Disaster Risk Communication Issues and Challenges: Lessons Learned From the Disaster Management Agency of Banda Aceh City

Shylvana Adella¹,*, Muhammad Fauzan Nur¹, Nazriatun Nisa¹, Arief Tirtana Putra¹, Fira Rizki Ramadhana¹, Fitri Maiyani¹, Khairul Munadi¹,², and Alfi Rahman¹,²,³

¹Department of Disaster Science, Postgraduate Program, Syiah Kuala University, Darussalam Banda Aceh, Indonesia
²Tsunami and Disaster Mitigation Research Center (TDMRC), Syiah Kuala University, Banda Aceh, Indonesia.
³Faculty of Social and Political Sciences, Syiah Kuala University, Banda Aceh, Indonesia.

*email: ishyladella@gmail.com

Abstract. The Badan Penanggulan Bencana Daerah (BPBD or Disaster Management Agency) of Banda Aceh City was established through Banda Aceh bylaw (or Qanun) No. 3 of 2011 following the significant 2004 Indian Ocean tsunami. Meanwhile, as Banda Aceh's population has grown, an increasing number of people have moved to and decided to stay in areas once affected by the tsunami. Given this background, disaster risk communication is indispensable. It is important for the BPBD of Banda Aceh City to disseminate risk messages throughout the community. Disaster risk communication is informed by the communication targets set by the BPBD of Banda Aceh City. The purpose of this study is to explore the issues and challenges in implementing disaster risk communication in the Banda Aceh community and across various sectors. A qualitative research design is applied to gain an insight into the disaster risk communication of the BPBD of Banda Aceh City. Data were collected through interviews and document analysis. The results of this study show that the BPBD of Banda Aceh City has carried out disaster risk communication in accordance with its primary mandated tasks and functions. However, there have been several challenges and issues, namely limited funding and a lack of technology and disaster knowledge. Consequently, the BPBD of Banda Aceh City has been unable to efficiently realize its disaster risk communication goals.

Keywords: Disaster Risk Communication, Disaster Management Agency, BPBD of Banda Aceh City

1. Introduction
In December 2004, a catastrophic earthquake that measured 9.2 on the moment magnitude scale struck west of Sumatra Island, Indonesia [1]. The earthquake triggered a calamitous tsunami, and Aceh was the most damaged area. The cataclysmic disaster caused 127,720 fatalities, with a further 93,285 people missing and 635,384 becoming internally displaced persons (IDPs) [2]. Banda Aceh was the area most affected by the tsunami in Aceh; more than 60% of Banda Aceh was damaged by the 2004 tsunami, with 64,461 people dead or missing and 2,830 injured [3].
Today, the population of Banda Aceh is growing rapidly, with an annual growth rate of 1.65% since 2009; this rate is predicted to increase by 2020 [4]. In some tsunami-prone sub-districts of Banda Aceh, such as Jaya Baru and Meuraxa, the population growth has been 0.76% and 1.20%, respectively, since 2012 [5]. Although the area has high risk of disaster, people have chosen to live in these sub-districts due to economic reasons, namely lower housing prices.

After the 2004 Indian Ocean tsunami, most people decided to return to tsunami-affected area, indicating the ineffectiveness of relocation and spatial regulation in Banda Aceh. Denis Stanley and Chang Seng (2013) indicate that conflict and rapid decentralization could be factors hindering institutional changes for dealing with disaster risk. However, a major disaster can be an important trigger for change and reorganization [6]. Since the 2004 tsunami, many countries have reformulated their understanding of natural disasters so that people are more prepared to face similar situations in the future. Indonesia, for example, established disaster management agencies at every level of government (national, provincial, and district), with the purpose of implementing more comprehensive and effective disaster risk reduction (DRR) and disaster risk communication (DRC). In each district of Indonesia, there is a Badan Penanggulan Bencana Daerah (BPBD or Regional Disaster Management Agency), while at the national level the BNPB (Badan Nasional Penanggulan Bencana or National Disaster Management Agency) directly reports to the President and coordinates the development of disaster risk reduction plans. At the provincial and district level, these same duties are conducted by the BPBD [7].

According to Regulation of the Ministry of Domestic Affairs (or PERMENDAGRI) No. 46 of 2008 [8] concerning the Guidelines and Working Procedures of BPBD in Indonesia, BPBD has three main functions: coordinating, commanding, and implementing disaster management at the district level. The regulation states that the BPBD is to be chaired ex-officio by the Regional Secretary and accountable to the Mayor of the city—in this case, the Mayor of Banda Aceh. Research conducted by Yuniarti (2016) [9] found that disaster management is not only concerned with physical infrastructure, but also requires synergic cooperation among stakeholders and related service providers to overcome problems using an appropriate communication approach. Therefore, the need for skilled communicators within the organization is necessary to strategically maintain and define its position, particularly when facing crisis-related criticism, threats, and uncertainties [10].

The BPBD of Banda Aceh was established in 2013 through Qanun (local bylaw) No. 3 of 2011 [11]. Communication is a crucial and important component that contributes to or helps avert disaster situations. Lindell and Perry, as cited in Rodrigeuz (2004), argues that one important function of risk communication is to explicitly or implicitly promote appropriate protective behavior by those at whom the information is directed. The primary goal of disaster communication is to inform people or communities about disaster risks and protect them from impending hazards [12]. The ultimate objective is to reduce the lives lost and number of injuries [12]. One of BPBD's tasks is to disseminate effectively disaster risks among the community to help them make appropriate decisions and take appropriate actions.

Risk communication is a dynamic and interactive process that involves the exchange of information between individuals, groups, and communities [13]. Risk communication can contain dramatic elements, problematic, solutions, and action/reaction that arise from the various human characters in coping with disaster [13].

DRC has expanded to the understanding of risk, particularly technical and scientific, with the increased public pressure for more information [10]. This form of communication has become increasingly ubiquitous and almost routine as a form of public messaging [10]. The reason why DRC is important is that natural hazards have caused thousands of fatalities and billions of dollars of damage to infrastructure and property, which could be prevented if communities were informed about
risk and took preventive action before the hazards occurred. The disaster risk information provided by the authorities is critical, because it will help communities create perceptions of disaster risk and mitigate impact [14].

According to the research conducted by Eisenman (2007) [15] people who lack disaster experiences or are newly settled in disaster-prone areas are vulnerable groups owing to their lack of disaster knowledge. Wachinger et al. (2013) [16] believes that previous experience with natural hazards and trust in government/expert capacity have the most substantial impact on risk perception. If people trust the government, they are more likely to take warnings seriously and act accordingly. However, such responsiveness depends on their perception of their agency to engage in effective protective actions and on the strength of their belief that personal responsibilities can be delegated to public emergency management. These issues need to be taken into account when developing communication processes and participatory activities.

Many BPBDs have limited personnel, logistical capacities, equipment and funding [18]. Many have problems, such as a lack of physical offices, and many of their staff are inadequately trained in key aspects of disaster management and communication. Commonly, BPBDs remain focused on disaster response rather than mitigation. Effective disaster management requires cooperation between governments and the various institutions that comprise them. Regional authorities often possess local knowledge about previous disasters and logistics that are indispensable in disaster prevention, mitigation, and response. However, effective disaster management also requires a strong central authority with the power to take control where necessary. Without local and central government cooperation and coordination, this jurisdictional overlap and gap could lead to both central and regional governments seeking to impose different policies and directives. This can cause, at worst, confusion leading to possible institutional paralysis or, at best, inefficient disaster management and avoidable deaths and property loss [17].

The BPBD of Banda Aceh City faces similar issues and challenges. For example, in terms of funding, the BPBD of Banda Aceh City only gets 0.6% of the APBK (district budget) [18]. As population growth has increased over the years, many of the newcomers coming to Banda Aceh have had less information about the hazards surrounding them. Aside from that, the BPBD of Banda Aceh City has also faced rejection from the community; for example, landowners may break disaster signs, fearing that they will decrease the price of land.

It is important to highlight the issues and challenges faced by the BPBD of Banda Aceh City in communicating disaster risk. Involved stakeholders are believed to be potential resources that can be used to ensure the disaster management process and its stages can reach the target audiences. Therefore, coordination and cooperation need to be developed into a proper process. Leaders who can mobilize and coordinate when dealing with potential disaster are likewise required. As such, the regional head can be the key to successful disaster management.

2. Purposes
The purpose of this study is to highlight the disaster risk communication issues and challenges faced by BPBD of Banda Aceh City after the 2004 Indian Ocean tsunami in providing and disseminating risk messages to its citizens.

3. Methods
This study is qualitative research. Data were collected through semi-structured interviews with the division heads and staff of the BPBD of Banda Aceh, then transcribed and analyzed using content analysis to identify the main issues and challenges faced by the BPBD of Banda Aceh City.
4. Results
The interviews were held on September 10, 2018, at the offices of the BPBD of Banda Aceh City. The interview results highlighted some relevant information, such as the agency's primary tasks and functions, and also focuses on its implementation of disaster risk communication issues and challenges.

4.1 The Primary Tasks and Functions of the BPBD of Banda Aceh City
The staff of the BPBD of Banda Aceh City routinely report the implementation of disaster management activities to the mayor of Banda Aceh, with reports made to the Regional Secretary—as the ex officio head of the BPBD of Banda Aceh—after the activities are finished. "Reporting to the Regional Secretary as the Head of BPBD of Banda Aceh is carried out after the activity takes place, both verbally and in the [written] report", said the Head of the Rehabilitation and Reconstruction Division. Furthermore, "the Chief Executive of the BPBD of Banda Aceh is actively communicating the outcomes of the activity with the Regional Secretary for evaluation and future agendas". This is in accordance with Article 8 of Qanun No. 3 [11] which stipulates that the BPBD must be accountable and report directly to the mayor of Banda Aceh at least once a month. Communication of activity reports between the BPBD and the leader/mayor is also appropriate, based on Yunarti's finding [9] that social cooperation must also be considered when handling disasters.

The BPBD of Banda Aceh City has 44 staff (38 civil servants and 6 non-civil servants). This is in accordance with the statement of a member of the Field Management of State Property Board, "There are many staff here who are civil servants. Also, we always ask the Regional Civil Service Agency for more staff to fill the shortcomings of our office".

As the leading agency in cases of disaster, the BPBD of Banda Aceh City should ensure that its staff receive appropriate and relevant training in disaster management. Several staff have attended such training, which is held by the BNPB. According to the Section Chief of Emergency Affairs, "Every year we send some staff from the BPBD of Banda Aceh City to attend the training held by BNPB". This is in accordance with Article 18, Paragraph 1, and Article 20, Paragraph 1, of the Qanun of the Province of Aceh [11] which states that the implementing elements of BPBD must have the expertise, knowledge, and integrity needed for disaster management, including cross-sectoral coordination functions.

In its cross-sectoral coordination function, the BPBD of Banda Aceh City is actively coordinating with other units and services. This was stated by the head of the Emergency and Logistics Division: "On September 5, 2018, we implemented a Table Talk Exercise (TTE) that was coordinated by the Chief Executive of BPBD of Banda Aceh. The TTE was attended by several agencies and services, such as the police, health services, social services, and Indonesian Inter-Citizen Radio or RAPI (Radio Antar Penduduk Indonesia)." The cross-sectoral coordination function is regulated through Articles 11, 12 and 13 of the Regulation of the Ministry of Domestic Affairs [8] concerning the implementation, coordination, and command of BPBD functions in Indonesia.

4.2. Issues and Challenge from in Disaster Risk Communication by the BPBD of Banda Aceh City
Based on its primary task and function, the BPBD of Banda Aceh has three functions: implementation, coordination, and command.

4.2.1. Implementation Function
Based on interviews, the implementation function of the BPBD of Banda Aceh City involved the dissemination of disaster materials to schools, villages, and other agencies. Many benefits were provided by school-based DRR programs and for evaluating challenges in disaster risk management. As such, the Indonesian government must integrate DRR into the education sector, such as by integrating DRR in the school curriculum and providing teachers with DRR training and preparedness in schools [19].
"We have been continuing to socialize disaster preparedness and mitigation programs in many schools based on our initiatives and in collaboration with other sectors or services," said the head of the Emergency and Logistics Office. Furthermore, the BPBD of Banda Aceh City collaborated with BRI (Bank Rakyat Indonesia) to socialize disaster education and conduct earthquake evacuation simulations for their staff. Nevertheless, this is not a routine activity, but only held occasionally, if there is an invitation or if funding is available. The purpose of this activity is to build people's knowledge of disaster risk, which is in accordance with Deverell's (2012) research concept of knowledge management within an organization, which is expected to change people's behavior so they can live with the threat of disaster.

4.2.1.1. Communication Target
The BPBD of Banda Aceh City has had various targets for disaster risk communication, reaching from elementary school students, the general public, and the disabled community. The head of the Prevention and Preparedness Division said, "disaster risk communication programs are targeted at various communities, for example, the establishment of disaster community resilience (Desa Tangguh Bencana, DESTANA) in several villages located in tsunami-prone areas". However, most DRC activities have been funded by non-government organizations or through cross-sectoral collaboration. As such, the BPBD of Banda Aceh City functions as an executor, not as an implementer. Furthermore, the disaster risk communication conducted by the BPBD of Banda Aceh City has not effectively reached the newcomers who are living with existing communities, a situation that could contribute to increased vulnerability [15]. This condition could also situate them in difficult positions when disaster occurs.

4.2.1.2. Strategy
The BPBD of Banda Aceh City is well aware of the potential hazards that are spread throughout Banda Aceh. Therefore, it has applied different strategies for disaster risk communication. As the Head of the Emergency and Logistics Division said, "before conducting disaster risk communication programs or other activities, the BPBD of Banda Aceh City always forms a team that will formulate the right strategies for reaching the targeted audiences". Disaster risk communication strategies have been formulated in several programs, including a series of workshops, disaster drills, schools, local communities, etc. The BPBD of Banda Aceh City has also conducted disaster risk communication programs in conjunction with the mass media, but extending only to coverage of BPBD activities. According to Asteria (2016) [13], the media's role in communicating disaster risk is important, as it is a benchmark of institutions such as BPBD's success in tackling disasters in the region. The mass media is used to provide information related to risks and hazards, and the ways to deal with them. The BPBD of Banda Aceh City has also promoted its activities so that the public can know of its programs. Social media also can be used in emergency situations, as proven by Alexander (2014) [21]. It is important for the BPBD of Banda Aceh City to use social media that are popular with the residents of Banda Aceh, such as Instagram and Facebook, in disseminating disaster risk messages and information.

4.2.2. Function of Coordination
In accordance with Qanun of Aceh Province No. 3 of 2011 [11], the BPBD of Banda Aceh City also has a coordinating function. Interviews found that the BPBD of Banda Aceh City has carried out this function through contingency plans, which were formed to cope with floods that involve various related agencies. The BPBD of Banda Aceh City has yet to specifically create a contingency plan for earthquakes or tsunamis, as it continues to use the contingency plan of the Aceh Disaster Management Agency or Badan Penanggulangan Bencana Aceh (BPBA) and BNPB. The head of the Rehabilitation and Reconstruction Division said, "The coordinating function of the BPBD of Banda Aceh City is carried out by coordinating contingency plans with other agencies. What has been completed is the flood contingency plan, which was prepared in 2016 for Baiturrahman and Lueng Bata sub-districts. Other agencies have adjusted their respective expertise". As such, according to some staff, during a
disaster or emergency response period, the BPBD of Banda Aceh City communicates the emergency to the Regional Secretary, who then returns the mandate directly to the BPBD of Banda Aceh City. In this case, the BPBD of Banda Aceh City has collected cross-sectoral trust to ensure it remains trustworthy institution in disaster management. This is in accordance with the research of [16] that disaster agencies must get public trust to ensure that disaster risk communication can influence the public mindset.

4.2.2.1. Communication Targets
The communication target of the BPBD of Banda Aceh City's coordinating function is disaster-related agencies, especially in Banda Aceh. These include the Social Service Agency, Health Service Agency, Search and Rescue (SAR), Regional Development Planning Agency (BAPPEDA), and other services. The communication process is conducted at the BAPPEDA office every week and involves representatives from each relevant agency.

4.2.2.2. Strategy
The BPBD of Banda Aceh City applies a coordination strategy by creating contingency plans that involve related agencies and organizations. As already conveyed by the head of the Emergency and Logistics Division, "cooperation with other agencies is still carried out using contingency plans and Medium-Term Development Plans (Rencana Pembangunan Jangka Menengah, RPJM) so that each agency conducts its activities as related to their respective fields".

4.2.3. Function of Command
In accordance with the Regulation of Ministry of Home Affairs [8] and Qanun No. 3 of 2011 of Banda Aceh [11], the BPBD of Banda Aceh City has been appointed as an agency for disaster management in Banda Aceh. The command function can be completed because the BPBD of Banda Aceh City is headed by the Regional Secretary, who can lead all related agencies if a disaster occurs in Banda Aceh.

4.2.3.1. Communication Target
In performing disaster risk communication, communication targets are all of the existing agencies and organizations coordinated by the BPBD of Banda Aceh City.

4.2.4. Challenges
In carrying out disaster risk communication activities in Banda Aceh, the BPBD of Banda Aceh City has several problems and challenges, including funding, technology, and knowledge capacity.

4.2.4.1. Lack of Funds
The lack of funding is the BPBD of Banda Aceh City's biggest issue in implementing its programs. It has also influenced such strategic programs as capacity building. This issue is also the reason why some programs are only carried out until the first stage, i.e. socialization stage, and not until more advanced stages such as simulations and drills. The new institutional arrangement for DM (Disaster Management) financing guarantees the availability of funds as part of the National Action Plan for DRR; however, there is still an over-emphasis on spending for post-disaster situations. Additionally, there is a need to improve the procedures and mechanisms for the equitable and timely allocation of funds and resources at the local level [6].

The head of Rehabilitation and Reconstruction Division said, "the Japanese government provided us with seismographs, but they cannot be installed because we lack the funds to hire experts". Research conducted by Oktari (2017) [18] states that the BPBD of Banda Aceh City only has limited funding through the Banda Aceh regional budget (Anggaran Pengeluaran dan Belanja Kota), and so it cannot perform maximally, including in its disaster risk communication programs.
4.2.4.2. Lack of Equipment

The main problem with equipment mentioned by the BPBD of Banda Aceh City in the context of completing disaster risk communication is the lack of appropriate devices. As the Head of the Emergency and Logistics Division said, "If a disaster occurs, we can't use a telephone or cellular phone to communicate with other agencies or regions; only Handy Talkie (HT) radios work during such cataclysmic events. However, our agency does not have HT Radio frequency. Because we lack the tools and frequency, it will be a big problem if a disaster occurs. We must borrow the radio frequency from the BPBA". According to Barbara's (2005) research [10], good disaster risk communication requires good technology in order to call public attention to the threat of disaster. Institutions such as BPBD should have technologically advanced communication equipment for disseminating disaster information.

4.2.4.3. The Limited Capacity of Staffs

In some cases, the local government of Banda Aceh has hired staff who are not aligned with the BPBD's needs. For example, the BPBD of Banda Aceh City needs an IT expert, but the staff assigned to the agency lack skills. As one staff member of the Field Management of State Property said, "Sometimes, the assigned staff do not meet our needs. They are transferred to the BPBD of Banda Aceh City from another agency and lack knowledge about disaster. The expert staff of the BPBD of Banda Aceh City have even been transferred to another agency." The head of the Emergency and Logistics Division added, "Since the BPBD of Banda Aceh parted with the firefighting department, we have had staff shortages when responding to emergencies, for example, expert staff that can set up tents quickly".

5. Conclusions

The BPBD of Banda Aceh City has conducted disaster risk communication through Qanun of Banda Aceh No. 3 of 2011 [11]. Communication is carried out in accordance with the agency's functions, namely coordinating, commanding, and implementing disaster management in the region. Communication is carried out through different forms and strategies, in accordance with the pertinent communication targets. However, there are several issues and challenges, such as limited funds and equipment, as well as a lack of staff capacity in implementing more comprehensive disaster risk communication.

References

[1] Ghobarah A, Saatcioglu M and Nistor I 2006 The impact of the 26 December 2004 earthquake and tsunami on structures and infrastructure Eng. Struct. 28 312–26
[2] BRR 2009 BRR Buku 0: Tsunami
[3] Meisl C S, Safaei S, Elwood K J, Gupta R and Kowsari R 2006 Housing reconstruction in Northern Sumatra after the December 2004 Great Sumatra earthquake and tsunami Earthq. Spectra 22
[4] Achmad A, Hasyim S, Dahlan B and Aulia D N 2015 Modeling of urban growth in tsunami-prone city using logistic regression: Analysis of Banda Aceh, Indonesia Appl. Geogr. 62 237–46
[5] Bappeda Kota Banda Aceh 2017 Statistik Banda Aceh 2017 (Banda Aceh: Bappeda Kota Banda Aceh)
[6] Chang Seng D S 2013 Tsunami resilience: Multi-level institutional arrangements, architectures and system of governance for disaster risk preparedness in Indonesia Environ. Sci. Policy
[7] Djalante R and Thomalla F 2012 Disaster risk reduction and climate change adaptation in Indonesia: Institutional challenges and opportunities for integration Int. J. Disaster Resil. Built Environ. 3 166–80
[8] Menteri Dalam negeri P 2008 PEDOMAN ORGANISASI DAN TATA KERJA BADAN PENANGGULANGAN BENCANA DAERAH
[9] Yuniarti T 2016 Kepemimpinan dan pengelolaan modal sosial dalam penanggulangan bencana banjir Makna 3 94–128
[10] Barbara R and W. Seeger M 2005 Crisis and Emergency Risk Communication as an Integrative Model J. Health Commun. 10 43–55
[11] Walikota Banda Aceh 2011 Qanun No. 3 Tahun 2011 Kota Banda Aceh: Tentang Susunan Organisasi dan Tata Kerja Badan Penanggulangan Bencana Daerah Kota Banda Aceh
[12] Rodriguez H, Diaz W and Aguirre B 2004 Communicating Risk and Warnings: An Integrated and Interdisciplinary Research Approach
[13] Asteria D 2016 Optimalisasi Komunikasi Bencana di Media asa Sebagai Pendukung Manajemen Bencana J. Komun. Ikat. Sarj. Komun. Indones. 01 1–11
[14] Rodriguez H, Quarantelli E L and Dynes R R 2007 Handbook of Disaster Research
[15] Eisenman D P, Cordasco K M, Asch S, Golden J F and Glik D 2007 Disaster planning and risk communication with vulnerable communities: lessons from Hurricane Katrina. Am. J. Public Health 97 Suppl 1 109–15
[16] Wachinger G, Renn O, Begg C and KuhlCie C 2013 The risk perception paradox-implications for governance and communication of natural hazards Risk Anal. 33 1049–65
[17] Butt S 2014 Disaster management law in Indonesia: From response to preparedness? Asia-Pacific Disaster Management: Comparative and Socio-Legal Perspectives
[18] Oktari R S, Fahlevi H and Irawati W 2017 Disaster budgeting of Banda Aceh’s local government: Trends and analysis of post-tsunami Aceh 2004 IOP Conference Series: Earth and Environmental Science vol 56
[19] Amri A, Bird D K, Ronan K, Haynes K and Towers B 2017 Disaster risk reduction education in Indonesia: Challenges and recommendations for scaling up Nat. Hazards Earth Syst. Sci. 17 595–612
[20] Deverell E 2012 Investigating the Roots of Crisis Management Studies and Outlining Future Trajectories for the Field J. Homel. Secur. Emerg. Manag. 9 Article 24
[21] Alexander D E 2014 Social Media in Disaster Risk Reduction and Crisis Management Sci. Eng. Ethics 20 717–33