencies. This study evaluates economic losses from tsunami-related building damage in Kecamatan Labuan, Banten, Indonesia. We employ the Cornell Multigrid Coupled Tsunami (COMCOT) model to simulate a deterministic tsunami source model with three scenarios: megathrust 1, megathrust 2, and a combination of both (magnitude 8.9). Fragility curves assess the likelihood of building damage considering the diverse building types in the study area. Building damage states will be categorized (light to collapsed) to determine repair needs and economic loss calculations. Economic loss is derived by multiplying repair costs with the corresponding damage state. Simulation results suggest potential tsunami damage impacting up to 12,382 houses in Labuan, Banten, with estimated total economic losses reaching $300 million USD. These findings underscore the urgency of proactive measures, including stricter building codes and timely warning systems, to lessen the future economic burden of tsunamis in this region.

Group - 1F

Tsunami Hazard Area Zonation Using Run-Up Modeling in The Coastal Area of Bandar Lampung City

Adnin Musadri Asbi, Djati Mardiatno, and Dina Ruslanjari

Bandar Lampung City is one of the areas in Lampung Province that has a coastal area. The location of the coastal area of Bandar Lampung City is directly adjacent to the sea and Mount Anak Krakatau which can trigger a tsunami disaster, causing this area to be included in the tsunami disaster prone area. This research will provide an overview of the tsunami hazard in the Coastal Area of Bandar Lampung City through tsunami run-up modeling with various scenarios. The output of this modeling is the inundation area caused by tsunami and the maximum exposure of tsunami waves obtained from the results of tsunami runup modeling processed with the model builder in ArcGIS software by entering DEMNAS data, morphology, land use, and coastline. There are six tsunami run-up height scenarios: 0.5, 1, 2, 4, 8 and 16 meters. The scenarios were then classified into a tsunami hazard index based on PERKA BNPB No. 2/2012 with three tsunami hazard class levels: low, medium and high. As a result, at the smallest run-up height (0.5 m) there is only a low hazard class of 58.19 ha. The tsunami hazard area starts to become significant at a run-up height of 4 m with a low hazard area of 122.6 ha; a medium hazard area of 173.93 ha; and a high hazard area of 239.1 ha. Whereas at the highest run-up height (16 m), the area of high class tsunami hazard reaches 1344.79 ha, with 53.86 ha of medium class hazard and only 19.17 ha of low class hazard. The wide distribution of hazards from each scenario shows that the coastal area of the city of Bandar Lampung is very vulnerable to tsunami hazards that can threaten the existence of settlements and land use in the area.

Seismic vulnerability assessment of health facility buildings. Case study: Langsa City, Indonesia

Haikal Fajri, Irwansyah, Lailissa'adah, Defry Basrin, Arisna Fauzia, Nova Purnama Lisa, and Muhammad Riswandy

Communities are now at risk due to the increase in both the frequency and intensity of seismic disasters, particularly in highly populated and rapidly developing areas. Over the previous ten years, there have been multiple documented earthquakes of a magnitude between 4.9 and 5.3 and a depth of 10 KM, with the epicenter occurring close to downtown. Given the frequency of earthquakes and the proximity of the epicentre point to the city center and medical facilities, this study aims to determine the governmentowned hospital's vulnerability to current seismic hazards in Langsa City, Aceh Province, Indonesia. Healthcare institutions must function effectively in the case of a disaster to treat injured citizens to a sufficient degree. First, a rapid visual screening (RVS) FEMA 154 field survey was conducted in Langsa City, and a building attribute information database was constructed. Second, the vulnerability of building information and building seismic vulnerability were estimated based on push-over analysis. Finally, in order to calculate the likelihood of structural failure and classify it into a loss assessment level in accordance with ATC 40 and FEMA 356 criteria, the building model will lastly be simulated using the planned ground motion equation with a scenario of an earthquake with a magnitude of 5-7 and an epicentre point of 22 km from the city center at a depth of 10 km. The six buildings were chosen, namely regional general hospitals and community health centers spread across five sub-districts. These were selected because of their strategic function in serving the health needs of the community both before and after a disaster occurs. It is hoped that this research can provide input for stakeholders in disaster management efforts in Langsa City.

Keyword: *Seismic Hazard, Building Vulnerability, Health Facility, Langsa city*

Group - 1F

LOCATION-BASED CLIMATE SENSITIVE DISEASE MAPPING USING MACHINE LEARNING FOR DASHBOARD DEVELOPMENT IN PUSKESMAS

Rizka Puspitasari, Connie Cai Ru Gan, Muhammad Yani, Zahrina and Taufik Fuadi Abidin

Understanding the context-specific trends and patterns of climate-sensitive disease is essential for planning effective climate adaptation activities, especially for primary health care. This study explores the development and application of a Geographic Information System (GIS)-based dashboard to map and forecast the disease cases associated with climate variables. The study uses machine learning techniques to anticipate disease incidence in relation to climate variables, providing a comprehensive spatial understanding of disease occurrence. The selected machine learning algorithms are calibrated and validated based on dengue data from 2010 to 2023 to study past trends and projected patterns of climate-sensitive diseases. The dashboard provides visuals and interactive data, providing healthcare professionals with tools to support strategic decision-making in response to potential outbreaks. The analysis reveals a significant correlation between climate variables and disease incidents, highlighting the need for an early warning system. This dashboard aims to assist in strategic decision-making, enabling primary healthcare service providers to allocate resources effectively and enhance patient care in a location most affected. This research holds the potential to significantly improve public health outcomes in the face of increasing climate change challenges.

Keywords: *climate change, climate-sensitive disease, primary health care, dashboard, machine learning.*

Group - 1F

Identification of Housing in Disaster-Prone Locations in Banda Aceh : Case Study Gampong Deah Raya

Dyah Erti Idawati, Seprina Yana Alidha, Lisa Maharani, Lia Maisari, Atika Aditya

Banda Aceh experienced a deadly disaster twenty years ago, which led to the loss of people as well as the economy. The city has been reconstructed, but the development of the city tends to eliminate the prone to disaster conditions. The purpose of the study is to identify the distribution of housing in disaster-prone locations in Banda Aceh and to analyze the characteristics of houses located in disaster prone locations in Gampong Deah Raya, Banda Aceh. The study utilizes descriptive qualitative methods using spatial analysis to determine the distribution of settlement under the disaster hazard with data collection techniques are observation, documentation, and interview. The research analysis uses a superimposed technique by overlapping existing maps using Arc GIS software. The result of the study shows that eighty-one from ninety gampong in Banda Aceh are vulnerable to earthquakes, tsunamis, floods, and liquefaction ranging from low, medium to high levels of vulnerability. In terms of housing, characteristics are dominated by full ownership rights with twenty-four percent of houses condition that are inhabitable. The findings also highlight the critical importance of community engagement the integration of local knowledge into disaster management practices and the importance of the city authority regulating prone disaster risk to city regulations. This research applies valuable insights to the global disaster management risk literature.

Group - 1F

Japanese Foreign Aid to Fisheries in Response to Disaster: The Case of the 2022 Tonga Volcanic Eruption

Daisuke Sasaki, Anawat Suppasri, Fumihiko Imamura

The fishing communities in Aceh were devastated by the 2004 Aceh Tsunami. Japan has provided official development assistance to rehabilitate the fisheries in Aceh. Recently, the large-scale eruption of the Hunga Tonga-Hunga Ha'apai submarine volcano off the coast of Tonga in the South Pacific Ocean occurred on January 15, 2022. The Ministry of Fisheries in Tonga requested that Japan provide equipment for fisheries, symbolizing Japan's international cooperation in fisheries. This study aims to clarify the factors that influence the formation of positive perceptions Japan's international cooperation in the minds of people related to fisheries in Japan through a literature review, followed by an analysis of a questionnaire survey to verify the hypotheses established based on the literature review. A questionnaire survey was administered using Rakuten Insight to a total of 200 respondents. Ordinal logistic regression was applied, followed by structural equation modeling, to confirm the factor structure in the form of a path diagram. In conclusion, we advocate that the Japanese government focus more on awareness-raising activities for disaster risk reduction in the fisheries sector and foster domestic trust in public aid to gain the consent of the public in Japan to prepare for the future after the 20 years of the 2004 Aceh Tsunami.

Keyword: *Seismic Hazard, Building Vulnerability, Health Facility, Langsa city*

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 1

08.30 – 10.15

Track 2:
Inclusive Community Resilience
And Disaster Education

Room 3: Meeting Room, 3rd Floor
TDMRC | Group 2A

Tsunami Mitigation in Novels Set in Aceh as Disaster Education for Z-Generation

Herman Rusli, Mu'jizah, Mohd. Harun, Mukhlis

This research focuses on tsunami disaster mitigation in novels set in Aceh. It is important because novels are literary texts highly favored by the younger generation. The study seeks to examine the forms of tsunami mitigation revealed by novelists in their works. The findings of this research offer an educational alternative about tsunamis for Generation Z, as novels are highly favored literary works among the young generation. The methodology used in this research is a qualitative descriptive analysis of literary texts, employing a hermeneutic approach. The data sources for this research are several novels written by Indonesian authors that depict the Aceh tsunami in their works. The research results show that two novels vividly portray the Aceh tsunami, namely (1) "Laut di Atas Langit" by Mex Wahab, and (2) "Te O Teriatte" by Akmal Basery Nasral. In both novels, the authors reveal several tsunami mitigations that serve as education for each reader, including (1) pre-disaster mitigation; (2) mitigation during the disaster; and (3) resolution after the disaster. These findings demonstrate that disaster education can be conveyed through literary texts, including novels.

Keyword: *Tsunami mitigation, Aceh novels, disaster education, Z-Generation*

Group - 2A

Effectiveness of Disaster Prevention Education Focusing on Disaster Prevention Awareness -Based on 10 years practice of the Tohoku University DRR Education "YUI" Project-

Mari Yasuda and Toshiaki Muramoto

The effectiveness of disaster prevention education depends on the atitude of the learners and the learning environment. We have conducted the delivery classes for disaster prevention education and workshops at many elementary and junior high schools and science museums over the past 10 years, and have verified the effectiveness of these classes and workshops. The results are as follows : (a) children's awareness of disaster prevention differs depending on the characteristics of the school location, and the effectiveness of disaster prevention education also differs; (b) the educational effects are more sustainable and has a greater spillover effects on families among junior high school students than among elementary school students; and (c) learning together with parents at a science museum is more effective than learning at school. These results suggest that the effects of disaster prevention education are compounded by the learners' residential environment, developmental stage, and the environment and co-learners in which they learn. Based on these findings, we contributed how to provide better disaster prevention education for elementary and junior high school students in the future.

Keyword: *disaster awareness, sustainability of educational effects, spillover to families, school characteristics, Developmental perspective, learning environment*

Enhancing Tsunami Disaster Awareness: Evaluating the Impact of the i-Share Curriculum in Serang, Indonesia

Twin H. W. Kristyanto, M.M. Lanny W. Pandjaitan, Lukas Lukas, Arham A. Bahri, Otniel J. Palloan, Muhammad I. Hibban, and Rani Nabilah

Serang City, as an area prone to geological disasters such as landslides and tsunamis, places the Regional Disaster Management Agency (BPBD Serang) as the front guard in disaster mitigation efforts. However, a challenge is the need for a disaster curriculum for schools at any level, especially regarding tsunami disasters. On the other hand, the Geology Study Program at the Universitas Indonesia has responded to this need by developing an innovative tsunami disaster mitigation curriculum, i.e. Innovative Tsunami Hazard Education (i-Share). Therefore, this study aims to assess the effectiveness of i-Share in enhancing participants' awareness and knowledge of tsunami disasters. Action research approach, as a qualitative method, was employed, with a curriculum tested on 25 teachers and 25 students from various senior high schools in Serang. Each session evaluated participants' tsunami awareness, with pre-and post-tests measuring curriculum effectiveness. Results show significant enhancement in understanding tsunami disasters. The i-Share curriculum also facilitated the sharing of tsunami-topic learning experiences among peers and family members, fostering a culture of knowledge exchange. In conclusion, while promoting knowledge sharing, the i-Share curriculum successfully improved understanding and awareness of landslide disasters among senior high school educators and students in Serang Regency, Indonesia.

Gauging Disaster Resilience for Sustainable Tourism in the Banyak Islands: Exploration Business, Government and Local Community Using The Torrens Resilience Institute Framework

Syafruddin Chan, Muslim A. Djalil, and Kurnia Asni

The study focuses on assessing the disaster resilience and preparedness of the Banyak Islands, Indonesia, with a specific emphasis on the business community, government officials, and local community. The region is prone to natural disasters such as earthquakes and tsunamis, which pose significant threats to the lives and livelihoods of its inhabitants. The primary objectives of this study are to evaluate the disaster resilience and preparedness of the business community, government officials, and local community in the Banyak Islands, and to identify areas for improvement to enhance overall community resilience. The study involves key informant interviews and a survey of business community members, government officials, and local community stakeholders.. Key informant interviews and surveys were conducted, with data analyzed using SPSS 22.0. Businesses show moderate preparedness (Caution Zone), government officials are moderately prepared (Alert Zone), and local communities also exhibit moderate preparedness (Caution Zone). The findings highlight areas for improvement, including increased collaboration and communication within the business community, infrastructure reinforcement, regular emergency drills, resource stockpiling, and community engagement. The study provides valuable insights for policymakers and disaster management authorities in the Banyak Islands. The findings suggest that enhancing collaboration, reinforcing infrastructure, and promoting community engagement are crucial for improving disaster resilience. The study's recommendations emphasize the importance of fostering a more interconnected and resilient community. In conclusion, the study highlights the need for a holistic approach to disaster resilience, emphasizing the importance of collaboration, communication, and infrastructure reinforcement. The findings provide a foundation for targeted interventions to enhance overall community resilience in the face of natural disasters.

Keyword: *Disaster, Resilience, Sustainable Tourism, the Banyak Islands, The Torrens Resilience Institute Framework*

How could Virtual Reality Inclusively Improve Disaster Awareness to Tsunami?

Gusti Ayu Ketut Surtiari, Syarifah Aini Dalimunthe, Abdul Fikri Angga Reksa, M Yudhi Rezaldi, Taro Arikawa and Diah Lenggogeni

Disaster management, including disaster education, has begun to use virtual reality widely. However, further research is necessary to understand how these tools can contribute to inclusive disaster risk reduction. In 2023, the Midterm Review of the Sendai Framework at the United Nations emphasises the importance of developing inclusive approaches to disaster risk reduction in policy, planning, and programs. Disability groups and gender issues need priority over other marginalised groups. By considering the importance of increasing awareness of the risks of tsunamis so that they can support behaviour change, this study aims to explore the potential use of VR technology for inclusive disaster risk reduction. We conducted the study using a qualitative approach supported by primary data generated from 150 households and 120 students in the riskiest areas on Bali Island. Meanwhile, the trial of the VR tool was tested among the selected disability groups, women, the elderly population groups, and children. We apply triangulation analysis to the two types of data collection methods. The results demonstrate that VR tools can effectively promote inclusivity by tailoring programs and applications to each group's needs, enhancing knowledge and raising tsunami-related awareness. This research is useful to help stakeholders plan inclusive disaster risk reduction programs with increased awareness of risks for everyone.

DEVELOPMENT OF A LEARNING MODEL BASED ON LOCAL WISDOM OF THE PEOPLE OF ACEH TO IMPROVE DISASTER PREPAREDNESS IN GENERAL COURSES OF DISASTER AND ENVIRONMENTAL KNOWLEDGE AT SYIAH KUALA UNIVERSITY

Ahmad Nubli Gadeng, Wiwit Artika, Enok Maryani, Epon Ningrum, Iwan Setiawan, Daska Azis, Mirza Desfandi

The purpose of this research is to develop a learning model based on local wisdom of the Acehnese community to improve student disaster preparedness. The research used mixed methods, and a research and design approach through seven stages: preliminary study, needs analysis, hypothetical model, expert validation test, FGD, limited trial, broad trial and effectiveness test. Data collection techniques were observation, interviews, documentation, tests and questionnaires. Qualitative and quantitatidata analysis techniques were used. The results showed that: The development of local wisdom-based learning model consists of: (a) Syntax starting from: orientation, change and temporary evaluation, demonstrate, independent practice. (b) Social systems involving formal, non-formal and informal environments, (c) The reaction principle through cooperation and active participation of students is expected to increase the knowledge and skills needed for disaster mitigation, (d) Support systems through the academic focus of lecturers and students are needed during learning (e) Instructional impact in the form of increasing self-teaching capacity related to disaster mitigation, and the accompanying impact in the form of increasing students' independence and level of sensitivity to the cause-effect relationship generated after learning. Based on the results of the validation test, it is concluded that the local wisdom-based learning model is suitable for use in learning in general disaster and environmental knowledge courses for students at Syiah Kuala University.

Keyword: *Development, Learning Model, Local Wisdom, Disaster Preparedness*

Reconstruction of Paleoearthquakes Impact and Its Return Period Perspective Study to support Infrastructure Resilience Program (Case Study: Paleoearthquakes inland Sumatra Island)

Jaya Murjaya, Suaidi Ahadi, Petrus Demon Sili, Asdani Soehaimi, Supriyanto, Yedi Darmadi, Putu Hendra Widyadharma and Fauzi

Sumatra island is one of earthquake prone area in Indonesia. Some of paleoearthquakes occurred in Sumatra Island and its vicinity as like earthquakes in Siberut island on 1797 with magnitude (M) 8.6-8.8, Bengkulu on 1833 (M 8.8-9.1) and Nias island on 1861 (M ~8.5). All of earthquakes is triggered of tsunami. Beside that some of paleoearthquakes occurred also in Sumatra land among of them the earthquake on 1822, 1892 (M ~ 7.7) and 1909 (M~7.6) respectively and earthquakes that occurred on 1921 (M~7). 1933 (M~7.5) and 1936 (M~7.1). This study made a reconstruction of paleoearthquakes impact or shaking, and earthquake return period (Tr) perspective to support a long-term infrastructure resilience program. The result is maximum intensity, Peak Ground Acceleration and Peak Ground Velocity of earthquakes 1822, 1892, 1909, 1921, 1933 and 1936 is about VI-VIII MMI, 25-56 % g and 15 - 48 cm/s respectively. Whereas for earthquake return period estimation (Tr) is used scaling law relations of earthquake and the slip rate values ($\bar{v}$). After calculating we found the Tr estimation for earthquake 1892 (MCE 7.7 and $\bar{v}$ 6.5 mm/y), earthquake 1909 (MCE 7.2 and $\bar{v}$ 14 mm/y) and for earthquake 1921(MCE 7.0 and $\bar{v}$ 8 mm/y) is about of Tr ≤ 563 y, Tr ≤ 228 y and Tr ≤ 174 y respectively.

Keyword: *paleoearthquake, earthquake intensity, peak ground acceleration, return period*

AIWEST - DR 2024
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Paralel Session 2

10.30 – 12.15

Track 2:
Inclusive Community Resilience
And Disaster Education

Room 3: Meeting Room, 3rd Floor
TDMRC | Group 2B

A Bibliometric Analysis on Disaster Volunteer Resilience Research: All Time Period

Yuli Arinta Dewi, Koentjoro Soeparno, Pradytia Putri Pertiwi and Mizan Bustanul Fuady Bisri

This study examines the scientific literature written by international authors, focusing on disaster topics related to volunteer resilience in all time periods. The article was published from 1968 to 2024 using a bibliometric study employing a database from Scopus. Scopus was chosen because it is the most trusted electronic database in the world. To visualize the results, this study utilized VOSviewer version 1.6.19. The research results showed that the articles used as references totalled 590 papers discussing disaster volunteer resilience. This topic emerged in the Connecticut Mental Health Centre with titled "Mental health and the urban crisis" and the most cited articles is "Covid-19 and mental health: a review of the existing literature" published in 2020. The publications were dominated by the Americas, Europe, and Australia compared to limited representation from regions such as Indonesia (only four publications). This study contributes to the existing literature on disaster volunteer resilience, particularly by providing a comprehensive overview of research trends and identifying gaps for future inquiry. Future research could explore the contextual factors influencing volunteer resilience and recommend further research in Indonesia, a disaster prone area.

Keyword: *bibliometric study; disaster; volunteer; resilience; VOSviewer*

Supporting for school teachers to update a tsunami evacuation plan

Aiko Sakurai, Takeshi Sato, Makoto Kumagai and Yoshiyuki Murayama

In 2022, Miyagi Prefecture revised its tsunami inundation assumption for the first time since the Great East Japan Earthquake of 2011. The tsunami inundation assumption shows the area and depth of possible inundation in the event of a maximum-class tsunami under adverse conditions, which would be wider and deeper than the inundation area of the Great East Japan Earthquake in 2011. Following the announcement, the authors developed and conducted a teacher training program in Ishinomaki-City, Miyagi Prefecture, by using a specific elementary school case twice in 2022 and 2023 in order to support DRR teachers in updating each tsunami evacuation plan based on the new assumption. The first training was started by understanding steps on how to read hazard maps based on geographical maps, and the participants examined an evacuation plan of an elementary school with a scenario under adverse conditions, which included the selection of an emergency evacuation place, a timing of evacuation, and received a short lecture on how to utilize collected information for decision making of evacuation. This study examines the process of participants' understanding by analyzing the results of group work and questionnaire surveys after each training and discusses ways and issues to improve tsunami risk communication to encourage school teachers to update a practical tsunami evacuation plan.

Natural Disaster Preparedness Among Elderly

Rika Yuliwulandari, Rifda El Mahroos, Debrina Kusuma Devi, Zulfan Febriawan, Johan Danu Prasetya, Tedy Agung Cahyadi, Eko Teguh Paripurno, Reza Pahlevi, I Made Andika Prakosa, Hafiz T.A Khan

The increasing number of older population and their vulnerability to disaster in certain area makes disaster preparedness essential for every older people. The primary element of effective disaster mitigation is preparedness. Therefore, disaster preparedness for the elderly is necessary to reduce the impact of disaster. Aim: This review aims to explore disaster preparedness among elderly. Methods: This systematic review was conducted in four database: Scopus, PubMed, Sage, and Google Scholar. Generally, Publications in English, with open access, published between 2020 and 2024. Article discussing natural disaster preparedness, pertaining to older adults (>65 years old) were included search terms such as “elderly”, “natural disaster”, “preparedness”, etc were used. The search obtained an initial 920 titles. Articles were included if they discuss about elderly in natural disaster preparedness. After screening by two researcher, twenty (20) articles were included in final analysis and review. Result: Needs in natural disaster preparedness for the elderly include mobility assistance, medication, communication support, social support, shelter, education and training programs. The factors that hinder preparedness are education, income, disability, communication and information technology, family and access to health services. Interventions that can be conducted include education for the elderly, elderly families, and community-based health organizations, the establishment of emergency food, disaster warning technology, obtain assistance, etc. Conclusion: The findings of this review contribute to a growing body of knowledge regarding natural disaster preparedness for elderly and have implications for academia, health care institutions and government.

Keyword: *natural disaster; needs; older adults; preparedness*

Consideration of the Use of Hydrogen Fuel Cell Vehicles in the Event of a Natural Disaster

Wang Yifei, Shibayama Akihiro

In the event of a large-scale disaster such as a natural disaster, large-scale power outages will occur and social functions will be severely degraded. In addition, medical institutions and evacuation facilities that are not equipped with emergency power generation facilities face the risk of loss of human life. In recent years, emergency power generation facilities have been introduced as a BCP measure to ensure that social functions and social life do not deteriorate in the event of a power outage due to a natural disaster. However, many emergency power generation facilities operate on petroleum, which is not suitable for global environmental measures that aim to be carbon neutral. For this reason, research is being conducted on the use of photovoltaic power generation facilities, biomass power generation, and hydrogen power generation in times of disaster. This study examines the use of hydrogen fuel cell vehicles in the event of a natural disaster. Hydrogen fuel cell vehicles are found to have advantages over stationary emergency power generation systems in terms of mobility, use as a means of transportation, and regular maintenance, although their power generation capacity is inferior to that of stationary emergency power generation systems. Next, to verify the feasibility of actual operation, an experiment was conducted to supply electricity to an evacuation center using a hydrogen fuel cell vehicle. As a result, it was found that a hydrogen fuel cell bus could supply the power necessary for the operation of the evacuation center for two days.

Disaster Information Seeking and Preventative Behaviors of Foreign Residents in Kobe City

Bethany Meidinger

Kobe City, Japan, has become one of the leading innovators and adopters of disaster prevention strategies and technologies since the Great Hanshin Awaji Earthquake, one of Japan's deadliest natural disasters in 1995. In the years that have followed, the foreign population of Kobe City has risen by approximately 20% and is expected to continue to rise, increasing the importance of local and prefectural governments outreach to the foreign residents for disaster prevention. This paper investigates what factors increase the likelihood that foreign residents will participate in community-based disaster prevention behaviors or be aware of ofNicial sources of disaster prevention information. It uses probit analysis with data from the 2023 Kobe City Foreign Residents Survey and The WorldRiskIndex. OfNicial channels for multilingual disaster prevention information investigated include: the Kobe International Community Center (KICC) Disaster Preparation Information website, the Hyogo International Association's (HIA) Disaster Preparedness Guidebook for Children and Parents and Hyogo Emergency Net. The study reveals that certain factors such as language ability are highly nuanced and may not be as strong a barrier to adequate disaster prevention knowledge in Japan as commonly believed. It also unveils potential key points for information distribution in the residents' social networks. However, regardless of nationality or the risk of disaster in the countries of origin, survey results indicate that foreign residents are not active participants in disaster prevention behaviors nor are they very aware of the aforementioned services and materials.

Local Partnership Patterns: Inclusive Disaster Risk Reduction Innovation in Yogyakarta Indonesia

Nurul Sri Rahatiningtyas, Eliya Amilati Hanafi, Wina Natalia, Risye Dwiyani, Said Fariz Hibban, Jessica Novia, dan Dhinar Riski Linggar Kingkin

The high population of elderly people and people with disabilities who are faced with various types of disaster threats in the Special Region of Yogyakarta (DIY) has raised awareness of the need for inclusive disaster risk reduction innovation. Local resource-based partnerships in innovation are believed to be able to answer sustainability challenges creatively, inclusively, and on target. This study aims to identify various partnership patterns with local experts in the process of scaling up innovation and then understand the added value of these partnerships. The data used in this study comes from document review, observations, and in-depth interviews with four innovators who are members of IDEAKSI activities, an innovation incubation program organized by the YAKKUM Emergency Unit (YEU) in 2021 - 2023. Data analysis was carried out using the partnership pattern framework from Stott and Murphy (2020). This study identified that during the scaling up stage, the entire innovators had established partnerships with a total of 17 local expert partners, which included local governments, communities, and non-governmental organizations. This partnership pattern is influenced by the characteristics of each organization. A collaborative approach that emphasizes interpersonal relationships and a deep understanding of local characteristics can increase the effectiveness of innovations related to inclusive disaster risk reduction. This result can be used as a guide in designing partnership strategies to innovate for inclusive disaster risk reduction at the local level. And it has the potential to become a partnership model that can be adapted in various places to overcome similar challenges globally.

Leveraging Web-GIS for School Safety: Insights from Japan and Taiwan

Takashi Oda, Aiko Sakurai, and Takeshi Sato

With the advancement of Web-GIS, schools are increasingly equipped to understand and utilize digital maps for safety purposes. Teachers can now leverage these tools to enhance school safety by considering the specific characteristics of their local environments. The importance of map literacy and geographic understanding among educators has grown, prompting the introduction of effective training programs and tools to support their efforts. This study presents the current status and challenges of school safety through geographic understanding, based on practices from Japan and Taiwan.

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 3

13.30 – 15.15

Track 2:
Inclusive Community Resilience
And Disaster Education

Room 2: DRI Lab, 2nd Floor
TDMRC | Group 2C

Cultivating Synergy between Science and Local Wisdom on Disaster Risk caused by Weber Fault in Maluku

Irene Sondang Fitrinitia, Mujizah Mujizah, Fakhriati Fakhriati, Erwin Baker, Muhammad Fuad, Trinimalaningrum Trinimalaningrum and Yeni Mulyani Supriatin

The Weber Deep, an active fault located in the southeastern waters of Maluku, holds significant potential energy to generate earthquakes and tsunamis, posing destructive impacts on the local communities. However, the general understanding of earthquake and tsunami occurrences among the Maluku populace largely relies on empirical experiences and local interpretations. Geoscience-based information regarding this disaster potential is not fully acknowledged across various societal strata. This research, conducted through document analysis, observations, interviews, and discussions with stakeholders, aims to achieve two primary objectives. Firstly, it seeks to comprehend the geoscience-based risks and potential impacts stemming from the Weber Deep, including identifying community efforts based on their local understanding. Secondly, it aims to explore synergistic approaches between geoscience-based information and the local understanding to enhance the resilience of Maluku communities. The study focuses on Ambon Island and Seram Island, where historical records document significant earthquake and tsunami events from 1674 to 2019. Findings underscore the necessity for improving disaster literacy rooted in geoscience, integrated with local knowledge. Presently, communities rely heavily on ancestral local knowledge, passed down through generations, while overlooking updated information on vulnerabilities and risks, systematically analysed by researchers and governmental bodies. This deviation poses a hindrance to community preparedness and mitigation efforts. Consequently, the research recommends the integration and continuity between geoscience-based information and local knowledge to effectively anticipate and mitigate the threats posed by earthquakes and tsunamis along the Weber Deep in Maluku.

Keyword: *Weber Deep, earthquakes and tsunamis, weber fault, disaster risk, local wisdom, geoscience-based information, Maluku*

What remains from survivors in the last two decades of the 2004 earthquake and tsunami in Aceh: exploring trauma from case study.

Yulia Direzkia, Nurul Husna Salahuddin

Numerous comprehensive review studies have indicated that survivors of the 2004 Aceh earthquake and tsunami continue to exhibit symptoms of post-traumatic stress disorder (PTSD) associated with significant life stressors. Our study investigated how trauma symptoms have developed over time and how they persist in the daily lives of survivors even 20 years after the disaster. The precise impact of this dynamic on survivors often remains unclear, with diffuse symptomatology of helplessness described, and effects attributed to earlier trauma may not be readily recognized. To clarify this, we examined six case studies within our clinical setting. Participants were children or adolescents during the disaster and are now seeking psychotherapeutic support as adults. We employed Eye Movement Desensitization and Reprocessing (EMDR) therapy, recognized by the WHO as one of the most effective trauma treatments, to address the needs of these individuals. Despite initially not attributing their symptoms to the tsunami, all participants shared a sense of helplessness hindering their daily functioning in an effective way. Through EMDR therapy, participants were able to connect their present difficulties to past traumatic experiences autonomously, facilitating a self-healing process. Instances of dissociation were also observed during therapy sessions. Three participants successfully completed therapy within 6-12 sessions, while the remaining three are undergoing ongoing treatment. Our study emphasizes the underestimated nature of trauma stemming from disasters and highlights the need for comprehensive interventions to empower survivors and address feelings of helplessness. This deeper understanding enables survivors to better cope with daily life and develop adaptive behavioral patterns

Keyword: *Earthquake, tsunami, trauma symptoms, Eye Movement Desensitization and Reprocessing (EMDR), Aceh*

Enhancing Healthcare Quality Through Lean Six Sigma Practices

Yenni Oktaviza, Mukhlis Yunus, Mahdani Ibrahim, Syafruddin Chan

This research aims to demonstrate the potential of Lean Six Sigma in enhancing efficiency and quality of service in hospitals, focusing on two hospitals in Indonesia. One of the hospitals studied, Rumah Sakit Ibu dan Anak, was built using donor funds post-2004 tsunami, highlighting the critical need for resilient healthcare systems in disaster-prone areas. By employing a combination of quantitative and qualitative methodologies, this study examines the application of Lean Six Sigma principles, the challenges of implementation, and the effectiveness of Value Stream Mapping (VSM) and Failure Modes and Effects Analysis (FMEA) in reducing operational waste. Data collection involved semi-structured interviews, participant observation, and documentation analysis, encompassing various hospital staff levels. This study not only contributes to the theoretical understanding of Lean Six Sigma in healthcare but also provides practical solutions for hospital managers and policymakers. The findings will highlight the potential benefits and obstacles associated with Lean Six Sigma adoption, offering valuable insights for improving hospital operations and informing policy strategies to enhance healthcare service quality in Indonesia, especially in regions vulnerable to natural disasters.

Keywords: *Lean Six Sigma, Efficiency, Value Stream Mapping (VSM), Failure Modes, Donor Funds post-tsunami 2004, and Effects Analysis (FMEA), and Healthcare service quality*

Resource Mobilization and Tsunami Disaster Preparedness of Ambon Bay Coastal Communities

Dwi Abad Tiwi, Diyah Krisna Yuliana, Novian Andri Akhirianto, Ritha Riyandari, Marina C. G Frederik, Andi Eka Sakya, Zulfa Qonita, Bambang Marwanta, Lian Yuanita Andikasari, Khusnul Setia Wardani, Matheus Souisa, Fretha J. Kayadoe

Ambon Island in Eastern Indonesia is in a tectonically active region where some earthquakes have produced tsunamis. The last major event occurred on October 8, 1950, when a magnitude 7.3 earthquake in the Banda Sea generated tsunami waves to the surrounding islands including Ambon Island. Historical facts and modelling studies show that coastal villages along the bay are highly susceptible to tsunamis. Therefore, resource mobilization and disaster preparedness are imperative for local governments and these communities to achieve sustainable disaster resilience. Our study focused on the level of preparedness of local government (Regional Disaster Management Agency) employees and coastal communities for future tsunamis. Three villages in the Sirimau District are the focus units: Galala, Hative Kecil, and Pandan Kasturi. The first two villages have been certified nationally by BMKG as tsunami-ready villages in 2023, and Pandan Kasturi village urgently needs to improve its disaster preparedness. Four parameters are used to assess the level of disaster preparedness: 1) Disaster risk knowledge, 2) Emergency response plans, 3) Disaster warning system, and 4) Resource mobilization. Regarding the disaster preparedness of local governments in facing the tsunami hazard, our study shows a highly prepared level (82,17 out of 100). Meanwhile, the communities show themselves to be at a ready or prepared level (71,28 out of 100). To improve the level of preparedness, we recommend prioritizing improvements in resource mobilization parameters, such as increasing information distribution and evacuation information including tsunami signages, and evacuation drills.

Keyword*: Resource Mobilization, Preparedness, Tsunami Disaster, Ambon.*

Group - 2C

Adaptive Social Protection as a strategy for enhancing household resilience to various shocks: A case study of national and local initiatives in Indonesia

Eri Krismiyaningsih, Saut Aritua Hasiholan Sagala, Latika Putri Barliani, Iffah Zati Mazaya, Debby Paramitasari, Alifa Zalfa Poetry Wicaksono, Abimanyu Arya Atmaja Abdullah

The increasing frequency of global disasters and climate change exacerbate the vulnerabilities and challenges faced by marginalized communities. Frequent covariate shocks disproportionately affect low-income countries, causing significant economic losses and affecting millions of people. Vulnerable groups suffer severe consequences, perpetuating poverty and socio-economic instability. In Indonesia, while the government has developed comprehensive social protection systems, there is a need for more adaptive approaches to address the specific needs of these communities. Adaptive Social Protection (ASP) focuses on resilience-building investments to prepare for, cope with, and adapt to various risks, including individual risks, disasters, and climate change. ASP is a key component of Indonesia's development plan, emphasizing poverty reduction, rights-based approaches, and multidisciplinary strategies. Although ASP is primarily discussed at the national policy level, initiatives to build these capacities have emerged at national and local levels. This study identifies and assesses these initiatives to enhance household resilience by building capacities to anticipate the shocks, cope with them, and build back better afterward. Using a qualitative approach that includes a desk review of literature and documents related to national and local government initiatives, the study shows how existing social protection, disaster risk reduction (DRR), and climate change adaptation (CCA) initiatives contribute to building household resilience. The findings also provide recommendations for scaling up and strengthening these initiatives to improve the capacity to manage multiple risks and offer insights and lessons for other countries seeking to develop ASP systems.

Keyword: *adaptive social protection, household resilience, national and local initiatives, disaster risk reduction, climate change adaptation*

Community perspective in the integration of mental health and psychosocial support and disaster risk reduction: lesson learned from 20 Disaster-Resilient Villages (Destana) in East Java Province, Indonesia

Bani Bacan Hacantya Yudanagara, Endang Retno Surjaningrum, Achmad Chusairi, Lantip Muhammad Dewabrata, Putu Vidyastitha Wiguna, Nafika Siti Nur Annisa, Anggita Aryo Putri

Indonesia has to cope with the constant risk of disaster. The island of Java has the most active volcanoes with high risk, this island is more prone to natural disasters such as tsunamis and earthquakes compared to other Indonesian islands. A disaster can impact individuals, families, and entire communities. When a disaster occurs, people react in various ways, such as confusion, fear, and anxiety, and will lead to worse mental health conditions. One way to prevent this is to provide mental health and psychosocial support (MHPSS). Previously, MHPSS only focused on response and recovery activities. However, in the last few decades, there has been a need to include the MHPSS program in Disaster Risk Reduction (DRR). Indonesian Government has linked the national disaster management policies and laws to the community-based DRR initiative called "Disaster-Resilient Village" (Destana). However, this program mainly focuses on physical and economic-based disaster management. Mental health and psychosocial aspects are not equipped in this program. Therefore, researchers want to address the existing gaps in the MHPSS strategy through the official DRR programs in Indonesia. We use participatory research to learn how the communities view the impact of disaster on mental health and the possible strategy to create MHPSS intervention in the disaster management cycle. They also asked to list sources of support in their local community. The result showed valuable perspective from 20 Destana in East Java Province. We found lessons that can be implemented in the future integration of MHPSS and community-based DRR in Indonesia.

Correlation Of Education For Sustainable Development (ESD) Competencies And Environmental Empathy Of Usk Disaster And Environment Mku Students In Supporting SDGS 2030

Windi Asnita Sari, Wiwit Artika, and Rina Suryani Oktari

Students are important agents of change in advancing the sustainable development agenda and whowill face increasingly complex environmental challenges. Understanding the relationship between ESDcompetency and environmental empathy levels can help universities and related stakeholders design more effective approaches to educating students tocontribute to sustainable development. Education for Sustainable Development (ESD) is a key element in achieving the 2030 Sustainable Development Goals (SDGs) which includes an educational approach that focuses on the understanding, knowledge, and skills needed to drive sustainable development. This study aims to determine the correlation between Education for Sustainable Development competency and empathy of USK Disaster and Environment MKU students. The population of this study was 2853 students. The sampling technique used Purposive Sampling technique, which amounted to 339 samples based on the sample size calculator at a confidence level of 95%. This study uses a correlation research method with quantitative and qualitative research types. Data collection was carriedout using a test instrument to measure ESDcompetency and a non-test instrument in the form of a questionnaire to measure environmental empathy. The data analysis technique used in this study is the product moment correlation analysis technique. The results of the analysis show that there is a significant positive relationship between ESD competence and environmental empathy as seen from the linearity coefficient = 0.869 with p = 0.000 <0.05. The value of the determinant coefficient (r2) is 0.755 or 75.5%. This means that the ESDempathy competence of the students contributes 75.5% to environmental empathy.

Keyword: *Competence ; Empathy ; Environment.*

Group - 2C

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 1

08.30 – 10.15

Track 2:
Inclusive Community Resilience
And Disaster Education

Room 2: DRI Lab, 2nd Floor
TDMRC | Group 2D

How is climate change represented in science standards of Indonesian elementary Integrated curriculum?

Melvina, Sharon Dotger

Indonesia's geographical condition has an essential role in reducing-but at the same time-increasing climate change. Unfortunately, previous studies indicate Indonesian students still have low knowledge of climate change (Purwatiningsih et al., 2017; Rosidin & Suyatna, 2017; Suyatna & Rosidin, 2016). This trigger some questions: how do students access information about climate change? What kind of information? As we know, media is one of the potential platforms where they can access information about climate change. However, some studies indicated skeptical attitudes on how media portrays scientific information on climate change (O'Neill & Boykoff, 2011; Anderegg and Goldsmith, 2014), where the information is political and economic perspective instead of in the form of socio-scientific lens. Lee et al. (2015) suggested improving primary education, especially in educating young generations about climate change. Here, science standards as official curriculum shapes how science being taught in classroom aswell the textbooks development where used by teachers and students in teaching and learning process. Therefore, this study aims to investigate what and how is the conversation on climate change represented in the official curriculum or standards in the context of K-6 (elementary education) in the scope of science and technology thematic (the intersection from Indonesian language, social studies, Science and Math subjects). This study is contextualized through the lens of framing theory (Scheufele, 1999). We used, two discourse tools namely the thematic analysis and Faircloughian Critical Discourse Analysis which are informed by Systemic Functional Linguistic to examine the "official" climate change discoutrse across subjects and grade levels. The findings and implication will be furthered explored.

Group - 2D

Building Resilient Schools: Analysis of Indonesian and Japanese Educational Institutions

Aprillia Findayani, Juhadi, Satya Budi Nugraha, Vina Nurul Husna and Genta Nakano

As a country with the same characteristics as Indonesia, Japanese schools integrate disaster education into their curriculum to ensure that students are well-informed and capable of responding effectively in emergencies. This research aims to provide a comprehensive knowledge and experience of how school disaster education in Japan and Indonesia. Several activities, including school watching and workshops, will be conducted to share experiences and good practices from Japan and Indonesia to enhance school resilience. The research finds out that both Japan and Indonesia recognize the importance of integrating disaster education into the school curriculum to empower students with the knowledge and skills needed to respond effectively to disasters, contribute to community resilience, and build a culture of safety and preparedness. In Japan, disaster education is integrated into the school curriculum and covers a wide range of topics, including earthquake drills, tsunami preparedness, fire safety, and evacuation procedures. Students learn about disaster risk reduction, early warning systems, and community resilience through practical training and theoretical knowledge. In addition, in Indonesia, disaster education is also an essential part of the curriculum, given the country's susceptibility to earthquakes, volcanic eruptions, floods, and tsunamis. Students are taught how to respond to different types of disasters, recognize early warning signs, and take appropriate safety measures. The curriculum emphasizes the importance of community preparedness, disaster response coordination, and the role of individuals in mitigating risks and protecting lives during emergencies.

Understanding Tobacco Control in Disaster Mitigation in Indonesia: Progress, Challenges, and Issues

Rizanna Rosemary, Nurul Kodriati, Oktomi Wijaya, Ahmad Affan, Ummu Nursholihah

Not only is Indonesia one of the few countries that has not ratified the Framework Convention on Tobacco Control, but it is also the second most disaster-prone country out of 193. Although strategies to limit tobacco use have been established in Indonesia, they have not been incorporated in the event of a disaster. This study attempts to assess and examine the discrepancy between what is understood today and what is genuinely required to enhance tobacco control in regions vulnerable to natural disasters. The population, intervention, comparator, and outcome (PICO) framework directs the systematic review's focus. Science Direct, PubMed, and Google Scholar databases will be thoroughly searched. According to the analysis, there is still a dearth of research on tobacco control in the context of crisis management. The lack of explicit laws controlling smoke-free zones in public settings during emergencies, including evacuation centers, is a glaring example of this shortcoming. The dynamics underlying the distribution and use of cigarettes, particularly in emergency situations, need to be further investigated. Furthermore, it is imperative to scrutinize the existing tactics utilized to govern the dissemination and intake of cigarettes during every phase of a calamity.

Keyword: *tobacco control, smoke-free, disaster mitigation*

Group - 2D

Empowering Changes: The Impact and Challenges of Women Social Workers in Banda Aceh of Post-Tsunami

Putri Saleh, Alfi Rahman, Ezri Hayat, and Rizanna Rosemary

The 2004 Indian Ocean tsunami that affected Aceh greatly reshaped its physical landscape and society, necessitating effective and inclusive mitigation efforts. In this case, women social workers have great potential to support disaster-affected communities, especially in the context of women's empowerment. Using qualitative research methods through in-depth interviews and Focus Group Discussions (FGDs) with 20 women social workers in Banda Aceh, this study aims to discover the experiences of women social workers in Banda Aceh after the tsunami and highlight the challenges and obstacles they faced. The data collected through the interviews and FGDs will be transcribed and analyzed using thematic analysis to uncover key patterns and themes. The thematic analysis will also identify some recurring themes, including the importance of community involvement, the impact of cultural norms on women's roles, and the need for better institutional support. This research shows that women social workers play a crucial role in disaster mitigation, yet their contributions are often unrecognized due to societal expectations and cultural norms. Despite these challenges, they remain resilient and committed. The research also suggests increasing their recognition and effectiveness through gender-inclusive policies, targeted training, resources, and support networks. As the results, this research may contribute to a paradigm shift in disaster management practices by recognizing and leveraging the unique strengths of women social workers and acknowledging their invaluable contributions to ensuring a more resilient and inclusive community recovery process in Banda Aceh.

Keyword: *women; social workers; tsunami; disaster.*

Equitable Coastal Development: Assessing Hazards, Vulnerability, and Capacity through Local Knowledge

Tibyan Asyukri, Lisa Hiwasaki and Rina Suryani Oktari

This proposed research addresses the vulnerability of coastal communities to climate change and disaster risks by identifying hazards, vulnerabilities, capacities, and livelihood assets of the coastal community in Banda Aceh. Key hazards such as floods, storms, and sea level rise will be identified through interviews with community members, leveraging their local knowledge, while a comprehensive assessment of livelihood asset access will aid in a better understanding of their vulnerabilities. The aim is to design equitable and sustainable coastal development strategies and identify the most vulnerable groups to support effective mitigation efforts. The research methodology will primarily involve semi-structured interviews with 10 key informants, including community representatives and local stakeholders. Using Participatory Action Research (PAR) as an approach, this study will employ a community resilience measurement dashboard with 11 indicators developed by the IFRC as its framework. This research is expected to provide strategic guidance for policymakers in designing protection and resilience enhancement programs for coastal communities. Additionally, the anticipated results are intended to serve as a reference for stakeholders in developing sustainable coastal development projects that consider the vulnerabilities and needs of local communities.

Keyword: *community resilience, disaster management, vulnerability, disaster risk, climate change.*

Spatial Patterns and Longitudinal Trends of Disaster Losses in Aceh: A Retrospective Analysis

Yolanda Yolanda, Rina Suryani Oktari, Daisuke Sasaki, and Hizir Sofyan

This study explores the spatial distribution and temporal trends of disaster-related losses in Aceh from 2017 to 2023. It addresses a critical gap in understanding the heterogeneous impacts of wildfires, tornadoes, landslides, human-caused fires, floods, coastal erosion, flash floods, and tidal waves within this region. Methodologically, mortality trends are analyzed using chi-square tests for linear trends, while economic losses are assessed through direct economic loss calculations. Annual Percent Change (APC) is estimated using weighted linear regression models to evaluate temporal variations in mortality rates. Data for this study were obtained from the Badan Penanggulangan Bencana Aceh (BPBA). Initial findings reveal varying impacts across districts, highlighting both increasing and decreasing trends in mortality rates and economic losses. This research underscores the need for localized disaster management strategies tailored to Aceh's specific vulnerabilities and resilience capacities. By contributing empirical evidence and methodological insights, this study aims to inform both practical interventions and theoretical advancements in disaster risk reduction, emphasizing the importance of context-specific approaches in enhancing community resilience and reducing disaster impacts. This research will provide critical insights into the mortality and economic impact trends of disaster-related events in Aceh, highlighting the need for targeted policy interventions to mitigate disaster risks effectively.

Keyword: *mortality, economic loss, linear trend, chi-square, annual percent change*

Visualizing the Earthquake, Tsunami, and Nuclear Accident: Disaster Images in 3.11 Picture Books

Elizabeth Maly, Julia Gerster, Ryo Saito, Naomi Chiba

The 2011 Great East Japan Earthquake, tsunami, and nuclear disaster, devastated communities along Japan's northeast Tohoku coast. As part of efforts to make sense of this massive and complex disaster, unprecedented in our lifetimes, there have been many initiatives to tell the stories of disaster experiences and pass down lessons to future generations. Along with disaster storytellers and memorial facilities, more than 130 picture books that deal with stories of 3.11 have been published, by large and small publishers, through crowdfunding, or self-published by authors. As picture books, they combine text and visual narratives, including images that convey the story. Many authors or illustrators have personal connections to the disaster-affected areas, and many books are based on true stories and people's experiences during and following the disaster. Most books focus on the experiences of the tsunami, although many deal with the nuclear accident and its impacts. Common themes include stories of evacuation and disaster safety; loss and grieving; community bonds and hope for the future; and animals and nature. This research focuses on the role of disaster images within 3.11 picture books. It considers how the 3 disasters (earthquake, tsunami, and nuclear accidents) are shown (or not shown) in the pictures, the style and size of the disaster images, and the relationship to the text. Through this analysis of visual images, the research clarifies typologies of disaster images depicted in 3.11 picture books and correlations across narrative themes.

Keyword: *picture books disasters, storytelling, children, disaster education, narrative, images*

Group -2D

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Paralel Session 2

10.30 – 12.30

Track 2:
Inclusive Community Resilience
And Disaster Education

Room 2: DRI Lab, 2nd Floor
TDMRC | Group 2E

Adaptation of Coastal Communities in Handling the Disaster-prone Coastal Area in Langsa Municipality

Arisna Fauzia, Cut Mulyani, Iswahyudi, Haikal Fajri

Langsa Municipality is one of the east coastal areas in Aceh with different characteristics from other beaches. Due to the restrictions of the area, this region is at risk for coastal disasters. However, this area is still densely populated as part of their livelihood is as Fishermen according to the Central Agency of statistics. There have been various accounts of the presence of intensity of disasters occurring such as tidal flooding and so on. The aim of this study was to know the extent to which knowledge of the communities adapt to disasters prone area in coastal regions. This study applied the direct observation method to the community by conducting semi structured interviews. The method of this study was qualitative research. At the end, the results of the study it was found that the people of Langsa Municipality still have respondents who are indifferent to disaster mitigation in coastal areas. In other parts, however, there are communities that already know what strategies to do if a coastal disaster strikes. It is hoped that this study should offer insight and a reference for designing government policy directions in reducing losses in society due to threats in the coastal area.

Keyword: *Disaster; tidal flooding; mitigation; adaption communities*

Successes, Challenges and Prospects for Implementing the Comprehensive School Safety Framework (CSSF) in Indonesia: A Narrative Literature Review

Jakiatin Nisa, Yohana Noradika Maharani

The education sector plays a role in facing various challenges caused by disasters and preventing dangers from becoming disasters. Comprehensive School Safety Framework (CSSF) 2022-2030 supports the education sector policymakers, planners, school administrators, and their partners to promote child rights, sustainability, and resilience in the education sector. This article aims to examine the implementation of the Comprehensive School Safety Framework (CSSF) in Indonesia, including the successes that have been achieved, the challenges faced and prospects. The research method used is Narrative Literature Review (NLR), a review that covers a variety of research and provides an overall summary through interpretation and criticism of literature based on data analysis to provide evidence or approaches related to certain problems. The stages carried out are identifying, assessing and interpreting all the findings in each CSSF research in Indonesia. The research results show that the implementation of CSSF in Indonesia has shown several successes, including increasing awareness and knowledge about disasters. There has been an increase in teachers' and students' understanding of disaster preparedness. Even at other schools in Mataram, the SPAB program integrated with the curriculum has succeeded in improving students' abilities in dealing with earthquake disasters and during the COVID-19 pandemic. Challenges faced in CSSF include a lack of sustainable planning and implementation, as well as the limited capacity of teachers, students and the school community in developing long-term and sustainable plans. Promising prospects include program planning, capacity building through more sustainable disaster education including formal and non-formal curriculum development, training and capacity building for school community and exploration of quality learning materials and the need for coordinated efforts from various parties, including government, educational institutions and society.

Keyword: *Disaster Resilient Education, Comprehensive School Safety, Success, Challenges, Prospects*

Consideration of people with disability in inclusive disaster risk reduction

Hyejeong Park, Sebastien Boret

Since the adoption of the Sendai Framework for Disaster Risk Reduction 2015-2030 and the "Leave No One Behind" strategy, the international society for disaster risk reduction (DRR) has been promoting inclusive DRR. This approach emphasizes the incorporation of all people and communities, including children, the poor, the elderly, and people with disabilities, as well as their families and caregivers. People with disabilities have been recognized as important stakeholders in DRR, and there's an emphasis on the need for them to be prepared for disasters in their daily lives. However, there are still limitations in addressing the needs of people with disabilities, who are often marginalized in society, and there are limited opportunities to understand their situation. To identify effective approaches to inclusive DRR, we conducted field observations and interviews with people with disabilities and their families and caregivers in Banda Aceh, Indonesia, and Japan, both of which experienced major disasters in 2004 and 2011. By listening to and learning from practical stories of people with different disabilities who experienced the 2004 Indian Ocean Tsunami and the 2011 Great East Japan Earthquake, we analyzed collected data in several aspects of effective inclusive DRR. This included social systems, human capacity, medical and social support, infrastructure, safety, and risk communication. This research provides insights into the overall circumstances of people with disabilities and social systems, offering wider interdisciplinary perspectives. Ultimately, it will help bring all stakeholders together to enhance coping capacity and disaster resilience.

Recording and archiving landscape changes in tsunami-affected areas: Attempt to activate collective memory through a mobile app Memorygraph for Banda Aceh

Yoshimi Nishi, Alfi Rahman and Hiroyuki Yamamoto

Disaster-affected areas struck by large-scale natural calamities experience landscape changes twice: once due to the disaster and again during reconstruction. Landscapes serve as anchors for collective memory, and documenting and sharing these changes are essential for revitalizing the collective memory of the community, which plays a key role in disaster prevention. This paper discusses the background and challenges associated with the introduction of the camera app "Memory Graph," which simplifies taking photos with the same composition, in efforts to record landscape changes in the disaster-affected area of Aceh, following the 2004 Indian Ocean tsunami.

Group - 2E

Understanding community attitudes and response to tsunami mitigation infrastructure and DRR methods in Kesennuma, Japan.

Hayley Leggett, Miwako Kitamura, Anawat Suppasri, Fumihiko Imamura, Tiziana Rossetto

Japan's tsunami mitigation strategy employs a multi-layered approach that includes physical and emergency management measures. Physical measures consist of concrete seawalls and embankments enforced by prefectural governments, often without community consultation, causing opposition. Following the 2011 Great East Japan Earthquake (GEJE), structures were installed without considering increased tsunami heights due to sea-level rise. Non-physical measures minimise shortcomings of tsunami infrastructure, but residents receive inadequate or incorrect information on disaster risk reduction (DRR), leaving them vulnerable. We identify changes required in communicating hazard perception and DRR methods, outline amendments in DRR preparation since 2011, and establish residents' preferences of physical tsunami mitigation. We focus on Kesennuma, a fishing city in Miyagi prefecture heavily impacted by the 2011 GEJE. During reconstruction, community opposition to proposed heights of defences led to negotiations for reduced seawall heights. Now, sufficient time has passed for residents to live alongside defences, allowing for a deeper insight into community perspectives and understanding of DRR. Using online and in-person questionnaires and interviews, we asked questions on Hazard Perception, Non-physical DRR measures, and Physical Countermeasures. Results revealed inaccuracies in residents' knowledge regarding non-physical DRR strategies, a general feeling of dissatisfaction with current defences, and lack of awareness about the limitations of these defences. Findings highlight the disconnect between physical defences, community acceptance, and DRR communication. Future work will propose methods to improve DRR communication and engage residents in decision making. This will involve iterative community engagement and numerical simulations to identify effective physical countermeasures that are adapted for sea-level rise.

Assessment of capacities at the local level regarding seismic and non-seismic induced tsunamis in Indonesia

Semeidi Husrin, Harald Spahn, Irina Rafliana

To better understand the specific context and existing experiences at the local level in Indonesia regarding seismic and non-seismic tsunami events, a meta-study has been implemented, which reviewed existing case studies and assessment reports of 18 tsunami related events in Indonesia between 2006 and 2021. The focus has been placed on the state of community awareness and understanding of the tsunami risks before the respective events as well as the local strategies and experiences to deal with the threats during the events. The events analysed in the meta-study showed a wide range of different patterns, leading to the conclusion that each event is unique and that there is no such thing as a typical tsunami-event. As the frameworks conditions regarding tsunamis early warning and disaster risk management in Indonesia have significantly changed over the period of analysis, a complementary context analysis was conducted to capture and visualize the most important changes along a timeline in order to assist the comparability of the cases. The comparative analysis of the 18 case studies was done using a set of 17 indicators, which were then evaluated with colour codes to facilitate a comprehensive and cross sectional overview. This analysis led finally to a series of conclusions and recommendations that were summarized in a supplement paper to a Policy Brief developed in the frame of the "TsunamiRisk" project by an Indonesian-German research team. The meta-study proofed that rapid assessments immediately after a tsunami related incident and the involvement of local stakeholders are important elements for capturing the experiences and drawing important lessons that can be learnt to improve tsunami preparedness and end-to-end tsunami early warning. Making use of analytical framework used for the meta-study, the research team developed an assessment tool that supports the evaluation of community preparedness capacity and response in any type of tsunami related incidents or exercises. This tool may complement

Small Island Communities and Gamalama's Volcano: A Multimethod Analysis of Parents' Disaster Preparedness

Dewi Ummah, Koentjoro Soeparno, Muh Aris Marfai and Praditya Pertiwi

This multi-methods study examines parents' disaster preparedness about the Gamalama volcano on one of the small islands of eastern Indonesia, Ternate. The research consisted of qualitative phases with two studies, a survey with open-ended questions (N=338) and semi-structured interviews (N=5) exploring aspects of disaster preparedness. The qualitative analysis found components of parental disaster preparedness that had not been found in previous studies. It was concluded that this study found seven aspects of parents' disaster preparedness for the Gamalama disaster on the island of Ternate. The seven aspects of disaster preparedness are 1) anticipatory emergency plans, 2) knowledge, 3) supportive resources, 4) understanding of early warnings, 5) spirituality, 6) religiosity, and 7) local wisdom values. The religiosity and local wisdom aspects are different thematic findings from the current disaster preparedness theory. The limitations of this composite study and suggestions for future research are also discussed.

Group - 2E

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 1

08.30 – 10.15

Track 7:
Disaster Risk Financing and Insurance,

Track 1:
Hazard, Technology, and Infrastructure

Room 4: DRI Lab, 2nd Floor
TDMRC | Group 7A

The Impact of Major Earthquake Disasters on the Establishment of Earthquake Insurance in Japan

Kenichi Kamata and Fumihiko Imamura

This research elucidates the history and mechanism of evolution of earthquake insurance system in Japan, primarily focusing on the establishment of insurance after disasters, and the introduction of earthquake insurance by the government in 1966. Despite exclusion clause, societal pressure led to partial compensations after the 1923 Great Kanto Earthquake. Earthquake insurance gradually expanded its coverage, significantly contributing to societal recovery and reconstruction after major disasters like the 2011 Great East Japan Earthquake.

Unveiling Successes and Shortcomings: A Critical Review of Disaster Resilience Financing in the Aftermath of the 2018 Central Sulawesi Earthquake and COVID

Saut Sagala, Priskila A. Sulaiman, Rayinda Putri Meliasari, Wewin Wira Cornelius Wahid, Fachriey Fadhlullah Mungkasa, Cyril Anfasha Firmansyah, Rufaida Nurul Vicri, Alifa Zalfa Poetry Wicaksono

Indonesia, highly vulnerable to geophysical and hydro-meteorological hazards, has experienced over 20,000 disasters in the past two decades, resulting in annual losses averaging Rp 20 trillion. The devastating 2018 Sulawesi Tengah earthquake alone caused economic losses of Rp 14 trillion, and the COVID-19 pandemic further led to a staggering budget deficit of Rp 1 quadrillion over two years. In response, the Indonesian government introduced the Disaster Risk Financing and Insurance (DRFI) strategy to strengthen disaster financing and reduce pressure on the national budget. This study employs a descriptivequalitative approach to thoroughly examine the implementation processes and dynamics of the DRFI strategy, assessing its effectiveness in managing disasters. By identifying successes, challenges, and opportunities for improvement, this research seeks to provide valuable insights for enhancing future DRFI implementations. These findings not only stand to benefit Indonesia but also offer crucial guidance for other developing countries striving for better recovery and resilience against growing disaster risks.

Keyword: *Disaster Risk and Financing Instruments, disaster risk resilience, Central Sulawesi earthquake, COVID-19, descriptive-qualitative*

Group - 7A

Floating Portable Toilet Design In Flood-Prone Areas

Diyatura Syahna, Eldina Fatimah, Muhammad Fauzi, Qurratul Aini, Arisna Fauzia

The flooding caused many difficulties for the victims, especially in terms of accessing toilets and inadequate sanitation services. When flooding occurs, toilets in victims' homes are often submerged, and emergency toilet facilities provided by the government are insufficient. This situation is also felt by communities living along riverbanks, where access to proper sanitation is very limited. To address this problem, this research aims to design a floating portable toilet, which is a portable toilet that can float on water. The design of this toilet considers various factors to ensure its functionality when used in water. The design of this toilet is based on secondary data from regulations related to public toilets, with the aim of serving at least 20 people per day, with a water capacity of 600 liters. This floating portable toilet is designed with four cubicles, consisting of two cubicles for women and two cubicles for men, each equipped with a toilet seat and squat toilet. Each cubicle has dimensions of 80 cm x 160 cm x 240 cm and is equipped with bathing, washing, toilet facilities. The waste treatment system uses black water with EM4 bacteria, as well as a gray water system that is able to purify water, so that waste water does not pollute the environment. The water source comes from flood water or river water which is pumped, filtered through a filter system, and stored in a reservoir before being used for sanitation needs in the toilet.

Group - 7A

Spatial time characteristics for the multivariate clustering of devastating earthquake: An example case of 2018 Mw 7.5 Palu earthquake

Andrean V. H. Simanjuntak, Umar Muksin, and Kutubuddin Ansari

Sulawesi Island, eastern Indonesia, is uniquely K-shaped with a tectonic evolution and a high level of seismic activities, which has experienced several destructive earthquakes followed by widespread damages and the subaerial landslide-tsunami (SLT) phenomenon. The 2018 Palu earthquake Mw 7.5 has generated 1,000 aftershocks in the last five years, and likely triggered several major earthquakes such as the 2019 Banggai earthquake Mw 6.9, 2021 Mamuju earthquake Mw 6.25, and also a swarm phenomenon in the Mamasa region. In this paper, we focus on analyzing the temporal nature of earthquake activities as well as the source mechanisms using stochastic moment tensor inversion (MTI) via a regional teleseismic network with rotated seismic waveform at a distance up to 5,000 km from the epicenter. The results show the various mechanisms as the representation of a complexity tectonic process in Sulawesi Island. For Palu and Banggai earthquake there is a left-lateral mechanism while Mamuju earthquake has a thrust mechanism. Specifically, the 2018 Palu earthquake has a mechanism with a N - S orientated left-lateral fault and a magnitude estimation of Mw of 7.55 ± 0.05 and depth of 17 ± 2 Km that has an actual nodal plane with strike 358°, dip of 67° and rake of -17°. The 2019 Banggai earthquake was resolved with an Mw of 6.90 ± 0.02 at depth of 14 ± 3 km, and an actual nodal plane with strike of 315°, dip of 80° and rake of 26°. On the other hand, the 2020 Mamuju earthquake provides the results with an Mw of 6.25 ± 0.05 and depth of 15 ± 2 km with actual nodal plane with strike of 337° and east-dipping of 17° and rake of 64°. We used earthquake catalog data from January 2018 to September 2022 and studied cluster analysis in terms of space-time-depth magnitude (STDM) time series. The breaks in time-series are able to explain the pre-shocks and aftershocks events before and after the Palu and other earthquakes. Finally, the Long-Short Term Memory Model (LSTM) of neural networks is utilized for training input and testing processes of the linearized STDM time-series. The results show the potential proposed LSTM model in terms of accuracy and precision. This type model can be generated and a statistical analysis for future predicted earthquakes at any given region can be done successfully.

Stability Analysis and Stability Recommendation Using Slope MassRating (SMR) - Case Study: Bukit Barisan Selatan National Park, Lampung

Alviyanda, Bilal Al Farishi, Rezki Naufan Hendrawan, Zaki Hilman, Daniel Radityo, Imam Achmad Sadisun, Anjar
Dwi Asterina Denhi, Deru Arief Wicaksono, Dimas Panggih Amukti, Dini Wulansuci, Yoga Prastio

Landslides that occur on the slopes of the roadside can disrupt activities on the highway and even cause casualties. Landslides often occur on slopes that are located next to Bukit Barisan Selatan National Park roadside, Lampung. Landslides caused disturbed roads and some part was covered by landslide material. Research was conducted to analyse and provide recommendations for slope stability. There are various types of slope materials in the research area like soil, rock, and mixing of both. This research concentrated on the analysis of three slopes stability with rock material using the slope mass rating (SMR) method. The slope materials consist of coarse sandstone intercalation claystone. The direction of the rock layers tends to have the same direction as the slope opening which makes the slope unstable. SMR parameters used some of therock mass rating (RMR) parameters, dip direction and dip discontinuity, dip direction and dip slope opening, kinematics analysis, and slope conditions. RMR calculation on three slopes with rock material is around 38-43, rock class III-IV with fair–poor rock type. Kinematics analysis showed dominant type of landslides are direct toppling. SMR calculation on three slopes are around 42-50, slope class III with normal slope type. Recommendations needed for slope stability are the application of shotcrete ordental concrete, ribs and/or beams, toe wall, bolts oranchors, toe ditch, toe or slope fences, nets, and lowered dip slope opening angle by 55o. It is necessary to strengthen the slopes following the recommendations given above. It is also necessary to monitor the condition of the slopes periodically to keep the slopes safe.

Group - 7A

Impact of the 2004 Mw 9.0 Indian Ocean tsunami earthquake on thenowcasting tectonic risk: A new insight from the last two decades of seismic activities in the Sumatra Island

Andrean V. H Simanjuntak, Kadek H. Palgunadi, Bayu Pranata, Rika S. Oktari, Priyobudi Priyobudi, Tio A. P. Setiadi, Anne M. M. Sirait, Dian Kusumawati, David P. Sahara, Pepen Supendi,,Umar Muksin, Sri Widiyantoro,, Daryono Daryono, Nelly F R. Manurung, Dwikorita Karnawati

Tsunami earthquakes are major natural catastrophes that pose a challenge in terms of prediction, thereby impeding efforts to prevent and strengthen with a satisfactory mitigation program. Within the last two decades, numerous catastrophic tsunamis have taken place in the Indian Ocean, such as the 2018 Anak Krakatau tsunami, the 2007 Bengkulu tsunami, the 2006 Pangandaran tsunami, the 2005 Nias tsunami, and the 2004 Aceh tsunami, which are notable examples of significant tsunami disasters. Approximately 130,000 individuals were lost in the northern part of Sumatra, Indonesia, during the 2004 tsunami earthquake, which wascaused by an extreme run-up tsunami, wide damages, and massive ground shaking. Seismically, the
2004 Indian Ocean Tsunami (IOT), with a magnitude of moment (Mw) of 9.0, occurred approximately 1200 km in length and 200 km in width. It powerfully activated several unknown offshore tectonic settings in the Indian Ocean megathrust zone. Since 2009, the Indonesian Agency for Meteorology, Climatology, and Geophysics (BMKG) has been operating a massive seismic network with ~500 seismic sensors throughout theIndonesia Archipelago, which includes an integrated tsunami and earthquake early warning system. The significance ofearthquake observation along the Indian Ocean successfully provides an adequate understanding about the impact of the 2004 IOT and the official database ofrisk and hazards for the Indonesia region. In this study, we integrate all earthquake catalogues from 1950 to 2023 to determine the current seismic activity and the faulting mechanisms along the Indian Ocean. The results of a comprehensive analysis that uses seismic inversion, hypocenter relocation, and seismic risk models define several offshore active tectonic systems with various mechanisms. An example system, known as the backthrust system, ruptures and dips in a southwest direction to the trench, potentially posing a significant risk in the offshore domain. On the other hand, hundreds of earthquakes also occurred in the outer trench along 2021 with normal faulting mechanisms, which related to the possible afterslip of the 2005 Nias tsunami, where similar conditions can also be addressed for the 2007 Bengkulu tsunami. The afterslip from several major earthquakes along the Indian Ocean has the potential to trigger and activate unknown offshore active tectonic systems in the Sumatra megahthrust zone, some of which may not be associated with the subduction process. Therefore, identifying the system responsible for potential risks and hazards in the near future is crucial. The updated tectonic system canbeneficially upgrade the mitigation program related to other tectonic systems in the megathrust zone. The multi-source fault system and various faulting mechanisms can generate future earthquake and tsunami hazards and risk models.

From Structural to Cultural Tsunami Preparedness: Insights from the Ten Tsunami-Ready Villages in Indonesia

Andi Sakya, Marina C G Frederik, Nurani Rahma Hanifa, Esti Anantasari, Endra Gunawan, Suci Dewi Anugrah, Nurul Sri Rahatiningtyas.

he study describes how the community's readiness and engagement were crucial in reducing the casualty and enhancing resilience against tsunamis. In particular, Aceh's 2004 and Sendai's 2011 tsunamis, placed strategic evidence that community readiness, early warning systems, education, and infrastructure were all necessary to enhance resilience and reduce the number of fatalities. UNESCO/IOC launched the so-called Tsunami-Ready Recognition Program (UITRRP) in 2021 and targeted all tsunami-prone communities worldwide by 2030. A community may be recognized as tsunami-ready by voluntarily fulfilling 12 indicators, which consist of 3 (three) primary categories: (1) Hazard Assessment, (2) Preparedness, and (3) Response capacity. Since its inception, 50 villages in 22 countries worldwide of which ten out of 5.477 villages in Indonesia have been recognized. Those villages are scattered across Indonesia, reflecting diverse cultural backgrounds. Data collection techniques used are in-depth interviews, participatory observation, and desk study. From the hazard assessment perspective, due to geological and geographic framework, these locations imply three differences: (1) tsunamigenic mechanism, (2) event recurrence time frame, and (3) inundation typology. Structural mitigation has been carried out through various disaster infrastructures in these villages. Our study found that: (1) Though the community no longer bears the consequences of the last tsunami event, local indigenous knowledge has evolved as an inherent societal process and a compelling reminder of the tsunami; (2) The dynamic factors fostering the 12 indicators' swift fulfilment, and (3) Sustaining and enhancing the already recognized resilience is a necessity to stay safe from the imminent tsunamis in the future

AIWEST - DR 2024
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Paralel Session 1

08.30 – 10.15

Track 3:
Urban Planning, Reconstruction And Recovery

Room 5: Tsunami Lab, 2nd Floor TDMRC | Group 3A

Time-series analysis of satellite images for spatially evaluating long-term changes in Banda Aceh after the 2004 Indian Ocean Tsunami

Hiroyuki Miura, Osamu Murao, Ryo Saito, Mizuki Sato, Mufidatun Khoiriyah, and Muzailin Affan

The urban areas in the coastal region of Banda Aceh was destructively damaged in the 2004 Indian Ocean Tsunami. After the tsunami event, reconstruction and recovery has been extensively started in the affected areas. As the result of urban relocation, new residential areas were developed to provide housing for the affected people. Decades have passed since the tsunami, and such urban sprawl and concentration has occurred in Banda Aceh. Then, remotely sensed images would be useful to spatially evaluate such long term changes of urban areas. In this study, we evaluate the spatial patterns in and around the affected areas in Band Aceh by time-series analysis of satellite images. The remote sensing images observed from 2000 to 2024 by the Landsat-5, -8, and -9 with the spatial resolution of 30 m were analysed, and spectral indices, such as Normalized difference vegetation index (NDVI) and Enhanced normalized difference impervious surfaces index (ENDISI), were calculated to characterize populated areas in the images. From the time series analysis of the indices obtained from over 20 years observations, we discuss the spatial patterns of the changes of the populated areas.

Tsunami Evacuation Risk Change Associated with Urban Recovery in Banda Aceh after the 2004 Indian Ocean Tsunami

Osamu Murao, Mizuki Sato, Kazuya Sugiyasu, Hiroyuki Miura, Mufidatun Khoiriyah, Ryo Saito, and Muzailin Affan

In Banda Aceh, which suffered the most severe damage from the 2004 Indian Ocean tsunami, the city has undergone changes during the reconstruction process to reduce future tsunami damage by constructing tsunami evacuation buildings and installing tsunami warning systems. On the other hand, the population is also increasing. In this study, we look back at the progress of risk reduction measures related to post-disaster evacuation, quantitatively evaluate the tsunami evacuation risk as of 2023, approximately 20 years after the tsunami, from the perspectives of population changes and evacuation time, and evaluate future measures. The issues related to tsunami evacuation in Banda Aceh were clarified. As a result, it was confirmed that (1) there was a population increase in low-risk areas and a population decrease in high-risk areas. (2) The construction of tsunami evacuation buildings significantly shortened evacuation time and significantly improved the evacuation completion rate, demonstrating the significance of tsunami evacuation buildings. (3) The deficiencies of using only the tsunami evacuation building and the effects of using other existing buildings were quantitatively demonstrated.

Methods for Classifying Disaster Risk Creation in Housing Reconstruction Projects

Grace Muir and Aaron Opdyke

Scholars and practitioners have observed that disaster risk is being generated faster than it is being mediated by risk reduction efforts. However, we lack empirical assessments and guidance for classifying instances of disaster risk creation. This research aims to develop a framework for detecting and categorising risk-creating outcomes. We present a methodology to assess extents of risk creation, with our application employed in the context of housing reconstruction projects in Indonesia. The focus on post-disaster settings is drawn from scholarly observations that risk creation arises out of the misguided capitalisation of opportunities for restructuring socio-spatial configurations. With risk reduction agendas often frontlined in the aftermath of disaster, this research unpacks instances where such ideologies are manipulated to (counterproductively) create risk. Of importance to our approach is the need to prioritise risk conceptions of typically marginalised community groups anticipated to be directly affected by risk creation processes, since biased risk framings can fuel the creation of risk. We utilise interview and focus group discussions in conjunction with co-produced settlement risk maps to outline a protocol for operationalising risk creation data. Insights from multi-hazard models, community knowledge, and expert consultation are therein triangulated to conceptually classify instances of disaster risk creation. To determine forms and extents of risk creation emerging through housing reconstruction projects, our framework offers a means to interrogate shifts in disaster risk across community scales.

A 20-year journey of enhancing community preparedness and early warning systems after the Indian Ocean tsunami in Aceh, Indonesia

Benazir, Nurkhalis Nurkhalis, Tursina Tursina, Teuku Faisal

This paper delves into the trajectory of community preparedness and the evolution of early warning systems in Aceh, Indonesia, spanning two decades following the catastrophic Indian Ocean tsunami of 2004. Evaluating community preparedness post-disaster, it investigates the complex relationship between land use changes and disaster resilience, particularly in light of rapid population growth and urban development in tsunami-prone coastal areas. The study also scrutinizes ongoing efforts to anticipate and mitigate future threats, considering the unique cultural and habitual dynamics in Aceh. Through comprehensive analysis, it sheds light on the progress made and challenges encountered in the continuous journey towards bolstering disaster resilience and safeguarding communities against natural disasters. Key focus areas include the adaptation of early warning systems to suit evolving community needs, the integration of traditional knowledge with modern technology, and the implementation of community-based disaster risk reduction initiatives. Furthermore, the paper highlights the importance of fostering partnerships between government agencies, non-governmental organizations, and local communities to ensure effective disaster preparedness and response. Insights gained from this study contribute to a deeper understanding of the complexities surrounding disaster resilience in Aceh and provide valuable lessons for disaster-prone regions globally.

Keyword: community resilience, tsunami threat, mitigation effort, risk management, future hazard

Building Vunerability Tendency Toward Tsunami Parameters

Rifdalila Kultsum, Benazir, Tantri Nastiti Handayani

Tsunamis can cause varying degrees of damage to buildings, ranging from minor impairments that do not affect the building's function to complete collapse. Thus far, assessments of building damage have predominantly focused on the inundation height relative to existing building types without considering the potential impact on each type of building at every inundation height. Therefore, this study aims to conduct a more detailed assessment of the potential damage to buildings exposed to the tsunami in the Kuta Raja sub-district, Banda Aceh, following the 2004 Indian Ocean Tsunami. The assessment involved classifying and mapping buildings based on structure type and number of floors, utilizing data from Regional Spatial Planning and satellite imagery. These data were then overlaid with a tsunami inundation zone map, developed using a worst-case scenario from previous studies with Geospatial Information System (GIS) software. The mapping results were integrated with fragility curves to evaluate the level of building damage across various structure types in each inundation zone, categorizing them into conditions: lightly damaged, minor damage, moderate damage, severe damage, and collapse. This study emphasizes the potential damage to buildings in each inundation zone based on structure type and number of floors, providing valuable insights for location selection and construction project design, with significant implications for future disaster preparedness and urban planning efforts.

Keyword: Tsunami, Kuta raja, Building damage assessment, Urban planning

Roles of disaster museums, memorial places and gathering spaces in long-term community recovery after tsunamis in Thailand and Japan

Titaya Sararit and Elizabeth Maly

The tsunami disaster of 2004 on December 26, caused by an earthquake in northern Sumatra, severely affected six provinces in Thailand. Over the 30 years since the tsunami disaster, there has been rehabilitation and development of the area, including housing, warning systems, and the creation of public spaces to remember the event. Along with increasingly frequent disasters worldwide, Japan also faced tsunami devastation after the Great East Japan Earthquake in 2011, 13 years ago. Tsunami-affected areas in Japan have also been redeveloped as part of recovery processes, including the provision of housing, advances in warning systems and evacuation planning, and creation of various memorial spaces and facilities. Recognizing the essential role played by gathering spaces in communities' recovery and disaster reduction, the purpose of this research is to define the roles of museums, memorial places and gathering spaces in community recovery in Thailand and Japan. After initially collecting post-disaster management data, research aims include: 1) evaluating community spaces to study community adaptation and knowledge transfer; and 2) evaluating the experiences and information residents have about tsunamis to improve risk perception for future events. Exploring the connections between disaster memorial museums, memorial parks, and gathering spaces, this research evaluates the roles of memorial and gather spaces in the long-term recovery processes of passing on knowledge to future generations. Emphasizing the transfer of knowledge, information, and local activities as part of disaster learning, this research aims to strengthen community resilience to cope with future disasters.

Trends of Building Development in Banda Aceh-Indonesia After 20 Years of the 2004 Aceh Tsunami: Challenges to Mitigate Impacts of Future Earthquakes and Tsunamis

Yunita Idris, Syamsidik, Muhammad Daffa, Al Farizi, Aulia Khalqillah, Sylvia Agustina, Ibnu Rusydy

After 20 years of the 2004 Aceh Tsunami, buildings development has been seen to increase significantly in terms of number, types, and functions. Notwithstanding the trends, there has been no study to reveal the construction culture/procedure changes in terms of policy and implementation of the new building codes. This research was aimed at capturing the building development trends and changes in construction culture (policies and implementation) in Aceh. The key question was whether the 2004 Aceh Tsunami and major earthquakes in Aceh in the last 20 years have driven the development and the changes or not. Two major cities in Aceh were selected in the study, namely Banda Aceh and Meulaboh. Rapid visual surveys were conducted in 2023 and in 2024. Previous years building data were included to see the trends. Two focus group discussions were conducted to confirm the main findings of this research. Eight key informants were interviewed to triangulate the findings. This study identified over 80,000 buildings in Banda Aceh and over 35,000 buildings in Meulaboh. A sharp trend of the number of the buildings was identified in Banda Aceh between 2017 and 2022 where the increase was around 35%. Most of the buildings were for housing. Some of the buildings were built within 2.0 km from the coastline of Banda Aceh. Meanwhile, in Meulaboh the trend was relatively mild compared to Banda Aceh. Construction workers in the two cities were found not to be aware of earthquake-proof related construction procedures, especially when installing bars at the structural components of the buildings. Furthermore, restrictions to build houses within tsunami high risk areas in Banda Aceh seem to be eased. No specific changes were made in terms of preventive measures on building damages due to tsunami in both study sites.

Keyword: *buildings, high risk earthquake, tsunami, rapid visual survey rapid visual survey*

Group -3A

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Paralel Session 2

10.30 – 12.15

Track 3:
Urban Planning, Reconstruction And Recovery

Room 5: Tsunami Lab, 2nd Floor
TDMRC | Group 3B

Long-term changes in post-disaster housing and establishment of community relationships

Chiho Ochiai

Housing reconstruction is one of the major tasks in post-disaster recovery; however, long-term observation is still lacking. The survey was conducted to identify the long-term (over ten years) changes in house ownership and house modification of the post-disaster houses that were designed and managed by the major donor originations, namely the World Bank (Gampong Lambung) and Asian Development Bank (Gampong Pande) in Banda Aceh, and finally to understand the current community relationships. About 100 samples from each site were collected regarding the house ownership and current condition and modification of the house by measuring the exterior. The survey revealed that only 10 percent of ownership has been changed in both sites, but over 50 percent (WB site) and 30 percent (ADB site) of current residents in 2017 are different from the original residents. Even though several houses are abundant, most houses are renovated by adding a kitchen or modifying the toilet. Self-funded improvements are self-evident in individual house details, and several houses have been completely rebuilt. Regarding the establishment of a community, since Gampon Pande was a historic land centered on fishing, there were few opportunities for outsiders to move in, so the traditional community was maintained. On the other hand, in Gampon Lambung, many housing units have been rented out, and migrant workers and outsiders have also become residents. With half of the residents no longer being local residents, their cooperation became essential to community management, and new community relationships were built.

Keyword: *Long-term changes, Housing reconstruction, community relationship*

The Effectiveness of Tsunami Walls in Mitigating Tsunami Impact

Radianta Triatmadja, Benazir, Athaya Syifa Widha Rana

Indonesia's extensive coastline requires protection from tsunamis. While constructing high seawalls for complete protection would be prohibitively expensive, lower seawalls can still offer partial protection and reduce tsunami risk. Generally, the higher the wall, the lower the hazard and risk associated with tsunamis. Tsunami hazard mitigation depends on several factors, including the seawall height, the distance of populated areas from the coast, the distance of the seawall from the coastline, and various tsunami characteristics such as height, length, and wave length. An alternative approach involves using elevated roadways as tsunami barriers, which can serve dual purposes in the absence of a tsunami threat. Research based on numerical simulations using DualSPHysics was conducted to explore the correlation between hypothetical tsunami shapes, tsunami heights, wall height, and both the run-up height and velocity of tsunamis surge behind the wall. The study varied wall height, tsunami height, and shape to assess their impact. The results are expected to provide valuable insights into the effectiveness of seawalls under different conditions, enhancing our understanding of tsunami protection measures for Indonesia's coastal areas.

Keyword: *Coastal structures, overtopping, run-up, DualSPHysics, tsunami protection*

Group -3B

Transitional Settlement Strategy post Disaster - A Comparative Study of Aceh Tsunami and Yogyakarta Earthquake Disaster

Nizam Nizam, Ikaputra Ikaputra

In the aftermath of major disasters, the provision of adequate shelter for displaced populations is a critical and complex challenge. This paper examines and compares the transitional settlement strategies implemented following two signi>icant disasters in Indonesia: the 2004 Indian Ocean Tsunami in Aceh and the 2006 Earthquake in Yogyakarta. Through a detailed analysis of the socio-cultural contexts, intervention strategies, and outcomes in both cases, we demonstrate the importance of context-speci>ic approaches to transitional settlements that go beyond mere physical shelter provision. Our >indings highlight the crucial roles of leveraging local leadership structures, maintaining community bonds, and integrating livelihood development in the recovery process. The contrasting experiences in Aceh and Yogyakarta underscore the need for adaptive strategies that respect local social dynamics and cultural preferences. This comparative study provides valuable insights for improving disaster preparedness and response mechanisms, particularly in diverse socio-cultural settings. Transitional settlement not only serve as an emergency safe place during and aftermath of a disaster, but also a healing place for recovery, and reconstruction. A good strategy in transitional settlement development is an important part of disaster management and could become a signi>icant investment for speedy recovery, and building a better more resilient society.

Sustainable Regional Development Planning Based on Coastal Disaster Risk Assessment (Case Study: North Coast of Central Java)

Novian Andri Akhirianto, Khusnul Setia Wardani, Anies Ma'rufatin, Amalia Nurwijayanti, Favian Mafazi Giska Putra, Farikhotul Chusnayah.

The northern coastal region of Central Java has developed into an area of economic activity and considerable regional growth. However, this region is also vulnerable to hydrometeorological disasters, including coastal flooding and extreme waves. Disaster risk reduction (DRR) is needed as the core of development, as emphasized in the Sustainable Development Goals (SDGs). This study investigates a model of the relationship between regional development and coastal disaster risk to assist planners and policymakers in formulating development and disaster risk reduction (DRR) plans. This research focuses on 13 regencies/cities in the northern coastal region of Central Java. Economic, poverty, demographic, social, and environmental indicators are used to assess regional development. Coastal disaster risks are analyzed by hazard, vulnerability, and capacity. The data analysis method employed scoring techniques, a relationship matrix of hazard, vulnerability, and capacity, as well as an integration matrix of regional development and disaster risk. According to research findings, Semarang City has the highest level of regional development, with the majority of indicators superior. Meanwhile, the majority of coastal disaster risk levels or 7 out of 13 regencies/cities are in the high-risk class. The matrix of the relationship between the level of regional development and coastal disaster risk shows that there are 9 regions (Regency of Brebes, Tegal, Pemalang, Pekalongan, Demak, Jepara, Pati, Rembang, and Tegal City) requiring priority to increase DRR. The findings of this research will contribute directly to achieving sustainable cities and settlements (SDGs 11), by implementing holistic disaster risk management at all levels.

Keyword: *Hydrometeorological Disasters, Central Java, Disaster Risk Management*

Group -3B

Reflections on Long-Term Recovery after the 2004 AcehTsunami: Sustainability in Spatial Planning and Disaster Risk Reduction in Indonesia

Saut Sagala, Cecilia Nonifili Yuanita, Tifany Salikha Dewi, Alifa Zalfa Poetry Wicaksono

The 2004 Tsunami Aceh followed by several devastating tsunami events in Indonesia, such as Pangandaran (2006), Mentawai (2010), and Palu (2018), left a significant impact on various aspects, especially the destruction of the physical-environmental and socio-economic landscape. The events resulted in Indonesia's continuous grappling with long-term recovery efforts. Indonesia has developed spatial planning and its guidelines that can minimize potential damage and losses to various systems. However, further integration with long-term recovery efforts, disaster risk reduction (DRR), and sustainability concepts should be considered. This study aims to evaluate lessons learned from major disasters over the two decades after the 2004 Tsunami Aceh, with a focus on the development of spatial planning and guidelines in Indonesia. This study employed a qualitative approach and a Risk-Based Planning Approach (RBPA). It also assessed how an increased focus on sustainability and recovery concepts can serve as an optimal long-term strategy for disaster management. The RBPA analysis revealed deficiencies in the current policies and guidelines, particularly the lack of integration between spatial planning and Indonesia's long-term disaster recovery efforts. This discrepancy highlighted areas for improvement in Indonesia's spatial plan to promote greater sustainability in the face of disaster. The results of this study can provide information to policy-makers and planners to strengthen DRR principles in spatial planning frameworks, foster participatory planning for system resilience, and promote sustainable development.

Keyword: *disaster risk reduction, long-term recovery, risk-based planning approach, spatial planning, sustainability*

Advancing Post-Disaster Resettlement after 20-years Indian Ocean Earthquake and Tsunami in Banda Aceh

Norazam Abu Samah, Khamarrul Azahari Razak

This study provides a new insight into global practices and regional benchmarking on disaster resilient recovery after 20-years Indian Ocean Earthquake and Tsunami in Aceh, Indonesia. Accelerated by our commitment to the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR2030), this transdisciplinary research aims to enhance understanding of resettlement design considerations and their cascading impacts on long-term community resilience and risk-informed sustainable development. We examine the effectiveness of post-disaster resettlement projects over three resettlement areas in Deah Baro, Panteriek, Ujong Bate, Banda Aceh, Indonesia. This study employed field observations and structured interviews with key stakeholders, including NGOs, local government agencies, NGOs, academicians and vulnerable communities. The study explores lessons (un)-learned and best practices for post-disaster resettlement projects based on a 25-years' experience by MERCY Malaysia, a global south NGO that promote the Humanitarian-Development Nexus, emphasising the public-civil society-private-academia partnership and localisation approach. We co-designed and co-developed disaster resilient recovery model to support multi-tier resilience culture after the mega-disaster. Key findings focus on varying levels of success in achieving the build-back-better agenda, influenced by self-help with ability to bounce back, strong connectivity, knowledge in preparedness, response and recovery, economic stability, social capital, and strong spirituals with good faith. This study highlighted five recipes to meet the future demands of the global agenda in 2030 and beyond. Ultimately, this research informs policy and practice by mainstreaming local resilience strategies into de-risk investment, and added value to future resettlement strategies, aiming to foster resilient communities and sustainable resilience agenda in a complex environment.

Spatial planning strategy for disaster mitigation based on earthquake risk analysis using geographic information system (GIS)

Muhammad Nazirurrahman , Teuku Aulia Geumpana , and Rina Suryani Oktari

The utilization of Geographic Information System (GIS) technology in spatial planning for disaster mitigation is a novel approach in the development of regional spatial planning documents in Indonesia, particularly in Pidie Jaya district. This district is situated along the fault line on the island of Sumatra, a tectonically active zone highly susceptible to seismic activity. This research employs a methodology that integrates spatial data analysis, and GIS modeling to comprehensively understand the potential and impact of earthquakes in the area. Initial data used for analysis was sourced from the 2016 earthquake in Pidie Jaya district. The analysis results were incorporated into GIS to create precise and detailed maps depicting earthquake vulnerability and hazard. Subsequently, a meticulous spatial planning strategy is formulated, encompassing recommendations for land use, building standards, and disaster mitigation infrastructure. This strategy is designed to offer practical and efficacious guidance for local governments in reducing earthquake disaster risks and to significantly contribute to the formulation of sustainable disaster mitigation policies. The findings of this thesis are expected to provide a substantial contribution to earthquake disaster mitigation effort, not only in Indonesia but also globally.

Keyword: *geographic information system (gis), seismic activity, infrastructure, earthquake vulnerability, pidie jaya district.*

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 3

13.30 – 15.15

Track 3:
Urban Planning, Reconstruction And Recovery

Room 5: Tsunami Lab, 2nd Floor
TDMRC | Group 3C

Impact of Vegetation Cover Loss on Land Surface Temperature in Sabang City: Implication for Small Island Space Management

Naja Asrina, Eldina Fatimah, Ashfa Achmad

Urban development, while contributing to economic growth and human activities, can also negatively impact the environment if not properly managed. Rapid development has led to changes in land use patterns, altering the function of natural spaces. Urban development has turned many vegetated areas into built-up land, which in turn affects local, regional, and global climates by increasing land surface temperatures. Sabang, a city on Weh Island, Indonesia, is experiencing development and changes in spatial patterns, with forest areas and water bodies decreasing, concerning about raising land surface temperatures. This study aims to identify changes in vegetation cover and land surface temperature in Sabang, assess the relationship between vegetation loss and increased surface temperature, and provide recommendations for spatial planning policies to mitigate these effects. Using satellite imagery from 2010 and 2020, we will employ NDVI mapping to track vegetation cover changes and digital conversion of radiation to monitor surface temperature changes. A correlation analysis will then be conducted to explore the relationship between vegetation cover and surface temperature. The findings will be used for suggestions in determining spatial management policies to mitigate surface temperature changes.

Keyword: *urban development, vegetation cover, land surface temperature, spatial planning*

Medium to Long-term Impacts from In-situ Housing Reconstruction: Insights from Post-disaster Surveys of the Indian Ocean Tsunami and Nepal Earthquake

Kozo Nagami, Tomoki Miyano, Mohammad Naser Sediqi

Using case studies from the 2015 Nepal earthquake and the 2004 Indian Ocean tsunami, this paper compares the outcomes of in-situ housing reconstruction that is often perceived more favorable in terms of swift recovery of livelihoods, community ties, culture, and tradition. In Nepal, slower regional development in rural, mountainous areas led to minimal population influx, preserving traditional livelihoods and community structures. In contrast, Banda Aceh, which experienced rapid post-tsunami urbanization, saw significant population turnover. Newcomers without tsunami experience moved into coastal areas. They are often engaged in non-land-dependent occupations but are attracted by low property price with high accessibility. These newcomers are augmenting long-term disaster risks with increasing both tsunami hazard exposure and socio-economic vulnerability. With mobilizing the twenty-year rapid recovery benefits, we should enhance both structural and non-structural disaster risk reduction measures essential to minimize the future disaster loss. In contrast, in rural areas like Nepal, in-situ housing reconstruction should have played a positive role maintaining the harmonization of human and nature. However, underdevelopment issue persists unchanged and challenges for maintaining reconstructed housing stocks can be a future problem. Both cases have both positive and negative impact in the perspective of mid/long-term, but recovery strategies must carefully examine the optimal balance of benefits and risks associated with choices among in-situ housing reconstruction and relocation while adapting to local contexts reflecting the region's urbanization landscape and development needs. medium to long-term outcomes depend on regional development, disaster risk characteristics, and socio-economic factors. Ultimately, the study emphasizes that recovery strategies must adapt to local contexts, balancing immediate needs with long-term sustainability, and consider both the evolution of benefits and the potential risks associated with different resettlement approaches

Keyword: *In-situ housing reconstruction, Relocation, Vulnerability, Population turnover, Benefit and risk*

Spatial Transformation of Post Tsunami Relief Houses in Ulee Lheue, Banda

Fithria Zahwa Kh, Dyah Erti Idawati, and Hilda Mufiaty

Approaching 20th anniversary of the tsunami struck Aceh, almost no trace of the tsunami was visible. Nowadays, areas that were hit the hardest by the tsunami have grown into dense residential areas. Many relief houses built by various donors on different locations have been transformed, adapting to the needs of their inhabitants, including the relief houses in Ulee-lheue. Based on Habraken theory of spatial transformation, the purpose of this study is to identify the spatial transformation that occurred in post tsunami relief houses in Gampong Ulee Lheue, Banda Aceh. This study employs qualitative methodology with a descriptive analysis approach. The primary data is taken through interviews and observations while secondary data is obtained through documentation of previous study. The sample were chosen purposively represent houses built by Uplink, BRR and Baitul Mal. There were nine relief houses chosen that experience transformations. Following Habraken step, the analysis of this study is framed by spatial structure and spatial value by comparing the current transformation and the basic type of relief houses. The results show changes have been found in the form of expansions that are dominated to the back and to the side. Additionally, the Uplink relief houses expand downwards. This transformation also resulted changes in the spatial structure included, hierarchy, house orientation, spatial patterns, circulation and access and increased territorial area. In term of spatial value, the changes can be found in usage space, economic and social dimensions. Contribution of this research is to provide knowledge in transformation and post-disaster housing.

Rooted Placemaking for Long-term Disaster Recovery: Community-based Initiatives in Tohoku after the Great East Japan Earthquake

Elizabeth Maly, Tamiyo Kondo

Rooted placemaking is defined as: 1) various actions of planting, growing, and ecological and food stewardship; 2) with community participation; 3) at both larger civic and smaller neighborhood scales. Applied across the disaster cycle, rooted place-making projects support local communities and build resilience from the emergency response phase, through recovery, and against future disaster damage. This research investigates the role of rooted placemaking in the long-term recovery of communities affected by the 2011 Great East Japan Earthquake and Tsunami in Tohoku. At the civic scale, green infrastructure planning projects for disaster mitigation after the tsunami created multiple large memorial parks. At smaller scales, various projects emerged with community involvement, including planting and growing trees, vegetables, and flowers, and caring for plants and green spaces. Research has shown the benefits of community gardens, urban farms, and farmers' markets for local residents, not only for health and wellbeing but also the potential to support the recovery of disaster-affected communities and build resilience to mitigate future impacts. There is also growing recognition of the potential of placemaking or human-centered approaches to the planning, design, and management of public spaces, that emphasize community-based participation and collaborative processes, and the potential for placemaking to restore place identity post-disaster. Drawing from a complication of cases of rooted placemaking in the disaster-affected area, this research analyzes the components and impacts of these projects for participants, visitors, and community members, and potential contributions towards supporting long-term community-based recovery in the region.

Keyword: *placemaking, community-based, community recovery, disaster recovery, long-term recovery*

Approaches to post-tsunami coastal reconstruction: comparisons across Indonesia, Thailand, and Japan

Alison Raby, Antonios Pomonis, Anawat Suppasri, Keith Adams, Nurullah Açikgőz, Marco Baiguera, Yunita Idris, Panon Latcharote, Francesca Marafini, David McGovern, Ella Meilianda, Harsh Mistry, Sukiman Nurdin, Eyitayo Opabola, Teraphan Ornthammarath, Nattapon Trumikaborworn

Natural hazards pose significant challenges to affected communities worldwide, yet there remains a lack of comprehensive studies comparing recovery efforts across different countries and cultures. This study addresses the gap by investigating the impact of three devastating tsunami events on four distinct locations: Banda Aceh (Sumatra, Indonesia) and Southern Thailand, both affected by the 2004 Indian Ocean Tsunami, the 20th anniversary of which provided the initial motivation for the study; the Tohoku region of Japan, affected by the 2011 Great East Japan Earthquake and Tsunami; and Palu Bay (Sulawesi, Indonesia) affected by the Palu-Central Sulawesi Earthquake and consequent triple disaster. Data for this research was gathered from recovery missions led by the UK Earthquake Engineering Field Investigation Team (EEFIT), working in collaboration with local partners (Tsunami and Disaster Mitigation Research Centre, Tadulako University, Mahidol University and the Asian Institute of Technology). Additional material was provided by the International Research Institute of Disaster Science (IRIDeS) at Tohoku University. This paper evaluates recovery in terms of spatial planning, the development of design codes, evacuation planning, and the reconstruction development of coastal and port structures. A companion paper considers post-disaster recovery of buildings and other structures in Indonesia. Key findings include a variety of responses to planning enforcement in exclusion zones, a reliance on US tsunami codes for building code development rather than the comprehensive Japanese codes, diverse behavioural responses to the use of vertical evacuation structures, and some similarities in the use of multi-layered protection from tsunamis, inspired by Japanese approaches.

A Review of the Effectiveness of Tsunami Evacuation Buildings Distribution in the Government-Designated Planning Area (BWP) in Cilacap Using GIS Simulation

Mufidatun Khoiriyah, Osamu Murao

Natural hazards pose significant challenges to affected communities Cilacap which is located in the southern area of Java Island, Indonesia, is exposed to the risk of tsunamis from the tectonic activities in the Indian Ocean. The area has a relatively flat topography which makes the necessity for tsunami evacuation buildings for vertical evacuation becomes crucial. In recent years, the government has been working on the tsunami evacuation plan and designating existing buildings to be tsunami evacuation buildings. However, upon initial observation, the distribution of tsunami evacuation buildings appears to be inadequate. This raises the question of whether the distribution of tsunami evacuation buildings in Cilacap can effectively improve the evacuation completion rate. Thus, this research aims to clarify the distribution and the capacity of tsunami evacuation buildings in Cilacap focusing on the government-designated planning area (BWP). The analysis is conducted by secondary data collection and Geographic Information System (GIS) to run an evacuation time simulation. The analysis result will be a foundation to propose a better tsunami evacuation map to minimize casualties during tsunamis.

Keyword: t*sunami evacuation building, GIS simulation, Cilacap, government-designated planning area, hazard map, evacuation route*

Group -3C

POST–FLOOD DAMAGE ASSESSMENT FOR STRUCTURE AND INFRASTRUCTURE: A REVIEW

Naziem Salehen, Nazirah Mohd Apandi, Warid Wazien Ahmad Zailani and Nur Alifah Ilyana

Flood damage assessment is an essential aspect of disaster management, forming the basis for understanding the repercussions of catastrophic events on communities, infrastructure, and the environment. This review paper aims to synthesize existing research on methodologies for estimating direct flood damage to houses and their contents. The review will focus on various approaches, including qualitative, quantitative, and mixed methods, employed in different geographical contexts to evaluate flood damage. By analyzing the strengths and limitations of these methodologies, this paper seeks to provide a comprehensive overview of current practices and identify gaps in the literature. The findings from this review indicate that while numerous methods exist for assessing flood damage, there is a need for standardized frameworks that can be adapted to various contexts. The review concludes that integrating expert opinions with robust data collection and analysis techniques is crucial for developing effective flood damage assessment frameworks. Ultimately, this paper aims to provide insights for government agencies, policymakers, and researchers to enhance their strategies for flood risk management and mitigation.

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 1

08.30 – 10.15

Track 4:
Disaster Society, Culture And History

Room 6: DRM Lab, 2nd Floor
TDMRC | Group 4A

Enhancing Tsunami Readiness: The Implementation of the Tsunami Ready Community Program in Deah Glumpang Village, Banda Aceh

Muhammad Harvan, Suci D. Anugrah, Admiral Musa, Resty Herdianingsih , Jumadin Jumadin and Rilza N. Akbar

Deah Glumpang village is one of many villages in Banda Aceh situated in a high-risk tsunami zone. The area was severely devastated during the Great Indian Ocean Tsunami in 2004. Despite rebuilding efforts, the persistent threat of tsunamis continues to pose concerns for the community's safety and development. To address this, the community of Deah Glumpang implemented the UNESCO/IOC Tsunami Ready Community Program to enhance their readiness and resiliency against tsunami disaster. This study evaluated the implementation of the program by assessing the fulfilment of its 12 indicators, which cover aspects of tsunami risk assessment, preparedness, and responses within the community. The methodology involved desk study, interviewing local residents and stakeholders, and field checking. This study used the UNESCO/IOC Manuals and Guide No.74 as benchmark to evaluate all the fulfilled indicators by the community. According to the evaluation results, all indicators have met the standards but can still be improved some more.

Group -4A

Food culture and community recovery – a case study from post 3.11 Miyagi and Fukushima

Julia Gerster

This research analyzes the role of food culture in community recovery following the multifaceted challenges posed by the 2011 Great East Japan Earthquake, tsunami, and nuclear disaster. Focusing on Namie Town in Fukushima Prefecture, which suffered from the impact of all three hazards, and Natori in Miyagi Prefecture, primarily affected by the tsunami, this study conducts a comparative analysis. Employing a cultural anthropology approach, it integrates qualitative data from interviews, focus groups, and participant observation spanning from 2013 to 2024. Additionally, interviews from the Voices of Tohoku archive are utilized. The comparative approach highlights differences and similarities in the effects of nuclear and natural hazards, and social responses to them. It discerns patterns in utilizing food culture for community and individual identity in post-disaster contexts, while also revealing politicization of disaster effects and food culture as well as their impacts on communal ties. For instance, national programs promoted the consumption of Tohoku produce to support the disaster-affected region, but these programs were also criticized for downplaying the nuclear disaster. Further, the disaster affected agriculture and fishing practices, altering some local practices in Miyagi and Fukushima. Key themes explored include adaptive capacities of local food systems, the role of food-related practices in fostering social cohesion, and the interplay between culinary heritage, social dynamics and post-disaster place-attachment. This analysis deepens understanding of connections between food culture, social dynamics, and disaster recovery, particularly in the context of compound disasters. This research presentation is based on a chapter draft of an ongoing monograph project.

A study on the relocation from Floating Villages to land in Cambodia focusing on the living environment

Miku Okuba, Shoko Araki, Michio Ubaura and Elizabeth Maly

In Kampong Chhnang Province, Cambodia, mass relocation and resettlement from Floating Villages to land-based areas has been implemented since 2017, for purposes of urban development and public health environment improvements. Through interviews with residents in each resettlement site and with the Kampong Chhnang Province government, this study aims to identify changes in living environment and behaviour before and after the relocation by comparing the three resettlement sites. This study is unique in that it focuses on the residents' responses to changes in their living environment and risk management to flooding in the resettlement sites. The housing layout did not change significantly before and after relocation, because residents self-built their houses in both former locations and resettlement sites and made use of flooding during the rainy season to move their houses. Although residents experienced flooding during the rainy season for the first time as a result of their relocation to land, it was found that they responded flexibly to changes in their living environment due to relocation by implementing risk management measures, such as making their houses on stilts. However, many residents expressed concerns about financial aspects, due to the lack of a support system for relocation and financial burdens on residents to rebuild their lives after relocation, such as building new housing and living infrastructure

A Comparative Study on Tourist Motivations to LUSI Island and LUSI Pond in the Context of Post-Disaster Tourism

Turniningtyas Ayu Rachmawati, Dea Saraswati Pramaningrum, Ar. Rohman Taufik Hidayat

The Sidoarjo mudflow disaster (LUSI Disaster) took place in 2006 in the oil drilling area operated by PT Lapindo Brantas in Siring Village, Porong District, Sidoarjo Regency. It remains uncertain when the LUSI disaster will come to an end, despite significant reductions in the eruption's volume. This paper will discuss an alternative perspective on the LUSI disaster, highlighting the existence of two tourist destinations, including LUSI Island and LUSI Pond, regarded as examples of Post Disaster Dark Tourism. LUSI Pond was established shortly after the LUSI eruption to safeguard nearby communities from the mudflow. LUSI Island emerged a decade later due to the deposition of sediment carried by mud into the Porong River. This study aims to compare the motivations of tourists visiting LUSI Island and LUSI Pond, as these two tourist destinations exhibit distinct characteristics. This study employs quantitative methods and utilizes analytical techniques, specifically multigroup factor analysis, a statistical technique comparing the average of latent variables, as well as the variance and covariance, across multiple groups. The discussed group in this study consists of the tourist destinations: LUSI Island and LUSI Pond. The study was conducted on samples obtained through a purposive sampling technique, specifically targeting individuals above the age of 17 who were not employed at the tourist destinations of LUSI Island and LUSI Pond. According to the research results, the primary motivation for tourists to visit LUSI Island is the motives of status and prestige. On the other hand, the main motivation for visiting LUSI Pond is driven by physical factors. In sum, the level of tourist motivation is higher on LUSI Island compared to LUSI Pond.

Bibliometric Analysis of Research Trends on Smong Using VOSviewer

Dian Novita Fitriani, Herry Yogaswara

The research aims to determine the performance of the publication of research topic articles that raise smong as well as knowledge mapping to find out areas of study that raise smong as a research topic. The study used 16 articles and proceedings indexed by Scopus as the research population. The bibliometric analysis carried out utilized keywords derived from the abstracts and titles of the articles collected. The results show that from 16 articles, the distribution of topics that mention smong as a research topic includes the tsunami disaster, especially those related to disaster risk reduction and disaster mitigation. Apart from that, the topic of smong is also studied in the field of local wisdom, education and learning, language, document study, communication especially risk communication, and community understanding. Research highlighting smong as a research topic began to develop and was published on Scopus from 2017 to 2024. This shows that the smong topic still attracts the interest of researchers from various fields of study. Bibliometric analysis on smong topics shows the popularity of a field of study so that it can be used by researchers to determine research topic both from trends and opportunities in other fields that are still rarely carried out.

Keyword: *Smong, tsunami disaster, disaster risk reduction, disaster mitigation, local wisdom, bibliometric Analysis*

Relationship Between Facial Morphology And Cementum Thickness Alternative Identification to Disaster Victim Identification

Abdillah Imron Nasution, Ridha Andayani

The application of the relationship between facial morphology and cellular cementum thickness is one of the identification alternatives that can replace primary identification according to Disaster Victim Identification. Material and Method. The facial morphology index calculated according to Martin and Saller classification. The placement of tape on the area where the marking of the Nasion and Gnathion and Zigomaticum points would be carried out. Marking of the Nasion and Gnathion and Zigomatic points was then carried out using a marker and the distance between the Nasion point to the Gnathion point and the distance between the two Zigomatic points was measured using a caliper to obtain the height and width of the face. Teeth samples were placed in saline media in an ointment pot as a medium for transportation and storage. The third apical part of the tooth root was cut with a transverse cut using a carborundum disc. The sample was observed under a light microscope at 100x and 400x magnification. The results were analyzed using the Pearson test. Result: The facial morphology category with a long facial skeleton has the highest average cementum thickness of 228.23μm, while the facial morphology category with a short facial skeleton has the lowest cellular cementum thickness with a value of 99.57μm. The results showed that the highest mesial-distal, buccal-lingual, and average cementum thickness belonged to the 31-35 years age group (491.25 μm, 175.5 μm, and 333.38 μm respectively). The mesial-distal, buccal-lingual, and mean cementum thicknesses were lowest in the 11-15 years age group (124.88 μm, 74.25 μm, and 99.56 μm respectively). Pearson's test results showed no significant relationship between facial morphological indices based on Martin and Saller's classification and cementum thickness. Conclusion: There is no significant relationship between facial morphology index based on Martin and Saller classification and cementum thickness.

Keywords: *Disaster Victim Identification, cellular cementum thickness, facial morphology index, Martin and Saller classification*

Media Presentations of Disaster Risks and Psychosocial Conditions

Uswatun Nisa, Rizanna Rosemary, Deny Yanuar, Zakirah Azman, Alfi Rahman.

Enhancing and disseminating positive efficacy information, along with boosting media engagement, is crucial for effectively educating the public about disaster riskand improving psychological preparedness. Efficacy information assists individuals in responding to risks both personally and socially,empowering them to make informed decisions that protect themselves and others, thereby influencing changes in beliefs or behaviors. Additionally,risk assessment and management involve evaluating and controlling risks to achieve successful outcomes or mitigate theworst impacts of disasters. This study aims to evaluate people'spsychological preparedness for disasters and investigate disaster risk information on media platforms. Using summative content analysis, which involves counting and comparing keywords or content followed by interpreting the underlying contextual meaning, the study identifies and counts specificwords or contentwithin texts to understand their contextual usage. The research reviews various news articles and coverage of disaster risk and psychological conditions in the online news media outlet Serambi Indonesia. Additionally, focus group discussions (FGD) are conducted to explore the possibilities and challenges in providing efficacy information on disaster risk and psychological preparedness. The study finds that coverage of disaster risks peaks during the commemoration of the Aceh tsunami, with a greater focus on losses and victims rather than on the psychological state and preparedness of people forfuture disasters.

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Keyword: *content analysis, disaster, psychological preparedness, risk information*

Group -4A

AIWEST - DR 2024
16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

Paralel Session 2

10.30 – 10.45

Track 4:
Disaster Society, Culture And History

Room 6: DRM Lab, 2nd Floor
TDMRC | Group 4B

Developing Cultural-Based Community Resilience to Disasters in Indonesia

Eni Maryani, Puji Lestari

This research analyzes the role of communities in disaster management in Indonesia, as a country with a population of 275,5 people, spread over a wide area and prone to disasters. Indonesia is a country that is vulnerable to various natural disasters such as earthquakes, tsunamis and volcanic eruptions. Environmental damage also often triggers large floods and landslides which not only cause casualties but destroy the fabric of life in a community. This research uses several disasters in Indonesia, namely the tsunami in Aceh (2004), the earthquake in Yogyakarta (2006), the volcanic eruption in Sinabung-Karo (2010), and the floods in Jakarta (2015-2020) as references for understanding the role of communities and various obstacles in facing or overcoming disasters. Through content analysis, in-depth interviews, and documentation studies, this research reveals the following important things. Through content analysis, in-depth interviews, and documentation studies, this research reveals the following important things. The strength of the community in a collective society needs to be used as the basis for developing this effort so that it not only maintains the noble values in Indonesian culture but also makes it a source of community strength, especially in facing disasters. This research reveals the role of communities both currently underway and those that have the potential to be developed in facing and overcoming disasters that occur in their communities. The word 'gotong-royong' (help each other), which has long been introduced as one of the characteristics of Indonesian society, was conceptually developed in line with the concept of social solidarity and is seen as important in developing the resilience of culture-based communities in Indonesia against various disasters.

Keyword: *disaster society, community resilience, culture*

A Multimethods Exploration of Vulnerability and Capacity Concepts Towards Women as a Vulnerable Group in Disasters: A Study in Bantul District, Indonesia

Kumala Intan Dewi, Setiyawati Diana, Pertiwi Pradytia Putri

Vulnerability and Capacity are technical terms that international organizations and disaster management agencies use as concepts for Disaster Risk Reduction. This study explores how women who have repeatedly experienced disasters and are considered one of the vulnerable groups, perceive and respond to the concepts of vulnerability and risk from their perspectives. The study used a multimethod concurrent design (qualitative-qualitative) approach to obtain the views of women survivors of the 2006 Yogyakarta earthquake through focus group discussions with 6 participants (study 1) and the opinions of professionals through semi-structured interviews with 2 participants representing the Indonesian Red Cross organization and the Bantul Regional Disaster Management Agency (BPBD) at the district/city level in Indonesia (study 2). The data were thematically analyzed and then integrated through a joint display. The results show that technical terms often used by international disaster management organizations are rarely known and appropriate translations in the local language can be found. There were variations in participants' understanding of the concept of vulnerability and women's capacity as a vulnerable group due to differences in experience and knowledge. Participants who were more exposed to information and participated in disaster training rejected the notion of women as vulnerable groups, but still conveyed several challenging conditions faced by women that reduce their abilities, such as gender-based multi-roles and responsibilities, value systems, and culture, socio-economic status, and shelter conditions that are still not women-friendly. Meanwhile, capacity is understood as the personal and collective ability to be able to respond to and recover from disaster events, including knowledge and skills, access to assistance and protection, the value of togetherness, the level of participation, optimism, and support from family, community, and aid organizations. Stress/trauma management materials, socialization, local training, and sustainable self-rescue practices through assistance from disaster management organizations are needs identified by participants to strengthen women's capacity.

Identifying Tourism Attractions' Potentials in Disaster Recovery Area: Case Study Isak Area, Linge Subdistrict, Aceh Tengah, Indonesia

Elysa Wulandari, Irin Caisarina, Laina Hilma Sari, Atika Aditya, and Siti Zahrina Fakhrana, and Sri Batara

Development and population growth in Aceh are increasing, as is the need for recreational areas. This study aims to provide a new recreational alternative in Aceh. By taking Isak area as a research area. The Isak area in the Jemer River Valley, inland in the Bukit Barisan Mountains, has a long history since the 10th century as the location of the Meurah Mege Kingdom. This study also provides a new perspective on the recreational aspects of Aceh that are not always associated with the tsunami disaster, but also enhance the historical, cultural and natural landscape aspects as a tourist attraction. The purpose of this study is to provide recommendations for tourist area centers in the mountains that develop a disaster-responsive historical culture. Through observation, and interviews this study found that many potential areas can be used for historical recreation in Kampung Isak.

Keyword: *Historical and Natural Tourisme, Attraction potentials, Isak Area, Gayo Highlands*

The Differences of Lip Print Patterns Among The Pakpak, Aceh And Singkil Tribes in Subulussalam, Aceh: A Pilot Study For Disaster Victim Identification

Abdillah Imron Nasution, Ridha Andayani, Ade Lala Affani Br. Bintang

Lip prints are a method used in forensic odontology, known as Cheiloscopy. Lip print patterns can also be used to predict ethnicity in Indonesia. The investigations carried out are useful to determine the cause and manner of death, especially in unidentified corpses such as victims of mass disasters. Objective: to determine the differences of lip print patterns among the Pak-pak, Aceh and Singkil tribes in Aceh. Method: The difference of lip print patterns based on Suzuki and Tsuchihashi classifications divided into 6 quadrant and digital data analyzed using Adobe Photoshop CC 2022. This research conducted in Simpang Kiri sub-district of Subulussalam. Subjects were taken using the Purposive Sampling Technique based on the researcher criteria (n=212). Results: The Kruskal-Wallis test showed a significance differences ($p<0.05$) in various types of lip patterns in the three tribes. Post Hoc test results found that there was a significant difference ($p<0.05$) in the type of lip print pattern between the Aceh-Singkil tribe (P=0.000) and the Singkil-Pakpak tribe (P=0.000). Meanwhile, there was no significant difference between the lip print patterns of the Pakpak-Aceh tribes (P=0.069). Conclusion: Based on Suzuki and Tsuchihashi classifications, there is significant difference between the lip print patterns of the Aceh-Singkil tribe and the Pak-pak-Singkil tribe, whereas there were no significant differences in lip print patterns between the Aceh-Pak-pak tribe.

Keyword: *Historical and Natural Tourisme, Attraction potentials, Isak Area, Gayo Highlands*

Group-4A

Sociocultural Interactions with Tsunami Memorials in Aceh: Insights from Diverse Community Perspectives

Alfi Rahman, Muzayin Nazaruddin, Yuva Ayuning Anjar, Rizanna Rosemary, Rosaria Indah, Syahrul Ridha and Siti Ghaisani Masturah

In the wake of the 2004 Indian Ocean Tsunami, numerous memorials were established in Aceh to honor the victims and educate future generations. This study explores the sociocultural interactions with tsunami memorials in Aceh, employing a qualitative research approach through in-depth interviews. A total of 38 informants were selected using accidental sampling from key memorial sites, including Mass Grave Siron, Mass Grave Ulee Lheu, Lampulo Ship, PLTD Apung, Tsunami Memorial Lamteungoh, and the Tsunami Museum. These locations were chosen for their significant historical and cultural relevance to the tsunami disaster. The informants were categorized into local residents, survivors, staff, vendors, researchers, and tourists. Data collection, conducted from June 2023 to June 2024, continued until saturation was achieved. Thematic and narrative analyses were conducted using NVivo software. The findings reveal the memorials' roles in fostering collective memory, promoting community resilience, and providing educational and economic benefits. Diverse community perspectives highlight the memorials' significant influence on cultural practices, such as annual rituals and commemorations, enhancing social interactions by bringing together different community groups, and revealing generational differences in how various age groups engage with and perceive these memorial sites.

Memory as Build Back Better and its Spatio-Temporal Change: Measurement and Future Directions

Ryo Saito , Osamu Murao , Hiroyuki Miura , Mizuki Sato , Mufidatun Khoiriyah , Muzailin Affan, Toshiaki Muramoto and Pradytia Putri Pertiwi

Build Back Better is an important concept in disaster science, though it is not well-defined. The concept is often applied in hard science disciplines such as architecture and urban design studies. Still, it is rarely used in soft science perspectives like those in the humanities and social sciences. How can we measure Build Back Better in humans and society? Some hints could be found in memory studies. Exploring questions such as “To what extent do people remember disaster events?”, “How do they evaluate their memories?”, and “Are they motivated to share their memories with others?” is meaningful.” These questions can be measured in psychometrics / psychological measurements. Measurements can transcend time and space, allowing us to compare different periods or areas. This capability could facilitate evaluating the temporal and spatial changes of Build Back Better. Measuring such memories could truly embody the principle of Build Back Better. This study reviews memory studies and discusses their potential relationships with Build Back Better, also proposing future directions for research.

Mega Tsunami Literacy Indonesia in 1674 On the North Coast of The Leihitu Peninsula, Central Maluku Regency

Ferad Puturuhu

Maluku is a region with a high Disaster Risk Index, including earthquake disasters. Historical literacy of a very devastating event in Maluku, namely the Earthquake and Mega tsunami in 1674, which destroyed several villages and claimed the lives of 2,500 people. The aim is to analyze the influence of disaster information literacy on community preparedness in facing disasters, and determine a model to bring back the history of the 1674 earthquake and mega tsunami to be known and commemorated as capital for community preparedness. The method used is a qualitative approach with descriptive methods and field surveys to obtain facts from existing symptoms and seek factual information about the earthquake and mega tsunami that occurred in 1674. Interviews using a purposive sampling method to find out the influence of disaster information literacy on community preparedness, observation and documentation. Data analysis uses data reduction, data presentation, drawing conclusions. Data validity is carried out by technical triangulation and source triangulation. The influence of disaster information literacy on community preparedness in facing disasters on the Leihitu Peninsula is still relatively low, and an interesting model for rediscovering the history of the 1674 earthquake and mega tsunami is utilizing information media, increasing public knowledge, creating historical monuments, preserving found tsunami scars, making the North Coast of Ambon Island a Tsunami Ready Community, always making February 17th the anniversary of Mega tsunami in Maluku, historical records of Mega tsunami must be owned by all villages/states on the North Coast of Ambon Island, and finding evidence in the form of notes, photos , and existing conditions due to the impact of the 1674 tsunami.

Keyword: *Literacy, Mega tsunami, Leihitu*

AIWEST - DR 2024
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Paralel Session 3

13.30 – 13.45

Track 2:
Inclusive Community Resilience And Disaster Education
&
Track 4:
Disaster Society, Culture And History

Room 6: DRM Lab, 2nd Floor
TDMRC | Group 4C

CAMPUS SUSTAINABILITY STRATEGY IN RISK ZONES: EARTHQUAKE RISK ANALYSIS AND TECHNOLOGY INTEGRATION AT BRAWIJAYA UNIVERSITY

Qomariyatus Sholihah, Widodo, Tri Wahyu Nugroho, Kristanto Adi Nugroho, Rita Parmawati, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni, Ridwan Danuarta Galisong, Sisilia Puni Suwandi

Brawijaya University is located in a volcanic earthquake risk zone. The physical vulnerability of buildings and the limited integration of digital technology are the primary challenges to campus operations' sustainability. This study aims to analyze earthquake risks through the SWOT (Strengths, Weaknesses, Opportunities, Threats) approach and utilize digital technology for risk mitigation. The method used is spatial analysis to map high-risk areas using GIS data, complemented by a SWOT analysis to identify the strengths, weaknesses, opportunities, and threats faced by the university. The operations research and analysis approach is also applied to design risk mitigation strategies and technology utilization. The results of the study show that Universitas Brawijaya has modern infrastructure, but its buildings are vulnerable to earthquake shocks. The main opportunity lies in the application of digital technology such as early warning systems and earthquake-resistant building design. However, the threat of earthquake risk and limited resources remain significant. There needs to be cross-disciplinary integration to create comprehensive solutions, including increasing campus awareness of risk and technology. A sensor-based early warning system and the application of digital technology can improve disaster preparedness and mitigation. Universitas Brawijaya must adopt a strategy that combines earthquake-resistant building design and digital technology to ensure operational sustainability amidst earthquake risk. Cross-disciplinary collaboration and disaster response awareness are also key in facing this challenge.

Keyword: Brawijaya University, Earthquake Risk, SWOT Analysis, Digital Technology, Operational Sustainability

RISK ASSESSMENT AS A FIRE DISASTER MITIGATION MEASURE IN EDUCATIONAL INSTITUTIONS (FACULTY OF ENGINEERING, UNIVERSITAS BRAWIJAYA)

Rita Parmawati, Kristanto Adi Nugroho, Qomariyatus Sholihah , Widodo, Tri Wahyu Nugroho, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni, Ridwan Danuarta Galisong, Sisilia Puni Suwandi

This study divides the observation results into four components namely (1) Site construction and layout which has two risk elements related to building conditions, construction, and layout; (2) Fire and process equipment protection systems which has four risk elements related to tools that support fire mitigation, (3) Operating processes with two risk elements related to a series of procedures that can mitigate fire; and Safety procedures and management controls has four risk elements related to management patterns in controlling a series of activities. These results show that there is a need to develop an action plan and also coordination between fields in the Faculty of Engineering, Universitas Brawijaya. It is important that these hazards and potential risks can be addressed effectively to create an optimal higher academic institution

Keyword: Fire risk assessment, Mitigation plans, Higher education safety

ENHANCING FIRE SAFETY IN ACADEMIC INSTITUTIONS: A RISKBASED ASSESSMENT OF KEY FACULTIES AT BRAWIJAYA UNIVERSITY

Qomariyatus Sholihah, Rita Parmawati, Widodo, Tri Wahyu Nugroho, Kristanto Adi Nugroho, Tri Puspitasari, Aulia Riska Lastika, Agus Saroni, Ridwan Danuarta Galisong, Sisilia Puni Suwandi, Bambang Haryanto

The findings reveal of four faculties in Brawijaya University does not have established a hot work permit system, as it a vital element for mitigating fire hazards that was then linked to work procedure. Moreover, inadequate electrical cable networks were widespread, that could be considering as fire risk when there is electrical malfunctions. From the system side, all the faculty are on the lack of infrared thermographic examinations, even though this system is needed to identify the overheated components in electrical systems that will led to fire hazard. On the human resources, it is important to organized fire team development and capacity building that will essential for guaranteeing efficient response during a fire hazard

Keyword: Fire Safety, Academic Institution, Mitigating

"May I know your story?": A post-colonial analysis on the application of community-based medical education in post- disaster Aceh, Indonesia

Rosaria Indah

The problems of inaccessibility and inequality in healthcare are related to significant challenges in doctor-patient interactions, which have increased in disaster-affected areas. Many medical education researchers have been trying to contribute to solving problems within poor doctor-patient interactions by
applying various strategies, including the community-based medical education (CBME) approach. However, there is a dearth of research exploring the implementation of this approach in disaster-affected contexts. This paper examines the application of CBME in post-tsunami Aceh, Indonesia, and analyses it in light of postcolonial theory. The researcher used ethnographic tools to observe 8 medical students' interactions with disaster-affected patients during home visits. The 225 hours of participant observations revealseveral important issues: Medical orientalism, othering process, and counter-discourse, which suggest that there was a great power imbalance between student doctors and patients. These findings also suggest that employing reflective and power-sharing approaches may contribute to balancing the asymmetrical power relations. In sum, this paper calls for the application of the CBME approach that may assist in overcoming the issue of inequality in doctor-patient interactions, especially in disaster-prone areas.

Revealing the Paleotsunami Heritage of Sumatra: Insights from Susoh and Beyond

Jędrzej Majewski, Patrick Daly, Adam Switzer, Ismail Nazli, Tomi Afrizal, Margaret Christie, Lillian Pearson, Jessica Pilarczyk and Benjamin Horton

Paleotsunami studies have revealed that the 2004 Indian Ocean Tsunami was just the latest in a series of a dozen tsunamis occurring over the past 7,400 years. While the vulnerability of northern Aceh to future tsunamis is evident, geological records for areas south of the 2004 inundation zone are insufficient to fully assess the risk. To address this gap, we conducted an extensive paleotsunami investigation along Sumatra's entire western coastline. Despite significant challenges posed by COVID-19 restrictions, we devised an innovative workflow enabling researchers from multiple countries to remotely participate in fieldwork, analysis, and capacity building. Our exploration covered more than 30 sites identified as potential repositories of buried tsunami sediments. In this study, we present findings from Susoh, a wetland site situated 40km south of the 2004 impact zone. Our analysis of the stratigraphy reveals a sequence of sediments deposited initially in a brackish lagoon, transitioning gradually to a freshwater environment. We identify four distinct sandy layers, indicative of past tsunami events, through stratigraphic and grain size analysis. Additionally, foraminifera analysis confirms a marine source for these sands, supporting their origin from tsunamis. Radiocarbon dating places these events between the present day and approximately 1850 cal. yrs BP. These findings constitute the first compelling evidence of paleotsunamis originating from ruptures of the Sunda Megathrust south of the 2004 rupture patch, underscoring the potential vulnerability of large sections of Sumatra's west coast to future tsunami occurrences.

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Paralel Session 1

08.30 – 10.15

Track 5:
Urban Planning, Reconstruction And Recovery

Room 7: Dynamic Earth Lab,
1st Floor TDMRC | Group 5A

Utilizing Twitter Data for Disaster Management: A Case Study of Monkeypox Outbreak in 2022

Kumpol Saengtabtim, Pantapat Kongpattanayothin, Jirajet Hansithiwong, Theekadhas Chantarasanarm, Nathamon Kongsawat, Thanasit Pakkaananchai, Paranut Prasittipap, Jing Tang, and Natt Leelawat

Twitter has been used worldwide as a microblogging to post about the daily news and information that happened. Many situations happened including the disasters; Twitter was one of the main tools that had high engagement based on the perspective of disaster victims and the outside view. In this research, we retrieved the data using Twitter API based on the keyword "#Monkeypox" from July 1 until September 6, 2022, which is the period that the global Monkeypox pandemic. 113,507 English tweets were collected. Two main objectives of this research are to prove whether Twitter can be used as a nearly realtime source of information during the pandemic and to define the stage of the disaster risk management (DRM) cycle. The correlation analysis between the number of daily tweets related to the monkey and the smoothed daily monkeypox cases was performed. For the second objective of this research, the tweets data was classified into each DRM phase based on the predefined keywords. Furthermore, the co-occurrence network and word cloud analysis visualize the key situation based on the overall study period. Accordingly, the results of the analysis can provide insight for indicating the pandemic situation, although the correlation results did not show a strong correlation between the number of tweets and the pandemic cases. Furthermore, the results can also provide a preliminary viewpoint for indicating the DRM phase. Lastly, the contents from the data visualization can also provide essential information such as the symptoms of Monkeypox, the concern, and the vulnerable group.

Keyword: *Disaster Management, Monkeypox Outbreak, Utilizing Twitter Data.*

Tourism Business Resilience and Sustainability during COVID-19: A Case Study of Nakhon Si Thammarat, Thailand

Kumpol Saengtabtim, Natt Leelawat, Ampan Laosunthara, Jing Tang, Akira Kodaka, Yasushi Onda, and Naohiko Kohtake

Tourism has been a major source of revenue for Thailand. However, during COVID-19 pandemic, Thailand's tourism-related businesses, such as hotels, accommodation, and transportation, suffered greatly. Nakhon Si Thammarat Province is a second-tier Thai province in the south of the country. Although the tourism businesses in this province suffered during COVID-19, it is expected they will quickly recover. This study analyzed the tourism businesses in Nakhon Si Thammarat Province using descriptive analysis and satellite imaging based on relative luminance. The descriptive analysis was conducted using flight data to Nakhon Si Thammarat and the occupancy rate, and the satellite image analysis used Planet data from PlanetScope sensors in the Wat Chedi area, which is a key tourism recovery area in this province. The satellite image analysis compared the land use and land cover (LULC) from 2018 to 2021 period. It was found that the tourism situation in Nakhon Si Thammarat had improved faster than Thailand's overall tourism situation and the area's tourism industry's recovery and sustainability resilience was primarily due to the influence of the faith in Wat Chedi as well as the specific targeting group of travellers.

Keyword: *Disaster Management, Monkeypox Outbreak, Utilizing Twitter Data.Tourism business resilience and sustainabilit, COVID-19 pandemic, descriptive analysis, satellite imaging, Nakhon Si Thammarat, Thailand*

Heritage and the Pandemic in Aceh: Rethinking Local Wisdom and Built-Environment for Community Resilience

Izziah, Cut Dewi, and Julie Nichols

The very fast transmission of the covid 19 that caused million victims in almost all over the world have brought to the issuance of international governments policies for lockdowns and travel bans. Such conditions have given impact on global mobility where people paused their travels drastically as well as changed the way people used the place. In the context of aftermath disaster, a number of studies claim that heritage acts as an active agent that can help community to build their resilience. Such an argumentation coincides with Acehnese traditional cultural context where its community engage with heritage site in order to conduct ritual activities when disaster struck. This paper – as part of the project Urban Heritage and Community Resilience: Conservation, Tourism, and Pandemic – aims to examine the uses and management of heritage places, and the ways heritage play a role in community resilience in Aceh during and after the and pandemic. It explores the way of understanding heritage within a dialogical frame of socio-cultural process involving local wisdom value and place in order to generate people ability to be resilient amidst the pandemic. In doing this, the study uses literature review method by examining a number of literatures that discusses historical background of Aceh in relation to pandemic, local wisdom in mitigating pandemic, and pandemic related activities in heritage places amid pandemic for community's resilience. The study found that during the covid 19 pandemic, heritage places in Aceh especially relate to religious value turned to become places for resilience. They facilitated local community to conduct ritual activities to help them to feel closer to God and thus strengthened their sense of resilience. Within these places, some activities to strengthen community resilience conducted.

Keyword: *Heritage, Pandemic, Local Wisdom, Community Resilience, Aceh*

Group -5A

Systematic Literatur Review : Health Worker Preparedness Factors in Fire Disasters in Hospitals in Indonesia

Prasetyaning Estu Pratiwi, Widyawanto Prastisho

Hospitals as health service institutions have a high level of fire risk compared to other places. The important role of preparedness of health workers in the management of fire disasters that may occur. This research aims to analyze the preparedness factors of health workers in fire disasters in hospitals. This research uses a systematic literature review (SLR) method where literature related to the research topic will be analyzed and synthesized. The literature that will be analyzed in this research is literature indexed on Google Scholar, Science Direct, and Pubmed. Literature published between 2020 and 2024. The literature obtained was sorted according to established criteria so that it is relevant to the research topic. The number of literature analyzed in this research was 12 pieces of literature. The research results show that the factors that influence the preparedness of hospital health workers in a fire disaster are knowledge, attitudes, actions, availability of active protection equipment (APAR) and passive protection facilities Passive protection facilities such as available emergency stairs, evacuation routes and gathering points.

Keyword: *Preparedness, Disaster, Fire, Health Workers, Hospitals*

Adaptation Strategies and Policies to Address Displacement Risks: A Case of Slow-Onset Disaster in Indonesia's North Coast of Java

Rufaida Nurul, Saut Sagala, Abimanyu Arya, Eri Krismiyaningsih, Ulima Nabila

Indonesia is exposed to the risks of climate change, which is exacerbating natural hazards and heightening displacement risks. On the northern coast of Java Island, the Indramayu and Demak Regencies are experiencing rising sea levels which have led to slow-onset disaster. Since the 2000s, the regencies have faced increased risks of coastal flooding due to sea level rise and land subsidence, leading to a gradual, permanent displacement of communities. Over time, the disaster risks are projected to worsen, necessitating the urgency to escalate policy efforts to address displacement risks due to slow-onset disasters. Several policies have been deployed to accommodate the issue, such as in-situ adaptation policies and planned relocation. Yet, the implementation is suboptimal due to the policy's unpopularity amongst the locals, lack of thorough spatial planning and risk assessment, as well as cost-related concerns. Furthermore, national and local government coordination and policy initiatives remain insufficient to address slow-onset disaster displacement. As a result, communities are constantly exposed to hazards due to the inadequacy of existing policies to avoid displacement and facilitate relocation or migration. Through a narrative analysis method, this study identified adaptation policy gaps related to slow-onset disaster displacement risks by reviewing national, provincial, and local policy documents, standards, and interview results of key government stakeholders related to disaster risk reduction, climate change adaptation, as well as social affairs and displacement. Overall, this study aims to provide policy recommendations to improve more robust and strategic adaptation to address slow-onset disaster displacement risks.

Keyword: *Climate change, Displacement, Migration, Slow-onset disaster, Policy review, Adaptation strategy*

Group -5A

Does social food aid reduce the prevalence of undernourishment? Evidence from Indonesia using panel GMM approach

Geubrina Yulia, Suriani Suriani, and Seftarita Chenny

In recent years, the world has faced the challenges of food crisis due to climate change, global economic crisis, conflicts, and environmental degradation that disrupt the food supply chain amidst a growing population. Indonesia has been facing the threat of food insecurity, as seen by the increasing trend of prevalence of undernourishment. This research aims to determine the influence of social food aid on the prevalence of undernourishment. This study used panel data from 34 provinces in Indonesia. Dynamic panel GMM analysis was used to examine the variable interactions. Several variables other than social food assistance were used, i.e. rice production, consumer price index, unemployment rate, and people's purchasing power. The empirical results demonstrate that social food aid and people's purchasing power have a negative effect on the prevalence of undernourishment. Meanwhile, the consumer price index and unemployment positively affect the prevalence of undernourishment. This research used panel GMM, which has not been widely used in previous studies in Indonesia. This research can provide advice on the implications of sustainable development policies.

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Paralel Session 2

10.30 – 12.00

Track 6: Disaster Governance And Diplomacy

Room 7: Dynamic Earth Lab, 1st Floor
TDMRC | Group 6A

The Governance Process Dimension in Building Resilience Disaster Village. Case Study : Gampong Lambung, Meuraxa District, Banda Aceh City

Yunita Arafah and Zya Dyena Meutia

The governance process plays an important role in shaping the Gampong Lambung to be smart and resilient. Successful governance processes will have a positive impact on a gampong to run its institutions by involving the role of public participation, existing human resources, available technology, financial adequacy, the existence of an umbrella of law, the support of leaders, governmental and non governmental collaboration. This study uses a qualitative research method with a case study of the tsunami on December 26, 2004 in Gampong Lambung, Meuraxa District, Banda Aceh City. Analysis of resilience through a sociological institutionalism approach. Through the sociological institutionalism analysis approach, it was concluded that the concept of Gampong Lambung resilience was formed by governance process dimensions. In the governance process dimension, the most important indicators in achieving resilience are the occurrence of coalitions, collaboration and broad coordination with many parties, both at home and abroad; governance in Gampong Lambung is also very focused on future village planning process activities, improving village performance, and increasing human resources in the field of resilience and preparedness to face disasters, especially tsunamis caused by earthquakes. Finally on the cultural dimension of governance, the most important indicators are; the character of citizens who are religious and surrender to the Almighty, giving them more strength in the face of heavy pressure; the culture of the local community that is continuously maintained, such as trusting and respecting the leader; and openness of citizens to change and their involvement in the development process.

Keyword: *governace process. Gampong Lambung, resilience, sociological institutionalism*

Socio-political setup for Earthquake Early Warning System (EEWS): The preparatory and initial decades of Japan's EEWS and relevance for the current efforts in Indonesia

Mizan Bustanul Fuady Bisri

The Japan Earthquake Early Warning System (EEWS / 緊急地震速報 / Kinkyu Jishin Sokuho) took roughly about a decade until its official launching and roll-out in October 2007. Arguably, Japan is the country with the large-scale/big network of EEWS with clear and segmented targeted/advanced and public users. Japan EEWS has had a fair share of successes and limitations in contributing to the country's disaster resilience. Nevertheless, the relative success of Japan's EEWS inspired other countries to follow suit, including Indonesia. The momentum for EEWS development in Indonesia increased after catastrophic disasters in 2018. At present, at least three major projects directly linked with the development of Indonesian EEWS are ongoing, i.e., two bilateral cooperation and a loan development operation. However, most development activities and work thus far have arguably heavily focused on (earth) science and engineering with less concerted academic and policy discourse from social and political aspects, which in the long run maybe counter-productive to EEWS development. This paper aims to shed light and systematically trace the history of the social and political setup of Japan's EEWS, especially the ten years of its preparation until its launching (~2007) and its updates after major disasters in the 2010s until the present. Based on this trace, the paper will argue whether the diversity and quality of social and political discourse about EEWS in Indonesia is on the right track. There are five social-political aspects that will be analyzed of social-political aspect of Japan EEWS development: the political goals, the (diverse) actors involved, the vertical intergovernmental relations, the users and EEWS alert design, and its economic/financing setup. In most academic papers about Japan EEWS, the social-political aspects above were discussed in a scattered manner, mainly in (earth) science and engineering publications. At a minimum, the paper will reorganize the story sequentially and contribute to meaningfully orchestrating the social-political discourse for Indonesian EEWS development

Keyword: *Earthquake early warning system (EEWS), Emergency response, Socio-political setup, japan, indonesia*

Group -6A

Formulation of Natural Disaster Mitigation Strategies Based on Disaster Risk Assessment for Sukoharjo Regency, Indonesia

Eko Setiawan and Denis Martein Reiska

Sukoharjo Regency, Indonesia is an area that has the potential to be greatly affected by disasters. This research aims to identify the types of potential disasters that may occur in Sukoharjo Regency and make proposals for disaster mitigation measures in Sukoharjo Regency that can be effectively implemented by the Sukoharjo Regency Regional Disaster Management Agency (BPBD) for the period 2022 to 2027 using the Disaster Risk Method Assessment. The research reveals that disasters that have the potential to occur and will occur in Sukoharjo Regency are floods, earthquakes, landslides, hurricanes/extreme weather, drought, and forest or land fires. Based on the risk matrix assessment, it can be seen that hurricanes/extreme weather and floods are at the Serious level with a value of 15. Meanwhile, earthquakes, landslides, drought and forest or land fires are at the Medium level. The suggestions given for making improvements are: First, pre-disaster management, there are two situations, namely when there is no disaster and when there is a disaster. Second, during an emergency response, it includes: a quick and precise assessment of the location, damage and resources; determining the status of a disaster emergency; rescue and evacuation of disasteraffected communities; fulfilment of basic needs; protection of vulnerable groups; and immediate restoration of vital infrastructure and facilities. Third, post-disaster management includes rehabilitation and reconstruction.

Keyword : *Disaster Risk Assessment Method Floods Earthquakes*

Utilizing the Climate Disaster Resilience Index (CDRI) to Evaluate Semarang City's Resilience to Climate Change Disasters

Rahma Hayati, Aprillia Findayani, M. Fikri Amrullah

Semarang is one of the Coastal Cities in Indonesia, which has quite complex coastal problems. Physically and socially, Semarang City faces the risk of global climate change accompanied by population growth. This research aims to measure the level of resilience of Semarang City based on the Climate Disaster Resilience Index (CDRI) parameters in facing disasters related to climate change. This research uses a quantitative statistical approach. The variable used in this research is the CDRI variable to measure climate disaster resilience by considering five dimensions: physical, social, economic, institutional, and natural factors. Using data collected from questionnaire surveys, we used the Weighted Mean Index (WMI) and Aggregate Weighted Mean Index (AWMI) methods to calculate scores for each variable. Based on the research results, among the five variables measured, institutional policy has the highest number, which means that in terms of policy, Semarang City has both written and unwritten rules related to handling climate change disasters. Meanwhile, the lowest value is natural, where natural factors can only reduce the risk but not completely overcome it. To achieve climate and disaster resilience, it is vital to ensure the inclusion of disaster risk and climate risk assessment into planning and management, revise existing development policies to include DRR measures, continue to monitor and assess development in high-risk areas, and ultimately ensure successful collaboration of the various stakeholders involved.

Keyword: *Climate Disaster, Ressilience, Semarang.*

Knowledge exchange in disaster risk management: A comparative study between Indonesia and USA

Ham Charles Mekardi, Rustian, Ruswandi Dody, Kheriawan, Setiadewi Ayu, Pakpahan Johan Fredi, Poerwanto Anggita Wulandari, Wijayanti Dian Nur, Susilastuti, Samudra Ditto Rizki, Duncan Andrew John Henry, Suharto Nanang Emanuel, Subagio Dian Cahayani, Yamashita Eric, Kim Karl

The 2004 Indian Ocean Tsunami affected Indonesia with massive devastation and suffering. It ignited the largest international humanitarian response and recovery in history. Academicians, responders, civil servants, teachers, and all professions were awakened to the urgency of disaster risk reduction, mitigation, preparedness, and readiness. Indonesia then instituted disaster management law, established national, provincial, and local disaster management organizations, and started developing a disaster management workforce. The United States of America (USA) supported Indonesia's 2004 tsunami response and recovery and continues to assist in capabilities enhancement. Knowledge exchange through training, education, policy improvement, system development, and organizational management contributes to the whole society's capacity. Collaborations between governments, private sectors, civil societies, nongovernmental organizations, and regular citizens generate improved outcomes. Recent US-Indonesia comparative study missions offer lessons and recommendations for urban planning and green infrastructure, nature-based solutions, and readiness progression. Comparative lessons gained include the incident management assistance team, supplemental response team, community emergency response team, regional office, biochemical hazard training, national interagency fire management, hazard and social vulnerability risk mapping, incident workforce academy, climate-induced hazards (hydro-meteorological), climate change adaptation, and pandemic readiness. New knowledge enrichment brings excitement and expectations, requiring competent human resource, financial, and policy investments. Capacity building must increase equity and resilience planning for vulnerable communities across the islands as Indonesia increases its regional disaster response contribution. Generated recommendations are prioritized for short, medium, and long terms transformation. Indonesia and USA continue to collaborate in nurturing sustainability and resilience despite complex challenges in disaster risk management.

Keywords: Disaster Management, Capacity Building, Knowledge Exchange, Human Resource Development, Training

A Review on Disaster Resilience Research from the Perspective of Governance: A Bibliometric Analysis

Liky Yuliandro Ledoh, Djoko Santoso Abi Suroso, Saut Aritua Hasiholan Sagala and Suhirman

The incidence of natural disasters and climate change has increased in its uncertainty and complexity. In dealing with them, the concept of disaster resilience is needed to be part of current and future governance. In this paper, we searched the Scopus database for data on disaster resilience from a governance perspective between 1996 to 2023 and conducted bibliometric analyses using the Bibliometrix R software package. The results show that: (1) From 1996 to 2023, the number of research papers on disaster resilience governance totaled 1,941, with a trend of progressive annual increase in publications over the last decade. The top three journals in terms of publications are the International Journal of Disaster Risk Reduction, Sustainability, and Natural Hazards. (2) There are 5,636 researchers from 82 countries or regions contributing to the field, with the top three authors being Wamsler C, Pelling M, Shaw R, but most authors (87.5%) have published only one paper. In addition, developed countries have strong research strengths in this area. (3) The study also identified several additional trending keywords, including "tourism," "equity," and "climate adaptation. These keywords indicate that issues related to disaster management, transformation and resilience are being addressed. Disaster governance with a focus on resilient cities and disaster transformation, as well as the convergence of climate change and disaster risk reduction, are the current research directions in disaster resilience governance.

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Paralel Session 3

13.30 – 15.15

Track 6: Disaster Governance And Diplomacy

Room 7: Dynamic Earth Lab, 1st Floor TDMRC | Group 6B

Risk Modeling for Food Kit Distribution During Malaysia's Monsoon Floods Using System Dynamics Approach

Prima Denny Sentia, Syaimak Abdul Shukor, and Amelia Natasya Abdul Wahab

The annual monsoon floods in Malaysia have a high risk of hampering the distribution of food kits for victims and impacting their basic needs. In order to minimize the risk of delays in distribution, this research proposes a system dynamics approach to build a risk model for food kit distribution delays during monsoon floods. The system dynamics approachbegins with buildinga causal loop diagram (CLD) and becomes the basis for designing a stock and flow diagram (SFD). The risk model will focus on distributing food kits through collaboration between disaster management authorities in Malaysia, namely the National Disaster Management Agency (NADMA), the Federal Agricultural MarketingAuthority (FAMA), and the Malaysia Civil Defense Department (APM) at the state and districtlevels. The risk model is then simulated to display the system behavior representing the actual state of food kit distribution in Malaysia.Further, this risk model isexpected to help authorities develop effective mitigationstrategies to improve Malaysia'sfood kit distribution flow.

A Framework for Humanitarian Logistics Support in Disaster Relief

Haliza Mohd Zahari, Ruzaidin Zain, Arifiin Ismail, Noor Azmi Mohd Zainol, Safar Yaacob, Nik Ismail Rashed Che Ali

The challenge in managing logistics needs in disaster relief response is seen to be getting moreacute now, especially when more actors from agencies are involved. Although there aremany policies, guidelines and procedures that govern logistics management techniques, it is found that the implementation differs depending on the assigned agency, work culture and understanding of a direction. To unite one agency is very difficult again when aiming for thecoordination of management of logistics needs. This research is motivated by the lesson learnt from logistics operation in the 2004 Aceh Tsunami. Therefore, this study presents a novel framework designed to enhance the efficiency and effectiveness ofhumanitarian logistics support in disaster relief operations. Recognizing the complexities inherent in disaster response, the proposed framework encompasses strategic planning, coordination mechanisms, and execution strategies. The Delphi technique, a consensus-building method, is employed to integrate the insights of expert stakeholders in the development ofthis comprehensive framework. This technique is used through a multi-round, iterative process involving a carefully selected panel of experts in humanitarian logistics.In the first round, experts are interviewed with encompassing key elements of the proposed framework. Responses are anonymized, aggregated, and fed back to participants in subsequent rounds which were done through Focus Group Discussions, allowing for reassessment and refinement ofopinions. This iterative process continues until a high level of consensus is reached among the expert panel. Then this input was used to develop the framework's core components including the strategic planning phase, addressingrisk assessment, stakeholder engagement, and resource identification. The coordination phase emphasizes the establishment of Humanitarian LogisticsStandard Operating Procedures and Policies to facilitate effective collaboration between and within logistics agencies. In the execution of logistics operations, strategic asset deployment, well-managed warehousing, seamless data sharing between responding agencies, and clear, timely communication are critical. This framework has the potential to enhance humanitarian logistics in disaster relief effectiveness including improved response times, resource optimization, and stakeholder satisfaction

Keywords: *Disaster Relief Response, Humanitarian Logistics Support, Delphi Technique, Focus Group Discussion*

The Mapping of Flood-Prone Areas in Meureubo Sub-District Using Geographic Information Systems (GIS)

Meylis Safriani, Cut Suciatina Silvia, Inseun Yuri Salena, Muhammad Arrie Rafshanjani Amin, Basir Dodi Hardiansyah

Flooding in Meureubo Sub-District, particularly near riverbanks, is caused by river overflow during the rainy season, inundating residential areas. This study aims to identify the distribution, extent, and mapping of flood-prone areas in Meureubo. It is a quantitative descriptive study that analyzes and maps flood vulnerability levels, determining flood hazard zones. The parameters used include slope maps, soil type, rainfall data, land use, and river density. The methodology involves scoring, weighting, and overlaying using ArcGIS 10.3. The study reveals that the total area of Meureubo Sub-District is 123.64 km^2, with three flood vulnerability classifications: highly vulnerable, moderately vulnerable, and not vulnerable. The "not vulnerable" category is the most dominant, covering 66.29 km^2 (53.58%) in villages such as Bukit Jaya, Balee, Peunaga Cut Ujong, and others. The "moderately vulnerable" areas span 47.20 km^2 (38.25%), located in villages like Gunong Kleng, Paya Peunaga, Peunaga Pasi, and Ujong Tanjung. The "highly vulnerable" areas cover 10.13 km^2 (8.17%), including Pasi Mesjid, Pasi Pinang, Mesjid Tuha, Pasi Aceh Tunong, and Meureubo village.

Keyword: *Flooding, mapping, Meureubo Sub-District*

Humanitarian Logistics Management Framework for Earthquake Disaster Mitigation Strategy

Arismawan, Michael Short, M.K.S. Al-Mhdawi, Prima Denny Sentia and Cut Maya Aprita Sari

Earthquakes are a serious threat to communities worldwide, causing severe damage and disrupting vital resources. This researchaims to developa humanitarian logistics management framework specifically designed to reduce the impact of earthquakes on communities.This framework will be constructed through secondary data analysis, using existing research and best practices in disaster management and humanitarian logistics. This approach allows for the creation of a comprehensive framework based on existing knowledge withoutthe need for primary data collection. The proposed framework will encompass key aspects of disaster preparedness, emergency response, and recovery, all focused on optimizing logistics operations. It will address criticalareas such as pre-disasterstockpiling, transportation and distribution networks, information management, and stakeholder coordination. By using secondary data analysis, the framework can be developed efficiently while ensuringit is grounded in evidence-based practices. This researchhas the potential to significantly enhance the efficiency and effectiveness of humanitarianaid delivery following earthquakes, leading to quicker and more robust recoveryfor affected communities.

Disaster Educational Programs for Children with Special Needs: An Interdisciplinary Study of a Special Support School in Banda Aceh in Indonesia

Sébastien Penmellen Boret, Hyejeong Park, Alfi Rahman, Muzayin Nazaruddin, Yulia Direzkia, Pradytia Putri Pertiwi

This study examines the development of inclusive disaster education in the schools in Banda Aceh twenty years after the 2004 Indian Ocean tsunami. 'Leave No One Behind' is one of the principles of the United National Sustainable Development Group (UNSDG), encouraging states to develop more inclusive and accessible societies. Extended to the domain of disaster risk reduction, this philosophy opens the door to a long-awaited call for more inclusive disaster preparedness among vulnerable groups, especially people with disabilities. Indonesia is a nation that embraces inclusiveness with campaigns promoting more access to education for vulnerable groups. Ministry of Education, Culture, Research and Technology (MoERCT) is currently experimenting with the development of 'inclusive schools' where children with physical/cognitive disabilities can sit in regular classes alongside their 'regular' peers. In a country at high risk of disasters, such programs also demand the initiation of inclusive school-based disaster preparedness. This research proposes to fill the gap by developing disaster classes, materials and tools adapted to children with physical and cognitive disabilities. Its interdisciplinary team comprises social scientists, clinical psychologists, psychological therapists, NGOs, and scholars of disasters. Our leading partner is a Special Support School providing for children with all kinds of disability, where we developed disaster classes and materials to foster an understanding of disaster risk awareness. Leaving no one behind, this case study allows us to consider all children with various abilities and needs. This study concludes with remarks on the possibility of applying their materials and findings in inclusive school settings and, more broadly, across society.

SPECIAL SESSION

20TH ACEH TSUNAMI Commemoration 26 Dec 2004 - 26 Dec 2024 | WCU World Class University

AIWEST - DR 2024

16th Aceh International Workshop and Expo on Sustainable Tsunami Disaster Recovery

in Conjunction

PIT IABI 8th

Ikatan Ahli Kebencanaan Indonesia

"BRIDGING HISTORY AND HORIZONS TOWARDS SUSTAINABLE RESILIENCE, ADAPTIVE, AND INCLUSIVE WORLD: COMMEMORATING 20 YEARS OF THE 2004 ACEH TSUNAMI"

Thinking with tsunamis and the impossibilities of governing the earth

This Special Session reflects on ongoing and unanswered questions about the role of the social sciences in the past 20 years:
What can we learn from local people about the entanglement of human lives with more-than-human forces, including tsunami waves? How can they help us – as academics – come to terms with the limits or impossibilities of overcoming the hazards of a volatile earth?

This is an interactive session where scientists: social, natural, and in-between disciplinarity, are expected to take the time to listen to and learn from experiences that are at once exceptional and ordinary. The session offers a space for reflections from different angles by diverse participants, for conversations and engagements that might help us to think out of the 'boxes' of disciplines, North-South divides, science vs laypeople, and other forms of asymmetries of knowledge and power. This session will conclude with an art showcase.

JOIN IN PERSON!
SPECIAL SESSION, 9 NOVEMBER 2024
09.00 - 13.00 WIB
HYOGO BUILDING ROOM B (MIK), TDMRC
UNIVERSITAS SYIAHKUALA, BANDA ACEH

OR VIA ZOOM
MEETING ID: 620 8332 8076
PASSCODE: 684680

CONTACT PERSON:
Muhammad Arifin, S.Kom M.si - TDMRC UNSYIAH
Whatsapp: +62 852-2842-7297

Dr. Weniza
Tsunami modeler,
National Tsunami Warning System
BMKG

Dr. Rina Suryani Oktari
DRR Expert, TDMRC
Universitas Syiahkuala

Dr. Herry Yogaswara
Anthropologist,
Head of Research Organization
for Archeology, Language and Literature BRIN

Moderator:
Irina Rafliana (Ph.D Cand)
Sociologist,
IDOS, Universität Bonn & BRIN

Rahmadiyah Tria Gayathri
Artist
2018 Palu tsunami survivor
Forum Sudut Pandang,
Palu, Central Sulawesi

Muhammad Ulpa
Tsunami 2004 survivor
Pulo Breuh (Rice Island)
Nanggroe Aceh Darussalam

Reflective Keynote:
Prof. Nigel Clark
Lancaster University
United Kingdom

USK Universitas Syiah Kuala | TDMRC Tsunami and Disaster Mitigation Research Center | The University of Sydney | IRIDeS International Research Institute of Disaster Science | UPNM | Universitas Gadjah Mada

Sudut Pandang | UNI Bonn | BRIN | unesco | BMKG | Institut Teknologi Bandung | IABI | IDOS | Lancaster University

SPECIAL SESSION

Workshop "Ingatan Tsunami: Setelah 20 Tahun"

Hadiri workshop ini, disediakan konsumsi dan uang transpor dalam kota. Terbatas hanya untuk 25 orang.

Syarat peserta: penyintas tsunami

Sabtu, 9 November 2024, 13.00 – 15.00 WIB
Minggu, 10 November 2024, 08.00 – 12.00 WIB

*Lokasi: Banda Aceh (lokasi workshop akan diberitahukan lebih lanjut kepada peserta terpilih)

Tahun 2024 ini genap 20 tahun Tsunami 2004 yang meluluhlantakkan Banda Aceh dan beberapa kawasan sekitarnya. Masyarakat Aceh, selepas tsunami, menghadapi dinamika untuk mengingat sekaligus melupakan tsunami. Di satu sisi, ingatan akan tsunami perlu terus dirawat untuk mengenang mereka yang meninggal, sekaligus untuk mitigasi bencana serupa di masa depan. Di sisi lain, penyintas juga harus bisa 'melupakan' tsunami agar bisa kembali ke kehidupan keseharian yang normal.

Workhop ini akan menjadi forum bagi para penyintas untuk mengungkapkan ingatan dan narasi mereka tentang Tsunami 2004: tempat-tempat mana saja yang mengingatkan tsunami, benda-benda atau arsip-arsip apa saja yang masih tersimpan, aktivitas apa saja yang dapat mengingatkan pada tsunami, dan hal-hal terkait lainnya.

Tertarik untuk ikut menceritakan kisah dan memorimu? Silahkan isi form di tautan atau scan berikut:

bit.ly/WorkshopIngatanTsunami

USK · TDMRC · The University of Sydney · IRIDeS · UPNM · Universitas Gadjah Mada · Department of Communications
ITB · UNI BONN · BRIN · unesco · BMKG · Institut Teknologi Bandung · IABI · IDOS · Lancaster University

SPECIAL SESSION 1
THE INSIGHT OF RECENT SEISMICITY IN SUMATERA AFTER 20 YEARS OF ACEH TSUNAMI 2004

Event title/theme	The Insight of Recent Seismicity in Sumatera after 20 Years of Aceh Tsunami 2004.
Name of Organization/ Institution and point of contact	Division of Geohazards, Tsunami and Disaster Mitigation Research Center (TDMRC), Universitas Syiah Kuala.
Other supporting institutions	1. Earth Observatory of Singapore (EOS), 2. Institut Teknologi Banding (ITB) 3. Badan Meteorologi, Klimatologi dan Geofisika (BMKG) / STMKG 4. Badan Riset dan Inovasi Nasional (BRIN, Indonesia) 5. Gempa GmbH
Background	The tremendous earthquake followed by a tsunami struck Aceh and the surrounding area in 2004. It took more than 200.000 lives and high economic loss. After this big earthquake and tsunami, there were some destructive earthquakes occurred in Sumatera, such as Nias's earthquake on March 28, 2005, Padang's earthquake on September 30, 2009, Pidie Jaya's earthquake on December 7, 2016, and Pasaman's earthquake on February 25, 2022. Based on these earthquake histories, many researchers have studied related to the seismicity in Sumatera region. To get more insightful knowledge related to recent seismicity activity and geological research in Sumatera that involves multi-geological methods, a special session of geohazards is held. We gather a number of researchers and experts into this special session to give a new insight from their research.

Aims/ objectives	To get a new insight into recent seismology, earthquake, geophysics, or geoscience research for the past 20 years after Aceh's Tsunami in 2004.
Expected output	A number of papers
Target audience (number and from which organization)	20-50 audiences.
Mechanism and Program Design (Session chair/ moderator, Resource persons/ speakers, Presentation Title, Points of Discussion, etc.)	The mechanism of the program is designed in the Presentation Title and Point of Discussion.
Tentative rundown	Attached below.

TENTATIVE RUNDOWN

No	Time	Duration (Minutes)	Agenda	PIC
1	08:25-08:30	5	Opening	Moderator
	08:30-08:45	15	Presentation	EOS, Singapore
	08:45-09:00	15	Presentation	USK, Indonesia
	09:00-09:15	15	Presentation	ITB, Indonesia
	09:15-09:30	15	Presentation	STMKG/BMKG, Indonesia
	09:30-09:40	10	Coffee Break	
	09:40-09:55	15	Presentation	BRIN
	09:55-10:10	15	Presentation	Vacant
	10:10-10:25	15	Presentation	Vacant
	10:25-10:40	15	Presentation	Vacant
	10:40-10:55	15	Presentation	Vacant
	10:55-11:10	15	Presentation	Vacant

SPECIAL SESSION 2
THINKING WITH TSUNAMIS AND THE IMPOSSIBILITIES OF GOVERNING THE EARTH

Event title/theme	Thinking With Tsunamis and the Impossibilities of Governing the Earth
Name of Organization/ Institution and point of contact	Badan Riset dan Inovasi Nasional Indonesia – BRIN (Irina Rafliana, Ph.D Cand.), Graduate Program in Disaster Science, Universitas Syiah Kuala (Dr. Rina Suryani Oktari), Lancaster University (Prof. Nigel Clark)
Other supporting institutions	Tbd Tbd
Background	In the wake of the great Indian Ocean tsunami, science has progressed – at various speeds – towards understanding the relations of human and the earth. But people are also continuously struggling to adjust to active geologies, and enormous loss of lives remains a risk. All the while, developments in warning system technologies and disaster risk and mitigation strategies place almost impossible responsibilities on those who are tasked with managing the hazards of active geology. Rather than presenting the many achievements in earth science and in policies and practices of tsunami risk reduction in the past 20 years, this session reflects on ongoing and unanswered questions about the role of the social sciences. How have the social sciences engaged with earthquakes and tsunamis over these years? What lessons have been learned and unlearned, and what has social science missed or failed to address? What challenges still lie ahead as human life confronts the complexities of living on a volatile earth? What can social scientists learn from those who have lived through and continue to live with the danger of geological upheaval?

Background	Unlike conventional academic workshops and seminars, this session attempts to put local communities and collectives center stage. What can we learn from local people about the entanglement of human lives with more-than-human forces, including tsunami waves? How can they help us – as academics – come to terms with the limits or impossibilities of overcoming the hazards of a volatile earth. This is a session where scientists, social, natural and the in-between disciplinarity, are expected to take the time to listen to and learn from experiences that are at once exceptional and ordinary. The session offers a space for reflections from different angles by diverse participants, for conversations and engagements that might help us to think out of the 'boxes' of disciplines, North-South divides, science vs laypeople, and other forms of asymmetries of knowledge and power. Method: Hybrid Workshop Syiahkuala University And via Zoom (link to be provided) Meeting ID: xxxx Passcode: xxxx Code of Conduct: Language of session: English with translations as needed. Caring and careful atmosphere for participants and panelists. Photos taken and session recording upon consent.
Aims/ objectives	The session starts with stories and witnesses from different communities: survivors of the 2004 tsunami from Pulau Breuh (Rice Island) and Simeulue Aceh, survivors of the Palu 2018 tsunami, including artists who have reflected on their experiences. We move on to look at the future of living with and narrating tsunami risks, in particular those associated with the 'Mentawai Megathrust' or 'Sunda Megathrust'. Along the way, we note that many local people will have experienced what writer Susan Lee Sontag (1966) refers to as 'fictional rehearsals' in facing future disasters (tsunami drills, evacuation maps, disaster management planning), in many cases where tsunami could hit the coasts even less that 5 minutes.

Aims/ objectives	A cry from local dwellers in Palu is still vivid on how the real tsunami experienced were much like a hoax, and derailed reality too far from what was taught and drilled (UNISDR/UNESCO 2019). Such rehearsals have become even more entrenched in the social science of disaster management in the Indian Ocean region after the 2004 tsunami, but they still seem to struggle to address local contexts and experience, especially around living with fear and anxiety about calamities. And further, to offer governing risks where it seems to be close to impossible. Reflective keynote is presented after the panel session, to resonate with the motivation of the session: the science of listening to others. 1. To inspire engagements and dialogues from stories and memories, art works and witnesses 2. To exercise inter/transdisciplinary thinking: thinking with tsunamis 3. To encourage critical dialogues in DRRM-related practices throughout Indonesia/the Indian Ocean region
Expected output	1. Collections of stories and witnesses documented in forms that are publicly accessible 2. Reflections on the roles social sciences play in the tsunami realms in the past 20 years, on what it means to live with hazards that can be reduced but can never be fully overcome. 3. Recommendation on how to engage diverse collectives in critical reflections and transdisciplinarity, and rethink about risk governance. Formats of the outputs will be discussed (specialized website, special issue publication art showcase, etc).
Target audience (number and from which organization)	1. 2. This session welcomes a diverse range of 3. participants, with unique emphasis and special invitation on social 4. scientists particularly from the Indian Ocean region. Assumed number of 5. participants: 20-25 persons. 6.

Mechanism and Program Design (Session chair/moderator, Resource persons/ speakers, Presentation Title, Points of Discussion, etc.)	Setting the stage: Irina Rafliana Panelists: 1. Survivor of 2004 tsunami from Pulau Breuh Aceh 2. Survivor of 2004 tsunami from Simeulue Aceh 3. Artists and survivor of 2018 cascading disasters: Rahmadiyah Tria Gayatri (Ama) – Forum Sudut Pandang, Palu Indonesian 4. Tsunami Warning Center Operator 5. Tsunami mathematics modeler – TBD 6. Rina Suryani Oktari – Syiahkuala University Reflective Keynote: Prof. Dr. Nigel Clark – Lancaster University
Tentative rundown	09.00 – 09.15 Introduction and setting the stage: Irina Rafliana 09.15 – 10.45 Panel dialogue: stories and experiences 10.45 – 11.00 Coffee Break 11.00 – 12.30 Reflective Keynote: Prof. Nigel Clark – Lancaster University Open Discussions 12.30 – 13.00 Closing and Art Showcase

SPECIAL SESSION 3
COMMUNICATING RISK AND DISASTER

Event title/theme	Communicating Risk and Disaster
Name of Organization/ Institution and point of contact	Department of Communication, Universitas Islam Indonesia & Department of Communication, Universitas Syiah Kuala Contact person: Muzayin Nazaruddin muzayin.nazaruddin@uii.ac.id
Other supporting institutions	Pusat Riset Ilmu Sosial Budaya (PRISB), Universitas Syiah Kuala
Background	The media's representation of disasters plays a crucial role in shaping public perception and understanding of disaster events. More fundamentally, communication at various levels —whether within groups, between groups, or through technologically mediated channels—significantly influences how risks and disasters are comprehended. The understandings that emerge from these communication practices subsequently informs individual and collective responses to disaster risks and actual disaster events. Therefore, it is imperative that the communication aspects are is taken seriously and systematically integrated into disaster risk reduction programs. This special session seeks to make a significant contribution to both communication and disaster studies. In the context of communication studies, particularly within Indonesia, disaster communication remains largely technocratic. Communication experts often function merely as 'consultants' within the government's overarching disaster management strategies, which tend to be 'top-down' and frequently overlook the perspectives of survivors. From the perspective of disaster studies, this session aims to advance the field of 'critical disaster studies,' offering a critique of the dominant hazard paradigm that pervades much of the current discourse.

Aims/ objectives	This special session aims to present and discuss the current studies on risk and disaster communication conducted by scholars from Universitas Islam Indonesia and Universitas Syiah Kuala, and other universities as well. In addition to showcasing these research outcomes, the session will also engage in mapping and analyzing current trends in risk and disaster communication studies within Indonesia, particularly those spearheaded by Indonesian researchers. This mapping of the literature is expected to provide a valuable foundation for developing a comprehensive research roadmap for the field of risk and disaster communication in Indonesia.
Expected output	A special issue at a journal or an edited volume
Target audience (number and from\which organization)	The participants of AIWEST, the students and lecturers of Department of Communication, Universitas Syiah Kuala.
Mechanism and Program Design (Session chair/moderator,Resource persons/ speakers,Presentat on Title, Points of Discussion, etc.)	This special session will take place in two sessions, with the following plan: **Session 1** Chair: Muzayin Nazaruddin Presenters: 1. Alfi Rahman (PRISB Universitas Syiah Kuala) Title: Disaster communication in cross generational Smong narratives among the Simeuluean people 2. Wiryono Raharjo – Department of Architecture Universitas Islam Indonesia, SPMKB UII Title: Developing disaster resilient university: lessons from Erasmus+ BUiLD ProjecRizanna 3. Rosemary (Department of Communication Science, Universitas Syiah Kuala) 4. Muzayin Nazaruddin (Department of Communication, Universitas Islam Indonesia) Title: Disaster journalism in Indonesia: reflexive notes after 20 years

Mechanism and Program Design (Session chair/moderator,Resource persons/ speakers,Presentat on Title, Points of Discussion, etc.)	**Session 2** Chair: Rizanna Rosemary 1. Mario Antonius Birowo (Department of Communication Science, Universitas Atma Jaya Yogyakarta) 2. Anang Hermawan (Department of Communication, Universitas Islam Indonesia) Title: Social capital for disaster preparedness: lessons form local communities on Mt. Merapi 3. Sidhi Bayu Turker (Dhyana Pura University) Title: The role of volunteer tourist in supporting sustainable tourism development 4. Ida Nuraini Dewi Kodrat Ningsih (Department of Communication, Universitas Islam Indonesia) Title: Community-based media activisms and risk communication on the slopes of Mt. Merapi
Tentative rundown	Session 1: 9 November 2024, 10.00 – 12.00 Session 2: 9 November 2024, 14.00 – 16.00

SPECIAL SESSION 4
A NEW ERA OF COASTAL DISASTER PREVENTION AND MITIGATION INTEGRATING NATURE AND TECHNOLOGY
(Proposed Day 2, Saturday 9 November 2024, 13:00-16:00)

Event title/theme	A New Era of Coastal Disaster Prevention and Mitigation Integrating Nature and Technology (Proposed Day 2, Saturday 9 November 2024, 13:00-16:00)
Name of Organization/ Institution and point of contact	International Research Institute of Disaster Science, Tohoku University (Dr. Anawat Suppasri)
Other supporting institutions	1. Bandung Institute of Technology (ITB), Indonesia 2. Universitas Syiah Kuala (USK), Indonesia 3. Gadjah Mada University (UGM), Indonesia 4. National Agency for Disaster Management (BNPB), Indonesia 5. National Research and Innovation Agency (BRIN), Indonesia 6. Chuo University, Japan 7. Kyoto University, Japan 8. Port and Airport Research Institute (PARI), Japan
Background	In modern society, coastal areas are increasingly vulnerable to natural disasters. This session proposes a sustainable and practical approach to coastal disaster prevention and mitigation by integrating the power of nature and the latest technologies. Specifically, it details using natural barriers such as mangroves and salt marshes, numerical simulation models for tsunami scenarios, and the implementation of VR-based evacuation drills. Additionally, the importance of community participation and cooperation is discussed from a social science perspective.

Background	The session emphasizes the role of local knowledge and experience and highlights the significance of residents' proactive involvement in disaster preparedness. Furthermore, it addresses the importance of education and awareness activities, presenting concrete methods to enhance disaster awareness among future generations.
Aims/ objectives	This session aims to provide a guideline for opening a new era in disaster prevention and mitigation, where nature and technology harmoniously coexist, ultimately contributing to the resilience of local communities.
Expected output	Showcasing specific examples that connect the coastal monitoring and hazard assessment related studies with nature-based disaster mitigation and human and social science products.
Target audience (number and from which organization)	This session will invite those who are interested in collaboration between natural and social science to enhance costal resilience, with total targeted 50 participants.
Mechanism and Program Design (Session chair/ moderator, Resource persons/ speakers, Presentation Title, Points of Discussion, etc.)	**Session** Chair: Dr. Anawat Suppasri and Dr. Rina Suryani Oktari Tentative Speakers: 1. Prof. Nobuhito Mori (Kyoto University) and Dr. Mohammad Farid (ITB) "Realtime and long-term coastal hydrodynamics and morphology monitoring" 2. Dr. Anawat Suppasri (Tohoku University) and Dr. Abdul Muhari (BNPB) "Integrated hazards and risk assessment of compound disaster" 3. Dr. Constance (Tohoku University) "Developing topobathymetry data for tsunami prone areas in Indonesia" 4. Prof. Syamsidik (USK) "Estimating Impacts of Tsunami on Buildings around Ambon Bay of Indonesia" 5. Dr. Kojiro Suzuki (PARI) and Dr. Djati Mardiatno (UGM) "Eco-DRR/Nature-based solution"

Mechanism and Program Design (Session chair/ moderator, Resource persons/ speakers, Presentation Title, Points of Discussion, etc.)	1. Dr. Kojiro Suzuki (PARI) and Dr. Djati Mardiatno (UGM) "Eco-DRR/Nature-based solution" 2. Prof. Taro Arikawa (Chuo University) "Development of Inclusive and evidence-based decision support platform for resilient coastal society" 3. Dr. Yasuhito Jibiki (Chuo University) "Revisiting the concept of social vulnerability from the view point from evacuation behavior: Case study of Bali in Indonesia" 4. Dr. Rina Suryani Oktari (USK) and Prof Hizir Sofyan (USK) "To be updated (Social perspective)" 5. Ms. Gusti Ayu Ketut Surtiari (BRIN) "Making Virtual Reality (VR)/Augmented Reality (AR)
Tentative rundown	13:00 – 13:10 Introduction of this special session by Session Chair Opening remarks by: • Prof Syamsidk (Universitas Syiah Kuala) • Prof Nobuhito Mori (Kyoto University) **Presentations on coastal monitoring and hazard assessment** 13:10 – 13.20 Presentation 1 (Online) 13:20 – 13:30 Presentation 2 (On-site) 13:30 – 13:40 Presentation 3 (Online) 13:40 – 13:50 Presentation 4 (On-site) 13:50 – 14:00 Q & A 14:00 – 14:10 Break **Presentations on nature-based solution human and social science** 14:10 – 14:20 Presentation 5 (Online) 14:20 – 14:30 Presentation 6 (On-site) 14:30 – 14:40 Presentation 7 (Online) 14:40 – 14:50 Presentation 8 (On-site) 14:50 – 15:00 Presentation 9 (On-site?) 15:00 – 15:10 Q & A 15:10 – 15:20 Closing remarks of this special session by Dr. Mohammad Farid (ITB, in confirmation)

SPECIAL SESSION 5
BUILDING MENTAL HEALTH RESILIENCE AFTER TSUNAMI: 20 YEARS ON

Event title/theme	The Insight of Recent Seismicity in Sumatera after 20 Years of Aceh Tsunami 2004.
Name of Organization/Institution and point of contact	Fakultas Psikologi Universitas Gadjah Mada Contact person: Diana Setiyawati, S.Psi., M.HSc., PhD., Psikolog
Other supporting institutions	Fakultas Kedokteran, Kesehatan Masyarakat dan Ilmu Keperawatan, Universitas Gadjah Mada
Background	The loss of lives during the 2004 Tsunami in Aceh not only caused immediate grief and trauma for survivors but also contributed to both immediate and long-term mental health and psychosocial problems. In response, the Faculty of Psychology and the Faculty of Medicine of Universitas Gadjah Mada contributed to mental health support and helped establish systems to foster resilience in the affected communities. This session will reflect on the development of the mental health system in Aceh, review the outcomes of past interventions, and discuss potential recommendations for future policies and practices.
Aims/objectives	1. Reflect on the Current State of the Mental Health System in Aceh: • Assess the progress made in mental health services since the tsunami. • Identify current challenges and gaps in the system. 2. Evaluate Past Interventions: • Discuss what aspects of the mental health response were successful. • Analyze areas needing improvement based on historical and current perspectives.

Aims/objectives	3. Generate Policy and Practice Recommendations: • Formulate actionable recommendations to strengthen mental health resilience in Aceh. • Propose strategies for enhancing collaboration among stakeholders, including government agencies, NGOs, and local communities.
Expected output	• A comprehensive understanding of the evolution of mental health services in Aceh post-tsunami. • Identification of best practices and lessons learned that can inform future disaster mental health responses. • A set of policy and practice recommendations aimed at enhancing mental health resilience in the region.
Target audience (number and from which organization)	100 people (online and onsite) • Mental health professionals • Policymakers • Academics and researchers in psychology and public health • Community leaders and NGOs involved in disaster response and recovery • Students and faculty from relevant academic disciplines
Mechanism and Program Design (Session chair/moderator, Resource persons/speakers, Presentation Title, Points of Discussion, etc.)	Hybrid workshop: **UGM (online)** 1. Prof. Sofia Retnowati, MS. 2. Rahmat Hidayat, S.Psi., M.Sc., PhD 3. Prof. Subandi, MA., PhD 4. Diana Setiyawati, S.Psi., M.HSc., PhD., Psikolog **USK (offline)** 1. Dr. Marty Mawarpury 2. Government of Aceh **Hybrid (online)** 1. Ruth Wraith, OAM (Royal Children Hospital) 2. Garry Warne, AM (Royal Children Hospital) 3. Mia Urbano (Nossal Institute of Global Health) Facilitator: Pradytia Putri Pertiwi, S.Psi., PhD

Tentative rundown	**1. Opening Remarks (10 minutes)** • Welcome participants and introduce the purpose of the session. • Brief overview of the significance of mental health resilience in disaster response. **2. Presentation Segment (40 minutes)** **Presentation 1: Current State of Mental Health Services in Aceh (20 minutes)** • Overview of the evolution of mental health services post-tsunami. • Key achievements and existing challenges. **Presentation 2: Evaluating Past Interventions (20 minutes)** Analysis of successful strategies used in the response. Areas needing improvement and lessons learned. **Presentation 3: The future of Mental Health Services in Aceh (20 minutes)** **4. Panel Discussion (30 minutes)** • Panelists: Mental health practitioners, policymakers, and representatives from local NGOs. • Discussion on key insights from the presentations and video, addressing questions such as: What practices have been most effective? How can we improve the current mental health system? • Open the floor for questions from the audience. **5. Wrap-Up and Next Steps (10 minutes)** • Summarize key points discussed during the session. • Outline potential policy and practice recommendations generated from the discussions. • Encourage ongoing collaboration among stakeholders to strengthen mental health resilience in Aceh. • Provide information on follow-up actions, including a summary report of the session.

SPECIAL SESSION 6
REMEMBERING THE TSUNAMI: AFTER 20 YEARS

Event title/theme	Remembering the Tsunami: After 20 Years
Name of Organization/Instiution and point of contact	• Department of Communication Universitas Islam Indonesia, • Department of Communication Universitas Syiah Kuala • Muzayin Nazaruddin (Komunikasi UII) • muzayin.nazaruddin@uii.ac.id • Rizanna Rosemary (Komunikasi USK) • Yarmen Dinamika (Serambi Indonesia)
Other supporting institutions	Serambi Indonesia
Background	Following any disasters, the affected societies will inevitably deal with dynamic tensions between remembering and forgetting the past experiences of the calamity. On the oneside, people who have experienced a disaster should try to forget the disaster in order to return to normal daily lives. On the other side, they need to remember the disaster for various reasons, such as to honor or remember the family who died, or to increase preparedness for the threat of similar disasters in the future. The necessity of remembering the disaster often leads to the canonization programs of the cultural memory of the disaster, which are evident in post-disaster monuments and commemorative events. However, the survivors may have their own personal ways to remember the event, such as keeping the photographs, artifacts, or ruins as memorials. Such memorials may further reveal forgotten memories or narratives of the 2004 tsunami which exist at the individual or small group levels.
Aims/ objectives	This special session aims to explore the diverse personal and small-group memories and narratives of the tsunami, shedding light on how disaster memories evolve over time. A deeper understanding of these memories can significantly contribute to efforts in disaster risk reduction.

Expected output	A number of papers
Target audience (number and from which organization)	The special session will take the form of a workshop, where 20 to 30 tsunami survivors will participate in various activities designed to explore their memories of the event. Participation will be open through a public invitation, and those interested will need to complete a Google form. From the submitted forms, we will select participants based on their suitability for the workshop's objectives.
Mechanism and Program Design (Session chair/moderator, Resource persons/ speakers, Presentation Title, Points of Discussion, etc.)	Some activities will be taken during the workshops are (tentatively): • Participatory tsunami memories map. • Photo elicitation and/or photo-voice.
Tentative rundown	The workshop will be divided into two 90-minute sessions (2 sessions x 90 minutes). Please kindly arrange the schedule of this workshop on the second day of the AIWEST, and not overlap with the other two special sessions: "Communicating Risk and Disaster" and "Disabilities, Inclusion, and Disaster Education in Banda Aceh"

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