

Is Japan's Tsunami *Tendenko* Applicable in Other Countries?

1. Overview

Unlike Japan, tsunami-prone archipelagic developing countries, like the Philippines and Indonesia, don't have coastal protection infrastructure such as concrete seawalls. Natural barriers like mangrove forests and coral reefs are also diminishing in these countries. For local tsunamis, experts warn that it will only take around two minutes after a strong earthquake for the first big waves to reach the shore. Quick evacuation to higher ground seems to be the only option for survival against tsunamis in areas lacking physical protective barriers.

Japan's tsunami *tendenko*, as successfully demonstrated in the "miracle of Kamaishi," can be adapted in other countries to save lives. *Tendenko* is an indigenous emergency evacuation practice in the Sanriku region. In essence, *tendenko* means evacuating without waiting for others (*tendenko* is a dialectical expression that can be translated as "go separately"). It is closely related to another Japanese term, *tomodaore*, referring to how a rescuer can lose his or her life along with the person/s being rescued ("perished together"). Because survival from a tsunami is a matter of racing against seconds before the arrival of giant waves, many people are killed because they spend time looking for their family members and friends instead of evacuating immediately. Towns in Tohoku with a "collective evacuation" policy suffered enormous casualties because residents misused potential escape time by gathering and waiting at the town hall. However, almost all elementary and junior high school students of two schools in Kamaishi City survived because they implemented *tendenko*, which they learned in their disaster education program.

While tsunami *tendenko* has been widely praised, it has also been criticized as being selfish and immoral, citing examples of leaving one's parents, siblings, or children as being heartless. Kodama (2013) offered an ethical analysis in response to these criticisms, emphasizing that the purpose of *tendenko* is to maximize the number of lives saved, as opposed to the almost certain lose-lose *tomodaore* situation that is expected to happen if people decide to look for each other before escaping to safer locations.

What I intended to do under my short-term Japan Foundation Asia Center Fellowship was to investigate how tsunami *tendenko* can be applied in the context of an Islamic society in Indonesia. Before *tendenko* can be adapted outside Japan, it must be reconciled with the local beliefs and culture of the adapting community.

2. Objectives

The aim of this project was to investigate the feasibility of applying tsunami *tendenko* in Indonesia by learning more about the concept from professors of Tohoku University in Sendai and from community leaders, residents, teachers, and students in Kamaishi and about its applicability in an Islamic society through discussions with researchers, disaster risk management practitioners, local government leaders, and residents in Banda Aceh. Specifically, the project would like to:

- a) Compare the effectiveness of tsunami tendenko with different tsunami evacuation practices, as observed in previous tsunami disasters in Japan
- b) Learn how tsunami tendenko is taught to students in Kamaishi and obtain a copy of instructional materials which can be adapted in Indonesia
- c) Learn how researchers, practitioners, and residents in Sendai and Kamaishi address the ethical and moral issues related to tsunami tendenko
- d) Compare tsunami tendenko with the current government-prescribed evacuation practices in Banda Aceh in terms of potential effectiveness
- e) Know the barriers and enablers related to Islamic teachings to the adaption of tsunami tendenko in Banda Aceh and how to overcome the barriers and promote the enablers

3. Collaborators

For this fellowship, I worked with two organizations that were created after the city where their parent university is located suffered from a devastating tsunami. These were my main collaborators:

- a) Dr. Takako Izumi, Associate Professor, **International Research Institute of Disaster Science (IRIDeS), Tohoku University**, Sendai, Japan, <http://irides.tohoku.ac.jp/eng/>

I have a good working relationship with Dr. Izumi. She was my senpai in the International Environment and Disaster Management (IEDM) Laboratory in the Graduate School of Global Environmental Studies of Kyoto University when we were studying for our PhD. In May 2018, she attended a forum organized by our organization, the Institute for Disaster Management and Reconstruction (IDMR), Sichuan University – Hong Kong Polytechnic University in Chengdu, China to commemorate the 10th anniversary of the 2008 Wenchuan Earthquake.

For this fellowship, IRIDeS provided work space and Internet access at the International Strategy for Disaster Mitigation Lab. IRIDeS also arranged meetings for me with professors and researchers of Tohoku University specializing in disaster risk reduction (DRR). Unfortunately, IRIDeS couldn't find translators for my visit to Kamaishi so my trip was cancelled. Dr. Izumi will be a co-author of the output publications from the fellowship.

- b) Ms. Rina Suryani Oktari, Researcher / Cluster Coordinator, **Tsunami and Disaster Mitigation Research Center (TDMRC), Syiah Kuala University**, Banda Aceh, Indonesia, <http://tdmrc.unsyiah.ac.id/en/>

I have known Ms. Oktari since 2014, when she was a Visiting Research Fellow in our lab in Kyoto University, when I was still a PhD student. I had previously reviewed for the Proceeding of the 2016 Aceh International Workshop and Expo of Sustainable Disaster Recovery (AIWEST-DR), which Ms. Oktari helped to organize. She also assisted our team of Kyoto University researchers in 2017 in our study on livelihood recovery after the 2004 Indian Ocean Tsunami.

For this fellowship, TDMRC provided work space and a project assistant, who I paid using the fellowship grant. TDMRC helped set up meetings, interviews, and a focus group discussion (FGD), including providing translation support whenever needed. Ms. Oktari and her TDMRC colleagues will be co-authors of the output publications.



Figure 1. With my collaborators at Tohoku University (left) and Syiah Kuala University

4. Activity Overview

Listed below were the five main activities during my 29-day Japan Foundation Asia Center Fellowship. Unfortunately, my planned visit school to Kamaishi City to learn how tsunami tendenko is taught to students and to obtain copy of instructional materials which can be adapted in Indonesia did not happen because I could not find a good translator. My host at Tohoku University advised me to reconsider going to Kamaishi as, based on their previous experience of doing research there, there are no one who can be interviewed in English. I was therefore not able to accomplish my second objective. Other than this, my fellowship was conducted successfully.

a) Fieldwork Preparation in Sendai

I met a few times with my host at IRIDeS, **Dr. Takako Izumi**, to discuss the research in Banda Aceh, Indonesia. I was able to obtain reference materials from IRIDeS, especially on the disaster risk reduction (DRR) activities of Sendai City, which can serve as exemplars for other tsunami-prone cities.

I was fortunate to be able to attend the special lecture of **Dr. Phil Cummins** (Australian National University) about earthquake risk in Indonesia, which is very relevant to my research. In his presentation, Dr. Cummins argued that hazard, exposure, and vulnerability have increased markedly in Indonesia since the late 20th century, in large part due to population explosion and rapid urbanization. I had a chance to talk to Dr. Cummins after his lecture and I shared with him my research in Banda Aceh.

While I was in Tohoku University, I was able to meet in person for the first time **Dr. Sebastian Boret** and **Dr. Elizabeth Maly**, two editors of the International Journal of Disaster Risk Reduction (IJDRR) who I had corresponded previously only via e-mail. I had published in and reviewed for IJDRR several times. Both Dr. Boret and Dr. Maly are working in the International Research Promotion Office of IRIDeS. I discussed with Dr. Boret his research on tsunami recovery in Banda Aceh and on disaster memorials in Tohoku. There is a potential to collaborate with Dr. Boret on disaster commemoration research in Mindanao, Philippines. On the other hand, I discussed with Dr. Maly her research on housing reconstruction in the Typhoon Haiyan-affected areas in the Philippines. I plan to invite Dr. Maly to submit an invited viewpoint article to the new Progress in Disaster Science (PDS) Journal, of which I am an editor.

My short stay in Sendai allowed me to get in touch again with **Dr. Fumihiko Imamura** and **Dr. Osamu Murao**, the Director and Assistant Director, respectively, of IRIDeS. My own organization,

the Institute for Disaster Management and Reconstruction (IDMR), Sichuan University – Hong Kong Polytechnic University, is very keen on maintaining our close relationship with IRIDeS.

b) Fieldwork for Study on Tsunami Risk Perception in Banda Aceh

Fifteen years after the 2004 Indian Ocean Tsunami, knowledge of the tsunami risk perception of the residents of coastal villages of Banda Aceh may provide important insights about their willingness to take precautionary actions against tsunamis. With my collaborators from TDMRC, I conducted research on tsunami risk perception among village officials in Banda Aceh. We were able to obtain 55 completed survey questionnaires from 18 villages. The respondents included village heads and vice heads, women leaders, youth leaders, and religious leaders, with age ranging from 24 to 66. Our next step is to analyze our survey data and write a journal article to report our findings.

c) Fieldwork for Study on the Applicability of Tsunami Tendenko in Banda Aceh

The main research conducted under the Japan Foundation Asia Center Fellowship was on the feasibility of applying tsunami tendenko in Banda Aceh. To gather data, my collaborators and I conducted a focus group discussion (FGD) on February 20, 2019 at the office of TDMRC. It was attended by 12 participants including an imam from the Grand Mosque; the head and two staff members of the disaster management agency; a representative of persons with disability (PWDs); a staff member of the search and rescue agency; a school principal; a woman community leader; a representative from the Red Cross; and a youth leader. They discussed the barriers and enablers to the promotion of tsunami tendenko in Banda Aceh. The FGD was conducted in Bahasa Indonesia. The transcript and the English translation of the transcript were already prepared by the research assistant, Mr. Fakhurrhadi. Our next step is to analyze our FGD data and write two journal articles to report our findings.



Figure 2. Glenn with village officials



Figure 3. Mr. Fakhurrhadi, Glenn's research assistant, helping village officials (left) and an imam complete the survey questionnaire



Figure 4. Banda Aceh is known for its keudè kopi (coffee shop); many of the meetings with survey respondents took place at coffee shops



Figure 5. Participants of the focus group discussion



Figure 6. The FGD participants were very active in giving their inputs

d) Public Lecture and Meetings with Officials at Syiah Kuala University

In addition to my own research, I was invited by TDMRC to give a public lecture on “Youth Participation on Disaster Risk Reduction in the Philippines.” I shared the experience of science clubs and youth councils in the Philippines as vehicles for youth participation in DRR in schools and in the communities. The lecture was attended mostly by Master’s students of the Graduate Program of Disaster Science.



Figure 7. Poster (right) and attendees of the public lecture

TDMRC informed the Vice Rector for Academic Affairs of Syiah Kuala University, **Dr. Marwan**, about my Fellowship and he invited me for a short meeting with him twice (courtesy call and debriefing). We discussed the possibility of signing a memorandum of understanding (MOU) between TDMRC and IDMR.



Figure 8. Two meetings with the Vice Rector for Academic Affairs of Syiah Kuala University

e) Visit to the Aceh Tsunami Museum

TDMRC suggested that I visit the Aceh Tsunami Museum. Like the Kobe Earthquake Museum and the Beichuan Earthquake Museum, the Aceh Tsunami Museum provides non-formal DRR education as well as serves as a memorial for those who perished in the 2004 Indian Ocean



Tsunami.

Figure 9. Glenn in front of the Aceh Tsunami Museum

5. Fellowship activity record

Date	Activity
January 26, Saturday	<ul style="list-style-type: none"> ▪ Flight: Manila – Tokyo (Philippine Airlines PR428) ▪ Shinkansen: Tokyo – Sendai ▪ Checked in at APA Hotel Sendai Kotodai Koen (near Sendai City Hall)
January 27, Sunday	<ul style="list-style-type: none"> ▪ Weekend ▪ Explored Sendai
January 28, Monday	<ul style="list-style-type: none"> ▪ Familiarized commuting to the International Research Institute of Disaster Science (IRIDeS) of Tohoku University from hotel
January 29, Tuesday	<ul style="list-style-type: none"> ▪ Meeting with host researcher, Dr. Takako Izumi ▪ Attended talk by Dr. Phil Cummins of Australian National University on “Earthquake Risk in Indonesia”; talk moderator was the Director of IRIDeS, Dr. Fumihiko Imamura ▪ Meeting with Dr. Osamu Murao, Assistant Director of IRIDeS, and Dr. Phil Cummins
January 30, Wednesday	<ul style="list-style-type: none"> ▪ Worked on tsunami risk perception questionnaire for Banda Aceh
January 31, Thursday	<ul style="list-style-type: none"> ▪ Had a meeting with Ms. Kyoko Koda of the Japan Foundation Asia Center
February 1, Friday	<ul style="list-style-type: none"> ▪ Worked on tsunami risk perception questionnaire for Banda Aceh
February 2, Saturday	<ul style="list-style-type: none"> ▪ Weekend
February 3, Sunday	<ul style="list-style-type: none"> ▪ Weekend ▪ Transferred to Hotel Vista Sendai (near Sendai Station)
February 4, Monday	<ul style="list-style-type: none"> ▪ Conducted additional literature review on tsunami tendenko
February 5, Tuesday	<ul style="list-style-type: none"> ▪ Conducted additional literature review on tsunami tendenko
February 6, Wednesday	<ul style="list-style-type: none"> ▪ Met with Dr. Sebastian Boret of the International Research Promotion Office and discussed his research on tsunami recovery in Banda Aceh and on disaster memorials in Tohoku. Discussed with Dr. Boret potential collaboration on disaster commemoration research in Mindanao. ▪ Met with Dr. Elizabeth Maly, also of the International Research Promotion Office, and discussed her research on housing reconstruction in the Typhoon Haiyan-affected areas in the Philippines ▪ Both Dr. Boret and Dr. Maly are editors of the International Journal of

	Disaster Risk Reduction (IJDRR), a journal that I frequently review for.
February 7, Thursday	<ul style="list-style-type: none"> ▪ Conducted additional literature review on tsunami risk perception
February 8, Friday	<ul style="list-style-type: none"> ▪ Shinkansen: Sendai – Tokyo ▪ Checked in at APA Hotel Higashi-Nihombashi-Ekimae
February 9, Saturday	<ul style="list-style-type: none"> ▪ Weekend
February 10, Sunday	<ul style="list-style-type: none"> ▪ Flight: Tokyo – Manila (Philippine Airlines PR427) ▪ Flight: Manila – Jakarta (Philippine Airlines PR535) ▪ Stayed overnight at POP! Hotel Airport Jakarta
February 11, Monday	<ul style="list-style-type: none"> ▪ Flight: Jakarta – Banda Aceh (Garuda Indonesia GA146) ▪ Checked in at Arabia Hotel
February 12, Tuesday	<ul style="list-style-type: none"> ▪ Meeting with Ms. Rina Suryani Oktari, Mr. Fakhurradhi, and Dr. Alfi Rahman of the Tsunami and Diaster Mitigation Research Center (TDMRC) of Syiah Kuala University
February 13, Wednesday	<ul style="list-style-type: none"> ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey with village officials) ▪ Courtesy call with Dr. Marwan, Vice Rector for Academic Affairs of Syiah Kuala University
February 14, Thursday	<ul style="list-style-type: none"> ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey)
February 15, Friday	<ul style="list-style-type: none"> ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey) ▪ Meeting with Dr. Swafina, expert on Smong, an Indonesian tsunami indigenous knowledge
February 16, Saturday	<ul style="list-style-type: none"> ▪ Weekend ▪ Fieldwork by Mr. Fakhurradhi (tsunami risk perception survey)
February 17, Sunday	<ul style="list-style-type: none"> ▪ Weekend ▪ Fieldwork by Mr. Fakhurradhi (tsunami risk perception survey)
February 18, Monday	<ul style="list-style-type: none"> ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey)
February 19, Tuesday	<ul style="list-style-type: none"> ▪ Public lecture for the Graduate Program in Disaster Science of Syiah Kuala University ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey) ▪ Meeting with Dr. Khairul Munadi, Director of TDMRC and Dr. Dr. Alfi Rahman; discussed potential collaboration between IDMR and TDMRC
February 20, Wednesday	<ul style="list-style-type: none"> ▪ Focus group discussion (FGD) on tsunami evacuation strategies at TDMRC ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey)
February 21, Thursday	<ul style="list-style-type: none"> ▪ Second meeting with Dr. Marwan, Vice Rector for Academic Affairs of Syiah Kuala University

	<ul style="list-style-type: none"> ▪ Fieldwork with Mr. Fakhurradhi (tsunami risk perception survey)
February 22, Friday	<ul style="list-style-type: none"> ▪ Fieldwork by Mr. Fakhurradhi (tsunami risk perception survey) ▪ Debriefing meeting with Ms. Rina Suryani Oktari, Mr. Fakhurradhi, and Dr. Alfi Rahman
February 23, Saturday	<ul style="list-style-type: none"> ▪ Flight: Banda Aceh – Jakarta (Garuda Indonesia GA143) ▪ Flight: Jakarta – Manila (Philippine Airlines PR540)
February 26, Tuesday	<ul style="list-style-type: none"> ▪ Fellowship debriefing meeting with Ms. Tomoko Nakamura at the Japan Foundation Manila Office

6. Future Plans

The immediate plan is to finish drafting the three scientific papers and submit them to reputable journals for review. We target to finish the manuscripts by June 2019. These are the three papers we are working on:

- a) Tsunami Risk Perception in Banda Aceh, Indonesia 15 Years after the 2004 Indian Ocean Tsunami
- b) Applicability of Tsunami Tendenko in Banda Aceh, Indonesia
- c) Tsunami Tendenko is Not for Everyone: Planning Ahead for Those Who Cannot Evacuate Unassisted

In November 2019, we will be presenting the research findings in two back-to-back conferences which will be held in Sendai, Japan:

- a) 2nd World Bosai Forum (<http://www.worldbosaiforum.com/2019/english/>)
- b) 12th Annual International Workshop and Expo on Sumatra Tsunami Disaster Recovery (AIWEST-DR) (last year's conference: <https://unsyiah.ac.id/pengumuman/aiwest-dr-2018>)

There might be other opportunities for disseminating or publicizing the results of the research in Banda Aceh, such as contributing editorial or feature articles to print and online newspapers during the World Tsunami Awareness Day (November 5); during the commemoration of the 1976 Moro Gulf Tsunami in the Philippines (August 17); or during the National Disaster Resilience Month (July) celebration in the Philippines. I will update the Japan Foundation Asia Center whenever my project gets featured on mass media or whenever a paper related to the Fellowship gets published. The Japan Foundation Asia Center will be acknowledged accordingly in the publications and presentations.

Reference

Kodama, S. (2013). Tsunami-Tendenko and Morality in Disasters. *Journal of Medical Ethics*, medethics – 2012–100813. <https://doi.org/10.1136/medethics-2012-100813>