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Recognizing Indigenous Knowledge for Disaster Management: Smong, Early Warning System from Simeulue Island, Aceh

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Abstract

A 9.1M earthquake occurred in Indian Ocean on 26 December 2004 and caused tsunami disaster that devastated many areas in Asian and African countries. Aceh Province, the closest areas from the epicenter, received huge impacts. With no early warning system, poor disaster management, not enough knowledge about tsunami disaster and the huge scale of disaster impacts, it caused a high number of victims. Death toll reached 200,000 people; while in Simeulue Island, the victims were only 7 people from 78,000 of the total population (2000). The story of Smong (means “tsunami in” Dewayan Language) that inherited from generation to generation since 1907 saved the Simeulueans. Smong naturally becomes an early warning system anytime earthquakes occur in this island. In other parts of Aceh in Sumatra, stories and messages about tsunami that occurred in the past can be found in some oral literatures, poems and songs; but the community did not recognize them and those cannot be used as Disaster Risk Reduction tool. Indigenous knowledge can be a powerful tool for disaster risk reduction; but, without recognition and utilization, it is merely a part of common things in community. The aim of this research was how to capitalize indigenous knowledge in order to improve disaster management and reduce the risk through the community based on success story of Smong Simeulue. Recognized indigenous knowledge should be adaptable, transferable and modified according to the community and environment condition. Empowering local community to recognize valuable Indigenous Knowledge for Disaster Risks Reduction can improve the future of Human Security. This preliminary research was conducted by learning from Smong success story through the media, literatures and interview. To keep sustainability of Indigenous Knowledge for Disaster Risks Reduction, a combination of local knowledge with new technology will be very useful.

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1. Introduction

Building a resilience community is one of important highlights from Hyogo Framework for Action 2005. Indigenous knowledge (IK) or local knowledge can be a valuable tool for disaster risk reduction (DRR). Indigenous knowledge is a unique tool given to community based on cultural and natural experiences.

According to Baumwoll, indigenous knowledge originated within the community, which contrasts from scientific knowledge that is often influenced by many outside sources unrelated to the local culture or environment. Indigenous knowledge can be easily adopted and used by the community. Indigenous knowledge is dynamic and continually influenced by the creativity, experiences and practice.

On 4 January 1907, a 7.8M earthquake occurred in Indian Ocean and caused the death of 70% of people in Simeulue. The survivors shared their experiences and knowledge through the oral story of Smong. Smong means tidal wave or tsunami. The word Smong also explains the tsunami disaster phenomenon; big earthquake is followed by low tide of sea water in the beach and giant wave sweeps through the land.

People of Simeulue use word Smong to warn the community to run away to higher and safer place when mega earthquake occurs. This story was transferred from generation to generation through lullaby called Buai-buai (a traditional song), poem of Nandong, and daily conversation in a family or community. This indigenous knowledge showed its power during mega disasters on 26 December 2004 and 28 March 2005. Smong alarmed people in Simeulue to run away to higher place and they survived.

Within Aceh ethnic groups (the main ethnic group living in coastal areas of Aceh), the messages and story of tsunami that happened in the past were implied in some traditional songs and oral literatures (hikayat, syair). But the community cannot recognize it as a message from the past and, thus, it is only a beautiful poem or fairytale. Unrecognized valuable indigenous knowledge cannot be used as disaster risk reduction tool. So, how to recognize valuable IK in community and make them useful for DRR tool? How to keep sustainability of valuable IK, such as Smong, in the future? Is it possible to adopt the successful Smong experiences to other places with different communities?

The objective of this preliminary research was to study on why the valuable IK in Aceh Besar Regency and Banda Aceh City are not useful for DRR and how to empower the local community to recognize valuable IK for DRR tool based on Smong success story in Simeulue Island.

There is also a possibility to adopt one successful practice of indigenous knowledge in a place to another place. To make it fit, the modification shall meet the culture based on the new location and community.

2. Sites and Methods

This preliminary research was conducted from December 2012 to August 2013 and it will be continued in the future by doing field research directly in Simeulue Island and increasing the number of interviewees.

2.1. Sites

Research was conducted in Aceh or Nanggroe Aceh Darussalam Province, Indonesia. NAD is located in northern part of Sumatra Island or the western part of Indonesia. For this research, interview was done in tsunami disaster devastated areas in Banda Aceh City and Aceh Besar Regency. People from Simeulue Island were contacted through long distance communication from Banda Aceh. In the future, a research field will be conducted directly in Simeulue Island, the closest area to the epicenter of Tsunami Disaster on 26 December 2004.

Banda Aceh City is the capital city of Nanggroe Aceh Darussalam, located at the tip of Sumatra Island along with Aceh Besar Regency. About 40% of both coastal areas were devastated by tsunami disaster. Banda Aceh City with total population of 174,433 (2010) and total areas of 61.36 km² is surrounded by 2,969 km² areas of Aceh Besar Regency. Aceh Besar Regency is divided into 23 districts and it has about 350,225 people living in there. Acehnese ethnic, the biggest ethnic group in NAD, dominates both areas.
In the past, *sya’e* (traditional poems), *hikayat* (folklore or oral literatures) and traditional dance songs were the communication media to share information for daily life, education and the development of Islam religion. Due to the improvement of technology in media, TV, Internet, radio take over and make the traditional media communication become merely as cultural properties only. Some messages about tsunami disaster in the past appeared in Aceh’s old literature.

Simeulue Island is located about 150 km from coastal area in the west of Sumatra Island or about 60 km from the epicenter of Indian Ocean Earthquake in 2004. Simeulue with total areas of 2,051 km$^2$ was part of West Aceh Regency and since 1999 it became Simeulue Regency with Sinabang City as the capital city. The Simeulueans consist of 3 ethnic groups: *Devavayan, Lekon* and *Sigulai* that live in 8 districts. According to census on 2010, total population in this island was 80,279 people. Although in the same province, the Simeulueans have very different cultural background from Acehnese who live in coastal areas in Sumatra Island.

2.2. Methods

This preliminary research was conducted through references study and interviewing people living in Banda Aceh, Aceh Besar and Simeulue Island. For people of Simeulue, the interviews were done to 20 people via email (quizoneiraand telephone). Direct interviews in Banda Aceh City and Aceh Besar Regency were done to 30 people from each area. The average age of interviewees is between 17 to 65 years old, female and male, with different occupation background (data not shown). Number of interviewees by gender in Simeulue Island, Banda Aceh City and Aceh Besar Regency is shown in figure 2.

The questions were about the knowledge on tsunami disaster and action taken during disaster, knowledge on valuable IK (messages about tsunami disaster in traditional songs, poems and stories) and suggestion for using valuable Indigenous Knowledge as DRR tool and how to keep its sustainability in the future.
Fig. 2 Number of Interviewee by gender in Simeulue Island, Banda Aceh City, and Aceh Besar Regency.

| Areas                  | 17-25 | 26-40 | 41-64 | 65~ | Total (people) |
|------------------------|-------|-------|-------|-----|----------------|
| Simeulue Island        | 4     | 6     | 6     | 4   | 20             |
| Banda Aceh City        | 5     | 9     | 8     | 8   | 30             |
| Aceh Besar Regency     | 6     | 7     | 7     | 10  | 30             |

3. Results and Discussions

3.1. Smong as Disaster Risks Reduction in Simeulue Island

Smong is from Devayan language word of “Kemong” or “Seumongan” which means “splash of water” or “tidal wave or tsunami”¹,⁸,¹³ that is used for tsunami warning when big earthquakes occur in Simeulue Island. The story of Smong begin after the 7.8 Magnitude earthquake³,⁴,¹,¹³ in Indian Ocean on 4 January 1907 destroyed Simeulue Island and caused the death of 70% of the total population in this island. The survivors recorded their experiences in the oral story and passed those to the next generation through buai-buai (lullaby) in family daily lives, nafi-nafi (advices) from old generation to the youth and through traditional poems and songs called Nandong that are performed in communal events in Simeulue. The lyrics about Smong in original language¹,⁸,¹³ and English translation by author are shown as followed.

Enggelmonsaocurito
Inangmasosemonan
Manoknopsaofano
Uwilah da sesewan
Unen ne aleklinion
Fesangbakat ne mali
Manoknopsaohampong
Tibo-tibomawi
Angalinon ne mali
uweksuraksahali
Maheyamihawali
Fano me singatenggi

Please listen to this story
one day in the past
a village was sinking
that what have been told
starting with earthquakes
following by giant wave
whole the country was sinking
immediately
if the strong earthquake
followed by the lowering of sea water
please find in hurry
a higher place
It is called “Smong” a history of our ancestor
please always remember the message and instruction

Smong is your bath
Earthquakes is your swing bed

thunderstorm is your music
thunderlight is your lamp

The last sentences are usually sung for lullaby for baby in a swing by mother and grandmother. This ritual is passed from generation to generation. When big earthquake occurs, the Simeuluean shouts “Smong” and people will run away to higher place. Smong saved thousands of people of Simeulue when tsunami swept away the island on 26 December 2004 and 28 March 2005. According to 50% of interviewees from Simeulue Island, were tsunami disaster not occurred in 2004, Smong alarm would have been forgotten by next generation because the mass media, such as TV, Radio, Movie, Radio, Internet, took over the community attention and time of community and families; thus, the ritual of buai-buai and nafi-nafi were almost not continued.

People nowadays like to spend more time for watching TV, using mobile phone, or listening to music, rather than listening to old Smong stories (Fig.3) the new activities with new technologies influence change in the habit of the community in preserving the IK. According to 1, 7, 9, 12, IK is dynamic and continually influenced by creativity, experiences, and practice. But, based on what happened in Simeulue, new influence can become obstacles in sustaining the IK for DRR if the communities are not aware of it.

We should combine the new influence or new technology with IK to preserve it and keep it useful. Combination of modern equipments and traditional way 5,6,7,9 of IK can be a vulnerability in disaster management in the future.

Smong stories can be improved by relaying it in TV programs, movies, books or arranging it into modern music arrangement or make it as a tool in disaster prevention education for children at school.
3.2. Unrecognized valuable IK for DRR tool in Aceh Besar and Banda Aceh

Acehnese people used oral literatures, songs, poems as mass media in the past. Islam religion was spread in Aceh through traditional dance with poetic songs. Songs and poems were not only used for cultural performances; they were also used to educate community, sharing information and messages. Some traditional songs and *hikayat* in Acehnese ethnic in Banda Aceh City and Aceh Besar contained messages about tsunami disaster that occurred in the past. Most of the lyrics were written beautifully and can be interpreted as a legend story and fairy tale, not as the experiences of the ancestors in the past.

According to the interviews with old people in Aceh Besar, the survivors from disaster in the past shared their messages in lyrical poems; they did not want to frighten the next generations, so they wrap those in beautiful words. The next generations listen to the poems but they do not get the messages on the disaster. Some parts of the lyrics from traditional songs in Aceh language containing messages about tsunami disaster are as follows:

- *laotmanyangmeugunong* Water sea reaches the Mountain
- *Bandumabehmeulambong* Everything flew away
- *Nyawonghana pat teuka* No more lives
- *Gampongpihabehmeurata* All villages devastated

Results in Fig. 4 show that almost all the interviewees (87%) in Banda Aceh and Aceh Besar cannot catch the message about tsunami in traditional Acehnese lyrics, 3% of them can get it but unsure about the message: was it a legend or true story. Nine percent of interviewees do not care about the traditional lyrics. Among them, only 1% get the messages. These numbers show that the messages about tsunami disaster in the past cannot reach the next generation; thus, the valuable IK will be useless for DRR tool.

According to old people, in the past, in Aceh Besar and Banda Aceh, family conversation was not done every day and storytelling was usually done by Quran Teachers or old people during *meudaruh* (reading and learning Quran together) or when everybody gathered together for community gathering. The other factor that made the message could not reach the next generation because there were too many poems and lyrics with different contents and purposes. Based on this information, various IK should be selected and adopted to the community to make it valuable.
3.3. Smong Recognition in Simeulue Island and IeBeuna Messages in Aceh Besar Regency and Banda Aceh City

_Iebeuna_ in Aceh language means “dangerous water” or _Smong_ or tsunami. Some hikayats told the story about _Iebeuna_ that happened in the past, but it was not as popular as Hikayat Prang Aceh (Aceh War story) or Hikayat Malem Dewa (a legend story about a great man). There were some poems and songs in traditional Aceh dance, such as Seudati (traditional Aceh dance performed by a group of men) and Likokpulo that can be used to share information about disaster and improve the local community knowledge about DRR. To make it useful, local community should be inspired and adopt it in daily practices. Warrenet et al. suggested that IK systems formed the basis for decision-making, which was operationalized through indigenous organizations and could provide local innovation and experimentation.

![Fig. 5 Comparison between Acehnese and Simeuluean experiences for IK recognition.](image)

People in Aceh Besar Regency, Banda Aceh City and Simeulue Island experienced tsunami disaster in the past. The survivors in each area shared their experiences through lullaby, poems, and songs (Fig. 5). The Simeulueans expressed Smong Story through _Buai-buai, Nafi-Nafi_ and _Nandong_. The Acehnese in Aceh Besar and Banda Aceh inserted it in _Hikayat, sya’e, _dance song lyrics (_Seudati, LikokPulo_) and daily conversation. Through the time, people in Simeulue Island continue the ritual and transferred those from generation to generation through daily life activities in families and communities. People in Aceh Besar and Banda Aceh improve the performances and lyrics but they forget the real message from the past. All the experience stories merely become cultural assets and performances that are performed during community events and festival. The transfer process in all areas continues but the meaning and purposes in Aceh Besar and Banda Aceh have changed.

Since it becomes a cultural tool, communities forget about the message and they do not apply it in daily lives. In Simeulue Island, the practices and application continue. When another disaster came, they applied it. That makes Smong valuable and helps DRR in Simeulue.
4. Conclusion

Indigenous knowledge has already existed and thrived in community. The assessments need to be done to identify which indigenous knowledge is valuable. In some countries, institutions are established to manage the indigenous knowledge. The institution is needed, but empowering the community to involve directly and adapt it is also important. Indigenous knowledge will be meaningless without practice. The *Smong* story is a success since the community in Simeulue applies it in their daily lives. For sustainability, the recognized indigenous knowledge should be transferred and recorded.

![Diagram of indigenous knowledge recognition process](image)

Fig. 6 Scheme of indigenous knowledge recognition process.

The recognition process of IK for DRR tool (Fig. 6) is started from assessment process, identifying the finding of IK, and then adapting it into community and practice in daily life. To keep the sustainability, the finding of IK shall be transferred and recorded. This process will be flexible and will depend on the condition of communities and places.

According David Alexander in *Principles of Emergency Planning and Management*, disaster management could be divided in pre and post disaster containing of four phases: Preparedness, Responses, Recovery and Mitigation. Indigenous knowledge can be used for reducing risk of disaster. Most researchers put indigenous knowledge as the part of Mitigation and Preparedness of Disaster Management.

Indigenous knowledge is never static and to keep it sustainable and useful for disaster risk reduction in community, in every phase of disaster management, there are steps and actions to be done. Adaptation and practice of indigenous knowledge shall be done before the event and continued during Response. After the event, usually, survivals find new phenomena and experiences. The old indigenous knowledge shall be modified and acknowledged. The modified indigenous knowledge shall be transferred and recorded to keep it update.
New technology can push over the IK and make community forgetting about past experiences. Combination of new technology and new habit in community can update the IK. In case of Smong, for children purposes, the Smong story can be animated or rewritten in pictures so that the children can understand easily and remember it.

After tsunami disaster in 2004 in Aceh, many authors, poets, art creators created something to deliver messages to the next generation. The traditional song lyrics in Aceh were modified by adding some DRR messages to the community. Recognition of Indigenous Knowledge is important, but to keep it applicable in every condition and sustain in the future will be more important. Sustainability of IK as DRR tool will improve the future of human security to live with natural disaster.

**Abbreviation**

DM Disaster Management  
DRR Disaster Risks Reduction  
IK Indigenous Knowledge

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