**Can Social Communication Catalyze Community Resilience and Education?**

**Lessons from Communication Behaviour of Local People after Natural Disaster**

ADI SURYANI

*InstitutTeknologiSepuluhNopember (ITS), Indonesia*

*adisuryani.rahman@gmail.com*

SOEDARSO

*InstitutTeknologiSepuluhNopember (ITS), Indonesia*

*soedarsoits@gmail.com*

ABSTRACT

Palu multi-disasters: earthquake, tsunami and liquefaction in 2018 causes life crisis. Many public facilities and infrastructures: offices, schools, roads, shops are destroyed, even disappeared. Many people lost their houses and families. Social structure and physical environment are also impacted. This life-threatening situation emerges mix feeling of panic, sad, anxious, depressed, even anger. Soon after disasters, Palu local people are establishing social communication and engaging in social interaction to continue their lives. Many people are still finding their families, information to find their lost relatives and friends, help the victims, move and start their lives in emergency tents or renovate their houses and impacted infrastructures. Through social communication and daily interaction, Palu community is gradually adapting and rebuilding their lives. This study aims to examine how social communication may potentially cater community resilience and be self-educated community. The data are collected through direct observation and interviews with some local people. The study indicates that daily social communication infused within social interaction may potentially facilitate Palu’s community resilience through four primary ways. Firstly, through communication, the people can share their disaster emotional experience which allows them to relieve their anxiety, insecurity, fear and panic. Secondly, they can disseminate local knowledge on problem solving. Thirdly, social communication facilitates social actions to recover. Fourthly, it allows the young generation to learn. Thus, social communication may potentially contribute to self-prepared and self-educated community from natural disasters. This is vital since it may help them to be self-sustained community from potential recurrent disasters.

**Keywords**: *social communication, community resilience, community education, communication behavior*

INTRODUCTION

Social communication is inseparable from human’s social live. It bridges information, expressions of human heart experiences, ideas and knowledge. Moreover, it connects individuals into community. Daily social communication enables people to do their regular activities. Communication also allows people to make friends, build networking, partnership and engage in community activities. Appropriate and effective communication can influence and generate social emotion and cognition to respond an event in particular reactions and do social actions in particular ways.

Natural disasters generate painful experiences, especially for the impacted society. They are frequently suffering from massive loss and destructions. They are losing their houses, all of their properties, families, relatives and friends. Their regular activities: working and schooling are impeded. Their routines are changed. Moreover, after great natural disasters, many remained people suffer from calamity following massive disasters: hunger, uncertainty, diseases, riot, criminals and anxiety that the disasters will soon come back again. Many of the victims should even start their life from beginning, while many of them choose to evacuate and never come back.

Social communication is also established by the impacted society. However, soon after disasters, they tend to develop different and particular communication from before disasters. This study aims to examine local people social communication post natural disasters: what they communicate, how their communication may potentially contribute to resilient community building and what they learn from their disaster experience. We focus the examination on Palu disasters which occurred in September 2018, based on two main considerations. Firstly, Palu city is located on vulnerable zone of earthquake disasters since it is passed by Palu-Koro fault. Secondly, Palu earthquake in September 2018 induced two other great natural disasters: tsunami and liquefaction. Other studies on communication and disasters focus on planned disaster mitigation programs from top to down.Differently, this study focuses on local people real communication, indigenous and experience knowledge to save their lives.We believe that it is also significant to hear, observe and analyze how the local people communicate, learn and share their disaster experience for preparing themselves to face the recurrent disasters.Local people’s knowledge and experience can be invaluable sources for disaster mitigation and management. In spite of their significant roles, there are still a few study explores disaster from local people perspective.

Local knowledge of how people respond to disaster is still reserved (Juliana, Amin, & Idrose, 2017, p. 900). Resilience in this study refers to the resilient concept of Driver Project in 2017 (Davis, 2017). It defines resilience as individual as well as community and systems to resist, recover and adapt from disruptions which disturb their ‘normal’ functioning (Davis, 2017, p. 6).

RESEARCH BACKGROUND

1. *Community Resilience from Disaster*

Natural disasters can be unpredictable. It can occur everywhere, anytime and frequently bring about massive destructions. Disasters are big threats for development since it can destroy many infrastructures and community wellness which are built year by year. One of many development concerns and needs should be directed into responding disasters (Ranjan & Abenayake, 2014, p. 88). This is because disasters causes loss in many aspects: live, supplies, communication, power, water services, social services, business, structures and functions of society (Davies & Davies, 2018, p. 746). Impacts, risk and threats of disasters can be reduced by increasing people’s capacity to be more self prepared and resilient (Jabareen, 2012, cited in Ranjan & Abenayake, 2014). Principally, community resilience is defined as capacity of community to face disasters. Ranjan and Abenavake(2014, p. 89) designate disaster resilience as community conditions in which people can withstand from disaster effects, adjust to quick changes and return to normal condition from disruptive situation. Similarly, McCaul and Mitsidou (2016, p. 10)identify community resilience as community and households ability to predict, adapt to consequences, accept, react and recover from disaster adversity in a certain time and effective ways without sacrificing long-term potentials, especially their well being. Community resilience is also defined as community capacity to survive and develop within short as well as long term by evolving their environmental, economic and social sustainability (Lerch, 2015, p. 10).

Community resilience requires the integration of various associating aspects and agents.Community resilience includes recovering social functioning systems, minimizing impacts, bouncing back in timely and effective ways and learning from experience (Give2Asia & IIRR, 2017, pp. 9–10).Gorin, Junghardt and Stal (2015, p. 8) recommend three main capacities: absorptive (coping shock and stress), adaptive (adjusting to what happens) and transformative (changing social identity, structure, systems). Differently, Davis (2017) mentions that community resilient capacity can be built by strengthening people’s capability to continue their system functioning despite disruptions, recover the system and adapt to changes. Specifically, community resilience is divided into several types: physical, social, economic, organizational and environmental resilience (Ranjan & Abenayake, 2014, p. 90). Moreover, there are several aspects contributing to community resilience:education, economic, environment, governance, health, infrastructure, social/cultural and disaster risk management (McCaul & Mitsidou, 2016, p. 12). Community resilience capacity is indicated by several indicators: social, economic, institutional, infrastructure and community capital (Davis, 2017). Furthermore, behaviorally, community resilience is specified by community response efficacy, community participation, collective efficacy, place attachment, empowerment, trust and intentions (Davis, 2017).

1. *Community Education and Disaster*

Natural disasters can be a stimulant for impacted community to learn and educate themselves. Education can significantly contribute to community resilience and empowerment. Education enables process of creating personal and group/social identities which are able to determine their own lives (Educar en Tiempos Dificiles, 2002, cited in Ceballos, 2006, p. 321). This enables society to learn to develop their own region potential. Community empowerment requires educational process which help individual or community understand what they have already learnt (Ceballos, 2006, p. 328). Moreover, community education is an education for life which tends to be self-directed and learners-centred (Government of Ireland, 2000). This implies that community needs to actively learn together to develop. From educational process, individuals acquire knowledge. Knowledge has power and the transmission of knowledge from one people to others is basically the empowering process (Hannon, 2019, p. 166). Education plays significant roles in disaster management. As mentioned by Vaughter (2016, pp. 1–2), education helps to prepareskills, knowledge and character of community to decrease risks of disasters. Many studies find that education caters community resilience from disasters through several ways:education shapes community response towards disasters(Vaughter, 2016), ICT learning/education can contribute to disaster management (Tarhan, Aydin, & Tecim, 2016), developing disaster education program by collaborating school and community (Oktari, Shiwaku, Munadi, Syamsidik, & Shaw, 2018; Parkash, Begum, & Rita, 2013),being more knowledgeable and are able to use their local knowledge for disaster preparedness (International Organization for Migration, 2015).

1. *Disaster Communication*

Many studies on disaster communication analyze communication functions to reduce disaster risks and impacts. Information is the most needed element during crisis and emergencies and helps the impacted society by spreading visible condition and trustworthiness (East Asia Summit (EAS) & Earthquake Risk Reduction Centre (ERR), 2014; Juliana et al., 2017). One of several keys towards community’s resilience is developing communication to inform during and soon after disasters since reliable communication can connect victims, impacted people/communities with rescuing teams, support systems and other families (East Asia Summit (EAS) & Earthquake Risk Reduction Centre (ERR), 2014).Developed communication systems and technologiescan spread emergency messages (Juliana et al., 2017), reach remote areas (East Asia Summit (EAS) & Earthquake Risk Reduction Centre (ERR), 2014). Effective communication also assists disaster mitigation and community preparedness by disseminating government’s information and getting information from local people (Robinson, 2017). Effective communication facilitates the post-disaster reconstruction process by allowing two-way communication among government, impacted community and reconstruction agents/teams (Jha, Phelps, Pittet, & Sena, 2010). Communication allows community to participate in recovery by socially-directly share information as well as through social media (Linardi, 2016; Teo, Goonetilleke, Ahankoob, Deilami, & Lawie, n.d.; Yang et al., 2019). Information from disaster site is essential for knowing damages, and need assessment process which provides inputs for coordination and decision making (Pan American Health Organization, 2009, p. 13). Moreover, disaster management requires communication planning which involves collecting, organizing, producing and disseminating data to inform decision makers and prepare resources to help (Pan American Health Organization, 2009, p. 26).

1. *Palu Disasters*

As the capital city of central Sulawesi province, Palu is a unique region and is vulnerable to disaster. Geographically, Palu is bordered by Donggala regency at north, Sigi regency at south, Donggala and Sigi regency at west and ParigiMoutong and Donggala regencies at east (BPS Kota Palu, 2018, p. 3). Palu is extended between 0º,36” - 0º,56” South latitude and 119º,45” - 121º,1” Eastern longitude (BPS Kota Palu, 2018, p. 3). Palu is located under equator with altitude of 0-700 meter above sea level(BPS Kota Palu, 2018, p. 3). Uniquely, Palu city is categorized Non zona season region which has its own season characteristics, different from other two season areas (BPS Kota Palu, 2018, p. 7).

In spite of its beautiful natural landscape and rich natural resources, Palu is located on dangerous zone. It is vulnerable to earthquake disasters since it is crossed by Palu-Koro faults and surrounding several small faults (Rusydi, Effendi, & Rahmawati, 2017). Earthquakes can occur not in Palu Valley, including Palu city, in minor intensity (≤ 3 Mw) not less than 5 times a day (BMKG, 2012, cited in Rusydi et al., 2017, p. 137). Palu is very sensitive to several natural disasters, including earthquake, tsunami, landslide and liquefaction (Pinem, cited in Tim CNN Indonesia, 2018). Disaster historical record shows that from 1927, there have been 8 major earthquakes hit Palu (Rusydi et al., 2017, p. 137).



Figure 1. Ruining houses at Balaroa, as impacted by liquefaction following Palueathquake

Again, on 28 September 2018, earthquake in 7.4 magnitude hit Palu. Until 9 October, 2018, it is reported that the disasters causes 2,037 fatalities, including over 4,084 injuries, 671 persons lost, 152 needs quick rescue and over 74,044 persons are evacuated in 120 sites (BNBP, cited in World Health Organization, 2018, p. 8). The earthquake happened is not the only disaster, since it triggers other following disasters: tsunami and liquefaction. Figure 1 shows many houses destructed by liquefaction at Balaroa. It is predicted that the earthquake is resulted from active movement, strike-slip faulting of Sesar Palu-Koro fault (Syifa, Kadavi, & Lee, 2019, p. 1). Consequently, several areas are under crisis, including clean water, shelter/houses, health, food, education and protection(Acaps, 2018, pp. 2–3). Several aspects become concerns, including health, water and sanitation, telecommunication, shelter, electricity and medical services (World Health Organization, 2018b).

METHODOLOGY

The study is grounded on a qualitative research. The study aims to examine communication at local people-community level after Palu disasters in 2018. Several characteristics of qualitative study areit explores life situation, records perceptions of local people ‘from the inside,’ and captures people’s understanding, thinking and daily behavior (Punch, 2011, p. 142).

1. *Data Collection*

Qualitative researchers examine spoken and written data picturing human experience, by employing various methods and sources of data (Punch, 2011, p. 168). Thus, the data of the study are collected from several sources:

1. Direct observation

The authors examine and analyze real social-physical situation in Palu after natural disaster, especially during the emergency situation until the Indonesian government announces the end of the emergency situation. During this period, the authors engage in daily activities with Palu community: at the traditional markets, visit the impacted areas, at *warung*, friends visit, in the rescue tents. The authors take notes on daily situation.

1. Interview

Two local people who can save themselves and their families are being interviewed. They are asked to tell stories on their feeling and experience when the disasters come and after the disasters. Both of the participants are civil servants.

1. Picture

The pictures are taken in natural environments after natural disasters, especially the official emergency situation. The pictures cover community daily activities, impacts of disasters or posters/billboards.

1. Natural conversation/dialogues

This includes the spontaneous conversation with local people. Frequently, they tells spontaneously their surprise and lingering emotion on disasters.

1. *Data Analysis*

The collected data are analyzed by employing analytic induction. It is started with reading, comparing and contrasting all the data, finding meaningful statements from all types of collected data, classify and develop them into several themes, build textual and structural descriptions, interpreting the data and comparing/contrasting with previous research findings or theories relevant to the analysis/findings.

RESULT AND DISCUSSION

1. *Communication and Resilient Catalyst*

The study finds that after the disasters, local people develop social daily communication which potentially contributes to disaster resilience and self-education through several ways:

1. Social sharing and emotional resilience

After disasters, many local people engage in spontaneous communication. They engage in expressive dialogs in many occasions at any places: when they meet their friends on roads, in emergency tents, when they visit the highly impacted areas, such as Balaroa, when they search for food, wait for medical services, help other victims or when they trace back some areas which they usually visit, when they go around their houses to know how the situation (roads, facilities, neighbor houses, damaged shops/*warung* or when they see the evacuation and recovery processes.

Through social interaction, they communicate their disaster experiences to each other. They communicate by telling their disaster experience to each other, how they can survive or how their family or neighbors can escape from tragedy. Many of them tell their experience expressively. Through this social interaction, they communicate their feeling: mixture of sadness, worry, afraid, empathy for those who lost their family members, even angry and blame for late/slow rescue or the one who is suspected to be the cause of disasters. This social sharing may relieve their emotion tension. This is as indicated by the following interview excerpt:

“…when I follow …we are asked to form some groups and share…that’s a psychosocial. I tell my experience because some people want to know. Also when I tell my experience, I feel relieved. I feel I can release my emotional burden through sharing…” (Participant 1)

“I tell to the other victims first, usually they tell what happens…and certainly we respond because we also experience…how is the situation when the earthquake occurs and after earthquake. Because both and after are very critical condition because after earthquake, many infrastructure damages…no electricity, no phone…we tell to each other because of three factors. Firstly, it relieves our emotional burden. Secondly, it shows that we can survive because doing certain actions and the other is for being active responding other people’s stories…” (Participant 2)

The data also indicate that social sharing may make the local people/victims have shared feeling, they listen and respond to each otherand feel being heard and cared.This may potentially give feeling of comfort. However, social sharing may also dangerously infect negative emotion, such as anger when they are debating on who should be accused for the tragedy or choice between changes or remains. It can ignite conflict. Conflict can be one of some building blocks which can hinder resilience since it can stir people emotion and cause more destruction (Gorin et al., 2015, p. 9).

Social sharing on emotion-related disasters can build social cohesion through communication. Community members’ communication, information and cohesion build adaptive capacity to resile (Combaz, 2014, p. 14). Telling emotional experience can be relieving (Pennebaker, Zech, & Rimé, 2001, p. 7). Physical and mental wellness of community members is one of several characteristics of resilience (Los Angeles County Community Disaster Resilience Project (LACCDP), n.d., p. 16).

1. Problem solving and collective learning

The other function of communication is catering problem solving initiative and transfer knowledge among victims/impacted community members. After disasters, some people can learn from stories/dialogues/conversations with other victims. They learn their own as well as other people experiences. There are three main things that they learn: what are the indicators or signs that disasters will occur, what they can do to quickly save their self or other people around them and what they can do in the future if the disasters are occurring again. They learn to reflect by tracing back their own experience, compare and contrasting with other people experiences and conclude. The data excerpt below shows what a participant learns after Palu disasters.

“…when the earthquake occurs, I actually want to anticipate, I browse, how we can anticipate earthquake because this earthquake cannot be predicted, cannot be determined when, what time, where it may happen. It’s very unpredictable…but there may be a way…because I am interested in technological things, up to date technology, gadget…so I try to find technology, gadget which can inform us before earthquake occurs. At least it can reduce numbers of victims or to know what happens. But, actually all buildings should be designed because even though there is warning, when the houses fences are not designed to anticipate earthquake like this, we can be trapped inside the house…” (Participant 2)

The data show that after disaster, the participant 2learns and searches technology which may potentially warn early when earthquake occurs. The participant 2 informs this to his colleague, relatives and neighbors.

This indicates that earthquake triggers individual learning and knowledge transfer to other people through daily communication.The participant 2 performs adaptive learning to mitigate/prepare himself and other people when the earthquake is recurrent. Adaptive learning occurs when individuals change their behavior as reaction to their external environment (Sessa & London, 2006, p. 20). Learning is one part of processes to be adaptive (Combaz, 2014, p. 14). Furthermore, adaptive capacity enablesthe impacted people to choose among choices to prevent or minimize more risks/disasters impacts in the future (Combaz, 2014). Adaptive capacity may enable community “to bounce forward” and to do this, the people need resourcefulness, flexibility and ingenuity (Gorin et al., 2015, p. 8). Technology and science can assist mitigation process since it can provide understanding of disasters: when, where, how and its intensity (James, 2007, p. 8).

1. Communication of Warning

The other function of local social communication is communicating emergencies and warning, especially local emergencies, such as damage of small bridge or damage of roads at local levels. Frequently, this types of damages are not informed or communicated by government or rescuing teams since they may not focus on too detailed damage due to limited energy, personnel and time. Thus, Palu people initiate to inform the damage and communicate the hazard to other people to minimize impacts or reduce more victims. This warning communication may potentially foster community resilience since it may reduce risks. Moreover, it may evoke feeling of security since it informs others which areas are still dangerous and may hurt them.



Figure 2. Local people communication using emergency media

To communicate the emergency warning, the local people use any media and brief language/message. Early warning systems are urgently required to disseminate alerts and preparedness (James, 2007, p. 8). In spite of the vital role of warning communication, how local people develop their unique warning communication is still inadequately researched. This is as described by figure 2, where Palu people communicate spontaneously using any available communication media to warn others and reduce more victims.

Indigenous communication of warning may lessen the number of victims or injured people. Minimizing loses and being able to “bounce back” are the primary aims of community resilience (Give2Asia & IIRR, 2017, p. 4). Saving live in disasters should not only be focused on pre-disaster risk management, but also when it occurs. The data show that during disaster, risk management is significant. Local people contribution and initiatives to save others are needed, especially because they know their areas well, better than the rescuing agents and volunteers.Knowing disaster risk and minimize the risk are the element of community resilience (McCaul & Mitsidou, 2016, p. 13).

1. Social action, efficacy and motivation

Any community resilient programs may not be successful without the active participation and involvement of the impacted community. Local community is genuinely invaluable and primary resource for disaster recovery for the short term and sustainable development for the longer term. Thus, it is significant to generate social action, efficacy and motivation of the local community itself to collectively develop their damaged areas. Public communication may generate collective emotion of efficacy to wake up and motivation to develop. One to one communication may less effective than public communication to move the people. Public messages using effective language can generate social emotion and cognition.

Soon after earthquake, tsunami and liquefaction, there are motto of “Palu bangkit, Palukuat” (Palu wakes up, Palu is strong), is widely spread locally in Palu. This motto is put at billboards, backdrops or any posters appear at the strategic sites. This verbal message aims to generate Palu people feeling of confidence and motivation to recover and develop. This recovery and development need Palu community capacity and active efforts. Local people can be capable developers in their areas since they have local/traditional knowledge which helps them to prepare, mitigate and recover from disasters (Ngwese, Sato, Boafo, & Jasaw, 2018). Since disasters are multidimensional events and affecting community and its’ vulnerabilities, it needs willingness and cooperation of all community elements(Lucini, 2013). Social resilience can be achieved by developing collective social relationship and communication (Lucini, 2013, p. 63).

1. *Communication and Community Education*

The earthquake, tsunami and liquefaction may bring destructive experiences which endanger Palu people and city long development. However, the disasters may not calamitous only, but also beneficial if Palu community can learn from it. The study indicates that there are several things they learn after disasters. The first is indicators/signs of when disasters will come. The second is how to save their selves and their families: what they should and should not do and where they should evacuate themselves. The third aspect is learning to accept what has happened, what they can do to save their life and their family lives in the future and how to recover. Palu community can develop their local knowledge and be self-learnt from disasters.Because everything has changed, they must learn to adapt to the current situation.Adaptive learning occurs when an individual/group of people absorbs/absorb information from their surrounding, react and change their behavior (Sessa & London, 2006, p. 20). Community social sharing on disaster experiences builds their institutional memory as parts of adaptive learning. The capacity to learn adaptively is determined byinstitutional memory (capacity to memorize and recall), innovative learning (implement institutional memory to adapt and change) and connectivity (build network among individuals, inside and outside communities (Davis, 2017, p. 15). Education is closely related to community self capacity to resile(Ginsberg & Hunt, 2015; Heijmans, n.d.; Shih et al., 2018; Twigg, 2015). Education is the basis of resilient communities which provides the foundation for other resilient components: strong network among organizations, preparedness and quick response among organizations, sufficient volunteers, mutual support among neighbors (Shih et al., 2018, p. 1).

The study indicates that the disaster learning occurs inter-generationally. After disaster, Palu children are also learning from their childhood experience. They are telling their experience to other relatives or within/outside people, what happens to them and their families. From their early phase of life, they already learn how to mitigate, feel the emotion, observe and help activities in emergencies tents and see their damaged environment, houses or schools. This may potentially provide disaster learning from childhood. Disasters may allow young generation to learn from their experience (Lerch, 2015).

Communication facilitates knowledge transfer from individuals to others/community and vice versa. Moreover, it caters the intergenerational learning. This means through communication disaster learning is sustaining through experience stories interpersonally and inter-generationally.

CONCLUSION

Communication furnishes all types of human/community activities. It bridges social interaction in any situations. In disaster circumstance, communication may positively support community resilience through several ways: healing emotional adversity, communicating risk and emergencies, deciphering experience-based problem solving and generating social action, efficacy and motivation. Through communication which is embedded in everyday interaction, experiences are told and knowledge are transferred from one people to other individuals or groups. Through communication, inter-generational learning also occurs. This learning allows the next generation to absorb knowledge from their parents and direct experience. Thus, communication can catalyze community resilience, even more disaster learning sustainability.

BIODATA

*Adi Suryani* is a lecturer at Institut Teknologi Sepuluh Nopember (ITS), Indonesia.

*Soedarso*is a lecturer at Institut Teknologi Sepuluh Nopember (ITS), Indonesia.

REFERENCES

Acaps. (2018). *Eartquake and Tsunami in Indonesia*. Acaps.

BPS Kota Palu. (2018). *Kota Palu dalam Angka. Palu Municipality in Figures 2018*. Retrieved from https://palukota.bps.go.id

Ceballos, R. M. (2006). Adult Education for Community Empowerment: Toward the Possibility of Another World. In *Global Issues and Adult Education* (1st ed.). Jossey-Bass.

Combaz, E. (2014). *Disaster Resilience: Topic Guide*. Birmingham, UK: GSDRC, University of Birmingham.

Davies, T., R. H., & Davies, A., J. (2018). Increasing Communities’ Resilience to Disasters: An Impact-Based Approach. *International Journal of Disaster Risk Management*, *31*, 742–749. https://doi.org/10.1016/j.ijdrr.2018.07.026

Davis, S. (2017). *Community Resilience Model*. Driving Innovation in Crisis Management for European Resilience Consortium.

East Asia Summit (EAS), & Earthquake Risk Reduction Centre (ERR). (2014). *Disaster Communication*. Retrieved from https://nidm.gov.in/easindia2014

Ginsberg, A. C., & Hunt, D. (2015). *Disaster Risk Reduction for Community Resilience. A Synthesis of Lessons from more than a Decade of Disaster Risk Reduction Programming*. Concern Worldwide.

Give2Asia, & IIRR. (2017). *Building Community Resilience: Mapping the Journey of Local Community-Based NGOs in Developing Sustainable Preparedness Programs* (pp. 1–27). Give2Asia and IIRR.

Gorin, P., Junghardt, J., & Stal, M. (2015). *Community Resilience Framework-Lessons from the Field* (pp. 1–30). Haiti: Swiss NGODRR Platform.

Government of Ireland. (2000). *Learning for Life: White Paper on Adult Education* (pp. 9–224). Dublin: The Stationery Office.

Hannon, L. (2019). How to Empower a Community? Helping Communities Take Control of their Health Destiny. *Preventive Medicine Reports*, *13*, 166–169. https://doi.org/10.1016/j.pmedr.2018.12.001

Heijmans, A. (n.d.). *Reaching Resilience. Handbook Resilience 2.0 for Aid Practitioners and Policymakers in Disaster Risk Reduction, Climate Change Adaptation and Poverty Reduction*. Retrieved from www.reachingresilience.org

International Organization for Migration. (2015). *Indigenous Knowledge for Disaster Risk Reduction. Documenting Community Practices in Papua New Guinea* (pp. 1–19). Papua New Guinea: International Organization for Migration, Papua New Guinea, International Organization for Migration, Transition and Recovery Division in Collaboration with National Disaster Centre and Usaid.

James, B. (2007). *Disaster Preparedness and Mitigation. UNESCO’s Role*. United Nations Educational, Scientific and Cultural Organization.

Jha, J. D., Phelps, P. M., Pittet, D., & Sena, S. (2010). *Safer Homes, Stronger Communities. A Handbook for Reconstructing after Natural Disasters*. Washington DC: The Institut Bank for Reconstruction and Development/The World Bank.

Juliana, N., Amin, N. A., & Idrose, A. (2017). Challenges of communication system during emergency disaste response in Malaysia: A review. *Journal of Fundamental and Applied Sciences*, *9*(4S), 890–904.

Lerch, D. (2015). *Six Foundations for Building Community Resilience*. Post Carbon Institute.

Linardi, S. (2016). Peer Coordination and Communication Following Disaster Warnings: An Experimental Framework. *Safety Science*, *90*, 24–32. http://dx.doi.org/10.1016/j.ssci.2016.03.017

Los Angeles County Community Disaster Resilience Project (LACCDP). (n.d.). *Resilience Builder. Tools for Strengthening Disaster Resilience in your Community*. Retrieved from https://rems.ed.gov

Lucini, B. (2013). Social Capital and Sociological Resilience in Megacities Context. *International Journal of Disaster Resilience in the Built Environment*, *4*(1), 58–71. https://doi.org/10.1108/1759590/3112990008

McCaul, B., & Mitsidou, A. (2016). *Analysis of the Resilience of Communities to Disasters. ARC-D Toolkit User Guidance Manual*. GOAL.

Ngwese, N. M., Sato, A., Boafo, Y. A., & Jasaw, G. (2018). Traditional and Local Knowledge Practices for Disaster Risk Reduction in Northern Ghana. *Sustainability*, *10*(825), 1–17. https://doi.org/10.3390/su10030825

Oktari, R. S., Shiwaku, K., Munadi, K., Syamsidik, & Shaw, R. (2018). Enhancing Community Resilience towards Disasters: The Contributing Factors of School-Community Collaborative Network in the Tsunami Affected Area in Aceh. *International Journal of Disaster Risk Reduction*, *29*, 3–12. https://doi.org/10.1016/j.ijdrr.2017.07.009

Pan American Health Organization. (2009). *Information Management and Communication in Emergencies and Disasters: Manual for Disaster Response Teams*. Pan American Health Organization, Washington D.C.

Parkash, S., Begum, I., & Rita. (2013). *Activity Book on Disaster Management for School Students*. New Delhi: National Institute of Disaster Management.

Pennebaker, J. W., Zech, E., & Rimé, B. (2001). Disclosing and Sharing Emotion: Psychological, Social and Health Consequences. In *Handbook of Bereavement Research: Consequences, Coping and Care* (Editors: M.S. Stroebe, W. Stroebe, R.O. Hansson, H. Schut, pp. 517–539). Washington DC: American Psychological Association.

Punch, K. F. (2011). *Introduction to Social Research. Quantitative and Qualitative Approches* (2nd ed.). London: SAGE Publication Ltd.

Ranjan, E. S., & Abenayake, C. C. (2014). A Study on Community’s Perception on Disaster Resilience Concept. *Procedia Economics and Finance*, *18*, 88–94. https://doi.org/10.1016/S22212-5671(14)00917-4

Robinson, L. (2017). *Words into Action Guidelines: National Disaster Risk Assessment, special topic: Public Communication for Disaster Risk Reduction*. United Nations Office for Disaster Risk Reduction (UNISDR).

Rusydi, H., Effendi, R., & Rahmawati. (2017). Vulnerability Zoning of Earthquake Disaster of Palu. *International Journal of Science and Applied Science: Conference Series*. https://doi.org/10.20961/ijsaascs.V12.5138

Sessa, V. I., & London, M. (2006). *Continuous Learning in Organizations. Individual, Group and Organizational Perspectives* (1st ed.). Lawrence Erlbaum.

Shih, R. A., Acosta, J. D., Chen, E. K., Carbone, E. G., Xenakis, L., Adamson, D. M., & Chandra, A. (2018). *Improving Disaster Resilience among Older Adults. Insights from Public Health Departments nd Aging-in-Place Efforts* [Research Report]. Santa Monica, California: RAND Corporation.

Syifa, M., Kadavi, P. R., & Lee, C.-W. (2019). An Artificial Intelligence Application for Post-Earthquake Damage Mapping in Palu, Central Sulawesi, Indonesia. *Sensors*, *19*(542), 1–18. https://doi.org/10.3390/s19030542

Tarhan, C., Aydin, C., & Tecim, V. (2016). How can be Disaster Resilience Built with Using Sustainable Development? *Procedia-Social and Behavioural Sciences*, *216*, 452–459. https://doi.org/10.1016/j.sbspro.2015.12.059

Teo, M., Goonetilleke, A., Ahankoob, A., Deilami, K., & Lawie, M. (n.d.). Disaster awareness and Information Seeking Behaviour among Residents from Low Socio-Economic Backgrounds. *International Journal of Disaster Risk Reduction*, *31*, 1121–1131. https://doi.org/10.1016/j.ijdrr.2018.09.008

Tim CNN Indonesia. (2018). Peneliti: Palu “langganan bencana,” tak layak jadi kota. *CNN Indonesia*. Retrieved from https://www.cnnIndonesia.com

Twigg, J. (2015). *Disaster Risk Reduction*. London: Overseas Development Institute.

Vaughter, P. (2016). *Unmaking Disasters: Education as a Tool for Disaster Response and Disaster Risk Reduction* (No. 6; pp. 1–4). United Nations University. Institute for the Advanced Study of Sustainability.

World Health Organization. (2018a). *Situation Analysis: Earthquake & Tsunami, Sulawesi, Indonesia* (pp. 2–10). World Health Organization-South-East Asia.

World Health Organization. (2018b). *Sulawesi Eathquake and Tsunami, Indonesia* (pp. 1–4) [Situation Report]. World Health Organization.

Yang, Y., Zhang, C., Fan, C., Yao, W., Huang, R., & Mostafavi, A. (2019). Exploring the Emergence of Influential Users on Social Media during Natural Disasters. *International Journal of Disaster Risk Reduction*, *38*. https://doi.org/10.1016/j.ijdrr.2019.101204