

Eila Romo-Murphy

Developing Disaster
Preparedness Education
via Broadcast Media and
Community Involvement



JYVÄSKYLÄ STUDIES IN HUMANITIES 236

Eila Romo-Murphy

Developing Disaster Preparedness
Education via Broadcast Media and
Community Involvement

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ABSTRACT

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This dissertation explores disaster preparedness education of communities in Indonesian earthquake-prone areas and identifies critical factors for developing media campaigns and educational programmes for disaster preparedness.

Stakeholder enabling is applied in examining the management of disaster preparedness communication and education, which takes place between the community, the broadcast media, and civic organisations. The social network contagion approach is applied for defining risk, and for reacting to risk in the community. A social constructionist perspective is brought into play to scrutinize risk perception in a cultural context. The information horizon framework is applied to investigate the information seeking practices of community members involved in disaster preparedness.

In recent years, the focus on crisis communication has moved from the response and recovery stage to a preparatory stage, while at the same time crisis and risk communication are equated as continuum. This study centers on the broadcast media and its role facilitating and strengthening community resilience in coping with disasters.

The article-based part of this dissertation is compiled using empirical data from a survey, focus groups, and key informant interviews conducted in Indonesian communities. Information Horizon map drawing was utilized in investigating the information behaviour related to earthquake preparedness. In addition, a literature review investigates current trends extracted from disaster preparedness literature.

In conclusion, the learning process for disaster preparedness takes place within the shared context of various stakeholders, from dialogue between the stakeholders, and from within the web of relationships of each stakeholder. The media campaign model, constructed on the basis of existing empirical studies, depicts the significance of community involvement in the procurement of knowledge, skills and attitudes affecting and molding disaster preparedness. New light is shed on the role of the broadcast media, especially radio, as a participatory agent involving the community in a learning process, which can effectively strengthen disaster preparedness education, and ultimately bolster resilience.

Keywords: disaster preparedness education, radio, resilience, community.

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FOREWORD

Media are by nature caught up in disasters: reporting, informing, updating. Whether from traditional news media or new media, whether near or far, the general public can choose how to be informed of disasters on a global level. After the two great tsunamis, which hit recently in Indonesia and in Japan, captured the international community's attention and led to increased interest in disaster preparedness for ordinary citizens.

How could media contribute to disaster preparedness and enhance, for example, the resilience of communities living in coastal areas susceptible to earthquakes and tsunamis? I became interested in this question after having been asked to be part of a post-tsunami research project in Banda Aceh, initiated in 2007. As a research associate to Health Communications Resources (HCR), I was given the opportunity to co-author an article with its founder, Dr. Ross James, 'Facilitating Disaster Preparedness Through Local Radio Broadcasting'. This encouraged me to further my studies in developing disaster preparedness education for Indonesian communities. When participating in research projects in both the Aceh and West Sumatra provinces, facilitated by Tearfund, UK, I became even more interested to find how radio can contribute in strengthening the overall disaster preparedness of these affected communities.

One influential aspect of my academic research education was my participation in a course of the Finnish Doctoral School of Communication in 2010, where I was introduced to a research method entitled 'Information Horizon Map Drawing' developed by Sonnenwald. As a researcher studying international audiences, I wanted to try out this new research method. Even though this method was only used in one of the studies that are part of this dissertation, I consider it a promising method and hope its usage will increase in the future.

My biggest thanks, 'teri makasih', goes to Universities in Banda Aceh and Padang; to the students of Ar-Raniry University, UNSIYAH and Andalas University, as well as to the staff of Ar-Raniry and Andalas University. Most of all, I am thankful to Pak Fuad Madarisa, for his advice in conducting the research projects, and for his efforts in facilitating me to network with the proper stakeholders in Padang.

During my licentiate studies I focused on community radio in Mongolia, supervised by prof. of Journalism, Raimo Salokangas, the Department of Communication in the University of Jyväskylä, Finland. I began my doctoral thesis from a media perspective with his support. Next, I was fortunate to also get involved with the Crisis Communication Group in the Department of Communication in the University of Jyväskylä, led by prof. Marita Vos, who became my supervisor in 2011. I am thankful for her positive attitude in supervising me, enabling the connection with crisis communication theory. Having been part of both doctoral seminars has helped me understand the scope of topics my fellow students are challenged with at the University of Jyväskylä, Finland.

I found a good friend and advisor for Indonesian culture; a political science doctoral student, Ratih Adiputri. Many thanks to Ratih for helping me to

stay focused on Indonesia, even though most of the writing for the dissertation was done in Finland.

Great gratitude I show to my employer, Media Mission The Messengers, for allowing me to take time for my studies. Financially, I thank Koulutusrahasto, The Education Fund and its Adult Education Allowance, as without this support I could not have invested the time for full-time studies when needed.

Thankfulness for editing the language belongs to my dear husband, Patrick Murphy, whose encouragement has been foundational during these years.

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The author

FIGURES

FIGURE 1	Spheres related to risk perception.....	31
FIGURE 2	Information flows in between the three stakeholders.....	48
FIGURE 3	Radio in relation to community in disaster preparedness.....	52
FIGURE 4	Empirical studies in this dissertation, year of data collection and main results.....	55
FIGURE 5	Radio and community roles added based on the author's research.....	80
FIGURE 6	Media as disaster preparedness education agent: being trusted, informing and educating.....	82
FIGURE 7	Media campaign model, based on empirical research and reviewed articles.....	84

TABLES

TABLE 1	The articles, their methods and sources.....	14
TABLE 2	Studies reviewed, their methods and disasters depicted.....	43
TABLE 3	The role of media in three types of disasters, as depicted in the empirical studies.....	46
TABLE 4	Research questions and articles dealing with them.....	57
TABLE 5	Articles, their method of data collection and data analysis.....	67
TABLE 6	Main societal preconditions in relation to each other.....	74

MAP

MAP 1	Map of Sumatra. Arrows point to Banda Aceh and Padang.....	56
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CONTENTS

ABSTRACT

FOREWORD

FIGURES AND TABLES

1	INTRODUCTION	11
1.1	Aims and theoretical perspective	11
1.2	Research problem and scope defined	13
1.3	Realisation of the research.....	14
1.4	Dissertation structure	15
2	ELEMENTS OF COMMUNITY RESILIENCE	16
2.1	Disaster preparedness communication in the midst of risk and crisis.....	16
2.1.1	Disasters and the challenges they pose	17
2.1.2	Risk and risk communication	18
2.1.3	Crisis communication	19
2.2	Disaster risk reduction	21
2.3	Stakeholder enabling.....	22
2.4	Masyarakat	23
2.4.1	The meaning of Masyarakat.....	23
2.4.2	Acehnese history.....	24
2.4.3	Minangkabau culture	26
2.5	Social construction of reality	27
2.5.1	Theory of sociology of knowledge	27
2.5.2	Changing views on education and preparedness.....	29
2.5.3	Constructionist approaches to risk.....	29
2.6	Resilience.....	32
2.7	Media as public service.....	33
2.8	Information behaviour	35
2.8.1	Krikelas model	36
2.8.2	Information horizons	36
2.9	Conclusive thoughts on the theoretical framework	38
3	CONCEPTUALIZING THE ROLE OF BROADCAST MEDIA IN DISASTER PREPAREDNESS	40
3.1	Lessons learned in disaster preparedness education - review in brief	40
3.2	Overview of ten empirical studies from the literature review.....	41
3.3	Findings.....	44
3.3.1	Media's role in disaster preparedness immediately before the disaster	45

3.3.2	Media's role in disaster awareness and preparedness education	46
3.3.3	Radio's contribution in disaster preparedness education	48
3.4	Conclusion	50
4	ACEH AND PADANG FINDINGS	54
4.1	The design of the empirical research	54
4.2	The research path and background on local radio in Banda Aceh and Padang.....	57
4.2.1	Overall description of the research path	57
4.2.2	Background on local Radio DJati - Banda Aceh.....	58
4.2.3	Background on local Radio Respon - Padang	60
4.3	Summary of the articles	61
4.3.1	Aceh community disaster preparedness - Article 2.....	61
4.3.2	Aceh evaluation - Article 3	62
4.3.3	Padang evaluation - Article 4	63
4.3.4	Padang Information Horizon drawing study - Article 5.....	64
4.4	Methods applied in the empirical studies.....	65
4.4.1	Article 2 methods	68
4.4.2	Article 3 methods.....	68
4.4.3	Article 4 methods.....	69
4.4.4	Article 5 methods.....	69
4.5	Findings of the studies answering the research questions	70
4.5.1	Stakeholders involved in media campaign.....	70
4.5.2	Societal preconditions for media campaigns	72
4.5.3	Communication channels utilized in media campaigns.....	75
4.5.4	Contribution of radio in disaster preparedness	76
4.5.5	Contribution of media to community resilience	77
4.6	Overview of the research results	77
5	TOWARDS A MEDIA CAMPAIGN MODEL	81
5.1	Media's roles and attributes in disaster preparedness.....	81
5.2	The media campaign model.....	83
6	CONCLUSIONS.....	87
6.1	Media as disaster preparedness educator	87
6.2	Evaluating reliability and validity	88
6.3	Recommendations for future research	89
	SUMMARY	91
	TIIVISTELMÄ	93
	REFERENCES.....	95
	APPENDIXES.....	102

1 INTRODUCTION

Disaster preparedness, in anticipation of nature's hazards, lacks a significant amount of research. In calamities, most attention is vested in the response and recovery. However, disaster readiness is called for since natural calamities have been increasing over the past two decades, and according to geologists they will increase in the future in certain areas of the globe as a result of climate change. (Gonsalves & Mohan 2011; Schiermeier 2011)

In the area of disaster preparedness, there has been research interest in emergency preparedness, especially for medical staff and hospitals, but very little focusing on ordinary people and their resilience.

Media's performance in natural disasters has not always been viewed positive. Media has been assessed as being sensationalistic, or framing the hazardous situation in a way that is not helping those affected (Barnes et al. 2008; Mirón & Ward 2007). Those who evaluate media positively in disasters, limit its role to being an information source. Broadcast media's educational role in engaging communities and facilitating community resilience has been dealt very little in creating disaster resilience.

1.1 Aims and theoretical perspective

This dissertation aims to build a model for educational campaigns of disaster preparedness targeted to coastal communities in Indonesia. The model is based on the author's research studies in these communities, in Banda Aceh and Aceh Besar in Northern Sumatra, and in Padang and its vicinity area in West Sumatra. These localities are situated on the most western island of Indonesia, and both of them have faced major earthquakes and a tsunami. The author's findings are compared to other similar studies dealing with natural disasters. The detailed research questions leading this thesis are presented in section 4.1. This is the first effort of its kind in investigating education for disaster preparedness, drawing on research findings, and connecting preparedness education to community level communication processes and media.

While the concept of 'disaster preparedness education' might not be used much in the scientific community, the intention of this dissertation is to define it and underline the benefits of adopting potential strategies for the network of media, organisations, and communities affected by disaster. Media's performance has been viewed negatively in previous research related to disasters; there are claims that media is not giving detailed information, it can be seen as framing the situation, and has been accused, even at times, of responding based on financial gain. This thesis aspires to view media in a positive light, as a facilitator of community engagement, and as an educator with the potential to bring vital information to help communities prepare before disaster strikes.

The research work is built on the presupposition that human beings by nature have tendency towards resilience, and that resilience can be enhanced by education. Preparedness education is co-created by governmental and non-governmental organisations (NGOs), media and the community. The emphasis, however, is in media as an educator, but simultaneously recognising that the mediating process is not one-way, but rather an interactive communications process with the community.

Focusing on broadcast media, and especially radio, it is argued that by using a multi-media approach in designing educational campaigns for disaster preparedness, communities are able to be mentally and physically prepared for future disasters. This facilitates the learning of an attitude of being risk-sensitive and strengthens motivation for searching useful knowledge, and developing behaviours and skills geared to coping with disasters in communities. In disaster preparedness the media are seen as part of a network of both governmental and non-governmental organisations, as well as the local community.

The dissertation acknowledges the interconnectedness of stakeholders in Indonesian communities. A relational view of managing these relationships, called stakeholder enabling (Calton & Kurland, in Boje et. al. 1996), is applied in examining the disaster preparedness communication in between the community groups, NGO network, and news media network. As an approach, stakeholder enabling emphasises that each stakeholder participates in dialogue, and the process of learning happens in a shared context of various stakeholders. In addition to the dialogue between the stakeholders, each stakeholder consists of webs of relations.

This dissertation is inspired by the social constructionist approach, acknowledging that human beings jointly create meanings and experience different realities. This creation of meaning occurs in community discourses. In traditional communities, the society creates procedures for breakdown of reality, and communities' social memory provides the stable viewpoints of societal life extending from the past to the future. However, in relation to education, the study recognises that there is a necessity for, on the one hand, proactive creation recognising the equivocality and exploring the solutions, and on the other hand, building new knowledge to the existing one. Social constructionist perspective proposes how risk, environment and media are constructed socially in the cultural context. The theoretical background also draws on the social con-

structionist approach to risk communication, which claims that the perception of risk is socially constructed (Aldoory 2009; Lundgren & McMakin 1998). Specifically, the social network contagion theory (Scherer & Cho 2003) has been chosen as a viewpoint to emphasise the role of social linkages in risk perception, reacting to risk and preparing for disasters.

In choosing approaches functionalism is applied with elements inspired by constructionism. The author holds the view that understanding others can be met both ways: on the one hand, "through the use of foundationalist epistemological assumptions characteristics of logical empirism" (Schwandt, 2005, 201), and on the other hand recognizing that knowledge of social reality depends "upon some background or context of other meanings, beliefs, values, practices and so forth" (Schwandt, 2005, 201). The positivist approach is visible where communication via transmission and channels is emphasised (as for example in case of tsunami warnings), while the interpretist approach, as described by Putnam (1983), is seen in the study when emphasising the importance of communicative processes in the community. Even though the author holds to both approaches, as far as methods, the inquiry paradigm is for the most part postpositivistic, and the multiple method research paradigm is recognisable, for example, in applying both quantitative and qualitative methods. However, in studying human information behaviour, and seeking new knowledge of earthquake preparedness, a method utilizing social constructionism is used: the Information Horizon map drawing investigates learning in a social network and interaction within several information sources (Sonnenwald, Wildemuth & Harmon 2001).

Cultural theory is applied in formulating the educational campaigns via news media for communities, considering the importance of the combination of culture and social relations in designing the campaign. Since this dissertation fieldwork is grounded in Indonesia, the Indonesian term 'masyarakat' is applied to the concept of community, and connected to the views of Berger & Luckmann (1967) to the community formulating its reality.

1.2 Research problem and scope

This thesis endeavors to gain a better understanding of the role of the broadcast media in disaster preparedness concerning natural disasters. This may contribute to clarifying critical factors for media campaigns aimed at community disaster preparedness and resilience in developing countries, and in particular Indonesia. Even though radio has been recognised as an important medium for information in the field of crisis communication, this dissertation adds insights to its role in building preparedness, specifically in relation to community engagement.

The empirical research, which focuses on several cases, aims to propose an educative media campaign model for disaster preparedness in the coastal communities of Indonesia. Disaster-related literature, presented in chapter 3

and in Article 1, supports the investigations in affirming that media influence both awareness and preparedness for disasters, with the condition of media content being related to community activities. The focus is on natural hazards only; this dissertation does not deal with medical, terrorist or ecological or other disasters.

Natural disasters have been increasing in all parts of world. The research focuses on Asia, specifically coastal areas of Sumatra, Indonesia, due to their geophysical vulnerability to major disasters such as earthquakes and tsunamis. The author's personal interest derives from leading several research projects regarding disaster preparedness in Aceh province and in Padang city and surrounding West Sumatra. Both of these areas represent urban and semi-urban societies, where community forms an essential part of social networking; however they are not mega-cities with heavy population concentrations. Therefore, for the most part, these results are applicable to urban, rural and coastal areas in Asia, which are vulnerable to natural disasters.

1.3 Realisation of the research

This dissertation is based on five published articles. One article is based on literature study and four articles on empirical field research. Table 1 shows their methods and sources.

TABLE 1 The articles, their study types, methods and sources

STUDY TYPE	METHOD	SOURCES
Article 1: Romo-Murphy, E. & Vos, M. 2014. The Role of Broadcast Media in Disaster Preparedness Education. Lessons Learned in the Scientific Literature 2002-2012. <i>Media Asia</i> 41(1), 71-85.		
Literature-based	Systematic review	87 refereed articles published in the last 10 years
Article 2: Romo-Murphy, E., Ross, J. & Adams, M. 2011. Facilitating disaster preparedness through local radio broadcasting. <i>Disasters</i> 35(4), 801-815.		
Empirical data Aceh 2008	Survey, focus groups and key interviews	984 tsunami survivors, eight focus groups, and six key informants
Article 3: Romo-Murphy, E. 2012. Monitoring Disaster Preparedness Education in Northern Sumatra. <i>Media Asia</i> 39(3), 127-131.		
Empirical data Aceh 2009	Key interviews	15 key informants (five government, five NGO informants, and five village leaders)
Article 4: Romo-Murphy, E. 2013. Evaluating Disaster Preparedness in West Sumatra through Media. <i>Planet at Risk</i> 1(1)		
Empirical data Padang 2010	Key interviews	14 key informants (eight government, and six NGO key informants)

Article 5: Romo-Murphy, E. 2013. Information Seeking for Earthquake Preparedness. Asian Journal of Environment and Disaster Management 5(2), 157-165.		
Empirical data Padang 2010	Horizon map drawing	21 village leaders and villagers; and 12 community radio listeners

1.4 Dissertation structure

Chapter 1 introduces the topic, presents the main aim and scope of this dissertation. Chapter 2 comprises of the theoretical part of the thesis. First the key concepts of crisis, disaster and risk are defined, followed by risk and crisis communication. This chapter also presents the approaches and framework of the dissertation.

Chapter 3 first presents a brief summary of the article based on a structured literature review of 87 articles (Article 1). Next, it provides an additional in-depth study of ten empirical articles selected from the literature review, conceptualizing the role of broadcast media as disaster preparedness educator and searching for critical factors for preparedness campaigns mentioned in the literature. Chapter 3 describes how broadcast media facilitate disaster awareness by informing and educating, but at the same time participation of communities in disaster preparedness education is necessary.

Chapter 4 provides the background for the empirical studies reported in Article 2, 3, 4 and 5, explaining the fieldwork in Indonesia in detail. Some parts of the research process, such as data collection for Article 2 and Article 3, glossary and acronyms have been included in Appendix 1.

Chapter 5 presents the media campaign model, based on the field research in Indonesia, and literature study reflected in Article 5.

Finally, in chapter 6, research limitations and suggestions for future research are discussed.

2 ELEMENTS OF COMMUNITY RESILIENCE

This chapter provides several theoretical viewpoints while examining the media, communities, and stakeholders. As the need for community resilience has been identified as an important goal in disaster management, and as the role of communication has become an integral factor in preparing for disasters, this chapter first defines crisis and risk communication in the field of communication. Second, disaster risk reduction is defined as serving the communities to mitigate disasters via communication and collaboration. And third, the stakeholder enabling approach is introduced, since it has inspired a community approach to disaster preparedness. The Achenese and Minangkabau communities in Aceh province and in West Sumatra are described as examples of stakeholders. Related to these two sets of cultural communities, theorizing takes place in defining risk perception via a social constructionist approach, which emphasises interaction and discourse between environment, media, and risk perception. Community resilience is defined via social processes to include communication and information sharing within the community. The media are shown as serving a dual purpose; not only do they keep the community updated on disaster status, but primarily they play a valuable role in collective learning to facilitate public preparedness. Local radio is introduced as a way of actualizing this educational function in community learning. Finally, information behaviour is applied in providing a conceptual framework for information seeking and sharing, which is an essential element to incorporate when investigating citizens' preparation for disasters.

2.1 Disaster preparedness communication in the midst of risk and crisis

In order to understand the concept of disaster preparedness communication, it needs to be defined in the field of communication. Palttala et al. (2012) investigated communication gaps in disaster management, and concluded that before

crisis, the role of communication needs to be defined, news media relationships attended, and preparedness plans for citizens promoted (Palttala et al. 2012, 11). This chapter focuses specifically into the role of communication in preparing for disaster, and connects news media and citizens, in the form of community into the picture.

2.1.1 Disasters and the challenges they pose

Disasters have been defined as having major influence, ‘an adverse impact’, requiring planning and co-ordination to utilize appropriate resources (Alexander 2003, 118). Sometimes institutions are challenged in responding to disasters, which results in crisis (Andersen & Spitzberg 2009, 209).

Alexander (2003, 118) uses the word ‘disaster’ as a synonym along with ‘catastrophe’ and ‘calamity’, and conceptualizes disaster as a cycle, whose quiet phases will be used as a preparation for the next phases when action is needed (“a cycle, which broadly distinguishes times of quiescence, in which preparations are made for the next event, and times of action, in which emergencies are managed”). According to Alexander (2003) the disaster cycle consists of five phases: mitigation, preparation, management of the emergency phase, recovery of human as well as infrastructural systems, and finally, reconstruction of the damaged areas and structures.

Coombs (2012, 60) defines disasters as “large-scale events that demand multi-agency coordination”. This implies that not only is the local community affected, but larger areas, for example on the federal level in the USA, or the district and provincial levels as in Indonesia.

Researchers have pointed out that the worst natural disasters since 1978 have occurred in developing countries. Disaster and poverty seem to co-exist, which has prompted developing strategies for communities to prepare for disasters. Disaster preparedness requires more attention to even an earlier stage, so that ultimately the risks of disasters are diminished. This can be accomplished, besides community disaster preparedness, also by addressing issues related to climate change. (Jayasuriya & McCawley 2010; Schiermeier 2011)

Some of the harmful effects of disasters can be prevented, or at least diminished. A natural disaster might cause a power outage, for example, but if households are prepared with candles and flashlights, the adverse effects of no electricity are obviously diminished. It is important to develop strategies aimed at communicating the risks involved and the preparations needed to minimize those risks. Risk communication and disaster preparedness communication must be recognized as essential components in the field of crisis communication.

Although science in the modern world provides several methods of calculating the risks associated with possible earthquakes and volcanoes, it does not always necessarily formulate the realistic risk perceptions of individuals and communities. And unfortunately, awareness of risk does not necessarily prompt for action to be prepared for disaster. Educational initiatives are needed for creating behavioural change within disaster prone communities. This thesis promotes a concerted effort to build up educational approaches and campaigns

to facilitate both the mental and practical preparedness strategies available for consideration and possible implementation within affected communities before disaster strikes.

2.1.2 Risk and risk communication

Disaster literature, discussed in detail in Article 1, connects disaster preparedness to the realization of risk. The basic hypothesis is that awareness of risk leads to willingness to prepare for disasters.

According to Zinn (2008, 4) risk discourse can be defined in three different ways. One, risk is referred to “hazard, loss, damage or threat”; indicating an unwanted event. Two, risk is referred to as being a simple calculation of the probability of the unwanted event happening times the extent of the damage it causes. Third, risk is referred to as risk taking, which can be seen in either a positive or negative light.

Conceptualizing risk unfolds several dimensions of understanding the risk; it is not only the “objectified laboratory knowledge directly applicable in practical contexts” (Zinn 2008, 14), but also the social and subjective knowledge. “Additionally, questions address the cognitive reflexivity of knowledge and how other forms of intuitive or pre-rational knowledge are involved in the perception and management of risk” (Zinn 2008, 14). Zinn adds that risk perception is associated with values, power relations and emotions (Zinn 2008, 13-14).

Zinn (2008) compares five theories of risk; system theory, govern mentality, socio-cultural theory, edgework theory; and the risk society of Beck. In this thesis the perspective of socio-cultural theory, formulated by Douglas (1994), is adopted. Douglas (1994) sees the selection, perception and response to risk as a cultural process, which depends on worldview and in which risk is linked to socio-cultural organisation (Zinn, 2008, 181).

“A strength of Douglas’s work has been her recognition that risk is a meaningful construction – so in this sense her (Douglas’s) work is ‘constructivist’ in describing the use of risk as discourse” (Tulloch 2008, 142). The socio-cultural theory of risk, also called cultural symbolic perspective, emphasises that it is the culture that interprets whether risk is real and how dangerous. This view is described by Douglas & Wildavsky: “The first issue in any argument about risk is to agree on which risks are most worrisome” (Douglas & Wildavsky 1983, 187). This notion fits well with the framework in this thesis of conceptualizing risk via social construction and perception.

Along with the definitions of risk, it is logical to define risk communication. Communicating about the future risks enhances awareness and preparedness for crisis. According to Coombs, at its core, risk communication is a dialogue between organisations that create risks and stakeholders that must bear the risk (Coombs 2009, 102; Coombs 2012, 57). The purpose of risk communication is to familiarize those stakeholders with the consequences of risk (Coombs 2012, 57).

Risk communication has appeared to be a difficult craft. Heath et al. (2009) pinpoint two reasons for this difficulty; one, citizens give little input in develop-

ing risk communication; two, news media and reporters are familiar with reporting the news, rather than how to advise or plan to make the news.

Lundgren & McMakin (1998) view mass media negatively, saying “it should not be relied upon as the sole source of information in planning risk communication efforts, due to its time and space constraints, aired or published stories, the media may fail to convey risk-related information in detail enough”. Therefore, they recommend using mass media carefully for risk communication plans (Lundgren & McMakin 1998, 133).

However, they also see the two sides of the coin – science and policy experts viewing the media coverage of health and environmental risks say it is too simplistic, while journalists and reporters see the scientists and policy makers as arrogant, controlling or unhelpful to their requests for information. (Lundgren & McMakin 1998, 237)

Risk communication comprises the content of risk messages, production and reception of risk messages disseminated via public relations programmes and community campaigns (Aldoory 2009). Literature on risk communication often focuses on communication concerning prevention and reduction of individual health risks, such as overweight or smoking. Aldoory, for example, limits risk communication to health communication (Aldoory 2009, 229).

Coombs (2012, 57) widens risk communication to sometimes cover the crisis response phase, especially in the case of a nuclear spill, and in the case of when evacuation is a necessity. “Risk communication can provide insights into how people are reacting and the types of information they need to cope with the crisis” Coombs (2012, 57). Traditionally, crisis communication has been seen to be focused on messages immediately after and following a disaster or crisis event, while risk communication entailed messages before the disaster, involving “warning, avoidance, prevention and cautionary advice”. However, risk and crisis communication may overlap, especially when a disaster evolves slowly, in cases such as a typhoon, a hurricane, floods, or volcanic eruptions (Andersen & Spitzberg 2009, 212). Currently, risk and crisis are seen as a continuum, which is also reflected in the definitions of crisis communication, which will be explained next.

2.1.3 Crisis communication

Crisis communication refers to communication supporting crisis management in all phases, before, during and following a crisis situation. A crisis can be man-made or caused by nature, and various categories are recognised, e.g. social, psychological, economical, chemical or meteorological crises. The main focus in crisis communication is on exchange of information and views between organisations involved, public groups, media and other stakeholders. According to Norris et al. (2008, 140) “by communication, we refer to the creation of common meanings and understandings and the provision of opportunities for members to articulate needs, views, and attitudes, ... the presence of communal narratives that give the experience shared meaning and purpose”.

Coombs (2012, 17,20) defines crisis communication as consisting of “the collection, processing, and disseminating information required to address a crisis situation”. Before the crisis, information collection focuses on the risks, making decisions on how to manage the potential risks, and training people to handle the communications process connected to the crisis situation. In this view, Coombs applies ideas from risk communication to crisis communication in preparation phase.

Crisis communication research within organisational studies has concentrated on stakeholder reaction management. However, the scope of research in crisis communication needs to be widened, as more needs to be known about the first-hand reports on crisis, and about the factors that shape the crisis response. (Coombs 2009, 99)

Common research topics in the literature of crisis communication have dealt with the event of crisis situation, its management and response. Especially from the organisational point of view, it is the image restoration, or public relations practitioners’ media usage and relationship or crisis strategies in crisis situations that have caught attention (Kersten & Sidky 2005, Gonzalez-Herrero & Pratt 1996, Cho & Gower 2006, Taylor & Perry 2005).

In the case of disasters, communication is essential between various agencies, e.g. collaborating in multi-organisational response networks. According to Adkins (2012, 95) “a disaster or a crisis event rarely if ever has an impact that is limited to only one organization or entity”. Since several actors are involved, a communication plan between agencies needs to be established well before any disaster or crisis.

Part of the crisis communication literature concerns how communication can support resilience in the case of natural disasters, pandemics and terrorism. Communication tasks in crisis situations have been described by Reynolds & Seeger (2005) in the ‘Crisis and Emergency Risk Communication Model’ and further developed into an audit tool to evaluate the crisis communication performance in various stages of a crisis or disaster (Palttala & Vos 2011). The goals of communication include empowerment, societal understanding of risk, and co-operation between citizen, media and respective organisations (Palttala & Vos 2012, 44).

Communication is essential in all phases of disaster. In this thesis the focus is on disaster preparedness education. The author prefers to use “education”, instead of “communication”, for specific reasons. Using the concept of “disaster preparedness education” the author points to the aim of expanding capacity to learn to cope with disasters, in other words, building resilience. The education process not only helps citizens to build on their understanding of disaster preparedness, but it also creates opportunities for them to construct new actions towards preparedness. Moreover, the citizens and relational communities construct new knowledge as well as an agreed understanding that can result in modified behaviours that bolster resilience. In this, the purpose of education is seen not so much as moving “from a condition of ignorance to one of knowledge” (Gergen, 1999, 179), but rather as encouragement to participate in

the process, collaborate, and form a community voice during the collective learning process. Chapter 2.7 deals with Paolo Freire's arguments, which according to Gergen (1999) are supported by social constructionism. In this chapter, the Freirian framework of liberation and critical pedagogy has been applied in relation to education mediated by local radio.

2.2 Disaster risk reduction

With natural disasters, something can be done to mitigate their destructive power - it might be possible to reduce overall structural damage, for example, by early on adopting earthquake resistant construction techniques. This is part of prevention and mitigation. Preparedness activities also include educative communication with public groups that strengthen resilience.

Nowadays disaster risk reduction (DRR) is emphasised by United Nations. According to UN's first biennial global assessment, the emphasis on policy needs to be on disaster risk reduction (ISDR 2009) UN as well as other agencies have established websites (UNISDR.org, unocha.org, Preventionweb.net, proactnetwork.org, odiph.org, unescap.org) to facilitate communication and information sharing in mitigation and disaster preparedness issues, focusing on climate change on one hand, and improving the disaster resilience of communities on the other hand.

In disaster risk reduction a community approach and social relationships are emphasised (Eiser et al. 2012; Jayasuriya & McCawley 2010). According to Heath et al. (2009) on the local level, emergency committees formed from community members have provided a way of realizing risk. Participating in such committees motivates citizens to search for ways to mitigate future disasters. For example, as a result of a chemical accident in Bhopal in India, theories and models have been sought to find answers as to how communication could serve the local population to mitigate future similar industrial disasters. Besides stakeholders, community groups like schools, citizen organisations, religious bodies, cultural groups, and disability organisations should be involved in pre-crisis practices since they all have networks and are able to disseminate information in a way that is appropriate to the group (Ballard-Reisch et al. 2008, 213).

Currently, in many countries, collaborative approaches including citizens in crisis preparedness and response are emphasised. In the USA, the term 'whole community approach' has been introduced to express importance of engaging public groups and organisations in crisis preparedness and response (<http://fema.org/whole-community>). For example, members of society were advised by experts "to create and sustain well-crafted infrastructures to identify risks, create emergency plans, and formulate messages and advice on actions that increase public safety" (Heath, Palenchar & O'Hair 2009, 471). These examples show that in wider crisis communication discussion, preparation is becoming more and more acknowledged as an integral phase of the process, often undertaken in collaboration with other actors. The role of communication in pre-

paring for crisis is not any more underdeveloped, as few years ago, as noted by Coombs (2009, 103).

2.3 Stakeholder enabling

Effective disaster communication requires the co-operation of several stakeholders. The development of a community approach in disaster risk reduction has been inspired by insights concerning stakeholder enabling in organisational studies. Such insights have been suggested conceptualizing the treatment of stakeholders. Breaking away from the traditional concepts of managing stakeholders, the relational view calls for enabling the stakeholders.

Past stakeholder theories have emphasised managing, 'stakeholder management', where agents exercise control over stakeholders, while the current theory of 'stakeholder enabling' implies that stakeholders, together with agents, jointly exercise control over shared concerns. This new approach focuses on an interactive process of multi-voiced stakeholder discourse, including community groups in multi-lateral action learning. (Calton & Kurland 1996, 154-158, Dixon 1994, 107)

Thus, the voice of local communities, their dialogues and conversations will be noted as multiple voices in local community narratives (Rosenau 1991, 169-173). Stakeholder enabling brings multilateral stakeholder dialogues to the forefront, for example, in public-private social problem-solving alliances (Austrom & Lad 1989). Dialogue, facilitated by moral agents is needed for establishing mutual understanding of goals. For example, governmental agencies, community and media agree that it is important to create a culture of safety together, and act accordingly. Interpersonal trust is a critical factor in collaboration in relational networks. Calton & Kurland (1996) conclude: "Our theory of stakeholder enabling will act to re-link decisions with accountability. Decisions will emerge from multiple stakeholder dialogue, facilitated by moral agents. Effective dialogue requires mutual respect, shared goals and resilient trust." (Calton & Kurland 1996, 176)

According to post modernistic dialogue in organization theory, it is not the expert, but the collective voice that needs to be engaged in the process of dialogue. Montouri & Purser (1996, 200) propose to develop small ecological learning communities within the context of larger organisational systems and their communities. Participants in these small communities can develop their own scenarios with appropriate technologies, based on local needs and resources.

Calling for a new way of organisational thinking, from managing to enabling, might be new for the western mind, however, not so new for the Asian mind, where societies are built on the importance of relationships and interaction. One such society is Indonesia, where the community, known as 'masyarakat' forms a central concept of social networks on all levels of society, whether national, urban, rural or village level. 'Masyarakat' forms the central platform

for local voices, meanings, participation, interaction and dialogue. As this thesis focuses on especially on communities in Indonesia, this will be further explained.

2.4 Masyarakat

The Indonesian's terminology of 'masyarakat' refers to a group of people who gather to build a system (closed or open) so they may interact with each other. It is like a network of relations between entities. Generally, the term 'masyarakat' refers to group of people living together in the regulated community. First, the term will be clarified and, next, its existence in two Sumatra provinces will be further explained.

2.4.1 The meaning of Masyarakat

In English, 'masyarakat' is translated as 'society'. However, while the term 'masyarakat' is derived from Arabic word 'musyarak,' meaning or emphasising the interaction, the word 'society' is derived from Latin 'societas', which means the friendship relationship, and refers more to friend, or social. (Adiputri, 2013 email)

In Europe, the German-originated word 'gemeinschaft' has been defined for community. Tonnies (2001) writes "...everyone who praises rural life has pointed to the fact that people there have a stronger and livelier sense of Community. Community means genuine, enduring life together, whereas Society is a transient and superficial thing. Thus Gemeinschaft must be understood as a living organism in its own right, while Gesellschaft is a mechanical aggregate and artefact " (Tonnies, 2001, 65). Similar views on the differences of community and society have been expressed by Tuan (2002, 311); community being small, physical proximate, with warm relationships, in contrast to society being complex and personal relationships superficial.

The Indonesian 'masyarakat' differs from the European 'gemeinschaft' in the size, usually 'gemeinschaft' is small, while masyarakat can be a small or large group of people. In relation to disaster preparedness, local villages and neighbourhoods will be the focus of attention, since disasters are experienced first at their level, which is the ordinary citizen's level in the community.

Historically in Indonesia, villages held neither administrative nor political power during the Suharto era. However, the situation in village power constellations changed during the post-Suharto period, starting in 1998, when a new law 22/99 on Regional Governance gave villagers more power in the form of the Village Consultative Assembly (BPD, Badan Perwakilan Desa) or called local government, representing the people, 'masyarakat'. In addition to local parliament on the village level, neighbourhoods inside the villages have their own heads, which are responsible for development of the neighbourhood (Lounela 2009, 47, 147, 148).

According to Lounela (2009, 148, 149), while the power of village heads diminished during the post-Suharto era, in some cases the village secretaries became more important, even so that they held responsibility over development projects, finances, statistics and issuing letters for villagers to get permits for family events such as marriages or funerals. The most significant changes to the Regional Governance law were the duties of the Village Consultative Assembly, including drafting the village budget, and issuing village regulations together with the village head.

Village life entails several facets encompassing everyday needs, such as housing and labour, as well as humanity and warmth. As the essence of everything, the villages provide the feeling of togetherness, the neighbourhoodness, and the social mesh that knits even the city together. (Jellinek 2000, 266)

In addition to forming a web of social interactions, a key concept of masyarakat is development and 'gotong royong', mutual self-help and exchange, mutual assistance, established by Sukarno to mobilise the people to participate in national and class campaigns (Bourchier 1998, 206).

From politicians and policy makers to poor village dwellers, 'gotong royong' is espoused as one of the most positive aspects of Indonesian culture. It means that neighbours know, care for, and help one another. Both urban and rural villages have been constructed around the same basic principles, which lie at the heart of Indonesian culture (Jellinek 2000):

- 'makan, tidak makan asal kumpul' (whether we eat or not does not matter, the important thing is that we gather together)
- 'bagi, bagi rejeki' (share our good fortune)
- 'rukun' (togetherness).

"These principles provide help for those in need, creating an indigenous welfare system without government intervention" (Jellinek 2000, 267).

Masyarakat refers to the people of Indonesia, whether on the national, provincial, district, village or neighbourhood level. The core of masyarakat is social interaction and mutual help. How are these attributes manifested in the villages of Aceh and West Sumatra? The next two chapters provide a brief orientation into the historical and cultural viewpoints of these two areas, with the pursuit of connecting Aceh's history and the culture of Minangkabau in West central Sumatra depicting life in the villages.

2.4.2 Acehnese history

According to Merikallio (2006) Aceh possesses a unique, independent and long history of Sultanates, from 1500s until today (Merikallio 2006). One of the strongest was Sultan Iskandar Muda, who wielded influence over the entire Malacca Straits from 1607 to 1636. Starting in 1873 the Acehnese resisted the Dutch army for over 30 years. The most famous hero from that time was female military commander Tjut Nya Dien (1850-1908) (McGlynn et al. 2007), also called Cut Nyak Dien (Jauhola 2013, 43).

In 1949, Aceh was joined by force to Indonesia (Merikallio 2006, 19), which resulted in Aceh joining a rebellion that flared in several regions of Indonesia in 1953, for six years. This continued until Aceh's leading religious leader 'ulama' accepted an olive branch as a symbol of autonomy; rebellion then wound down for a while (McGlynn et al. 2007), until the 1962 Acehnese rebellion, which resulted in Aceh being granted special status allowing it to implement Shari'a Islam (Jauhola 2013, 37).

An important segment of Aceh history came about in 1971, when Mobil oil discovered massive natural gas reserves in Northern Aceh. The Lhokseumawe liquid natural gas plant became the largest in the world accounting for 30% of Indonesian's oil and gas exports. As often is the case for mineral resources, McGlynn et al. (2007) criticise that most of the money derived from natural riches flew out to Jakarta and abroad.

In 1976 Aceh declared independency by Hasan di Tiro, and the Free Aceh Movement (Gerakan Aceh Merdeka, GAM) was formed. In succeeding years the movement, as well as the population of Aceh, was repressed by the military. Horrified by the brutality of the military the local population gave support to GAM. Thousands of GAM supporters escaped to Malaysia. (Merikallio 2006, 20)

According to McGlynn et al. (2007), the Indonesian military conducted a brutal counter-insurgency campaign in 1989-1992, and government troops stayed in the province. After the fall of Suharto in 1998, President Habibie acknowledged the resentment and anger in Aceh and apologized to the Acehnese for human rights abuses. GAM started reinforcing its troops (Merikallio 2006, 20). The Acehnese believed independence was around the corner. Exiled guerrillas came from Malaysia and began recruiting soldiers to join with GAM troops. (McGlynn et al. 2007)

May 2000 saw the humanitarian pause in hostilities and Henri Dunant Centre (HDC) facilitated ceasefire talks on Aceh between the government forces and GAM. Aceh received status of special autonomy in 2001, guaranteeing wider political, economic, and religious laws, including the right to legislate Shari'a laws. (Merikallio 2006, 22)

Ceasefire talks lead to COHA (cessation of hostilities) in December 2002, brokered by HDC, with the hope that GAM would accept autonomy as a starting point for talks, and gradually lay down its arms, and the Indonesian army would pull back to defensive positions. All parties, including representatives of civil society, would take part in Aceh's future, with the plan of having free elections in 2004. According to McGlynn et al. (2007), even though the peace process was supported by the Acehnese and the international community, it had very little backing from the negotiating parties themselves, resulting in the collapse of COHA in 2003, and the declaration of a military emergency (which was changed into a civil emergency one year later), however, for all practical purposes martial law remained in effect. (McGlynn et al. 2007)

After Susilo Bambang Yudhoyono become the president of Indonesia in 2004, new hopes for solving the Aceh autonomy question arose. In addition to the election result, two other events facilitated the peace negotiations; one, a

new Finnish negotiator visited the prisoned Aceh negotiators in Jakarta, and two, GAM was running out of weapons. (Merikallio, 2006, 35) Naturally, the devastating results of the December 2004 tsunami helped in facilitating the negotiations.

The official peace agreement between the Indonesian government and GAM was signed in August 2005 in Helsinki, and was called the Law on Governing Aceh. Finnish President Martti Ahtisaari has been credited with facilitating the negotiations. The Indonesian House of Representatives passed the new Aceh governance law in August 2006. (Merikallio 2006)

In conclusion, the history of Aceh contains several elements affecting life in villages. The conflict caused stress, and distrust of the army and the police. The relationship to the national government has been shadowed by several problems, such as the pursuit for independence and sharing the profits from the harvesting of natural resources.

2.4.3 Minangkabau culture

The villages in and around Padang have kept the unique names of the Minangkabau culture. The villages were called 'nagaris' before 1979, and have retained that name despite the law, which reorganised village life. Nagari villages indicated 'adat' would be followed as the local regional customary law and tradition in the community. Historically, Minangkabau define themselves adat as, "based on religion, and religion is based on the book". Custom is embedded in the communal culture, expressed by the Minangkabau saying "adat neither cracks in the sun nor rots in the rain" (Din Bahar 1993). The Minangkabau concept of adat seems to be more rigid than that of Avonius, who mentions adat may be territorially, religiously, or ethnically defined in everyday life. (Avonius 2003, 137)

Minangkabau is a matrilineal society, affecting the roles of male and female. According to the genealogical register, the man in the family carries responsibilities both to his son and nephew. The nephew is expected to acknowledge the authority of his uncle, even so that the greatness of the uncle is defined by the amount of the nephew's respect. As a result of matrilineality, the woman inherits the property. From this follows, that the husband is the guest at the wife's house. The wife cultivates the land she owns, while the husband helps in harvesting and ploughing. As a result, it is common for Minangkabau men to leave the village to labour in a city. Minangkabau men are well known for their involvement in commerce. (Din Bahar 1993)

The Minangkabau culture includes many sayings, which define the roles and relationships of family members. The symbolism is not limited to the language, but is expressed in the architecture of the buildings too, for example, carvings of the traditional buildings depict the values of the society, for example a carving of a flock of ducks going home symbolises organisation. (Din Bahar 1993)

How do Minangkabau cultural features relate to village life? Based on adat, tradition is important, as well as the role of women as household decision makers, especially when the husband is working elsewhere.

Although the Acehnese reside in Northern Sumatra and the Minangkabau in West Sumatra, both cultures contain similar elements in that both ethnic groups have been good traders historically; the men tend to leave home for trade, leaving the farming to the women (Kahn 1993). The trader aspect of the men might possibly be advantageous when forming public-private partnerships.

Masyarakat, the community is very central to the Sumatra coastal areas, both in Aceh and West Sumatra. Social interaction in the community is the key factor in creating and maintaining meaning for the villagers.

2.5 Social construction of reality

Communities create meaning while interacting. In disaster preparedness communication, enhancing understanding of risks forms a key element. This chapter explains how the theorizing of Berger & Luckmann (1967) connects to the construction of risk.

2.5.1 Theory of sociology of knowledge

The basic notion behind the theory of sociology of knowledge is, that how something looks depends on how we look at it. The key question is what we 'know' as our reality. First, the concept of the social construction of reality is clarified, followed by how communities understand the field of forces and construct risk. Comprehension of processes influencing risk perception helps to define the key issues when designing media approaches for disaster preparedness. Berger & Luckmann (1967) define the social construction of reality basing it to the everyday knowledge.

"The theoretical formulations of reality, whether they be scientific or philosophical or even mythological, do not exhaust what is 'real' for the members of a society. Since this is so, the sociology of knowledge must first of all concern itself with what people 'know' as 'reality' in their everyday, non- or pre-theoretical lives. In other words, commonsense 'knowledge' rather than 'ideas' must be the central focus for the sociology of knowledge. It is precisely this 'knowledge' that constitutes the fabric of meanings without which no society could exist. The sociology of knowledge, therefore, must concern itself with the social construction of reality." (Berger & Luckmann, 1967, 15.)

Next to objective reality there is and subjective reality, and according to Berger & Luckmann (1967, 134), the relationship between the two is dialectic one, never static, like an ongoing balancing act. Berger & Luckmann (1967, 129-130) clarify objective reality as follows: "Objective reality is the one we are born in and we socialize into it. However, when an individual is born, he is not a mem-

ber of society automatically; instead, he is born with disposition toward sociality, and becoming a member of society through socialization”.

The subjective nature of reality is constructed in interconnected relationships and social processes. The everyday life presents itself as corresponding meanings, which results in sharing common sense about reality of the world, called ‘*commonsense consciousness*’ by Berger & Luckmann (1967, 23).

Berger & Luckmann (1967, 70) define knowledge as “the objectivated meanings of institutional activity”. So that the relevance of knowledge for all members of society would be the same, especially in situations when the knowledge is complex and important for the whole society; they need to be re-affirmed through symbolic objects or rituals. Besides the latter, for Berger & Luckmann (1967, 152), conversation forms the most important means of reality maintenance, as well as for sharing the relevance in the group.

Berger & Luckmann (1967, 70-71) pose a hunting society as an example of knowledge transmitted from generation to generation, from knowers to non-knowers. According to them, institutionally designated uncles are defined as knowers, and therefore, they are able to teach hunting for others. They know the hunting craft, because they are maternal uncles (not because they know hunting). Similarly, the village heads in Indonesian rural areas are viewed as knowledgeable or skilful since they are the village heads.

The theory of sociology of knowledge emphasises the collective aspect of meaning, created jointly in social processes, and reconfirmed in the community discussions. This collective understanding situates the group in time and space.

“The symbolic universe also orders history. It locates all collective events in a cohesive unity that includes past, present and future. With regard to the past, it establishes a ‘memory’ that is shared by all the individuals socialized within the collectivity. With regard to the future, it establishes a common frame of reference for the projection of individual actions...All the members of a society can now conceive themselves as belonging to a meaningful universe, which was there before they were born and will be there after they die...”

(Berger & Luckmann, 1967, 103)

At this point it is important to point out, that Berger & Luckmann (1967) define crisis as a disruption in maintaining the reality. Procedures and collective rituals are set up for times of such breakdowns in reality.

“In crisis situations the procedures are essentially the same as in routine maintenance, except that the reality-confirmations have to be explicit and intensive. Frequently, ritual techniques are brought into play. While the individual may improvise reality-maintaining procedures in the face of a crisis, the society itself sets up specific procedures for situations recognized as involving the risk of a breakdown of a reality.”

(Berger & Luckmann, 1967, 156)

Both the individual as well as the society set up procedures for situations involving a risk of a breakdown in reality. Berger & Luckmann (1967, 156) men-

tion that “collective rituals of reality-maintenance may be institutionalized for times of natural catastrophe”.

Even though reality maintenance is called for in disasters according to Berger & Luckmann (1967), creativity is also needed in adjusting to a changing situation, as proposed by the constructionist approach dealt with in the next section.

2.5.2 Changing views on education and preparedness

Instead of maintenance, the constructionist view stresses innovation and creating new. Especially in educative activities, according to Binzarg & Manning (1996), the emphasis is shifting from providing objective facts based on predictability, into strengthening students’ ability to make sense and give sense to their reality, facilitating proactive creation and exploration (in Boje et. al. 1996, 264-265).

Note here this view applies to disaster situations, where it is rarely possible to give tailored answers and instead, creative behaviours and solutions are called for. While it is beneficial for a society or a stakeholder to have procedures practiced, a mind of proactive creation is needed and useful in a crisis situation.

Creativity and activity have proved to be successful in several studies of disaster preparedness education, as explained in chapter 3. Simple lectures are not enough, it is the exploration, and the finding of information, and doing things actively with others that produces positive results. In this way building relationships to promote trust and cooperation is an important aim in preparedness education.. However, while calling for preparedness education in relation to traditional societies, the researcher needs to keep in mind the subjective construction of their reality, which tends to lean toward maintaining the reality rather than preparing for its change.

In disaster preparedness, citizens gain cognitive knowledge, learn certain skills to face the crisis, and at the same time, according to Wenger, individuals and communities create new identities (Wenger, 2001, 263). In this process, the three views of learning, behavioristic, information processing, and constructivistic learning (Tynjälä, 1999) are applicable. This thesis utilizes these three views: information processing, behavioristic learning resulting in changed behaviour, and social constructivistic learning in constructing knowledge as a product of social processes in the community.

2.5.3 Constructionist approaches to risk

The constructionist perspective proposes that the risk, environment and media are socially and culturally constructed through interaction and discourse. It emphasises the role of culture in approaches to risk communication.

According to Aldoory (2009, 228), the social constructionist approach emphasises the influential role of culture in constructing meaning, beliefs and actions. This implies that interpretation of risk and risk messages varies depend-

ing on the cultural group. Note also that media use varies depending on the cultural group.

Lundgren & McMakin (1998, 21) claim that the social constructionist approach to risk communication assumes that the scientific community, media personnel, and audiences all have “values, beliefs and emotions that subtly affect how risks are assessed and communicated”. Those who communicate about risk, and especially media, need to understand the socio-cultural as well as psychological determinants that help formulate risk, or risk assessment (Finucane 2002, 36; Finucane & Holup 2005, 1610). According to the social network contagion approach (Scherer & Cho 2003), relations between individuals and the resulting social networks and self-organizing systems affect risk perceptions and communication. Strong social ties and frequent interactions shape how people react to the risk message or share risk information, even though there is no attempt to change or influence them (Scherer & Cho 2003).

Contagion theory is based on the assumption that communication networks provide a platform, which exposes people, groups and organisations to information, attitudes, and the behaviours of others (Burt 1987). It recognises two kinds of contagion, cohesion and structural closeness. “Contagion by cohesion implies that the attitudes and behaviours of the others with whom they are connected influence network members. Contagion by structural equivalence implies, that others who have similar structural patterns of relationships within network influence people”, as Monge & Contractor state (2001, 466). In the framework of this thesis, both forms of contagion can be hypothesized to exist – cohesion among the community relationships, and contagion among those at the same level of stakeholder organisations, such as in between government, non-government, or on the village level. Experts make risk evaluations and declare the levels of uncertainties; however, it is the individuals and their social networks that construct the perception of risk in the end. Douglas & Wildavsky (1983, 73) state the following: “The notion of risk is an extraordinarily constructed idea, essentially decontextualized and desocialized. Thinking about how to choose between risks, subjective values must take priority. It is a travesty of rational thought to pretend that it is best to take value-free decisions in matters of life and death.”

Douglas & Wildavsky (1983, 84) notice that risk perception dialogue is divided into two realms, one emphasising intellectualism in decision-making, and the other emphasising an irrational view. They bring forth the idea of community life defining the perceptions of members, referring that community members learn from the community rather than from experts such as health authorities (Douglas & Wildavsky 1983, 85).

Another controversy over risk relates to the division of the problem into two main realms, that of physical science and that of subjective perception, within the middle of these two realms culture, with its shared beliefs and values (Douglas & Wildavsky 1983, 194). This is clarified in figure 1 (inspired by Douglas & Wildavsky 1983, 194).

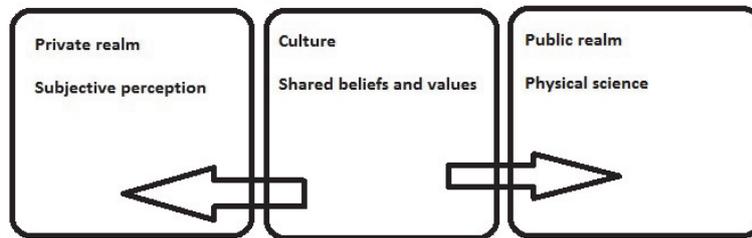


FIGURE 1 Spheres related to risk perception

The social amplification of risk framework (SARF), proposed by Kaspersen et al. (1988), emphasises the social structures and processes in experiencing risk, which are echoed in risk perceptions from individuals or from society as a whole. Perception of risk, as well as the process of experiencing the risk and the community response to risk, all have repercussions on society, whether from a human context, the structural aspect, or from an economic perspective. According to the cultural theorist view of risk perception, it is the combination of cultural biases and social relations that interact in creating the perception of risk. This combination of cultural biases and social relations is also known as the ways of life in cultural theory. (Wildavsky & Dake 1990, 44)

Wildavsky & Dake (1990, 55) propose that risk communication programmes focus on; instead of facts; on creating trust in institutions, and on the credibility of hazard information. They also recommend that cultural theory, as it is sensitive to understanding how various worldviews are related to risk perception, should be used when formulating and tailoring educational programmes “to the plural rationalities represented in the general public” (Wildavsky & Dake, 1990, 57).

One way of adding social linkages and citizen participation is community involvement. Participatory approaches have been proven functional in the case of community radio in connection with organizing of community meetings. In addition to interaction, community meetings can generate satisfaction for citizens; providing the event organizers, such as government agencies, are credible or trustworthy (McComas 2003). Community involvement can be fostered via community organisations, such as labour unions, veteran’s groups, and fraternities, which may serve as a segmentation agent for various groups (Stephens et al. 2004).

Community needs to be involved in the early stages of designing the response and recovery related to disasters. Besides communication, ongoing collaboration needs to be emphasised, as this will help in creating partnership and trust. Collective action in responding to disasters can include public - non-profit partnerships as well as public - profit partnerships which can bridge the critical gap in service delivery during emergencies not met by public organisations (Kapucu 2006, 217-218). Instead of a top-down linear model, the process model is suggested to work best in risk communication, where instead of expert voice; the decision output is seen as a community effort (Heath et al. 2009, 479).

2.6 Resilience

Resilience is a key feature helping both individuals and communities in surviving disasters. In mitigation research, the consensus exists that resilience needs to be strengthened, while vulnerabilities are to be reduced. Resilient people cope better than expected, while vulnerable people are exposed to a greater degree to the damages caused by disasters. (Gonsalves & Mohan 2011, 101)

One of the older definitions of resilience is by Douglas & Wildavsky (1983, 196): "Resilience is the capacity to use change to better cope with the unknown; it is learning to bounce back". Godschalk (2003, 140) defines resilience as a communities' capacity to anticipate and respond to disasters, while Weick & Sutcliffe (2007) argue that anticipation does not help in coping with the unexpected and learning needs to be emphasised. Resilience entails capacity to learn from failure, and remain sensitive to errors. Resilience "encourages people to act while thinking or to act in order to think more clearly" (Weick & Sutcliffe, 2007, 71).

Norris et al. (2008, 130, 135) define community resilience in a multifaceted way, composed of a network of adaptive capacities that include resources, as well as the dynamic attributes (robustness, redundancy, rapidity) of those resources. The more severe, enduring, and surprising the stressor, the stronger the resources must be to create resistance or resilience. Information and communication are seen as an adaptive resource, consisting of "narratives, responsible media, skills and infrastructure and trusted sources of information", while also the importance of social capital is underlined, including sense of community and citizen participation (Norris et al., 2008, 136, Fig. 2).

Resilience is seen as a characteristic that applies to all crisis phases (e.g. Boon et al. 2012; Ainuddin & Routray 2012) and therefore present before, during and after disaster. Enhancing resilience is especially seen as relevant in the pre-disaster stage, as a tool to strengthen communities and increase their capacity to recover quickly. Community resilience, once established, helps throughout all stages of a disaster. Therefore, community resilience is seen as a characteristic of communities, and targeted as a set of adaptive capacities helping communities cope with disasters. This includes both the social processes within the community, as well as the communication and information processes, including media.

Resilience manifests itself in the physical infrastructure even before a disaster occurs, and resilient communities can take specific actions to deal with coming threats. There are several areas to target in preparation, such as costal management, community-driven development, livelihood assessment, and disaster preparedness as well as planning. Local capacities can also be strengthened through the building of strong social networks, habitat creation and restoration, financial mechanisms, market linkages, and through utilization of low cost and effective tools via information technologies. (Gonsalves & Mohan, 2011, 351)

In addition, resilience manifests itself in community through social processes. On the communal level, supporting community-based management can help create resilience. Communities, like living organs, have a voice that needs to be heard in decision-making. In that capacity, relief organisations need to learn to listen to the community, which in turn can strengthen local capacities. (Gonsalves & Mohan, 2011, 350, 351)

Resilience can be increased via community participation and risk management. Resilient communities have been recognized to own a positive self-image, an optimistic perspective on life, and an eagerness to develop the community climate. Resilient communities have the capacity to recognize conditions, mobilize resources, and self-organize in response to a crisis. It is through resilient acts that communities and their members construct strategies that manage risks. Building resilient, socially networked, vibrant communities where stores of communication capital reside offers greater comfort and security than disconnected communities. (O’Hair et al. 2005, 313, 314)

Another approach was used in a Japanese study of Maiko School (Shiwaku & Shaw 2008). Maiko students actively collected information in planning how to prepare for a crisis, improving group cohesion and useful skills in crisis preparedness. Reducing disaster risk is about reducing the underlying causes of risks, which are closely related to vulnerability, however, increasing resilience also means looking at what is available and accessible to individuals, households and communities, and in building on those existing capacities (Colten & Sumpter 2009, 781).

In this thesis community resilience is seen as a key concept of disaster mitigation. The author agrees with Weick & Sutcliffe (2007) in that improving resilience consists of not only enlarging competencies via education, but also forming knowledgeable people into networks and avoiding indifferent feedback practices in the communities. In developing countries, such as Indonesia, community radio forms one way of enhancing the local voices and providing community members with a platform to share their narratives. There is also a need for creating structures in the local government that facilitate community-based decision-making and management. During the interviews for this thesis, for example, the village leaders interviewed voiced that there had not been enough drills on the local village level. Perhaps this is an indication that the resilience of local villages in rural areas should garner more attention when it comes to disaster preparedness education.

2.7 Media as public service

The media has several roles in disaster reporting and Chapter 3 details media’s roles in disaster preparedness. In recent years, some public service broadcasters in Asia initiated discussion on the social responsibility of public service broadcasting. Tanaka (2012, 11, 12) calls for public service broadcasters to meet the

needs and wants of the public, instead of following a traditional paternalistic model:

"In the face of saving lives, which is the ultimate public value, everything else becomes secondary.... In the broad-scale and complex disaster of 3.11, NHK was required to serve the public in all the astonishing way and complexity. The traditional paternalistic 'public value from above' does not suffice to meet the needs and wants of the public. The disaster reporting is a vital social responsibility and a valued role for PSM. It has been so since the establishment of NHK but the experiences of disaster reporting of 3.11 imply that the meaning of 'public' has been changing."

'Public value from the bottom', instead of from above is called for by Tanaka (2012), who is convinced that such topics as human security would be a worthwhile topic in public service media (PSM).

When discussing organisational crises, Andersen & Spitzberg (2009, 210-211) list some common features that relate to media and information in the case of disasters:

- All disasters are 'local' in character, meaning that they are reported by local media initially
- Information is always incomplete in disaster situations
- Slowly unfolding disasters demand more media consumption and confirmation than sudden disasters
- The more complex or technical the risk or disaster, the more media messages will be accepted by the public

These characteristics could be applied to public service broadcasting in relation to natural disasters.

In addition to public service broadcasting, broadcast facilities, established locally, can provide a communication platform for the local community. Community radio is a radio station put together by the residents of a community, for their needs and is run by the community; "a radio station by, for, and from the people" (Ramakrishnan, 2007). Community radio actualises what Thompson (1995, 4) calls for involving the usage of communications media; "the creation of new forms of action and interaction in social world, new kinds of social relationship and new ways of relating to other and to oneself".

Paolo Freire's concepts of community development radio, also called 'Comdev radio' and participatory communication, have been utilized in developing community media in Latin America and Africa. Within the framework of liberation and critical pedagogy, a local radio station gives voice to ordinary citizens, and facilitates them to become responsible for their own lives (Freire, 1972). Srampickal (2006, 10) states that community radio in many developing countries functions in a similar fashion, as local conscientizing agents, which is especially valuable in rural, post conflict communities. In addition to the role of providing information, community radio is able to focus specifically on local needs. It provides a venue for community members to participate in making programmes utilizing local talent in music, songs, and storytelling. Similarly, according to White (2004, 11, 19), community media allows ordinary people to

become producers of media discourses, and give marginal groups possibilities to create media content from their point of view.

Both Freire (1972) and White (2004) see the role of community radio as an educator, even as a starter for socio-political change. The key factor in creating change, according to White (2000, 219), is that the audience deconstructs and reconstructs mass media text and while doing so, formulates an alternative view of the society.

In addition to being an educator, community radio has many other functions (Romo-Murphy 2010), such as “radio as fun, radio as a revitalizer, as a collaborative project, as a free expression and self-determination, as a political tool to involve and affect listeners, as a voice amplifier with a transformative impact, as serving with other social groups and as an empowering tool” (Milan, 2008).

In this thesis community radio is seen as serving both the community as well as other social groups (stakeholders) and as an effective empowering tool in disaster preparedness. However, the author would like to extend the concept of community radio to local radio. Strictly speaking, as defined in the beginning of this chapter, in the ideal case, the community financially supports community radio. However, in many cases this has not been possible, and community radio has needed to look elsewhere for funding, either locally or internationally. When referring to community radio in this thesis, this simply means a model that enables the listeners to be involved in and participate in the production of radio programmes. This relates to the broader definition of radio including facilitation of community preparedness.

2.8 Information behaviour

Information behaviour is a process that varies depending on the context and situation where the individual acts (Sonnenwald 1999, 184). In organisational communication, the organisations are seen as acting in an information environment, and making sense of as well as showing recognition to their environments. They are seen as information obtaining as well as information processing systems (Sutcliffe, 2001, 225). Especially in times of catastrophes, organisations need information on developments in the areas and people affected. Organisations, as well as media, actively search for sources for reliable information from the catastrophe area. The communities affected also have many information needs during a catastrophe; however, those needs are very different from the needs of organisations and media. Communities and the people affected have even fewer information resources, since very often the telecommunications network collapses when a disaster occurs. During the Indian Ocean Tsunami 2004, ‘people on the street’ formed the primary source of information about the approaching tsunami for local citizens.

Naturally, the information environment for preparedness differs for each catastrophic situation. Before an event, there is no immediacy, and in addition

there are many sources available. Since the purpose of this thesis is to create a model for educational pre-disaster campaigns, the focus is on information seeking related to being prepared.

The concept 'information behaviour' in information seeking is used here, even though conceptually, from the social constructionist viewpoint, the term 'information practice' would be better suited in this framework. As explained by Savolainen (2007, 121), "In this light, a basic characteristic of the discourse on practice, in general, as well as 'information practice', in particular, is the emphasis placed on the role of contextual factors of information seeking, use, and sharing, as distinct from the individualist and often decontextualized approaches that are seen as characteristic of assumptions of information behaviour".

Savolainen (2007) proposes the term information practice to rise from a social constructionist point of view, while information behaviour rises from the cognitive point of view. However, due to language constraints, methodologically it was not possible to research the creating of meaning in local discourses; therefore, the concept of 'information behaviour' is utilized in this thesis.

2.8.1 Krikelas model

The Model of 'Information seeking' by Krikelas (Krikelas 1983) defines information-seeking behaviour as an activity to respond to a specific need. In this approach information need is based on uncertainty recognized by an individual and, consequently, a cognitive environmental map is used to deal with uncertainty. Information seekers usually prefer a human as a source of knowledge and one that is easy to approach.

For the purposes of disaster preparedness, Krikelas' model suits well in its defining the need of information as "a state of uncertainty recognized by the individual" (Henefer & Fulton 2005, 226). Information seeking, related to immediacy, is separated from longterm information gathering. The model emphasises that it is the nature of the problem and its urgency that defines the activity of information seeking, recognizing that a human being is able to draw upon his or her own experience or memories. (Henefer & Fulton, 2005)

The Krikelas's model emphasises that the individual makes a conscious effort towards information seeking, and accidental and incidental acquisitions of information are beyond the scope of information behaviour. Savolainen (2007, 114) concludes, that even though Krikelas' model shared the traditional behaviourist concept of 'stimulus' as information, the model does not focus on an observable stimulus-response -model, but rather looks to the internalized, unobservable process in a human being where stimulus reduces uncertainty.

2.8.2 Information horizons

The information horizons framework, initially introduced to information studies by Sonnenwald (1999), emphasises the role of social networks and contexts in information behaviour. Information behaviour is a process, and information

horizons and information sources are determined socially and individually (Sonnenwald 1999, 184). The information horizons framework builds on theories of information science and sociology. The framework for human information behaviour provides a theoretical basis for the method of information horizons (Sonnenwald et al. 2001).

The framework proposes that human information behaviour is "shaped by, and shapes individuals, social networks, situations and contexts" (Sonnenwald, 1999, 180). Social networks help to identify, and information needs and social networks help to determine the information resources available. Information behaviour is constructed amidst a flow of reflections and/or evaluations concerning the lack of knowledge. Once the lack of knowledge has been recognized, individual seeks the knowledge from the 'information horizon'. According to Sonnenwald (2005), information horizon consists of both information resources and relationships, such as social networks, documents, broadcast media, webpages, books, and information retrieval systems. Human information seeking can be viewed as collaboration among an individual and information resources. In the collaboration, the meaning of information is shared, and the lack of information is resolved. (Sonnenwald 2005, 191-197)

Information horizons may be conceptualized as densely populated spaces, where many solutions are assumed. The information-retrieval problem expands from determining the most efficient path to the best solution, and how to make those solutions visible to the individual and to the other resources. An information horizon may consist of a variety of information resources. (Sonnenwald, 1999)

Based on this framework, Sonnenwald & al. (2001) developed a research method, that is, an information horizon map that graphically represents information resources and people's preferences for these resources (Savolainen 2007, 1712). Savolainen & Kari (2004) developed Sonnenwald's framework further into the concept 'Information source horizon', building a bridge between information studies and social phenomenology. They define horizon as an imaginary field, where the information user positions his or her preferred sources by significance and relevancy. Relevance of an information source is evaluated by its quality and accessibility. Savolainen & Kari (2004) emphasise how the information environment is perceived. For example, in their research on placing the Internet as an information source horizon, the research question dealt with perceiving the value of the Internet as a source for self-development.

Huvila (2009) sees differences between the frameworks of Sonnenwald and Savolainen & Kari (2004) in that the relationship to the reality of the information horizon is either real or perceived. Sonnenwald's framework deals with real sources of information, while Savolainen & Kari's information horizons framework is comprised of "imaginary fields that open before the mind's eyes of information seekers" (Huvila, 2009, 19). Sonnenwald's framework has been used in studies for city planners' information seeking (Serola 2006), for children's and students' information seeking - for example when they needed help in a topic they defined (Shenton & Dixon 2003), and for understanding the re-

ciprocal relationships between technologically-mediated systems, communities and information resources (McDonald & Lin 2006). In these studies, the graphical presentation of the map has been utilized either as a starter or as a conclusive method, in addition to the interviews or focus groups.

In this thesis, the map is used as a descriptive means of showing respondent's information sources for earthquake preparedness. This was the first time information horizon maps were used in ethnographic research. Due to the language constraints, the respondents were not interviewed on the selection of their sources. In comparison to the Savolainen & Kari -approach the author of this thesis prefers Sonnenwald's information horizon in that it enables studying the relationships between the information sources. The respondents were asked to rate the sources in terms of preference, not in terms of relevance, since linguistically this would have been difficult to explain to the respondent-drawers.

2.9 Conclusive thoughts on the theoretical framework

Disaster communication has been defined as one form of crisis communication. Crisis communication is the general form, and disaster communication a special form of communicating, as in the case of this thesis, before a natural disaster, in preparedness education.

In theory, disaster and crisis are conceptualized as being close to each other, sometimes overlapping or seen as a continuum. In public health, risk communications is used related to health campaigns and media messages to induce changes in citizens' behaviour. Risk communication is based on the assumption that the public has a right to be informed about the hazards and risks, and make decisions regarding the risk or threat (Seeger & Reynolds 2008, 9).

In this thesis risk communication is seen as focused on communicating the threat of an approaching natural disaster. Risk communication forms an essential role in creating awareness among the public. Without risk communication, the citizens may not know of the threat. In this respect, risk communication is essential in disaster preparedness communication.

While risk communication informs of the probabilities of threat, 'disaster preparedness communication' positively educates the community about the readiness for disaster. In designing educational media campaigns, it is of utmost importance to know what sources and communication channels community members are using. This cognitive side of information horizon theory is called 'information behaviour' or 'information-related behaviour' (Savolainen, 2007).

As risk communication is constructed socially, this calls for an emphasis on the community, and using communal methods of discussion, discourse, and gatherings to facilitate internalization of the risk awareness. Once this perception and awareness of disaster probability is created, the citizens and community orient together towards preparedness. This preparedness facilitates the

community's capacity to anticipate and respond to disasters. This capacity is also called resilience.

The research has been conducted in less pluralistic settings, where traditional cultures have been nurtured, and the structure of society has remained consensual. Similarly, the role of media is to help maintain community stability (Dunwoody & Griffin 1999, 143, 144). This aspect needs to be kept in mind when interpreting the research results. The role of the media differs depending on the nature of the community where it functions. In communities with pluralistic values, it is the structural pluralism that primarily determines how media stories are constructed (Dunwoody & Griffin 1999, 156).

Brown & Singhal (1999, 273) point out that in homogenous communities, with similar community values and beliefs, pro-social messages can be adopted quickly. This is a feature that facilitates the acceptance of disaster preparedness campaigns in Indonesian coastal areas.

In this study, the subject of disasters is approached from a positive perspective, with the focus on awareness and preparedness and the purpose of contributing to reducing harm. This idealistic view is permitted by hypothesising the concept of community resilience, and a community's ability and capacity to learn.

Quarantelli (2008, 899) questioned, "*Are individuals and groups likely to engage in preparing for disasters if they are aware of disaster-inducing related threats and risks? This is often assumed in disaster educational or information campaigns and in public policies, the notion being that knowledge and information will lead to relevant actions.*" Could one reason for Quarantelli's scepticism be the inappropriate approach that campaign methods have taken in not pressing for community involvement? Or, could it be that the community does not trust the channels used for campaigning?

This thesis presents the notion that both media and community can work together supporting and encouraging one another actively in a positive environment with the overall goal of strengthening resilience in facing disaster. In this scenario the media viewpoint is changed from that of framing, stagnation, or sensationalism, to the proposition of media carrying social responsibility in a multilateral relationship with the community and a functional organisational response network. The community viewpoint in this case is changed from one of passivity and vulnerability, to one of active participation and involvement, thereby creating a positive atmosphere in which resilience can be bolstered.

3 CONCEPTUALIZING THE ROLE OF BROADCAST MEDIA IN DISASTER PREPAREDNESS

This chapter defines the role of broadcast media in a disaster situation, and specifically looks at how radio contributes to disaster preparedness. For this purpose a structured literature review was conducted, published in Article 1. The method and results of this review, including 87 refereed papers published in the last ten years are summarized in section 3.1.

For this chapter an additional study was conducted, based on the systematic literature review. Using the data-extraction table created for the literature review, ten empirical studies found were analysed to further conceptualize the role of broadcast media in disaster preparedness, as this is the main focus of this dissertation. The method for this additional study is explained in section 3.2. In section 3.3 the findings are reported and discussed, and in section 3.4 conclusions are drawn.

3.1 Lessons learned in disaster preparedness education -review in brief

The 87 reviewed articles were selected for in the EBSCO and ProQuest databases, covering refereed journals in the previous 10 years. The following search words were employed: 'disaster', 'preparedness' or 'readiness', and 'media', 'radio', 'message', 'campaign', or 'broadcast'; or combinations thereof. Initially 392 articles were catalogued (duplicates removed), and after screening the articles for relevance, a data-extraction table was compiled for their analysis. The research questions for Article 1 were: RQ1. How is disaster preparedness defined in the literature? RQ2. What have investigations of previous disasters taught about disaster preparedness education? RQ3. What, according to literature, is the contribution of the broadcast media to disaster preparedness? RQ4. What trends are found in research regarding the role of broadcast media in disaster preparedness education?

As an answer to the first research question, the literature review concluded that the terms of awareness and preparedness have been defined as separate modalities of preparedness, with the proposition that awareness precedes preparedness. Moreover, the review concluded that with broadcast media, the purpose is to influence both modalities of preparedness. The literature review defined the disaster preparedness as preventative actions before, during and early stages of the disaster, with the purpose of reducing the risk. These actions are related to information sharing about the disaster, whether by a government, an individual, a household, or a community.

Responding to the second research question, the literature review pointed out that besides indigenous knowledge, disaster preparedness needs to be cultivated by community groups and societal institutions such as schools and family.

Looking into the contribution of broadcast media in the third research question, their role is viewed both in a positive and a negative light. Informing citizens about the risks and giving advice on preparing for disasters is viewed positive, while examples of media framing of response actions when portrayed in a sensational way are seen as negative.

Finally, the literature review revealed a growing role of media information in facilitating disaster awareness. They often are the primary source about the approaching disaster. Their role could be boosted by being perceived as a trusted source of information, and by being a source of preparedness education on a continuous basis. Research on media's performance has centred on the quality of the warning messages. An important finding from these investigations shows the content of these warning messages can be validated through social networks. And although media is seen as needing to improve its performance, in relation to warnings and education, the literature review concluded positively that media does facilitate disaster awareness. At the same time, the participation of citizens and communities in disaster preparedness education is necessary. The details of the literature review were reported in Article 1.

To further analyse the findings in the literature, as a basis for this dissertation, empirical studies among the articles found were scrutinized. The purpose of the next sections of this chapter is to shed light on the usefulness of the broadcast media as a disaster preparedness educator and facilitator. These ten empirical studies, from the literature review, were further discussed with this purpose in mind.

3.2 Overview of ten empirical studies from the literature review

To conceptualize the role of broadcast media in disasters, ten empirical articles from the literature review were further scrutinized to clarify the role of the broadcast media in disaster preparedness. From the 87 articles, the author selected empirical studies dealing with natural disaster. The ten depicted media's role in disaster preparedness. In and of itself, this is a novel approach, focusing

on the role of broadcast media in disaster preparedness, while bringing together insights from empirical studies.

The empirical studies dealt with different kinds of disasters, earthquakes, tsunamis, hurricanes, cyclones and potentially destructive storms. The studies took place in various countries; five were implemented in various countries in Asia, two in the USA, and one each in Australia, New Zealand and Turkey. The Asian countries include Bangladesh, India, Nepal, Indonesia and Malaysia. The media landscape and societal situation in non-Asian countries differ significantly from the Asian situation, however, similarities do exist – for example, in studies about hurricane Katrina, it is the minorities in the USA that rely on interpersonal channels in both the preparedness for hurricanes and in their decision making to evacuate (Spence et al. 2007). In Asian studies, such as in Tamil Nadu, India; the villages relied on interpersonal channels in their evacuation decision (Sharma et al. 2009).

Ethnic differences are present in the USA studies; when using the Internet, the African Americans did not use it to the same extent as the Caucasians and non-whites. However, television use, as a medium of disaster communication, was universal in the three ethnic groups. (Spence et al. 2007)

The ten empirical studies reviewed all point out the need for several actors in disaster preparedness. With the exception of the study in Australia, these studies depict the view that media, by itself, is not enough as a source of information in warning and educating about disaster. In all these studies, media is depicted as partner with other actors, such as government departments, non-government organisations, and the community.

In two empirical studies (Shiwaku et al. 2007 and Ronan et al. 2012), the results of a specific school educational programme were tested. Even though the focus was on the school programme, the educational approach also included media and community. Both studies concluded that even though risk perception can be taught via a school programme, the development of the behavioural action for disaster reduction requires additional participation using media, and interaction with the community.

Five empirical studies focused on a recent disaster, whether a cyclone, storm or hurricane; these viewed the media as a source of warning and information rather than a source of education (Cretikos et al. 2008, Kim & Kang 2010, Paul & Dutt 2010, Sharma et al. 2009, Spence et al. 2007). By learning from an actual event, how people responded and behaved at the onset of a natural hazard, it is possible to gain knowledge about citizens' information needs in advance in preparation for disasters. From these studies conclusions can be drawn for building a model for disaster preparedness education.

Three empirical studies (Kusumasari & Alam 2012, Tekeli-Yesil et al. 2011 and Said et al. 2011) dealt with media as an education source. Both Kusumasari & Alam (2012) and Said et al. (2011) emphasise the educational function of media in partnership with government organisations and community, even though both of them view government as the primary factor in disaster preparedness, saying the government is responsible for protecting the community

(Kusumasari & Alam, 2012), and the government needs to create the laws, infrastructure and procedures for disaster preparedness. On the other hand, in Turkey, Tekeli-Yesil et al. (2011) sees media's task to support the culture of safety in society, by helping citizens to understand the risk of disasters, and to motivate them to look for information on their own.

An overview of the empirical studies found is provided in table 2.

TABLE 2 Studies reviewed, their methods and disasters depicted

	Study	Method	n	Disaster
1	Shiwaku et al. 2007	Questionnaire survey in six schools in Nepal	452 students aged 15-16	Earthquake
2	Sharma et al. 2009	Interviews for those who received warning by radio in India	44 household heads	Cyclone
3	Paul & Dutt 2010	Purposive sampling, survey in Bangladesh	257 survivors	Cyclone
4	Cretikos et al. 2008	Rapid cluster survey in Australia	227 households	Storm
5	Kusumasari & Alam 2012	Key informants from central, provincial and local government, community leader, local and international NGOs in Indonesia	40 key informant interviews	Earthquake
6	Ronan et al. 2012	Pre and post-test via school in New Zealand	213 primary and intermediate students, ages 8-17	Earthquake
7	Spence et al 2007	Survey in USA	935 Hurricane Katrina evacuees 5 weeks following the evacuation	Hurricane
8	Tekeli-Yesil et al. 2011	Survey in Istanbul	1,123 city interviews	Earthquake
9	Said et al. 2011	Multi-method: focus group and surveys in Malaysia	19 focus group participants, survey to 236 students, 85 teachers, 30 leaders and 122 households in three villages	Tsunami
10	Kim & Kang 2010	Telephone interviews in USA	186 Hurricane survivors	Hurricane

The author examined these studies qualitatively, in order to determine media's role in disaster preparedness. The ten empirical studies evolved around the role of media as a whole, without concentrating on one medium. Therefore, the first two research questions dealt with the 'media', while the third question focused on radio's role. The author's aim was to define the role of the broadcast media and, in particular, radio in disaster preparedness.

RQ 1: What is media's role in disaster preparedness immediately prior to disaster?

RQ 2: What is media's role overall in disaster preparedness education?

RQ 3: What is radio's contribution in disaster preparedness education?

3.3 Findings

This section defines the role of broadcast media in disaster preparedness as it found in the studies reviewed. According to the ten empirical studies, media's contribution is shown as having two fundamental functions: one; a source of information, and two; a source of education. Table 3 in chapter 3.3.1 lists the studies and their principle views on the role of media. Chapter 3.3.1 begins with media's role in the immediate disaster communication situation, followed by chapters 3.3.2 and 3.3.3 dealing with the long-term preparedness situation, which is designed to build community capacity for resilience in a possible disaster event.

Before answering the research questions, certain preconditions, dealt with in the studies, are mentioned. These are necessary preconditions in disaster preparedness education. Awareness of disaster, risk perception, and message qualities have been mentioned earlier in this dissertation. These same issues emerged in these ten studies as follows:

- Disaster/hazard awareness and risk perception are necessary preconditions in disaster preparedness. (Cretikos et al. 2008; Kim & Kang 2010; Kusumasari & Alam 2012; Paul & Dutt 2010; Sharma et al. 2009; Tekeli-Yesil et al. 2011)
- Warning and preparedness messages need to have certain qualities: they must be understandable, tailored according to ethnicity and language, and false alarms are not allowed. The messages need to be trusted and easy to assimilate as far as the existing knowledge and understanding. (Paul & Dutt 2010; Sharma et al. 2009; Spence et al. 2007)

Sometimes the awareness and message qualities are both present; however there lacks the consideration of the ability to prepare, for example, in the case of a low socio-economic situation. Sometimes there is awareness; however, the message is so complicated that it is not understood. Or the message is not trusted since its sender is not trusted, or there has been a history of erroneous mes-

sages. In communities, media messages are confirmed by the social networks. Sometimes there is personal risk awareness, however, if the social risk awareness is missing, often no preparations will be made.

Motivation surfaced as a new precondition for disaster preparedness in these studies. According to three studies, motivation is needed by citizens and communities to collaborate, to look for information related to risks and prepare for disaster events. (Kim & Kang 2010; Spence et al. 2007; Tekeli-Yesil et al. 2011)

3.3.1 Media's role in disaster preparedness immediately before the disaster

Cretikos et al. (2008) found that broadcast media provide an important source of information immediately before and during disaster. Before disaster it was television and radio giving information about the approaching storm, and about half of the households reportedly made preparations. During the disaster, radio was assessed as the primary source of communication: radio 78%, social networks 50%, TV 41% of the households sampled.

Said et al. (2011) reported that in Malaysia television, radio, and public address systems, as well as patrol cars, proved to be most effective for early warning and evacuation notification. Similarly, Ronan et al. (2012) pointed out, in his study in schools, that it is easy to educate children to listen to radio for more information, after having heard a warning siren.

Television, cell phones and Internet were more used than radio as information sources in hurricane Katrina evacuation in the US (Spence et al. 2007). In Bangladesh, neither television nor radio was consulted when an evacuation decision was made in the community. In the latter case, there were neither radios nor televisions available in the households. This lack of technical equipment points to the need for confirming that households and communities are equipped with radios and batteries (Paul & Dutt 2010).

Sharma et al. (2009) studied the effect of radio's warning to evacuate before the onset of a cyclone. Warning was received, however, the decisions for evacuations were not based on media information only; instead the local community decision became an intervening factor.

These studies all point in the same direction; broadcast media inform of an approaching natural disaster. It is straightforward to teach the public to follow broadcast media for further developments of the disaster, and what measures need to be taken to respond to the event. But more important than responding to the approaching disaster, is the state of mind of being prepared even when there is no sign of an imminent hazard.

In order to take preparatory measures, citizens need to know how to be ready to take such measures. This is where disaster preparedness education comes into the picture. The citizens need to be made aware of the risk, and how to make preparations to withstand the disaster. Such preparatory measures include, for example, shelter locations, evacuation routes, emergency bags, and fuel, to name a few. What do these studies show about the media in disaster preparedness education? This question will be addressed in chapter 3.3.2.

Table 3 shows that five of the empirical studies address media primarily as an educator, and four others concentrate on the informative and warning role of media, while two mention warning as well as education.

TABLE 3 The role of media in three types of disasters, as depicted in the empirical studies

Main role of the media	Disaster type		
	Cyclone, Hurricane	Earthquake	Tsunami
Information and warning	4 (2,3,4,7)		
Warning and education	1 (10)		
Education		4 (1,5,6,8)	
Education and warning			1 (9)

Most of those studies, which see media as a source of information and warning, relate to storms, cyclones, or hurricanes. In contrast; studies, which see media as a source of education are earthquake-related investigations, and one study dealt with tsunamis from the viewpoint of media being both an educator and a warning agent.

Storm hazard warnings can inform households regarding the paths of the storm, and can include some educational advice on how to prepare. In the case of earthquakes education is needed not only to make citizens aware of the risks involved, but also to guide them in making preparations for specific scenarios. In some cases, with strong earthquakes, education means informing of the possibility and signs of tsunami.

3.3.2 Media's role in disaster awareness and preparedness education

As mentioned earlier, media is seen as part of the interconnected network of communication between organisations, community, and media representatives. Kusumari & Alam (2012) emphasise the interconnectedness and raise the issue of public involvement in planning the preparedness education on the community level. Besides availability of an early warning system, it is crucial that information flows to all levels of the community, including the vulnerable groups in the community, both before and during disaster.

Media's role is seen in its contribution to build a community-level communication environment. While Kusumasari & Alam (2012) place media in the macro level of society, Kim & Kang (2010, 484) see media on a community micro level when they point to 'different community storytellers' (such as the local media, community organisations and neighbours) as being the first and most critical component in helping residents prepare for disasters.

Media are recognised as a source of self-education for those who seek information on disaster preparedness. Shiwaku et al. (2007) mention Internet, TV, books, newspaper and other media - as sources of information. Self-education

via media is effective in raising the awareness, but for the actual preparedness discussions in social settings are needed. Shiwaku et al. define self-education as looking for information independently from media, and stress "In the actual action of searching information, community, family, and self-education are the effective factors. In taking measures level, community plays significant role" (Shiwaku et al. 2007, 582).

Spence et al. (2007), point out that information seeking is guided by motivation, interest and trust. For crisis preparation, both African Americans and Caucasians sought information from broadcast media, especially television. Spence et al. (2007) concluded that new media had not reached the point of usefulness in giving information about crisis preparation, in comparison to traditional media. However, the media landscape globally has changed so much in recent years, that new media will no doubt become an important source of disaster preparedness information. Another interesting finding from this research by Spence et al. (2007) is that at the very onset of hurricane Katrina, the African Americans considered interpersonal information more than media as a source of information in preparation for the crisis.

Tekeli-Yesil et al. (2011) found that the Internet is a promising option for disseminating information in districts of Istanbul, however their conclusion was that media's strength (especially that of television and newspapers) is its capability of reaching the population in general. Unfortunately, the Istanbul study did not probe radio as a source of information about the risk and how to cope with it. (Tekeli-Yesil et al. 2011, 434)

In Malaysia, Said et al. (2011) reported that television is the most effective in raising tsunami awareness. This is understandable, considering Malaysia's vicinity to Indonesia, a country, who was among the first countries experimenting with satellite television. However, Said et al. (2011) recommends multiple approaches for public awareness and education in tsunami.

In conclusion, the media are seen as a vital tool for raising awareness and building preparedness. Media, by keeping the disaster issues on the agenda, reminds it users about the risks, survival, coping, and mitigation in disasters. Media does not need campaigning as the news flow about the disasters reaches the audience. According to these ten studies, media's role extends from building a community level communication environment to including disaster-related content for citizens' information and education.

It is clear, as the stages of disaster preparedness move from awareness to action; more is needed than just exposure to media news and information. Since very little has been researched on the media as an educator in disaster preparedness, this dissertation's aim is to create such a model. Tekeli-Yesil et al. (2011) do call for media to motivate citizens to look for information, and call for media to support the culture of safety in the community (Tekeli-Yesil et al. 2011, 444). Media, in partnering with the government organisations and the community, contribute towards creating an ideal learning environment for disaster mitigation.

Factors facilitating disaster preparedness education via media can be listed as follows, according to these studies.

- Media motivates for information seeking (Spence et al. 2007).
- Media, reminds of the need to implement pre-disaster measures (Shiwaku et al. 2007).
- Media proves to be trusted (Spence et al. 2007).
- Media prompts for drills and for community activities, involves public (Kusumasari & Alam 2012).
- Functions in multimedia approach, co-operation with government organisations, schools, community and other media (Kusumasari & Alam 2012).
- Media needs to act in a more responsive manner; question people and encourage them to take precautions (Tekeli-Yesil et al. 2011).

Figure 2 illustrates how information according to these empirical studies, is seen to flow between government departments, the community, and the media.

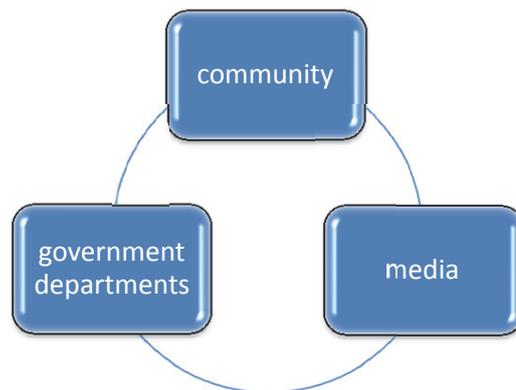


FIGURE 2 Information flows in between the three stakeholders

Government departments (government responding agencies and authorities), especially the meteorological and geophysical departments, are responsible for keeping the public informed on the development of possible tsunamis as a result of an earthquake, and local government should keep the technical warning systems functioning, especially in tsunami areas.

3.3.3 Radio's contribution in disaster preparedness education

There exist very few empirical studies dealing with radio's contribution to disaster preparedness education. Out of the broadcast media, it is television and radio together that are referred to mostly in the studies. However, several studies on disaster preparedness education in schools (Ronan et al. 2012) show it is

easy to teach children and youth the concept of being prepared for disaster, which includes the importance of listening to the radio, after a warning signal has been sounded.

The empirical studies found do not specify radio's contribution, as Shiwaku et al. (2007) did, referring to students' self-education as using 'media', in which the questionnaire used to test disaster preparedness, included as 'books, Internet, newspapers and TV' (Shiwaku et al. 2007, 580-581). Can radio be seen as playing an active role, as a valid contributor to disaster preparedness education programmes or campaigns? Three arguments supporting radio use in disasters preparedness education follow.

First, radio's contribution to warning has been proven in several studies, such as Sharma et al. (2009) in India, Ronan et al. (2012) in New Zealand, and Cretikos et al. (2008) in Australia. Radio often follows the public warning signal as the next information source. Citizens turn to radio to learn more. Radio does have the advantage of being battery powered and doesn't rely on affected power supplies. The community members, with radios, can be educated to turn to the channel acknowledged as specialised in disaster updates for more information.

Second, according to these studies, radio's role has been to inform concerning evacuation and about shelters. It is important that the media provide worthy evacuation information. In cases, where this has not happened, the citizens loose trust in radio warnings, and rather trust the opinion of the community. This was found in Sharma et al. (2009) in a study in Tamil Nadu, which concluded that the quality of shelters needs a review. Quality of shelters might be a key issue affecting evacuation decisions. In Bangladesh, at coastal areas, an educational campaign was proposed to the utilization of shelters in the case of cyclones. In the same study, Paul & Dutt (2010) noticed that for villagers without radios and televisions, the information should be communicated using means other than the broadcast media.

Third, radio provides information on the nature of the possible disaster facing the community. As a result of less traditional knowledge in Asian communities about disasters, there is a gap in disaster understanding. Radio talk shows and stories have been recognised to contribute to the oral tradition that still is prevalent in developing countries. In Malaysia, Said et al. (2011) report how Langkawi radio station had a twice-weekly one-hour radio show, explaining the nature of tsunami, its threat and how to prepare for it. The topic for the other show was the evacuation plan.

Clearly, radio is related to warning, evacuation advice and carrying the community voice according to these ten studies. When it comes to individuals seeking information, these studies referred to television and the Internet. For Asian audiences, television was recognised as most effective in raising awareness (Said et al. 2011). Therefore, radio's contribution in media campaign needs to be defined as 'where radio is at its best', and that is giving information on warning, evacuation and the quality of shelters. Practices about the combination of 'siren sound-listen to radio' need to be planned, followed by evacuation

drills to the shelters. Since this is all local, and a community effort, local radio is best deployed for such practise.

Factors facilitating disaster preparedness education via radio, according to these studies give radio the following roles and attributes.

- Radio is depicted as a community storyteller (Kim & Kang 2010)
- Provides knowledge on disasters (traditional knowledge decreased) (Sharma et al. 2009)
- Provides regular, factual information and keeps the issue with news and early warnings (Cretikos et al. 2008, Said et al. 2011)
- Needs programme content tailored locally according to the population (Kim & Kang 2010)
- Programmes need to give advice for physical preparedness and resources, such as radio and battery purchase beforehand (Paul & Dutt 2010, Ronan et al. 2012)
- Brings awareness of the severity of hazards, disaster risk (Paul & Dutt 2010, Said et al. 2011)
- Teaches how to prepare for hazards (Said et al. 2011)
- Prompts for the usage of public shelters (Paul & Dutt 2010, Said et al. 2011)
- Calls for being acknowledged by other organisations so that citizens pay attention to radio (Ronan et al. 2012)
- Needs to include lower educational and socio-economic levels, and different ethnic backgrounds (Spence et al. 2007)
- Along with other media, provides a platform for sharing community information (Kim & Kang 2010).

3.4 Conclusion

This comparison brings together insights from previous empirical studies, contradicting the traditional view of radio's role as a warning and disaster media only, and shedding light to its significant contribution potential in the preparedness stage. Broadcast media carry an obvious early warning role in disaster situations. Immediately, in the pre-disaster stage, they inform about the approaching hazard, and give directions on how to prepare, and provide evacuation notices when needed. These are all very practical aspects of crisis communication, and they are easy to deliver via broadcast media, especially if citizens are accustomed to tuning in to their televisions and radios for critical information at the onset of a natural disaster. Media's informative and warning role is related to cyclones, hurricanes, and tsunamis. Since government is responsible for keeping a proper early warning system in each country, radio and other media co-operation, as well as organisational communication with the government, is crucial at the warning stage.

In addition to the imminent disaster, the scientific community has started to focus on preparedness as a process. Long beforehand, media educates citizens by providing knowledge on the nature of natural calamities and how to be prepared in case a disaster strikes. In relation to earthquakes; via media, the geologists can tell populations where the fault lines exist, and what the most probable locations for earthquakes and tsunamis are. The crucial question is what happens in the minds of citizens once they hear the probability of risk? How can their motivation to be prepared be enhanced?

Media functions in a social and societal situation, by updating information from the government and help organisations. These studies show that information dissemination to the community is important. Dissemination requires both content and technology. Communities need to have local government personnel with expertise in providing the content, and the citizens need to have the radios, televisions, cell phones and digital tools to receive the content. Radio's contribution in being a source of information can be enhanced by providing radios and batteries in cyclone and other disaster prone areas, by pointing out the benefits of radio's mobility in evacuation situations.

A new issue brought to light through these studies was the precondition that school preparedness programmes need to be integrated with community programmes, and that citizens need to become active users of educational information (Ronan et al. 2012, Shiwaku et al. 2007). All in all, the community aspect of disaster preparedness is prevalent in all these studies.

In conclusion, radio is pictured as the best medium for early warning and source of information for updates about an approaching disaster. Figure 3 depicts radio as a source of warning, information and storytelling. These radio roles facilitate the building of awareness via self-education; which happens when people listen to the radio for specific disaster information. It is through dissemination of critical information on disasters, that radio enhances the listener's level of awareness to risk. The top arrow in Figure 3 indicates how self-education leads to awareness. However, in order to make a behavioural change, or to actually prepare for disasters in a concrete way, the community needs to be involved. If behavioural change is to take place, community participation is necessary, as shown in the bottom arrow of Figure 3. Few studies presented here showed that evacuation notices were not always followed, relying on the reflection of community members. This is an important finding for future preparedness approaches, to research community opinions and pursue opportunities to influence the views of decision makers and ultimately strengthen the decision making process in the community.

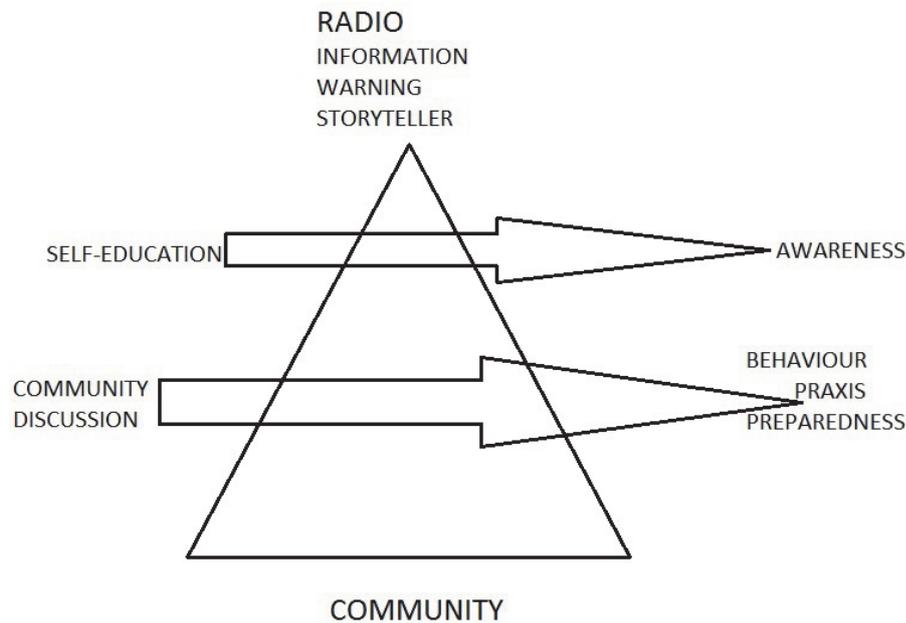


FIGURE 3 Radio in relation to community in disaster preparedness

In addition to building awareness, broadcast media can be used as an educator to strengthen preparedness. This preparedness training, embraced by communities which are active in helping design educational materials, and willing to adopt education in a group setting, is the most effective means of building resilient communities. This conceptual chapter emphasises research studies to support this view of educational intervention being effective when media information is combined with group activities.

Broadcast media can have a positive effect on preparedness activities given one essential requirement: it must co-operate with the local community. Radio's function is best in raising awareness and in preparedness education when joined with and actively inviting community participation. Community involvement is made possible by organising meetings and discussions on topics related to disaster preparedness. The assumption here is that it is community involvement that actually increases or adds to overall preparedness supported by broadcast media. This approach contradicts the traditional view of recognizing radio as a warning media only.

In addition to being a handy information channel during the early warning stages, radio, if any media; can appropriately convey the voice, the testimonials, and the historical perspective of locals, all of which make a major contribution to disaster education at the community level. Radio's role, as a channel for a community storyteller, needs to be reinforced in local communities. Local

radio has the capacity for building a community-level communication environment, which has been proven to facilitate the disaster preparedness learning process.

Research has shown that learning preparedness works best within the context of social and societal networks. Whether targeting schools or strengthening community education, media provide an essential source of information. But once again, this information is enhanced immeasurably through community participation, interaction, and discussions, and especially when organising community-wide drills designed to simulate a disaster situation. In working together with various groups in the community, including people from different educational, socio-economical and ethnic backgrounds, the content is guaranteed to be locally tailored. This aspect of localising, working with community groups, and being the platform for community stories is mentioned in relation to radio in these studies. This aspect, of media strengthening the capacities of local communities to become more resilient in disaster, will be carried forward and expounded upon in the chapters that follow. The ten studies analysed discuss media as a whole, presenting both the successes and the failures in warning about disasters, and in preparing for them. Radio is included as one medium, and rarely is radio mentioned alone, but as one medium in the context of other media.

Radio is effective in both warning and informing in the event of disaster, and research has proven citizens can be taught to tune in for radio announcements after hearing a warning siren. In educating the citizens to prepare for disasters, broadcast media are most responsive when utilizing a framework sensitive to society and social networks. The best evidence of broadcast media's preparedness role can be seen at the local level, where the broadcast media function in a network of local community organisations.

Based on an analysis of ten existing empirical studies, it can be concluded that learning disaster preparedness is fostered best in the context of social networks. Information provided by broadcast media is a strong facilitator of preparedness if combined by community activities and conversations. These studies show that radio is effective in providing a platform in which the community can function as a storyteller to encourage preparedness. Next, the results of own empirical work are reported.

4 ACEH AND PADANG FINDINGS

The empirical studies conducted by the author in the provinces of Aceh and West Sumatra, Indonesia, are presented in this chapter. Carrying out this type of research can be very difficult when a researcher is an outsider from another culture and does not know the local language. To meet these challenges it was necessary to collaborate with a number of local research assistants.

Section 4.1 clarifies the design of the empirical research, the overall aim and the research questions. Section 4.2 explains the overall research path, it introduces the two research projects that led to the articles, and it provides background on local radio in Banda Aceh and Padang. Section 4.3 provides a summary of the articles. Section 4.4 brings together the methods used in the empirical studies. Section 4.5 summarizes the findings by providing answers to the research questions in the respective sections. The chapter ends with Section 4.6 which presents the overview of the results of the Aceh and Padang studies.

4.1 The design of the empirical research

The four studies, from different angles, focused on understanding the role of broadcast media in contributing to community resilience via preparedness education. The overall research aim was to determine the contribution of broadcast media, radio in particular, to disaster preparedness education among Indonesian communities. After carrying out the survey in Aceh province, the researcher took notice that radio alone is not adequate for educating the community, but that preparedness rather called for a multi-media approach. This necessitated in the research purpose being changed to distinguishing the critical factors for educational media campaigns aimed at community disaster preparedness, in order to build a model for future educative campaigns.

The research questions leading to the articles were the following.

- RQ1: What stakeholders or actors are involved in the media campaign?
 RQ2: What societal preconditions are necessary for media campaigns aimed at community disaster preparedness?
 RQ3: What communication channels are utilized in media campaigns aimed at disaster preparedness?
 RQ4: How does radio contribute to community disaster preparedness?
 RQ5: How do broadcast media contribute to community resilience?

The author sought to clarify the broader context of preparedness campaigns, by investigating the stakeholders or actors involved as a prelude to establishing such campaigns. Moreover, the media channels were seen as having significant importance, and radio in particular. Finally, a more complete picture developed showing how media overall contribute to community resilience.

Figure 4, gives an overview of the four empirical articles and their main focus, as depicted in the rectangle of each sector. The data was gathered during the period 2007 -2010.

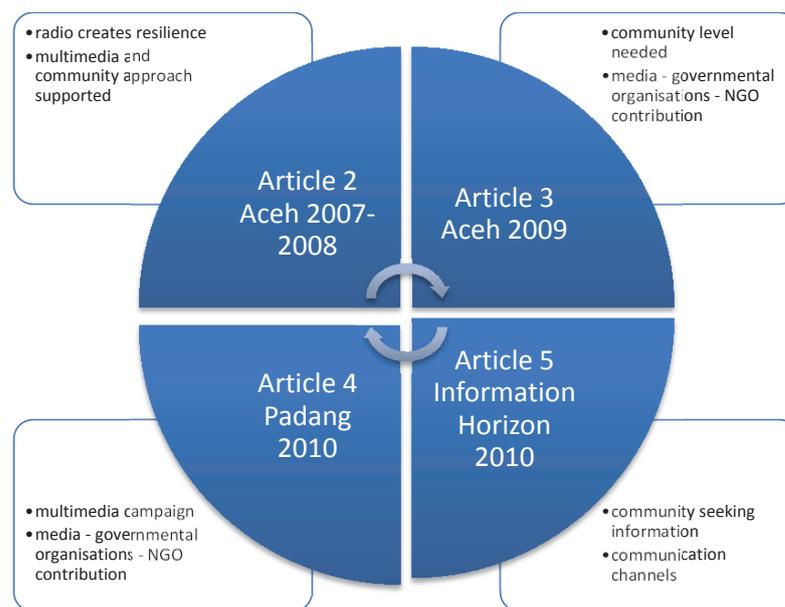


FIGURE 4 Empirical studies in this dissertation, year of data collection and main results

The articles in which the four studies were reported had the following titles.

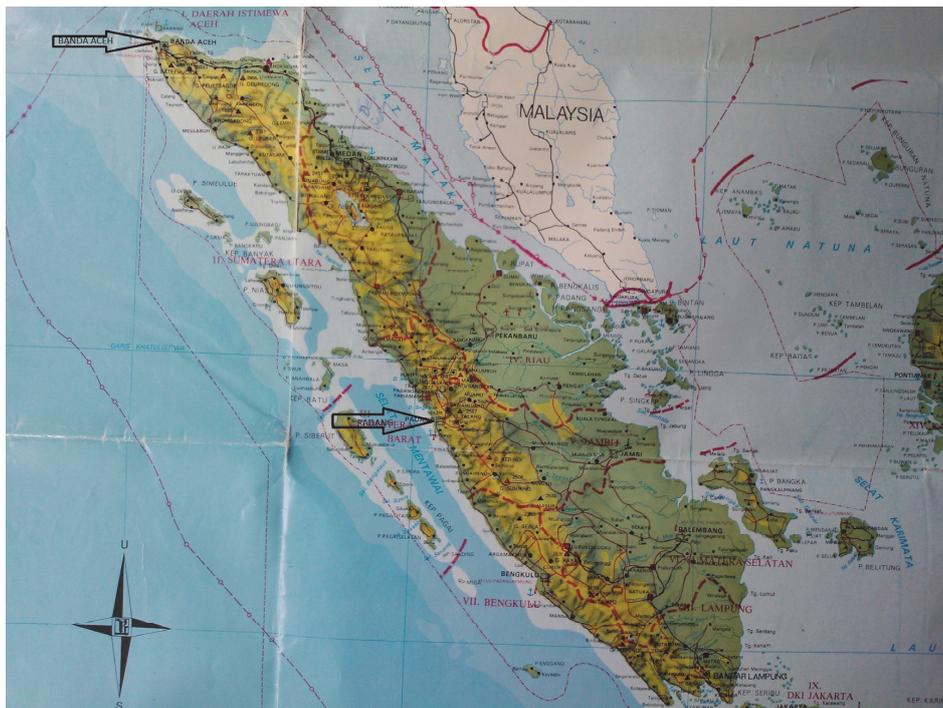
- Article 2 - 'Facilitating disaster preparedness through local radio broadcasting', article published in *Disasters*, Vol. 35, no.4, 2011
 Article 3 - 'Monitoring Disaster Preparedness Education in Northern Sumatra', published in *Media Asia*, Vol. 39, No. 3, 2012

Article 4 - 'Evaluating Disaster Preparedness in West Sumatra through Media', published in *Planet at Risk*, Vol. 1, No. 1, 2013

Article 5 - 'Information Seeking for Earthquake Preparedness', published in *Asian Journal of Environment and Disaster Management*, Vol. 5, No. 2, 2013.

The research work for the dissertation was done within the framework of two projects. The first of the two projects was carried out in Banda Aceh and the surrounding Aceh Besar region, located in the province of Aceh, in Northern Sumatra. The Aceh project is explored in Articles 2 and 3. The second of the two projects, conducted in Padang and vicinity in the province of West Sumatra, is examined in Articles 4 and 5. The locations are shown on Map 1 depicting with arrows Banda Aceh in the North and Padang in the middle of the island along the shore.

MAP 1 Map of Sumatra. Arrows point to Banda Aceh and Padang



The projects brought their own dynamics into the research for this dissertation, and, therefore, the studies did not answer the research questions one by one, but altogether the studies cover the research questions posed. Table 4 shows for each research question which articles were relevant.

TABLE 4 Research questions and articles dealing with them

Research question	Article 2 (Aceh)	Article 3 (Aceh)	Article 4 (Padang)	Article 5 (Padang)
RQ1: What stakeholders or actors are involved in the media campaign?	X	X	X	
RQ2: What societal preconditions are necessary for media campaigns aimed at community disaster preparedness?	X	X	X	
RQ3: What communication channels are utilized in media campaigns aimed at disaster preparedness?		X	X	X
RQ4: How does radio contribute to community disaster preparedness?	X	X		
RQ5: How do broadcast media contribute to community resilience?	X		X	

4.2 The research path and background on local radio in Banda Aceh and Padang

4.2.1 Overall description of the research path

The author's interest in the topic of disaster preparedness arose after having been invited by Health Communications Resources (HCR) to conduct a post-tsunami communications study at the end of 2007 in Banda Aceh, Northern Sumatra. The survey findings in Aceh indicated that the local community is an important information source. Citizens had learned an attitude of resiliency towards disasters, based on radio programming aired to them via a local radio station. A key to the success of local radio teaching disaster preparedness related topics, was the involving of community groups in programme production alongside the radio station staff.

One year after the survey, the author returned to Aceh, this time to conduct an evaluation on the impact of disaster preparedness education that various media had delivered over the past two years. In key interviews, both government and civil society representatives gave positive feedback on the role of media educating citizens on disaster preparedness. However, the village leaders expressed discontent that disaster preparedness education had not reached the village level.

The following year in 2010, questions similar to those used in the Aceh evaluations were posed to district level disaster management representatives in

Padang and other localities on or near the coast of West Sumatra. The Padang and Aceh interviewees were both of the opinion that disaster preparedness education had not reached all areas, and that some areas were covered better than others. The main finding showed media was seen positively as to educating citizens about various disasters, how to prepare for them in order to survive, and how to be resilient. In addition to the educational factor, the media was praised for its co-operation with government departments, NGOs, and communities.

In Padang, a drawing exercise was used to display how various channels are utilized for information on earthquake preparedness. Village leaders and secretaries, as well as a group of community radio listeners, drew maps depicting their sources for earthquake preparedness. The results revealed similar results as the Aceh survey in that personal communication is important as a source of information. The new finding from the drawing study showed that newspapers were considered as a focusing source, which means that it pays to publish articles covering disaster preparedness stories. In Padang, there is actually such a paper called 'Haluan,' which has published features on disaster preparedness.

4.2.2 Background on local Radio DJati - Banda Aceh

Radio DJati was founded in Banda Aceh in the aftermath of the Great Indian Ocean Tsunami. It began as a First Response Radio unit set up to deliver aid in the form of information to tsunami survivors. Following the first response stage, Radio Djati received a licence to continue broadcasting as a mitigation radio. Radio programmes and public service messages (PSM), based on the Aceh DMP 2008 findings (Article 2) and geared towards disaster preparedness, were produced jointly by community groups and local Radio DJati programmers, starting in June 2008. In addition to radio programmes, other media messages were delivered via TV programmes, and by means of street banners. The community organized tsunami drills as well. Key informants evaluated the impact of media message programming during interviews implemented in October 2009.

The preparedness raising programming on Radio DJati was described in a local newsletter as follows:

“Features were developed, for example, where implementers of the DRR projects were able to share good practices and lessons learned. Interviews were made with important personnel and beneficiary communities, thereby helping to promote information-sharing and better coordination among the various organizations and civil society actors working in the province to facilitate DRR. To assist communities in preparing and responding to disasters, public service messages (PSMs) were developed taking into account the cultural context. An important approach in developing these PSMs, explains one member of the partnership, was to “listen to the community before we want them to listen to us.” This approach made it possible to first consider the environmental context of the listeners before developing the messages. The PSMs brought simple, hazard-specific instructions in the

local language weaved into a story-like form to illustrate how best to reduce disaster risk. Instead of using voices of professionals, the scripts were taken to village communities, where the members were more than excited to help out by voicing the scripts themselves.

This approach helped in making the messages more appealing and effective to the larger community and it enhanced their awareness. Another activity incorporated talk shows where stakeholders in Disaster Management (DM) from various government departments, INGOs and NGOs, as well as community representatives, were brought together to discuss and share knowledge on initiatives in disaster management policy, programming, and planning. The talk show offered a platform for listeners to call in with questions and seek clarifications on issues related to DM. Gender, education and warning systems were just some of the issues dealt with." (Aceh Recovery Newsletter 2008, 10, 19)

During the last half of 2008, public service messages were each aired for a period of six months and were either delivered in a block from 2 to 4 pm, or from morning until night at various times once a day on local Radio DJati. The topics for PSMs by the community groups who facilitated their production were the following.

- Preparing for tsunami – what does tsunami mean? Three groups; handicapped, elderly women and elderly men produced a programme about compiling an emergency bag.
- Tsunami signs – what are the signs of tsunami (alarm, e-quake, water resides, animals panic). Three groups of people; children, elderly women and elderly men produced a tsunami sign feature.
- Disaster preparedness before tsunami. A children's group prepared a special feature for children.
- Preparedness when earthquakes happen. A children's group prepared a special feature for children.
- Disaster preparedness during tsunami – go far away from the sea, go to the escape building, run to the hills.
- What we need to do when an earthquake happens and we are inside the house or in a building?
- What we need to do if the earthquake comes and we are in the car?
- Getting the right information if a disaster happens – do not trust just gossip, but get the info from trusted source such as radio, TV, police.

In addition to these topics, there were two special features for the handicapped; one about voicing their needs to others when disaster occurs, and another about what the handicapped can do in the case of a disaster. These topical programmes were aired both on Radio DJati and government radio RRI Indonesia.

4.2.3 Background on local Radio Respon - Padang

Respon Radio was established right after the 30 September 2009 earthquake. A team from Health Communication Resources (HCR) flew to Padang; they set up a suitcase radio studio in Padang Pariaman regency. The target was to cover both cities of Padang and Pariaman by radio. To do so would mean establishing a signal at a location between Padang and Pariaman, and close to the Minang airport. After the initial 12 days of broadcasting, the local provincial governor and the federal district head invited Respon Radio to open a permanent radio station, which was set up in Pariaman city.

The programme strategy of Respon Radio was to facilitate recovery from the earthquake by addressing the disaster-related needs of the local populations and then providing health and welfare information, based on interviews with listeners and public officials, in a format flavoured with indigenous music. Later, after the recovery phase, the target was to move on to community development programming. From the very beginning, the radio station used a cellular audio interface to make it easy for listeners and government officials to interact with the station.

From March 2010, Respon Radio was licensed to broadcast community programming covering most of the Pariaman area. Six months later, in September 2010 Respon Radio received a commercial license. The programming objectives of Respon Radio are listed below.

- To give helpful, timely information and education on disaster response and disaster mitigation topics. This can be done by deliberately pursuing relationships with government and non-government disaster response groups. Respon Radio seeks to be the chosen radio partner of these agencies.
- To establish community development programming. This can be done by partnering with likeminded groups and by thoroughly researching the needs and interests of community radio listeners. Respon Radio needs to go to them, collect their opinions, and air their stories.
- To support families with programmes on relationship building, health, education and other important issues of concern. This can be done by knowing their interests and by seeking expert advice.

Below is the programming content for Respon Radio, as explained by the station manager (Respon Radio Research Report, 2011):

“Disaster Respon focuses on educating the citizens how to build a safe house - we are working together with ‘Construction Clinic’ from Andalas University. In this programme, we follow the disaster recovery and rebuilding phase from government. We are making a talk show with NGO “KHOTIB” to advocate the disaster victims whom until now still not received any aid yet (money) from government to rebuild their house. We are making CSAs, features, ‘adlibs’ and a programme

called 'Time Signal' for disaster preparedness. KHOTIB has a grass root community that controls the government's transparency on distributing aid."

According to the station manager, in February 2010, the majority - 70% of Respon Radio listeners were aged 15-25 years, and 30% were over 25 years. At the time of research, in November 2010, the announcer at Respon Radio reported that most of the callers to the interactive programmes were middle-aged women (70% of the callers). (Progress Report, 2010)

In excess of 10,000 SMS messages per month have been received from listeners since the station began broadcasting on Dec 4th, 2009. During the research project, on Nov 7th, 2010, Respon Radio organised an open house in the community. About fifty people from all age groups visited the station. There was an emphasis on middle-aged women, but young people also came. The respondents to the Horizon map drawing exercise came from this group of visitors to the station.

In addition to Respon Radio, there are three other radio stations in the area airing disaster preparedness programming: RRI Padang, Classy FM (www.classyfm.co.id), and Siaga FM 107.5, who initiated the 'Jaringan Jurnalis Siaga Bencana' JJSB (Disaster Journalist Network). Both RRI Padang and Classy FM are well-known radio stations in Padang, while Respon Radio's signal does not reach Padang. The majority of Respon Radio's listeners are from Pariaman. In addition to the radio stations, Padang TV broadcasts the disaster preparedness programme entitled, 'Ready-Prepare-Readiness'.

4.3 Summary of the articles

In the following subchapters each study as depicted in the articles 2-5 is summarized.

4.3.1 Aceh community disaster preparedness - Article 2

The Aceh 2008 research project was initiated three years after the Great Indian Ocean Tsunami of 2004. The research project was entitled 'Disaster Mitigation Preparedness' (DMP), also called Aceh DMP 2008. It was established in cooperation with a local university, two international organisations, and one local radio station. The purpose of the study was threefold: to survey the information behaviour of local residents immediately after the tsunami, to discover the information needs of local residents two days after the tsunami, and finally to compare the results to one another.

A survey was designed to ask Banda Aceh residents about their recall of the disaster, survival methods, information seeking behaviour after the disaster, and ways of learning about disaster preparedness. In addition to the survey, key informant interviews and focus groups were organised to discuss issues concerning tsunami survival and information needs. Appendix 1 explains, in

greater detail than in Article 2, the interviewees and questions asked in the interviews and discussions.

Aceh DMP 2008 revealed that interpersonal networks are important information sources. The community, which locals call 'masyarakat,' and the village hall, which is called 'meunasah,' turned out to be as popular an information source as radio and newspapers. Television was acknowledged for its ability to illustrate issues using moving pictures, which are well suited in detailing scientific concepts like how a tsunami is created.

Since local radio DJati had organised conversations with community groups, and together with stakeholders had produced disaster preparedness radio content, Banda Aceh residents had learned resilience-related topics via local involvement utilizing radio. Subgroups of the community, such as vulnerable groups, benefitted most from the radio programmes specifically tailored for disaster preparedness. Listening to local radio Radio DJati correlated with the positive resilience attitude, 'I can do something to help reduce the impact of the disaster'. This attitude of resilience was prevalent especially among the disabled population in Aceh.

The interviewees emphasised the need to teach the communities the warning system and response mechanism to that system. They saw disaster preparedness education as a need to be organised jointly by several stakeholders, including the collaboration of the Indonesian state radio network. Based on these findings an education plan was designed by HCR consultants and local community groups, including communication channels and disaster preparedness topics.

4.3.2 Aceh evaluation - Article 3

As a follow-up to Aceh DMP 2008 (Article 2), in the end of 2009 an evaluation was conducted in Banda Aceh (Article 3). The results of Aceh DMP 2008 had been the impetus to produce radio programmes together with local community groups, targeted to disaster preparedness. The purpose of the evaluation was to not only measure what the residents had learned of disaster preparedness via radio, but also what they had learned from other news media, such as the television and print media. The evaluation questioned, via key informant interviews, if the government and media had done their part in facilitating the disaster preparedness of the community.

The Aceh DMP evaluation identified the government as a crucial facilitator of disaster preparedness in two ways: one, it created policies for disaster management and coordination, and two, it created the infrastructure for disaster preparedness; specifically the reliable tsunami warning system. The interviewees also credited the government for working with the media, but at the same time they saw the need for improvement in the government working with radio and Palang Merah Indonesia (PMI, the Indonesian Red Cross). Other areas for improvement on the government side included increases necessary for budgeting and funding for disaster preparedness, and the need for informing citizens about technical errors in the warning system.

The broadcast media had contributed to community education by sharing information on various disasters along with an emphasis on skills and survival mechanisms in disasters. The community had learned to find information about disaster preparedness from television and radio. The media had provided the community with opportunities for participation by promoting disaster drills and training. Drills proved to be an exemplary means of good co-operation with the government; however the evaluation pointed to the disparity of learning in the villages. The Aceh Besar village leaders in particular, the 'keuchiks', emphasised the need for organising community level disaster training and drills in the villages. The 'Keuchiks' provided several ideas of how to utilize the channels villagers make use of outside the news media to deliver training materials, for example via lectures in village halls or mosques.

4.3.3 Padang evaluation - Article 4

Aceh's evaluation technique was repeated in Padang in 2010 using the same method of interviewing key informants on media's performance in disaster preparedness education. The timing of evaluation was different in Aceh and Padang; at the time of the evaluation in Aceh, local media outlets had been broadcasting information and instructing on disaster preparedness for about two years, while in Padang this was less than one year. The questions were similar as in Aceh; fourteen key informants were interviewed in Padang, government representatives and informants from non-governmental organisations.

Padang has not faced as gigantic a tsunami as Aceh; however a tsunami did hit the Mentawai islands, located 150 km off the Padang seashore, in October 2010. The Mentawai tsunami occurred a few weeks before the key interviews were conducted in Padang and vicinity. In addition to that tsunami, Padang had earlier encountered a major earthquake in September 2009.

The Padang evaluation produced similar results as the Aceh evaluation, confirming the news media's role as an educator for community disaster preparedness. As a result of the September 2009 earthquake, the Mayor of Padang had started to use Radio Republic Indonesia (RRI Padang) to disseminate earthquake information, and programmes of response and recovery (R&R). Even though the community attributes a positive aura to the media for providing information, the NGOs criticised the news media, notably television, for exaggeration. According to the evaluation, the media need to improve their accuracy of disaster information.

A media campaign, addressing the construction of buildings was seen in positive light by key informants for encouraging citizens to make improvements to their houses to withstand earthquakes. The campaign was truly a multi-media campaign, involving the news media, posters on busses, and notice boards in the communities, as well as film. One key issue surfaced related to constructing better buildings. Key interviewees recognized the financial constraints in improving the building styles, and suggested public-private - partnerships to alleviate the financial demands on the government.

Key interviews showed that local government help is needed in communities affected by disaster. The local government does provide simulations and drills together with other stakeholders, but local government lacks financial resources for infrastructural preparedness. Even though Padang has properly signed evacuation routes, other coastal areas need the same. In addition to an evacuation system, local government needs to work to develop and maintain a consistent warning information system in collaboration with the media outlets. The under-sea tsunami warning system is the first line of defense against approaching tsunamis, but it takes resources to use it properly for continuous monitoring and maintain the system over time.

In certain areas, like in Padang Pariaman, a multi-stakeholder response team has been established. A civic organisation, the Journalistic Network for Disaster Preparedness, has been promoting the idea of organizing awareness campaigns. Even though many areas have been addressed, key informants recognized the fact that more mediated disaster preparedness education is needed in the city of Padang as well as in other rural and coastal areas.

4.3.4 Padang Information Horizon drawing study - Article 5

Lastly, an information behaviour study was conducted in Padang and vicinity. This study was designed to help determine the appropriate channels for disaster preparedness education in cities along the West Sumatra coastline, from Pilubang to Painan. Local village heads along with secretaries and villagers were asked about their information sources for learning and making preparations in advance of earthquakes. Earthquakes are very common in West Sumatra, and in fact they have been on the increase over the past ten years. According to Statistik Indonesia 2011, as many as 634 earthquakes were recorded in 2008 (in comparison to 2005 and 2003; 217 and 75 respectively). Residents remember very well the 7.6-magnitude quake in September 2009. A monument, depicting names of all those who died in this earthquake, has been erected in the Padang center.

During this information behaviour study research assistants visited villages they were familiar with, which provided them easy access to the village leaders. The data was collected from among community radio listeners, during an open day event at Radio Respon in Pariaman.

The respondents were asked to make a drawing depicting their information sources for earthquake preparedness. They began by drawing themselves in the middle of the page at first, and then entered the information sources as lines and circles surrounding self. In the final stage, they ranked the importance of sources numerically. The drawings were reviewed using the Sonnenwald analysis. In conclusion, this Horizon map study (reported in Article 5), which covered earthquake preparedness, confirmed the Aceh DMP 2008 findings (reported in Article 2) concerning the importance of interpersonal networks as a source of information.

Listeners to Respon Radio preferred community radio as a primary source for earthquake preparedness. On the other hand, village leaders in their draw-

ings pictured the government as their information source more often than community radio listeners, and village leaders' rating of the government was also higher than the rating given by radio listeners. It appears that village leaders have a closer connection to government, based on their position as local officers. Community radio listeners, on the other hand, appreciated the 'masyarakat' as a source for earthquake preparedness. One explanation for the differences in the drawings by village leaders and community radio listeners could be their gender, as the first were men and the latter women. A new finding was that newspapers showed as a focusing source for disaster preparedness.

4.4 Methods applied in the empirical studies

The author's methodological approach is mainly postpositivist, however, it incorporates some insights from the constructionist paradigm in the sense that the research purpose is to shed light on media's ability "to create and sustain a given social reality" (Hesse-Biber 2010, 158). In other words, media are able to construct the concept of the importance and convey the practical facets of disaster preparedness. In data collection, the purpose was to find out if and how media has succeeded in facilitating community disaster preparedness, as evaluated by key people. In the evaluation, paying attention to the local context was of utmost importance.

The author's approach to the topic includes elements of both functionalism and interpretivism. From a functionalistic point of view, the author sees social phenomena as an entity, which is measurable via quantitative methods. However, from the interpretivist viewpoint, the author acknowledges that meanings are socially constructed in the interaction process. But, due to language constraints, the author was not able to go deep into the interpretation of meanings. The interviews incorporated data-driven analysis, by forming categories from common themes, while reading the interviews several times, making notions and markings, and checking the author's interpretations of interviewees' language use from local research assistants.

Research, in international settings, leads to a special relationship between the researcher and the researched. Stephens (2009, 33) points out that there are "a number of interlocking questions broadly concerning the role and voice of the researcher in the research process; and the representation, incorporation and celebration of the researched voices in the study". The collaboration of local universities and stakeholders was necessary in conducting the research related to the articles. The author sees advantages in collaborating with local research assistants in collecting the data, since it facilitates the cultural encounters, and has certain benefits in that interviewees' opinions are 'not affected by them seeing a Western face'. Moreover, in data collection, the stigma connected with being a cultural outsider is eliminated.

This dissertation utilizes several methods. The research topic is very complex, focusing on disaster situations that could bring a devastating emotional

burden for those affected. With this in mind a number of research methods were employed, because using multiple methods could bring benefits when approaching a research topic from various angles. As a whole the dissertation is comprised of multiple methods, including one article in which a mixed method design is applied. Next is an explanation of the methods used in Article 2.

Article 2 was methodologically the most complex; the author chose a mixed method design, which entails both quantitative and qualitative data collection. Hesse-Biber (2010) uses the concept 'explanatory sequential design' (Hesse-Biber 2010, 105), where quantitative data is followed by the collection and analysis of qualitative data from focus groups and key informant interviews. In Article 2, the qualitative data was utilized to complement the quantitative data of the survey results.

Since the collection of quantitative data took place, timewise, in close proximity to the qualitative data in Article 2, there was no time-lag problem, which is often detected in mixed method studies. Using a local trained team with interview skills benefited the author in this case. Moreover, the focus groups and key informant interviews in Article 2 added insights to the survey findings.

Focus groups are interactive interview settings created for a small group of respondents, who engage in discussion prompted by the moderator with questions (Johnson & Turner 2003). Focus groups are used for participants to obtain a common ground for a topic, and to research subcultures, and their interpretations of meanings (Hirsjärvi & Hurme 2008, 61). In Article 2, the groups (for more details, see Appendix 1) discussed the tsunami experience, impressions of their survival, and the information sources used before, during, and after the tsunami.

Key informants are defined as individuals with special detailed knowledge, which they are willing to share; they could also be people who have access to other possible respondents in the community (Hornby & Simon 1994, 169). In the articles included in this dissertation, key informants were chosen by discretion from governmental and civic groups, as well as from villages. Details for key informant interviews related to Article 2 are presented in Appendix 1.

In addition to the mixed method research applied in Article 2, two articles (Article 3 and Article 4), published in conjunction with this dissertation, used a qualitative method, a form of semi-structured interviews.

The semi-structured interviews for key informants in Articles 3 and 4 consisted of ten questions. The interviewees answered the questions in their own words; however, the interviewer could change the order of the questions, depending on the situation (Eskola & Suoranta 1998, 87).

Finally, in Article 5, the Information Horizon map utilized is in most cases considered a qualitative method, as the respondents verbally explain their choices for information in a particular setting. Sonnenwald (1999) created this method in which respondents are asked to draw a map of their sources of information in particular context, after which the graphical presentation of their

information horizons is analysed in conjunction with the interview data using techniques derived from social network analysis and content analysis. However, in the case of Article 5, when the respondents ranked their information sources without explaining the reasons for choices, and instead numbered them, the author considers this type of Information Horizon map as a quantitative method. The analysis was done quantitatively, which is explained in detail in Chapter 4.4.4.

In conclusion, this dissertation is comprised of multiple methods; however, in analysing the data content analysis is utilized in three of the four empirical studies. As a method, content analysis is applied in researching the content of the language as communication (Hirsjärvi, Remes & Sajavaara, 1997). The analysis comprises of a systematic reading and categorization of the narrative data. In these studies, the categories were formed during the analysis. The researcher read the data in particular respondent categories, as well as the questions, seeking answers to the questions posed. The content analysis of transcribed and translated discussions and interviews is based on thematic analysis; this came from reading the material several times, forming the categories, and connecting similar notions.

Table 5 depicts the multi-method approach as being utilized in the four empirical studies. Table 5 presents the methods in each published article.

TABLE 5 Articles, their method of data collection and data analysis

Article	Method of data collection	Method of data analysis
2) 'Facilitating disaster preparedness through local radio broadcasting', article published in <i>Disasters</i> , Vol. 35, no.4, Oct. 2011	Survey Focus groups Key informant interviews	Frequencies Crosstabulations Correlations Content analysis
3) 'Monitoring Disaster Preparedness Education in Northern Sumatra', published in <i>Media Asia</i> , Vol. 39, No. 3, 2012	Key informant interviews	Content analysis
4) 'Evaluating Disaster Preparedness in West Sumatra through Media', published in <i>Planet at Risk</i> , Vol. 1, No. 1, 2013	Key informant interviews	Content analysis
5) 'Information Seeking for Earthquake Preparedness', published in <i>Asian Journal of Environment and Disaster Management</i> , Vol. 5, No. 2, 2013, 157-165.	Information Horizon map - drawing	Matrix analysis by information sources and their rankings Node analysis

The empirical fieldwork in these studies was based on collaboration between the author, the team of HCR associates, and the local University students and their lecturers. This type of research can also be seen as a collaborative research approach (Thuno 2006, 245-261). Collaboration was necessary across the national and academic fields, and it succeeded due to networking.

4.4.1 Article 2 methods

The Article 2 research in Aceh consists of three main parts: a random-sample field survey consisting of 984 interviews in Banda Aceh, a series of focus-group discussions in the surrounding district of Aceh Besar, and a series of key informant interviews with government officials in Banda Aceh.

A two-stage cluster sampling, utilising a probability-to-population size method, was used to obtain a sample of 1,000 households in the city of Banda Aceh in November 2007. The sample in each Banda Aceh sub-district was drawn, first at the *desa* (village) level, and secondly at the *dusun* (sub-village) level with data from the 2005 Nanggroe Aceh Darussalam (NAD); the census of August and September 2005. A booster sample of 50 households was chosen from the tsunami-torn Meuraxa area, since many houses were rebuilt there after the 2005 census. As some interviews did not materialise, the final sample was N=984. Interviewers used the Kish grid to select household respondents randomly. If the chosen respondent was still not available after three attempts, the interviewers chose another respondent from a different household. The sample was weighted by education to match the census. (Romo-Murphy et al. 2011)

The survey data was collected from face-to-face interviews using a questionnaire by Ar-Raniry students. A team of three students were trained to code the questionnaires into a spreadsheet. The author analysed the survey data with SPSS.

The survey provided quantitative data for information seeking behaviour. Since the information seeking situation of a tsunami experience can be complex and dynamic, both focus group and key informant interviews were used to complement the survey data.

The focus group discussions and key informant interviews were administered by several individuals from Ar-Raniry University, along with NGOs (Aceh Community Disaster Preparedness 2008). The interviews were transcribed and translated from local language to English by one University lecturer and one NGO worker; both were fluent in both languages. The author examined both focus group and key interview data using content analysis. The analysis was carried out by reading the transcribed materials back and forth inductively, and clustering similar topics to the same categories. Heritage (1994) calls this data-driven analysis.

4.4.2 Article 3 methods

The Article 3 data from Aceh was taken from key informant interviews conducted by the University of Syiah Kuala (Unsyaih) and Ar-Raniry University

(IAIN) third and fourth year students using the local language. The students received interview training from the project team, including the author. The purpose of conducting key informant interviews was to ascertain the effectiveness of the disaster preparedness project in the eyes of the decision makers and leaders of the communities. The method comprised 15 key informant interviews, government representatives, informants from non-governmental organisations, and village leaders. Governmental interviewees consisted of people responsible for disaster preparedness and response, while NGO interviewees were those who were involved in creating radio content for disaster preparedness programming. Village leaders were selected by the local interviewer.

Altogether ten questions were used to ascertain what key informants thought residents of Banda Aceh and Aceh Besar have learned about disasters preparedness in the past two years and what they still need to learn. Key informants also evaluated the use of the various media for effectiveness in providing disaster preparedness training.

The interviews were transcribed by a radio producer, and emailed to the author for content analysis. The author initially utilized the Google Translator for translating the interviews from Indonesian to English, and making sure the data were anonymized. The Google translations were checked by the local radio producer, and consultation with radio staff was provided when deemed necessary. After the language checks, the researcher categorized the answers to each question by topics. A detailed example is provided in the article.

4.4.3 Article 4 methods

In the Padang evaluation, the data collection method followed the same path as in Article 3; it utilized key informant interviews, using the same instrument of ten questions as in Article 3. This time, the local interviews were carried out by either post-doctoral students of Andalas University, a lecturer from the same University, or local radio reporters. The interviewers were comprised of various ages, and experience ranging from having conducted interviews in postgraduate level to novice interviewers; therefore, their training for the tasks was challenging. After training, the interviews were conducted, but this time no audio recordings were made, as per the recommendations of local data collectors. In cases of translations being unclear, the author consulted the interviewers to clarify and reconfirm the meanings. After the language was clarified, the author examined the results of the interviews using content analysis, reading and re-reading the interviews, to identify the themes discussed. The analysis was carried out in respect to finding answers to the questions asked in the interviews. Once the themes were developed and defined, the analysis was conducted manually.

4.4.4 Article 5 methods

In the 'Information horizons map' study, the respondents were asked to draw a map of their information sources for earthquake preparedness. After drawing

the sources, the respondents were asked to rank the order of using them. The rankings for sources were analyzed quantitatively using a matrix of information sources and respondents. The rows summed up the times each source was drawn, and the number of rankings. Using social network analysis, respondents' rankings of information sources were converted into arrows from the first source to the second, etc. Based on the number of outgoing and incoming arrows, the information sources now also called 'nodes', were named as either focusing, starting, balanced or loner nodes. This was an open method, providing respondents the opportunity to express their views.

In the 'Information Horizon map' drawing study, purposeful sampling was done to select the villages either by having experienced a disaster (regency of Agam) or by their proximity to the sea (village of Painan). In villages, the interviewees were chosen by discretion. Village leaders and villagers were both interviewed by a trained team of local postgraduate students of Andalas University, and local radio station staff members. (Romo-Murphy 2013, 157-165)

4.5 Findings of the studies answering the research questions

In the sub sections below the findings are presented for each of the research questions mentioned in section 4.1.

4.5.1 Stakeholders involved in media campaign

Disaster preparedness campaigns can be defined in two forms. First, there are campaigns for a certain purpose, and that is to simulate an emergency situation that has a high likelihood in the area, such a tsunami, and practise reacting to this hazard. These kinds of drills are useful, and both Aceh and Padang studies showed that the stakeholders appreciate each other's collaboration in organising these events. Tsunami practise is a special kind of educational campaign that involves the participation and collaboration of government agencies, media and the community.

Second, in addition to such tsunami drills, there are media campaigns targeting the various other aspects of disaster preparedness; campaigns that have been carried out in the past, and need to be conducted in the future. The organising of this second type of campaigns is the focus of this dissertation, and the conclusive results will be dealt with extensively, culminating in the creation of a model based on the research findings and related literature. However, before elaborating on stakeholders involved in media campaigns, it is worth noticing that government's disaster management related agencies carry a heavier responsibility in organising drill campaigns than in media campaigns.

In Indonesia, the national and provincial government agencies, the BNPB, *Badan Nasional Penanggulangan Bencana*, National Agency for Disaster Management (until 2008 BAKORNAS) and the BPBD, *Badan Penanggulangan Bencana Daerah*, Regional Disaster Management Agency (until 2008 SATKORLAK) form

the disaster management coordination body, while the district level coordinators and their task groups form the root-level implementing unit. The governmental agency BMKG, *Badan Meteorologi Klimatologi, Dan Geofisika*, Indonesian Meteorological, Climatological and Geophysical Agency, is in charge of the tsunami early warning system, while the non-governmental radio communication groups RAPI (*Radio Antar Penduduk Indonesia*, Citizen band radio Indonesia) and ORARI (*Organisasi Amatir Radio Indonesia* Indonesian Radio Amateur Society) are also involved and usually participate in organising tsunami drills. The current disaster management structure in Indonesia is presented in Article 4.

Drawing conclusions from the conceptual chapter 3, disaster related government agencies consist of various departments, depending on the country; it could be civil defence, homeland security, health and emergency, the ministry of science and technology, the ministry of disaster management or meteorological department, as shown in table A1 in the Appendix 2.

In addition to government, non-governmental civic organisations such as Mercy Corps, the Indonesian Red Cross and the Red Crescent have all been involved in tsunami drills in Indonesia. Governmental and non-governmental organisations, media and community are the three foundational stakeholders in disaster preparedness and recognised in the scientific literature referred to in Article 1. According to the empirical findings from research projects referred to in conceptual chapter 3, on the local level, government collaboration with local media has been successful in several Asian countries besides Indonesia. Similarly, the research projects described in the Articles 2, 3 and 4 of this dissertation verify the same triangulation. The three articles 2-4 acknowledge the importance of co-operation between government departments, NGOs, community groups, and the media in facilitating disaster preparedness of the community. The collaboration between these three stakeholders has been quite evident during the organising of disaster drills and practices.

The existence of proper warning communications systems, as well as the infrastructure provided for possible evacuation procedures; are two areas related to practicing for disaster. Financially, building the infrastructure for these aspects of disaster mitigation might be challenging for local governments. In the case of Aceh, the international community helped with the reconstruction, as well as with the creation of infrastructural mitigation programmes. Even the 'Build Better' -media campaign in Padang (Article 4) was partly funded by an international agency. In Padang key interviews (Article 4), the district level authorities suggested the formation of public-private partnerships to help with funding challenges. Formulating a coordinated funding mechanism on the national level for disaster risk reduction was recommended for Indonesia by Djalante et al. (2012). In this view of problems of disaster preparedness funding, as Lassa (2013) describes, "private firms (either government owned or pure private firms) are considered as other potential sources of local disaster financing". According to Lassa (2013), there are several impediments to disaster risk reduction in Indonesia, due to the government lacking financial capacity. To solve the problem, Lassa suggests 'corporate social responsibility', referring to private

businesses to help the surrounding communities is disaster risk reduction and mitigation. He suggests that private firms grow from being 'risk ignorant' to being 'risk sensitive'. Besides private sector participation, Lassa (2013) calls for the public sector and civil society organisations to facilitate in disaster awareness education. The budgeting constraint has been detected also elsewhere in Asia, for example by Tong et al. (2012) concludes it being a factor in planning resilience for educational sector in Vietnamese schools.

In applying the theory of stakeholder enabling to the three main stakeholders; the governmental and non-governmental organisations, as well as the media; interact with the community to inform and educate the citizens. This interaction builds trust. The three stakeholders become equal partners in communication, in the sense that information and education flows in between these three in all directions. However, this is not always the case in actual practise. Village leaders in the Aceh evaluation (Article 3), as well as Padang key disaster management officials (Article 4), voiced concerns about the government not informing enough about what to do in a disaster event. These research projects make it clear that government and media are expected to improve their function in terms of warning and informing.

However, when it comes to educating citizens on disaster preparedness and organizing media campaigns geared to community resilience, the focus is clearly on the relationship between the media and the community. This educational process functions best when the community is involved in planning the information and education based on their situation and needs. Such groups, mentioned in the Appendix 3 table A2, related to the author's research projects in Aceh and Padang, were Flower Aceh, Handicap International, HelpAge and Beudoh Foundation, and CSW (Church World Service). Notably, community involvement benefits most those who are vulnerable, such as the disabled, elderly citizens, women and young children, as concluded in Article 2. The audience that uses the media and lives under the government jurisdiction, called the community in this dissertation, creates the actual field where disaster preparedness grows. From the social constructionist point of view, community groups form their disaster preparedness awareness and risk perception through discussions. Community and media, as shown in Aceh DMP 2008 (Article 2), form the key stakeholders in creating an environment that will lead to for forming and maintaining of a disaster preparedness attitude, knowledge and skills via social interaction, a topic that will be addressed in section 5.2.

4.5.2 Societal preconditions for media campaigns

In creating campaigns the societal preconditions carry an important weight to the actual campaign in question. There are two levels of societal preconditions; one, the preconditions related to organisational relationships, and two, the preconditions related to perceptions held in society.

First, referring to organisational level, both Aceh and Padang studies emphasised the necessity of collaboration of the three stakeholders (see the table A2 in the Appendix 3). Communication makes this collaboration possible. At

the governmental and media levels, the stakeholders need to agree on communication facilities in the event of disaster. At the media level, media organisations need to synchronize their message, so that contradicting messages are not conveyed to the community. In addition, the communication processes at the community level need to be planned in advance, for example, some communities are missing a local warning procedure, while other communities are missing response teams.

Addressing the second type of precondition - what are the preconditions related to society's perceptions? It will take additional questions to ascertain answers to this question, such as; what is the perception of reality in the society? Are the principles of 'culture of safety, resilience and mitigation' prevalent in the society? Does awareness of risk exist in the community? What are the discourses taking place in the community? What values are present in the media, in village life, and on various organisational levels?

The starting point as well as the end result of the campaigning is to build up a culture of safety. In order to design a campaign on disaster preparedness, an underlining attitude of pursuing a culture of safety needs to exist. Campaign builders have certain hypotheses on the nature of disasters, and on the nature of citizens. As a result of disaster preparedness education and campaigning, community resilience increased.

In the past, media have been viewed as sensationalist when reporting about calamities, and the empirical studies of Chapter 3 as well as the results presented in articles (Article 1 and Article 5 specifically), point out that thinking of media as a resource in facing future disasters is a fairly new concept. The underlining principle of media performance, both in information and as an education channel, is 'being trusted'. If media are not trusted, there is little point in developing media campaigns, or expecting media to function as disaster preparedness facilitator.

To enable cooperation between media, citizens and organisations, the necessity of trust is called for in several areas of relations: there needs to be a basis of trust of citizens towards both the media and the governmental organisations, while the media need a basis of trust in government announcements and its respective departments' technical know-how to collaborate. Likewise, the government needs to trust the media and the communities. And needless to say both governmental and non-governmental organisations need to trust each other.

So far, when dealing with trust, the focus in this dissertation has been on the significance of trusting media specifically in media campaigns. However, trust is needed in relation to all information sources, whether mediated, the public, or organisations or other stakeholders. Ainuddin & Routray (2012) found out the existence of trust towards civic and religious organisations important in the recovery process in Baluchistan (Ainuddin & Routray 2012), however the authors see community trust necessary not only in response and recovery stages, but also before disaster occurs. In disaster survival, a basis of trust is inevitable in relation to the capacity of each individual, as well as the

community as a whole, and realisation of this capacity needs to happen before the disaster strikes. Article 2 points out how trust is created via media interaction with locals, especially within the vulnerable groups of society.

However, it is important to note that trust is not enough – plain trust, without risk perception does not result in building resilience. Once trust has been established, the level of awareness of risk needs to be defined; it is crucial that any campaign content be formulated together with the communities, based on the current level of risk perception. The focal point is community, its involvement and its participative action. One way of defining the current level of risk perception is by organising conversations on disaster preparedness, either as a village community or in sub groups of community members. NGOs proved to be effective when working with subgroups of the community in Aceh (Article 2).

In a low risk perception situation, media (which possesses high trust in this scenario) needs to convey the awareness of disasters. Panic develops in the community, which possesses an elevated risk perception, yet has no trust in media. Contrasting aspects of media and anxiety surfaced in Articles 3 and 4, a positive mention was that disaster education lessens panic, and a negative mention of media creating panic when not giving accurate information. (An example of the latter case, mentioned in the Padang research, occurred when a warning was given and yet no tsunami appeared. Citizens started leaving their homes, and the streets were filled with vehicles heading away from the coastal areas, resulting in traffic jams.) The ideal case of resilience in the community is created as a result of elevated risk perception on the one hand, and a high trust of media on the other hand. Table 6 presents these key variables.

TABLE 6 Main societal preconditions in relation to each other

	Risk perception: low	Risk perception: elevated
Trust: high	Awareness raising	Resilience
Trust: low	No resilience	High anxiety

In cases when community perception of risk is low, a prerequisite for building a campaign is a basis of trust in the media. A media campaign is designed to raise awareness of risk and bolster preparedness. Communities construct their own reality, whether safe or containing the possibility of risk, based on their worldview, as pointed out by Sharma et al. (2009) in their study of Indian communities. In the future, the construction of risk based on worldview needs further research. Little is known about the deeper thinking of risk in Asian communities; the western scientific community is tuned to individualistic thinking, which contrasts with the Asian way of community thinking, and social risk perception.

When functioning in a society, which has learned to trust media (based on the trustworthy behaviour of media in the long term, giving accurate information on disasters) and which perceives the risks, resilience can be constructed

and media can support this process. Chapter 4.5.5 adds to this framework with the closeness of community networks, belonging and participation.

4.5.3 Communication channels utilized in media campaigns

Evaluations in Aceh and Padang (Articles 2, 3, 4 and 5) provide empirical results regarding the communication channels for information seeking towards disaster preparedness. Community proved to be as utilized a channel as radio and newspapers in Aceh, even though television was the most used source for disaster preparedness information. In Padang, several media proved to be useful in teaching topics on disaster preparedness. While broadcast media's contribution has proved valuable in co-operating with the government and community, the findings in Articles 3 and 4 show that special attention needs to be paid to educating remote village communities in disaster preparedness in using the channels relevant to them. For village leaders in Aceh it could be television, while in Padang, newspapers. These two areas of Sumatra are traditionally distinct – Aceh communities are more oral, while West Sumatran communities are more literal.

While television is assessed as an interesting medium, on a negative note that it tends to create sensationalism and can make situations look worse than they actually are in reality. Its strength is its ability to illustrate with moving pictures the natural phenomena of earthquakes and tsunamis. One village leader in Aceh prefers television because 'you can see'.

Even though a less utilized medium in the Western hemisphere, print media seem to be popular in Aceh and West Sumatra. Traditionally, the village leaders have functioned as information nodes for the community as they read newspapers in local coffee shops ('warung kopi') and shared the news to the community when returning to the village. The Padang study showed that newspapers are still seen as the source of information after which other sources are not sought. As a recommendation from the Information Horizon map study, in Article 5, feature stories about disaster preparedness should be published in newspapers in the future, especially in Padang and the surrounding areas.

According to the Padang key interviews published in Article 4, print media, such as leaflets, have its advantages when detailed directions are needed, such as when giving building advice or detailing evacuation procedures.

Banners proved to be good information sources in Aceh for informing about tsunami drills, while in Padang their success was in the communicating during the campaign promoting earthquake-resistant construction methods.

In creating disaster preparedness education, considering ethnicity is also a key issue. Campaign builders need to familiarize themselves with the culture, its information behaviour, such as information sources and sharing, and in knowing the manner how decisions are made based on information received. One such example was the wish by 'keuchiks' (village leaders in Aceh), which emerged in the Aceh DMP 2008 study; they requested disaster preparedness lectures delivered in mosques, and the informational leaflets to be given out via local meetings and in prayer houses ('meunasah').

Whatever communication channel is used, the key issue in communicating is gaining trust. Media need to emphasise correct reporting of hazard warnings. In Banda Aceh and Padang, a few false alarms have been broadcasted, and this appears to have lessened the citizen's trust in warnings. Since media draw their warning messages from the governmental sources, a functional disaster preparedness capacity appears to be lacking too at the local government level, noted also by Djalante et al. (2012). Improving the level of commitment towards disaster preparedness is necessary on both the local media and local government level, so that the future hazard information, warnings and preparedness education can be trusted.

4.5.4 Contribution of radio in disaster preparedness

Radio has the ability to provide both information and timely warnings. By giving news updates on calamities, it has the potential to keep the issue of natural disasters on the agenda. The traditional view is to think that radio's contribution 'ends' after the warning and updating stage. However, research projects presented in this dissertation bring a new life to radio's contribution in disaster readiness. From a focus on the warning stage, the radio can move towards preparing citizens and communities for disasters before crises occur. Assessment of such programmes in Aceh and Padang shows that local radio has educated citizens to take actions for disaster preparedness. Radio functions best as an educator by offering communities' participation in producing preparedness programme content. This can include for example, topics regarding signs of tsunami; how to protect yourself when a strong earthquake hits, how to help others, how to express your need of help to others, and what to include in an emergency bag in the event of an evacuation. On the local level, in relation to governmental organisations, radio has facilitated setting up drills in Aceh (Articles 2 and 3) and invited government officials for live and recorded interviews. In relation to communities, radio has been depicted as a community storyteller using drama and the voices of local inhabitants.

Evaluations in Aceh (Article 3) showed that radio could improve its disaster preparedness programming twofold, by tailoring the content to different age groups, and by using creativity in producing the programmes. For some, disaster education via radio reduces panic, while for others talking about disasters may create anxiety. To solve this issue, the programmes should be made with the intention of both reducing anxiety and creating confidence towards the handling of disasters, or as interviewees said it, 'how to save ourselves'.

The clearest evidence as to radio's preparedness mediating role was shown in the Aceh DMP 2008 study (Article 2). Radio programmes produced by community group; provided awareness of the disasters as well as how to prepare for them. Such topics as 'how do I know a tsunami is coming', and, 'what to prepare for an emergency bag' were discussed in communities, and facilitated by community groups. The results showed that vulnerable groups, in particular, such as children, the elderly, pregnant women and the handicapped,

benefitted most from working together during the discussions and when producing of disaster preparedness programmes.

4.5.5 Contribution of media to community resilience

The key question in media approaches targeting disaster preparedness is how media contribute to resilience. As resilient communities are the focal point of disaster risk reduction initiatives, the ultimate success of media campaigns can be measured against resilience. Norris et al. (2008, 136) define resilience in their figure as “narratives, responsible media, skills and infrastructure and trusted sources of information” on one hand, and as ‘social capital’ consisting of ‘sense of community’ and ‘citizen participation’ on the other.

Looking into Norris et al.’s definition, media contribute to resilience by providing trusted information and communication. By acting as a community storyteller and providing a platform for social memory, media stimulate resilience. Communities grow stronger using communication networks, and through information sharing. When the community participates in the media arena, resilience is facilitated. These topics were covered in Article 1.

In Article 2, community resilience was measured by asking the survey respondents what they had learned about disaster preparedness and mitigation from local radio. Almost half, 40% of the respondents, said they had learned from radio that disaster preparedness helps to save lives, and every fifth had learned that ‘I can do something to help reduce impact of the disasters’.

The skills and infrastructure portion of Norris et al.’s definition was addressed in Article 4. The main finding of Article 4 in West Sumatra was that the media campaign, created and implemented in co-operation with several stakeholders, increased citizens’ awareness of the need for improving the construction standard or at least of smaller improvements to the houses to withstand the earthquakes. The campaign message was disseminated through broadcast media, as well as several types of printed materials including posters, billboards and leaflets. Media campaigns of this nature can remind citizens of preparing especially in districts that face a high probability of a natural disaster and are not yet deemed to be adequately prepared.

Besides construction skills, other evacuation-related issues were brought up in key interviews in West Sumatra coastal areas. Keys (Article 4 in 2013) pointed out the need for education on how to utilize evacuation maps, and how to mark evacuation routes well. In the future, the coastal areas of West Sumatra would benefit from media campaigns organised with these topics in mind in coastal areas of West Sumatra.

4.6 Overview of the research results

The Aceh and Padang studies shed light on the issue of facilitating disaster preparedness and community resilience via the news media, with a special focus

on radio. Both government and NGO representatives appreciated local radio stations efforts to produce preparedness programmes, and their activities related to collaborating with government and NGOs in organising drills. The crucial group of people that missed the preparedness education were the village leaders, called 'keuchiks' in Aceh. Considering their status in the community, it is of the utmost importance that they are informed about disaster preparedness activities because culturally, they carry the responsibility to keep the villagers updated. The village leaders voiced their discontent in not being informed about the practices and drills arranged by the government. Moreover, they were left out of the radio messages, since they do not listen to radio, but watch television. Even so, the village leaders provided some useful suggestions for future preparedness mediating: the printed preparedness materials could be voiced into digital form including being delivered in radio talk programmes, and mosques could also be a source for providing lectures relating to disaster preparedness.

The situation in West Sumatra differed largely from that of Aceh. First of all, the disaster experience itself was not as devastating as in Aceh, and the involvement of international help agencies was not as significant as in Aceh. The resources for organising drills and preparing radio programmes targeted for disaster preparedness were understandably smaller than in Aceh. Second, the ethnic composition of Padang, its surroundings and the province where the area is located in West Sumatra, varies considerably from that of Aceh. The Minangkabau people are known for their matrilineality and high literate and educational history in West Sumatra, while the Acehnese are known for having the autonomous tendency to separate from the Indonesian government. Third, the issue of trust has suffered in Aceh during the years of conflict so that the citizens do not trust certain local governmental departments, the army, or the police (Merikallio, 2006). The purpose here is not to compare these two distinct situations in detail, however, in interpreting the results these facts must be considered and reflected in context when considering the results of these two sets of studies which took place in relatively close proximity.

These studies underline the potential benefits of organised community groups discussing and producing disaster preparedness related programming on radio. Once the community is actively involved in the education process, their disaster preparedness can improve accordingly. Similar results have been found by several researchers; Shiwaku et al. (2007); Kim & Kang (2010); and Kusumasari & Alam (2012).

The Padang study revealed a lack of funding for disaster preparedness activities. As a solution, public-private partnerships were suggested. In the Aceh study, it was the international aid provided following the Indian Ocean tsunami, which brought the human and financial resources necessary for recovery and capacity building.

In chapter 3, a model was presented for radio's roles in disaster preparedness. This model was based on ten research studies conducted in various countries, and it depicted the importance of community participation in the learning process of disaster awareness and preparedness. Radio stimulates the issue by

informing, giving updates and warning and broadcasting citizens' stories, however, by itself, radio's effect remains lean without community participation.

In comparing the author's findings to the model based on the ten existing empirical studies, at this point two roles need to be added to the model: (1) radio as trainer of relief workers and government personnel to use broadcast media in the various stages of disaster, and (2) radio as a co-operator with government and other stakeholders. These two roles surfaced clearly during key interviews, especially for the organising of tsunami drills. Drills and simulations openly provide a practise ground for the whole community, where each stakeholder can learn their tasks and responsibilities.

In addition to organising community discussions on disaster preparedness as verified by the ten research studies reviewed in Chapter 3, local radio benefits from community involvement, by recruiting villagers to participate in designing and producing of programmes, as was shown in the Aceh study. This community involvement is carried most productively via small networks, organised either by voluntarily or civil society organisations.

Based on the outcomes of the ten existing empirical studies in Chapter 3, together with the additional dimensions of radio as a trainer of relief workers, government disaster related departments, as well as a collaborator with local stakeholders, a compilation of the roles of the news media and, in particular, radio, is explored here.

Roles of news media in disaster preparedness:

- Inform, educate and facilitate disaster preparedness
- Reduce anxiety
- Co-operate with government, other stakeholders and local residents when organising practices and drills
- Develop into a trusted and accurate source of information, avoiding exaggeration of the impact of the disaster.

Roles of radio in disaster preparedness:

- Local radio creates disaster mitigation messages, for various age groups, including the disabled and other vulnerable community groups.
- Create narrative and drama programmes dealing with the topic
- Produce radio specials also in areas outside the cities, e.g. in coastal areas
- Create programmes both on the value of preparedness and the practice of preparedness
- Give citizens and community members opportunities to participate by involving them in programme design and production
- Train relief workers and government personnel to make radio programmes about disaster management
- Find agreement with government agencies and other stakeholders, such as NGOs, about their roles in the event of a disaster
- Embrace the idea that community radio is a key source of preparedness information for its listeners.

The above is summarized in Figure 5.

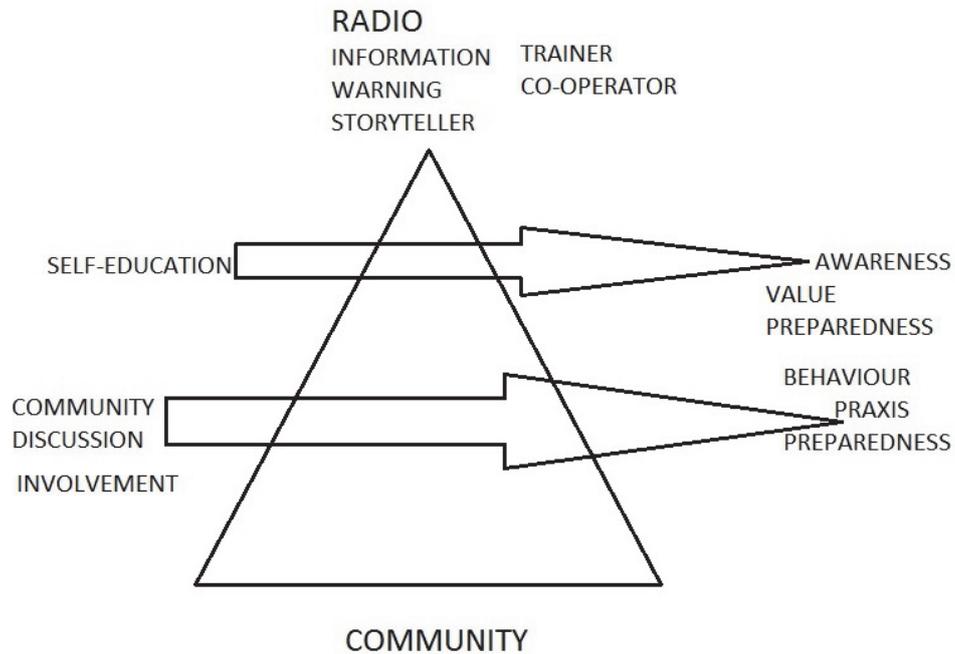


FIGURE 5 Radio and community roles added based on the author's research

The Aceh and Padang findings also help to identify crucial factors in designing the campaigns for disaster preparedness that are listed as follows.

- Multimedia approaches, including television, radio, newspapers and print media, cellular communication
- Use of those channels that the population is using, and creating content relevant to the audience – in a culturally sensitive way
- Co-operation with government and other stakeholders, media and community
- Testing of community-level communication systems
- Community level disaster training and drills
- Information and education that embraces the adoption of a culture of safety.

In the future, multimedia campaigns will probably include more smartphone and social media strategies, even games to educate about disaster preparedness. The crucial component in media campaigns is the focus on community. The Aceh and Padang findings suggest some topics for media campaigns related to disasters in developing countries, such as construction, evacuation routes, how to utilize evacuation maps, and what to do when an earthquake happens.

5 TOWARDS A MEDIA CAMPAIGN MODEL

In this dissertation a long journey is undertaken in order to identify the critical factors for a media campaign model supporting disaster preparedness. This journey included both theoretical and empirical insights. In creating media campaigns for developing countries, the main focus is on broadcast media and its contribution to community resilience. The literature review of ten empirical articles, reported in Chapter 3, pointed out the need for government, media and the community to collaborate in providing the infrastructural elements for disaster preparedness including participation in media campaigns. Own studies showed that in the media campaign model, the main focus needs to be on community participation in the media. In the next sections, first, we concentrate on media and its functions and qualities, with insights derived from the ten articles in conjunction with the author's empirical studies. Second, some practical thoughts are shared about the structural process of organising media campaigns. And third, a model for disaster preparedness education is presented, based on the literature and empirical studies conducted.

5.1 Media's roles and attributes in disaster preparedness

Figure 6 illustrates the media with its roles and attributes. The roles of broadcast media as an information source and an educator in disaster preparedness are depicted by the two small wheels. The big wheel, pushing the smaller ones, illustrates the attributes of media. A key attribute of the contribution of media to community resilience is the necessity of being trusted by the community. To support resilience media first of all need to earn and maintain the trust of citizens. By delivering factual news and information, while at the same time avoiding sensationalism, the community learns to trust the media. Media also build awareness by keeping disaster risk reduction an ongoing issue in the media arena. It appears citizens learn to value the significance of the observations, and show intent towards being more prepared in the event of disaster. Any media

campaigns, disaster warnings, or preparedness education approaches are preceded by trust in the source. From this trust grows the ability to create awareness of the issues, and carries the potential to motivate audiences to look for more information.

To the left of the big wheel there is the closer small wheel, which represents the broadcast media as an information source. Traditionally, the broadcast media's function has been to build awareness through its broadcasting of problem issues. This includes information related to news, or the actual warning messages of the approaching disaster, and the evacuation notices.

The top of the small wheel represents the broadcast media's role as educator. Education is enhanced through media's role of being a community storyteller, where citizens can participate and share their experiences of previous disasters. Via dialogue and conversation community and social networks *process* the information broadcast through the media and turn it into practise. Without community involvement, media advocacy efforts will not turn into action. Preparedness is built as a result of awareness, which is linked with a process of community participation. The public reaction towards messages from the media, as an educator carrying out broadcasts, needs to be analysed collectively in co-operation with the appropriate government departments, and with the community through the use of simulations.

Any campaign needs to be tied in with community activities, in which media functions to bring people together, or focuses the message content to various groups of the community, whether segmented by demographics (such as children, youth, women, disabled, elderly people) or ethnicity.

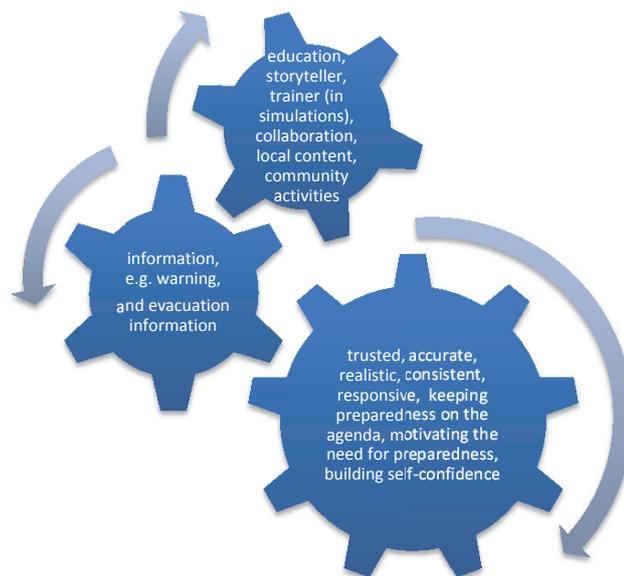


FIGURE 6 Media as disaster preparedness education agent: being trusted, informing and educating

One thing is certain – there is a need for preparedness education in the communities. Traditional knowledge of disasters has lessened, and history has shown that information dissemination to the communities is not optimal, yet the probability of disasters is, e.g. related to climate change, on the increase.

5.2 The media campaign model

Moreover, there are some essential insights regarding the process of organising a media campaign. To create a campaign the first task is to research the communities' communication environment and media use. Based on this research critical decisions are made determining the communication means and channels, the content, format and target groups.

The author's research projects initially focused on broadcast media as the preparedness education communication channel, however, during the process the need for additional channels, such as print media, mobile media, interpersonal communication and simulations became clear.

The content of the media campaign is to be derived from the community's needs as reflected in the Aceh and Padang research projects. The findings pointed out the educational needs for different types of disasters. Preparations on how to survive earthquakes, for example, must include: knowing what to do after a warning sound, what kind of attitude is important to have during earthquakes, what the effective evacuation processes are, how to build earthquake-safe houses, how to prepare the interiors of houses for earthquakes, and how to prepare an emergency bag.

The format used in media campaigns is also to be considered collectively with the community. Findings from the author's research projects show that drama programmes in broadcast media were appreciated as well as dialogues and talk programmes. Key interviewees suggested that government emergency staff should be interviewed on talk shows. Whatever the programme format, the main issue is its relevancy, being of interest and having the capacity to be interactive.

In the author's projects, the handicapped, the elderly, pregnant women, and children benefitted most from the disaster preparedness programmes produced on local radio in Aceh. These groups of society are considered most vulnerable in disaster situations. In Padang, the NGO representing the handicapped was the most critical of local government disaster preparedness actions. These findings emphasise the value of focusing disaster preparedness education on those who are physically challenged.

The most crucial factor is that any media campaign must be planned together with the community. This is the most effective way for the community to increase its awareness of disaster preparedness - via involvement and participation. Disaster preparedness education can thrive in a societal environment. Culture, values and language, add flavour to the campaign. In a media campaign, in addition to NGOs, other stakeholders taking part might include businesses

that can possibly provide funding or resources for the campaign. The more players are involved, the wider the impact will be; this was detected in the Build Better –campaign in Padang. Some other radio communication players, like RAPI and ORARI in Aceh, were called on for co-operation in simulations. Additionally, media associations can be included, such as the Journalistic Network of Disaster Preparedness in the Padang media campaign.

Furthermore, the foundational values can be incorporated in the model. A media campaign requires a certain basis of trust in media within the community, together with risk perception on the part of the citizens. Within this framework of trust and risk perception, educational campaigns increase community resilience. These factors were explained in detail in Chapter 4, Table 6, while the media-related parts of the below model were explained in Figure 6. The objective of the below model is to provide the overall picture of how critical factors for media campaigns interact.

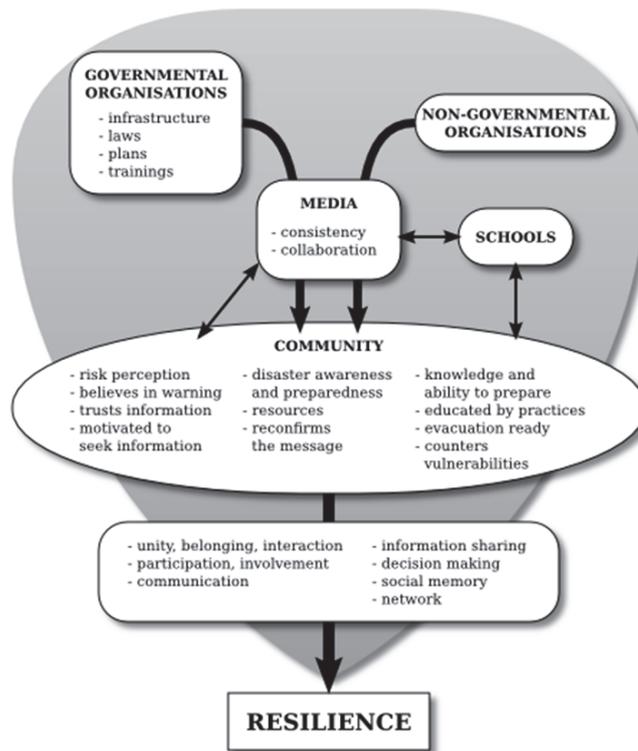


FIGURE 7 Media campaign model, based on empirical research and reviewed articles

In the model, resilience is depicted as the outcome of the entire disaster preparedness education process. The goal of an educational campaign is resilience, defined as a capacity to anticipate and be prepared to respond to a disaster accordingly. For resilient capacities to develop in the community (drawn as el-

lipse in the middle), the community needs motivation to seek information, trust the information obtained, believe in the warnings given, and possess a certain amount of risk perception. In addition to these qualities, the community needs awareness and practical preparedness; such as know-how to fix houses to withstand calamities, and know how to prepare an emergency bag. Based on this dissertation's research projects and literature studies, the most crucial preparedness factors include practical preparedness, and plans to counter vulnerabilities. Practical preparedness supposes access to resources along with the physical and mental ability to carry out the preparations.

Resilience is created through community interaction, participation and involvement. Cohesive communities share information, and make relevant decisions regarding disaster. United communities with closely-knit networks have proven to survive disasters better than isolated communities. (Kim & Kang 2010, Lau et al. 2010)

How do the media (as shown in the left lobe of the heart) facilitate the communities' resilience? Research studies point out that media inform about the various disasters and how people can react to them. Media educate on ways to prepare for disasters. These media offerings must all resonate with and be reconfirmed by the community, in meetings, through discussions, interviews, talk shows in broadcast media, and in articles in print media. Social memory (as discussed in Article 5) has been shown crucial for future disaster preparedness; therefore, broadcast media need to give time and space for community members' stories.

By supplying information and education, and being a voice of the community, media stimulate resilience. Once a community knows the risks and how to prepare, self-confidence follows. In addition to providing the community with education and resources, media can collaborate with governmental organisations to organise practices and rescue trainings, and with NGOs to educate them on the optimal use of broadcast media related to disasters.

To this point the roles of media in building resilience have been explored. The model includes certain attributes of media, which are detailed in articles and author's research projects, and in Figure 6. These attributes, arising from field research, include media being accurate, culturally sensitive, realistic, responsive and consistent. Consistency refers to all media outlets providing the same core of instruction and information regarding disaster readiness. In an ideal case, the schools will echo the same core instructions as the governmental organisations, the NGOs and the media.

Looking into relationships between these stakeholders, in the model, there is a line from NGOs connecting the media to the community. This refers to the research projects in Aceh and Padang. In both localities, the NGOs provided groups for community members to produce preparedness-related content to media, in most cases to local radio. In this model, there is another line from governmental organisations through media to the community. This connection, media collaborating with governmental organisations in organising drills and

agreeing about communication facilities, was mentioned by several key interviewees.

Governmental organisations have a vital role in creating the infrastructure, which helps the community to build resilience. This infrastructural responsibility is important – without the government providing resources for building disaster-related infrastructure, such as evacuation buildings, routes and markings, the community preparedness training would be in vain. Another important governmental issue in community resilience is making plans and backing legislation towards community disaster preparedness. Moreover, staff employed by the disaster-governmental organisations needs to be trained for disaster situations, and should be knowledgeable in using media.

This model is designed for community-oriented countries like Indonesia. Community forms the basic platform for learning. As we all know, when disaster hits, it is the responsibility of each household and village to face the disaster responsibly, and this will not happen successfully without preparation.

6 CONCLUSIONS

In the previous chapter the model summarising the results was presented, including the main outcomes of the research. In this chapter we review the purpose of this dissertation, evaluate its reliability and validity, and finally, propose recommendations for the future research.

6.1 Media as disaster preparedness educator

This dissertation sought to define disaster preparedness education in a novel way, by defining media as facilitator in the interaction with the community as capable for resilient behaviour. This function of media as preparedness educator has not been studied in this extent earlier. Media's contribution in giving information and warning about disaster has been acknowledged in disaster related studies; however, its contribution to educate citizens in disaster preparedness is new.

This dissertation concludes that broadcast media, including local radio can be used for disaster preparedness education, when it happens in an atmosphere of collaboration enabling preparedness activities of the community and local stakeholders. Radio by itself is not enough for creating disaster preparedness, but the relevant media in the community together needs to be involved. That is why this dissertation ended up in creating a model for broader educative campaigns. Such campaigns can be a one-time effort but preferably, a continuous effort, keeping disaster preparedness on the media agenda.

In addition, the prerequisite for media's contribution to disaster preparedness is that the citizens trust media. This attribute was called for in the key interviews both in the Aceh and West Sumatra provinces.

6.2 Evaluating reliability and validity

In the empirical studies the researcher collaborated closely with the local University lecturers and students. The researcher pursued to be culturally and ethically sensitive in all areas. The local culture was observed during the selection of samples, the forming of the questions, the organizing of the interviews, and through the use of local interviewers to collect data. The survey questionnaire, as well as the focus group and the key informant interview questions, was translated from English to Indonesian, and then translated back to verify the meanings of the linguistic concepts. All the questionnaires were pretested; the Information Horizon Map question was pre-tested by a group of students from Andalas University. The data collection and interview trainings were conducted via a translator from English to Indonesian.

The interviews were carried out in the local languages when necessary, with Indonesian the preferred choice. Acehese and Minang were used on occasion. In addition, the focus groups and key informant interviews were either recorded or written down, and transcribed for analysis by the author, with attention for anonymizing the data.

In selecting the translators, the author was limited to choosing from those available on the radio stations' staff that knew both English, Indonesian, and in some cases Acehese. This selection process was beneficial in that the translators were familiar with the topic, the local culture, and the language, which included an understanding of special linguistic expressions. The translators were able to clarify the meanings of the interviews. In cases when Google Translate was used to translate the interview content, the translators rechecked these translations. Due to financial issues it was not possible to use an independent source for quality checks on the translations as recommended by Hennink (2007, 218).

The reliability of the survey results is based on random sampling, and on the training of the interviewers to use the instrument and select the sample accordingly. One area of Banda Aceh, the coastal area of Meuraxa, was underrepresented in the survey sample; the area had been rebuilt with new housing complexes since the 2005 census, from which the sample was drawn. The reliability of key informant interviews can be detected by the repeated measurements of the same phenomenon. The key informant results were consistent with each other.

Evaluating the validity in qualitative research is not easy. Content validity and criterion-related validity do not contain much help in evaluating the qualitative research (Carmines & Zeller, 1979, 26). When it comes to construct validity, however, the four empirical studies validate each other as they give a similar result - confirming the role of broadcast media as a disaster preparedness educator, and showing the involvement of community as a necessary facilitator for disaster preparedness education via media. This kind of validation is also known as triangulation. Moreover, the research methods and the data collection

strategies were carefully designed to respect the researched and the cultural situation. According to King (1994, 32), involving other people, such as local students and research assistants, benefits the considerations of validity when interpreting the qualitative interviews. Collaboration with locals in interpreting the data adds to the ethnographic validity, and helps the researcher to understand the local perspective (Thuno 2006, 258). It was with these concepts in mind that the researcher sought to gather data with a cultural perspective.

6.3 Recommendations for future research

Key findings derived from empirical studies in both Northern Sumatra and West Sumatra show that community forms an important information source for disaster preparedness. In the Indonesian context, educational approaches using broadcast media benefit from community involvement. Media campaigns designed together with the local community, with an emphasis on citizen participation appear to enhance both risk awareness and preparedness for disasters. This result echoes similar findings in other disaster studies in Asia as mentioned in Chapter 3.

More research needs to be vested to clarify what processes in the Indonesian community work best in creating this resourcefulness. Is it the community meetings and discussions? Or perhaps arranging disaster preparedness lectures in mosques? Is it utilizing mobile communication in interpersonal networks? Or is it the village leader visiting coffee houses, the 'warung kopi,' and sharing the knowledge he learned there? (In remote rural villages the village leader visits the 'warung kopi', he reads the paper there, and returns to the village to tell the news.) The theory of stakeholder enabling can be applied to answer these research questions in detail in the future, in particular, using participatory approaches in further investigating this issue in Asian communities. Of similar importance is an interpretative analysis of how perception of risks is formulated, referring to Asian researchers continuing to seek answers for ways of improving community disaster preparedness and resilience.

In the scientific literature, radio has been recognized as a warning and information medium, rather than a preparedness educator. The focus of this dissertation is to show the educational capabilities of broadcast media; specifically radio, in mediating disaster preparedness. Based on the research projects in Indonesia, as well as related articles noted in Chapter 3, critical factors were identified for media campaigns targeted for disaster preparedness education. During the very first investigation in Banda Aceh the author had to divert from a 'radio only' to a multimedia approach as a result of key interviews in Banda Aceh and in the Padang area. While three studies (Articles 2, 3 and 4) pointed in the same direction, to the necessity for multi-media education and campaigns, they also verified an important element: local radio facilitates community learning while prompting participatory methods locally. It appears that local radio, enabling community involvement, possesses the capacity to facilitate disaster

preparedness and resilience better than any other media in developing countries. During the participatory process, the power of those holding authority and influence decentralises and voice is given to those who are vulnerable.

The grounding principle in disaster preparedness is to support a culture of safety. This is promoted, by government's legislation and media's attitude of responsibility. The approach of 'culture of safety' raises several concepts essential to facing disasters - preparedness, awareness and risk perception. Practising the creation of a culture of safety, government departments make decisions geared towards this goal. Action points include creating plans and laws for disaster preparedness, investing in communication infrastructure - such as setting up warning signal systems, marking evacuation routes, building evacuation buildings, setting up educational and communication programmes in schools, and working together with the media. Organising tsunami practices is being accomplished, however, for other aspects much remains to be accomplished. Due to limited financial resources, governments in developing countries are challenged with disaster mitigation plans. Therefore, key interviewees (Article 4) voiced the need for public-private partnerships to help solve the financial challenges. Future studies need to focus on investigation of the possibilities of public-private partnerships in developing countries. Even so, there is much to be considered in creating public-private partnerships, such as how can the interested parties solve the stakeholder paradoxes arising from this kind of collaboration? How to reconcile, for example the various goals relating to the economic and social aspects of individual organisations?

The media campaign model presented in this dissertation provides a framework for educational approaches to preparedness in Asian communities. The empirical modelling is based on field research in Indonesia, and therefore it is best suited for the Indonesian cultural and ethnic environments. However, in creating the model, also related literature that dealt with disaster situations elsewhere in Asia was applied. Therefore, the model could be applied to other Asian countries facing similar disaster situations, in particular, risk of earthquakes and tsunamis. In some cases, the model can apply to situations in Asia with storms and cyclones as well, while it could be tested in other parts of the globe facing similar natural disasters.

The author's hope is that this dissertation will stimulate conversation and spawn additional research projects related to building and stimulating community resilience to natural disasters.

SUMMARY

In Kobe 2005, at the World Conference on Disaster Risk Reduction (DRR), disaster preparedness was recognised as being one of the gaps in the disaster management cycle. While considerable discussion has taken place on response and recovery in disaster management, preparedness has not received the attention it warrants. There has been more research on disaster response than preparedness (Paek et al. 2010). Preparedness is a process that requires long-term capacity building on a local level, as Djalante et al. (2012) describes the problems in Indonesia: "Impediments to the process include a lack of capacity and capability for DRR at the local government level, 'a lack of systematic learning' and a lack of commitment from the government to mainstream DRR into broader development agendas".

For this 'lack of systematic learning', preparedness can be seen as the other side of the coin. Preparedness is defined as measures taken in preparing to handle the disaster, actions to prepare for disaster, and mental readiness for what to do in case of disaster, as well as confidence to respond in the disaster event (Shaw et al. 2004).

Broadcast media have been acknowledged as the leading source of warning and information concerning hazards, and in giving advice on what to do during an impending natural disaster. Even so, media's role in educating to prepare for disasters needs to be clarified, and this dissertation proposes that the educative role of the media can be reinforced considerably. Broadcast media can influence both modalities of preparedness: first, to enhance the awareness of disasters, and second, to enhance the preparedness for disasters. This dissertation investigates the two modalities and examines more closely media's role, particularly radio's contribution to disaster preparedness education.

In the scientific literature, media is placed in a triangle, which includes organisations and community. Disaster communication itself happens within the communication networks of governmental and non-governmental organisations, local residents, and the local media (Kusumasari & Alam, 2012). This dissertation takes a closer look into media's role in facilitating disaster preparedness education in interaction with local communities. The model for disaster preparedness educational campaigns was constructed as a result of reviewed literature and empirical research projects in the Aceh and West Sumatra provinces, in Indonesia. Empirical fieldwork consists of a survey, focus groups, key interviews and Information Horizon map drawing; from 2007 to 2010. Four articles, describing the empirical findings of these projects, and one article relating to the structured literature review of disaster preparedness were published and are presented as part of this dissertation.

The theoretical background is based on a relational view of stakeholder enabling, emphasising evolving interactive relationships and two-way communication between the governmental and non-governmental organisations, media and the community. A social constructionist approach is applied to the communities' perception of risk. These theoretical choices fit naturally into the

dissertation's empirical settings, in that Indonesia is a nation, which emphasises the concept of community, called 'masyarakat' in the Indonesian language.

Radio was shown to be effective in reaching the community, however it is worth noting that many village leaders do not listen to radio and additional sources need to be utilized to educate them in disaster preparedness. Even so, government departments, as well as non-governmental organisations did show their appreciation of local radio for providing a platform for disaster preparedness discourse, and for its effectiveness in facilitating and arranging disaster simulations.

The two key components of the model for disaster preparedness education are formed by the community and its involvement with the media. The empirical studies in Aceh and Padang resulted in positive learning accomplishments, once the community groups participated in creating radio programmes and carrying out conversations relating to preparedness topics. Even though radio proved to be functional in giving lifesaving and self-sustaining information and education, the final conclusion from all the research projects is that a broader approach including community involvement is needed in creating disaster preparedness campaigns and comprehensive educational approaches in Indonesian communities.

This dissertation focuses on Indonesia; nevertheless, the preparedness campaign model can be applied to similar community-oriented societies in Asia facing the risk of natural disasters. The author hopes, that the model facilitates building effective campaigns for disaster preparedness and community resilience, by using trusted channels of communication in collaboration with local communities. Media-supported disaster preparedness education helps build resilience, and such a role of broadcast media can be further developed.

The author's limitation in these research projects was not knowing the local languages. However, utilizing local knowledge and enlisting local students as data collectors was crucial in communicating with community members. The author hopes that Indonesian researchers will continue to carry out research projects on disaster preparedness, and test the functionality of this model in their studies.

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TIIVISTELMÄ

Luonnonkatastrofeihin varautumisen kehittäminen osallistamalla yhteisöä paikallisradion avulla Indonesiassa

Väitöskirja käsittelee luonnonkatastrofeihin varautumista Indonesian rannikkoseuduilla. Kehittämisen kohteena ovat alueet, jotka ovat kohdanneet usein toistuvia maanjäristyksiä ja tsunamin. Tarve kiinnittää huomio näiden alueiden asukkaiden kriisivalmiuteen on ilmeinen. Tieteellisen tutkimuksen painopiste on toisaalta ollut katastrofeihin reagoinnissa, ja toisaalta paikallisväestön selviytymisessä. Yhteisöllisessä viestinnässä on kehitetty viranomaisverkostoa toimimaan tehokkaasti paikallisväestön ja median kanssa. Luonnonkatastrofin tapahduttua tiedotus ja avustustoiminta on käynnistettävä välittömästi. Sille, miten media voisi auttaa paikallisia asukkaita varautumaan luonnonkatastrofeihin etukäteen, on annettu vain vähän painoarvoa.

Tämä väitöskirja kohdistuu tarkastelemaan, miten uutismedian ja yhteisöllisen viestinnän ja vuorovaikutuksen keinoin voidaan edistää paikallisväestön tietämystä, kykyä ja taitoa kohdata luonnonmullistuksia. Väitöskirja pyrkii valottamaan uutismedian uuden roolin mahdollisuuksia. Informaation ja tiedottamisen lisäksi median mahdollisuuksia käsitellään kriisivalmiuden kasvattajana. Kirjoittajan tutkimuksissa sähköisen median, erityisesti radion, kasvattajuus mahdollistuu yhteisön vuorovaikutuksen kautta. Kirjallisuuskatsaukseen ja empiirisiin tutkimuksiin pohjautuen kirjoittaja kehittää mallin, jonka pohjalta Indonesian rannikkoseuduilla pystytään rakentamaan kriisivalmiusviestintää mediakampanjoiden avulla.

Tutkimuksen päähuomio kohdistuu paikallisen yhteisön kriiseistä selviytymisen rakentamiseen. Miten yhteisön lannistumattomuus ja selviytymiskyky luonnonkatastrofeja vastaan rakentuvat yhteisöviestinnän avulla? Tarkastelussa tuodaan esille toisaalta yhteisön sisällä tapahtuvaa viestintää, toisaalta median välittämää viestintää ja vuorovaikutusta, yhteistyössä sidosryhmien kanssa. Yhteisön käsitys katastrofeista, niiden luonteesta, todennäköisyydestä ja niihin valmistautumisesta syntyy sen pohjalta, millainen kuva yhteisölle on muodostunut todellisuudesta. Kirjoittajan näkemyksen mukaan indonesialaisessa yhteisössä todellisuuskäsitys rakentuu sosiaalisessa vuorovaikutuksessa. Yhteisö oppii parhaiten keskustelemalla median välittämistä sisällöistä ja toisaalta valmistamalla mediasisältöjä. Esim. radioasema ottaa yhteisön jäsenet mukaan valmistamaan kriisivalmiusohjelmia.

Tutkimuksen teorian muodostaa mm. Caltonin ja Kurlandin sidosryhmäteoria; englanniksi 'theory of stakeholder enabling', joka korostaa sidosryhmien mahdollistamista. Sidosryhmiä tarkastellaan tasavertaisina, osallistuvina ja toistensa kanssa viestivinä ryhminä. Sidosryhmiä mahdollistavasta teoriasta seuraa, että kriisivalmiusviestinnän kehittäminen pohjautuu yhteisön osallistamiseen. Tarkastelen yhteisön osallistamista prosessina, joka mahdollistaa kriisivalmiuden sisäistämisen keskustelun, mukanaolon ja yhteisen toiminnan keinoin. Suhteessa mediaan tämä tarkoittaa sitä, että yhteisö sisällytetään mukaan rakentamaan mediasisältöjä.

Bergerin ja Luckmannin teoria tiedon ja ymmärryksen sosiaalisesta rakentumisesta soveltuu tarkastelun lähtökohdaksi. Ymmärrys luonnonkatastrofeista, riskeistä ja niihin varautumisesta tapahtuu yhteisöllisessä kulttuurissa ryhmän vuorovaikutuksen ja keskustelujen pohjalta. Väitöskirja nojaa sosiaalisten suhteiden tärkeydestä riskien hahmottamisessa Scherer ja Cho'n teoretisointiin.

Katastrofeihin varautumisessa tarvitaan riskien ymmärtämisen ohella resursseja ja tietotaitoa. Informaatioteoriaan pohjautuen väitöskirja käsittelee sitä, miten tieto varautumisesta välittyy yhteisön jäsenille. Informaatiohorisonttia hyväksi käyttäen väitöskirja tarkastelee, miten yhteisön jäsenet hahmottavat tiedon lähteitä maanjäristykseen varautumisessa.

Väitöskirja pyrkii löytämään vastauksia kriisivalmiuskasvatukseen sekä teoreettisella että käytännön tasolla. Miten kriiseihin varautuminen on määritelty kirjallisuudessa? Mitä on opittu kriisivalmiuskasvatuksesta? Mitkä oleelliset sidosryhmät kuuluvat paikalliseen kriisivalmiusviestintään? Mitkä yhteiskunnalliset reunaehdot tarvitaan valmiuskasvatuksen onnistumiselle? Mitä viestintäkanavia käytetään paikallistason kriisivalmiuskasvatuksessa? Mikä on sähköisen median, ja etenkin radion osuus valmiuskasvatuksessa?

Väitöskirja koostuu viidestä julkaistusta artikkelista, joista neljä pohjautuu empiiriisiin tutkimuksiin Indonesiassa Sumatran saarella. Yksi artikkeli muodostaa kirjallisuuskatsauksen kriisivalmiusviestinnän tutkimukseen.

Empiiristen tutkimusten metodina on kolmessa artikkelissa käytetty surveytä, keskusteluryhmiä ja asiantuntijahaastatteluja. Yksi artikkelista käsittelee informaatiohorisontin tutkimista ja siinä Sonnenwaldin kehittämää informaatiohorisonttiin liittyvää piirrostehtävää. Kirjoittajan rooli näissä empiirisissä tutkimuksissa on ollut lähinnä kansainvälinen konsulttitutkija; paikallisten yliopistojen opiskelijat ovat keränneet tutkimusaineiston molemmilla tutkimuspaikkakunnilla, ja kirjoittaja on analysoinut ja tulkinut aineistot yhteistyössä paikallisten kielikonsulttien kanssa. Kaiken kaikkiaan empiiriset tutkimukset on tehty tiiviissä yhteistyössä paikallisten sidosryhmien kanssa.

Kriisiviestinnän tietellinen tutkimus on osoittanut, että riskin hahmottaminen on oleellista siinä, miten yksilö tai yhteisö valmistautuu luonnon katastrofeihin. Selviytyminen katastrofeista on yhteydessä riskin hahmottamiseen. Media viestinnällään voi kasvattaa yhteisöä realistiseen käsitykseen riskistä. Yhdellä edellytyksellä – yhteisö luottaa mediaan. Media ansaitsee luottamuksensa pitkällä tähtäimellä jakamalla todenperäistä tietoa. Sekä väitöskirjan empiiriset tutkimukset että muiden väitöskirjassa mainittujen tieteentekijöiden tutkimukset viittaavat samaan suuntaan: kaksi oleellista muuttujaa – luottamus ja riskitietoisuus – ohjaavat sitä, miten luonnonkatastrofien kohtaamisen kyky rakentuu.

Katastrofeihin varautumista opitaan eri sidosryhmien muodostamassa verkostossa. Empiiristen tutkimusten pohjalta rakennetussa mallissa korostuu yhteisön osallistuminen vuorovaikutuksessa sähköisen median, erityisesti paikallisradion kanssa.

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APPENDIX ONE

DATA COLLECTION DETAILS FOR ARTICLES 2 AND 3 GLOSSARY AND ACRONYMS

Article 2

KEY INTERVIEWEES

- YTH Bapak Ir. Mawardi Nurdin, Mayor of Banda Aceh
- Mr. M Yahya as Head of Kesbang Dan Linmas or Badan Kesatuan Bangsa (The bureau of national unity and security) of Aceh Province and as Secretary of operation of SATKORLAK (unit for Coordination and Implementation of the BAKORNAS), together with Mr. Marwan, Secretarial member of SATKORLAK
- Mr. Syahnan, Head of Meteorology and Geophysics station (BMG) in Mata Le, Banda Aceh
- Bapak Zulfikar, DISTAMBEN (Department of Mining and Energy, NAD)
- Mr. Devi Riansyah, Section Head Relief and Social Welfare, Dinas Social (Department of Social Welfare, Aceh Province)
- Mr. Fauzi SH, Deputy head of INFOKOM (Department of Information and Communication, NAD)

KEY INTERVIEW QUESTIONS

(Before beginning the interview, ask the Interviewee, for the record, to state his/her name and the name of his/her office or organization, his position in that office and what his function involves)

1. What was the greatest challenge that your office faced during the December 2004 disaster? During the first six weeks of the disaster, what were the most urgent needs of the local population that your office had to address? How did you go about meeting those needs?
2. What was your greatest source of frustration during that time given the mandate of your office and the expectation and needs of the public?
3. What was your greatest fear as a public officer during that time?
4. Did your office have enough of the resources that the public needed at that time? If not, where did you find the additional resources that you needed?
5. Given that all means of communication were totally destroyed in the disaster, how did you and your office/organization disseminate information to the public? How did you gather information FROM the public. Which group did your office get a lot of help from? Which group did your office work

very closely with during the emergency? Why did you choose to work with that group? What help did they provide at that time?

6. In your assessment, do you think the people of Banda Aceh and Aceh Besar are better prepared now in case another similar disaster happens? Kindly elaborate on your answer (whether “Yes” or “No”).
7. Do you see a role for the local media when it comes to local disaster preparedness and disaster mitigation? What role would that be?
8. During times of emergency, which media (e.g. newspaper, television, radio, etc.) do you think people tend to trust and rely on the most for information? Which one would they trust the most?
9. As far as your office is concerned, which media do you feel can most effectively provide the platform that your office needs in order that it can respond better in times of emergency and in educating the public to become more prepared in times of emergency?
10. In your opinion, given the focus of your office/organization, what key messages does the public need to know so that people can be better prepared should another disaster happens.
11. Does your office have some kind of a communication plan that you are ready to implement in the event a natural disaster happens? What is the focus of the plan? Who are the target publics or audiences of your communication plan? In your opinion, how can radio help your office effectively implement your community disaster preparedness and disaster mitigation program?
12. In your assessment, what are the causes of vulnerability of people in Banda Aceh and Aceh Besar? How can public information help address this vulnerability

FOCUS GROUPS

Eight groups, facilitated by partners, were conducted in January 2008 with following number of participants (in brackets): elderly men (7), non-elderly men (11), non-elderly women (4), elderly women 1 (5), elderly women 2 (8), children 1 (6), children 2 (9) and disabled group (7).

In elderly groups, the cut-off age is 55, meaning that participants over 55 belong to elderly groups, and participants 55 and under belong to non-elderly groups.

The focus groups were formed and conducted by project partners, with the research assistants of the Aceh DMP 2008 leading the groups, together with partners, so that each focus group had two moderators, and a notetaker. Partners included Handicap International, Logica AIPRD, Old People’s Association and World Relief.

Guide Notes for Partners for the FGD:

The focus group discussions aims to find out the following from the participants:

- a) the emotional struggles that they faced in the immediate aftermath of the disaster and in the months immediately following;
- b) stories of how they survived – what helped them to survive - in the immediate aftermath of the disaster and how they went about rebuilding their lives and re-establishing their homes and livelihood
- c) and how media, especially radio, could provide the support

Guidelines for Selecting FGD Participants and for Organizing the Session:

- a) One focus group each for the following: people with disabilities, children (aged 10-13 years), elderly women and elderly men (aged 55 years and above), women (ages 22-50 years) and men (ages 25-40 years)
- b) Each groups will have no more than 10 participants
- c) Participants should be a current resident of Aceh Besar and was present in Aceh Besar when the December 2004 disaster happened
- d) Participants of a Focus Group should not be known blood relatives, not neighbors, not co-workers as this would affect their openness in answering some of the questions.
- e) Participants should not have previously undergone any kind of training, seminar, workshop, or any similar activity about disaster preparedness or disaster mitigation.
- f) When choosing a venue for the FGD, make sure that the session venue is located in a quiet and comfortable place, without the presence of any activity that may produce noise during the session (which badly affects the session's audio recording)
- g) Choose a neutral location. This helps encourage people to come early to the session. Quite often, participants who come from the same community where the session is to be conducted, tend to be the ones who arrive late.
- h) As much as possible, choose a venue with functioning electrical outlets. This is needed for the audio-visual equipment that will be used during the sessions.
- i) Print out and distribute to participants as soon as they get to the venue printed copies of the session ground rules. The Ground Rules must be presented and agreed upon at the very beginning of the session.
- j) The Moderator and Notetaker are not supposed to express their opinion on any of the questions nor on any opinion expressed by the FGD participants.

Suggested Session Ground Rules:

1. All handphones must be switched off or switched to silent mode before the session starts.
2. The FGD is not after right or wrong answers but it seeks to hear the participants ideas as well as feelings. Each participant is therefore entitled to express her/his opinion within the time that is given to her/him. Everyone is expected to show respect and not interrupt somebody while he/she is talking.

FGD Questions:

1. Think back to the tsunami in 2004. How did you know that a tsunami was approaching? What helped you to know what was going on? What helped you to survive the earthquake and the tsunami? Before the December 2004 disaster, did you learn anything from the elders – traditional knowledge – that helped you to know that a disaster was approaching? In your opinion, did that knowledge help you to survive the tsunami or earthquake of December 2004?
2. In the immediate aftermath of the disaster, what was your greatest source of fear and frustration about the situation? How did you overcome this? Where did you get help from to deal with your fears and confusion during that time?
3. Do you feel vulnerable in case another disaster happens? Why do you think you are vulnerable? Do you feel that your community is aware of your special needs (especially for people with disabilities, children, elderly)? What kind of help do you expect from your immediate community?
4. In your opinion, what helped you re-establish your life again after the 2004 disaster? Where did you get help in rebuilding your house and your source of livelihood? What support or help did you need immediately after the disaster happened and six – ten months later? Where did you get the help that you needed in order to rebuild your life?
5. Take a look at these ways of information channels about crisis – (*Mosque, Meunasah, Police, Hospital, Village leader, Family members, People at the street, TV, Radio, Phone, internet*): What channel or channels would you use to be informed in an emergency situation (e.g. tsunami, earthquake, typhoon, landslide)? What channel would you use to get further directions?
6. In your opinion, what kind of preparation did you have which helped to mitigate the impact of the disaster? What do you think do you need to do in order to be more prepared in the event of another disaster?

Article 3

List of key informants for interviews:

- 01 BMKG – Badan Meteorologi Klimatologi Dan Geofisika- charge of Tsunami Warning
- 02 Pusdalops – Warning center – coordinates Disaster management and warning dissemination
- 03 Pak Walikota BNA (Banda Aceh)
- 04 Dinas Social – Department of Social Welfare
- 05 TDRMC – Tsunami Disaster Research and Mitigation Center
- 06 PMI- Palang Merah Indonesia – Indonesian Red Cross
- 07 Handicap International
- 08 Flower Aceh
- 09 WALHI Ulee Kareng – Wahana Lingkungan Hidup Indonesia NGO
- 10 Rapi- Radio Amateur Penduduk Indonesia (Indonesian Radio Amateur Society)
- 11 Keuchik Tanjung Selamat Kec. Darussalam
- 12 Keuchik Ulee Lheu
- 13 Keuchik Blang Krueng
- 14 Keuchik Peukan Pada
- 15 Keuchik Cot Paya Kec Baitussalam

Glossary and acronyms

AIFDR –Australia-Indonesia Facility for Disaster Reduction

BAKORNAS – National Coordinating Agency for Disaster Management until 2008, currently called BNPB

BAPPEDA – *Badan Perencana Pempangunan Daerah*, Regional Body for Planning and Development

BMKG – *Badan Meteorologi Klimatologi, Dan Geofisika*, Indonesian Meteorological, Climatological and Geophysical Agency, governmental agency in charge of the tsunami early warning system

BNPB – *Badan National Penanggulangan Bencana*, National Agency for Disaster Management (until 2008 BAKORNAS)

BPBD – *Badan Penanggulangan Bencana Daerah*, Regional Disaster Management Agency (until 2008 SATKORLAK)

Bupati (Ind.) leader of regency (Kabupaten)

Camat (Ind.) leader of district (Kecamatan)

Desa (Ind.) Village, rural connotation

Dinas Sosial (Ind.) Department of Social Welfare, Government office in charge of distributing relief and other kinds of aids during times of emergency

DISTAMBEN - the ministry of Energy and Mining, and responsible for identifying hazards and disaster prone areas

Dusun (Ind.) sub-area of village

DMP – Disaster Mitigation and Preparedness

DRR – Disaster Risk Reduction

Gampong (Acehnese term) Village

IAIN – The State Institute of Islamic Studies Ar-Raniry

INFOKOM – Department of Information and Communication, the local government public affairs and information office

- IRAS - Infrared Astronomical Satellite**
Kabupaten (Ind.) District (regency), consists of villages
- Kampung (Ind.) Village**
- Kecamatan (Ind.) Sub-district**
- Kelurahan (Ind.) Village**
- Keuchik (Acehnese term) leader of village**
- Kepala desa (Ind.) leader of village**
- Kota (Ind.) Municipality**
- Lurah (Ind.) leader of village, civil servant status**
- NAD - *Nanggroe Aceh Darussalam*, Province of Aceh**
- Nagari (Minangkabau term) leader of village**
- ORARI - *Organisasi Amatir Radio Indonesia* Indonesian Radio Amateur Society**
- PMI- *Palang Merah Indonesia*, Indonesian Red Cross**
- RAPI - *Radio Antar Penduduk Indonesia*, Citizen band radio**
- R&R - Response and recovery**
- RRI - Radio Republik Indonesian**
- SATKORLAK - *Satuan Koordinasi dan Pelaksana*, Provincial Disaster Coordination and Implementing Unit, until 2008, currently called BPBD**
- Sosialisasi - socialization, meaning dissemination and publicising the information via community meetings, a concept used in Indonesian development practise by New Order Regime (Jauhola, 2013, 147)**
- WALHI - *Wahana Lingkungan Hidup Indonesia*, The Indonesian Forum for Environment**
- Walikota (Ind.) the City Mayor, or leader of district**

APPENDIX TWO

Table A1 . Factors critical to media campaign, derived from the Chapter 3 related ten articles.

Study	Actors	Communication means	Preconditions	Disaster
Shiwaku et al. 2007	School, teacher Educational department Community media	Essays, talk, books, Internet, newspaper, TV, Community communication Lecture School earthquake safety educational pgm	Community involvement Learning based on being active	Earthquake
Sharma et al. 2009	India meteorological department, <u>Cyclone Warning center</u> Vishakpatnam Coastal state relief commissioner, district collector (<u>revenue official, fisheries dep. official</u>) Sub-district admin. level (<u>mandal revenue official</u>) gov.revenue dep, dev.dep.admin.mac hinery, village level	Telegram, fax, telephone, wireless, messengers Face-to-face communication, television, radio, and public address Warning disseminated in various ways: homogenous community meet the leader, heterogenous community use various media	Messages understood, by ethnic language and technical terms Community perceiving the risk Social structure Awareness and attitude of village elders positive History of previous messages: no false alarms	Cyclone
Paul & Dutt 2010	Bangladesh gov. Storm Warning Center of Bangladesh Meteorological Department Ministry of Disaster Management and Relief Bangladesh Red Crescent Society Cyclone preparedness teams of first responders Friends, relatives, neighbours, gov. officials and NGO workers	Megaphones, house to house visits by CPP volunteers Handheld sirens, signal lights, transistor radio, television 32 upazilla offices has a very high frequency transceiver each Cyclone preparedness pgm	Belief in cyclone warning, content of warning message understandable and timely Electronics have batteries Making people aware of hazard Initiate educational campaign to improve utilization of shelters	Cyclone
Cretikos et al. 2008	Local gov.operated radio network Australian government	Radio with batteries, mobile phone, television, emergency contact list	Australian gov. emergency plan: 1. Households have equipment such as battery	Storm

	<u>Health services,</u> <u>emergency services,</u> <u>broadcast media</u> <u>organisation</u>	Family, friends, neighbours, colleagues	operated radios 2. Households are aware of the disaster role of radio networks Each state makes arrangement with national gov. operated emergency broadcaster	
Kusumasa ri 2012	Bantul local government and its institutions, Bantul Mayor Community (leaders) and media representatives District disaster management unit Local and int'l NGO in Indonesia	Detailed information on sub/districts and villages, maps depicting vulnerable areas Disaster issues included in gov. programs. Early warning system, training and exercises Communication network between orgs, community and media representatives	Local gov. informs community about the risks Autonomy in decision making Bureaucracy and community educated and trained for tsunami drills and equake simulations Local gov. becomes responsible for protecting community Local gov. and community. org have disaster awareness which is translated into routine activities	Earthquake
Ronan et al. 2012	School Public channels e.g. local radio Local emergency management	School education program supplementing a larger community wide effort Teachers discuss with students Public flyer and nine page document Public education campaign	School education program should be integrated within the whole of community programs	Earthquake
Spence et al 2007	Government agencies such as Federal Emergency Management Administration and the Dep. of Homeland security <u>Media</u> <u>Minority community leaders</u>	Television Interpersonal channels New media and cellular phones	Trust in information Motivation to search information Capacity to assimilate new information Ability to prepare	Hurricane

Tekeli-Yesil et al. 2011	Media <u>Civil Defense Organisation</u>	Earthquake preparation leaflets, information booklets Television, newspapers and magazines, Internet Risk maps	Media information should help people to seek information on their own, question and understand the risk Media gives realistic picture of disaster, acts in a responsive manner Media supports the development the culture of safety in society	Earthquake
Said 2011	Community disaster committee, leaders Government, town departments Responding agencies, authorities Ministry of Science, Technology and Innovation, committee IACETRM District committee, school, local mosque Community groups, leaders, NGO Hoteliers, taxi drivers, business associations	Disaster alert system, early warning Identification of geographic features Lecture, sermon, talk show, briefings, seminar and workshops, printed material, posters Internet, books, journals, CD, exhibitions Television and radio programs, Video Public address, patrol car	Laws, infrastructure (seismic stations, buoys, gauges, cameras, sirens, wave breaker, evacuation shelters), relief fund, procedures Community based approach CBDP recognizing heterogeneity in communities -> community ownership and full support from government Each org. needs a liason person Tsunami emergency response plan	Tsunami
Kim & Kang 2010	Community organisations FEMA, Red Cross, NOAA Local or federal government	Local media (tv, radio, newspapers) Network of people - interpersonal talk, discussion Guidebooks, websites, emails	Neighbourhood belonging (affectively and behaviorally) ->Motivation to collaborate Personal and social risk perception Connection to storytelling mechanisms ->access to knowledge, resources, motivation	Hurricane

APPENDIX THREE

Table A2. Factors critical to media campaign, derived from my research projects published in Articles 2-5

Study	Actors	Communication means	Preconditions	Disaster
Aceh DMP 2008	Meunasah Masyarakat Community Coffee shop Local authorities INFOKOM Provincial authorities (early warning system SATKORLAK) Hospital Media	Few mention traditional knowledge Personal communication Community communication Radio Djati (immediate, interviews) RRI Television (pictures) Newspaper Mobile comm. Suggestions: Educational campaign on early warning system and processes Use locally most relevant media outlets	Gov. and media agree on communication facilities in the even of disaster Culture of safety, resilience and mitigation Communication processes at local level: Culturally- embedded information-sharing and decision-making Interaction with locals before crisis to create trust Train relief workers, special groups and gov. personnel	Tsunami
Aceh DMP evaluation 2009	UNDP-DRR Gov. departments (disaster management) BMGK NGO, INGO Community reps. Media	Radio Djati PSMs, interviews, Talk shows, Television (science facts) Banners Tsunami drills Suggestions: Printed media read over electronic media Education into mosques (lectures, leaflets)	Gov, BMGK and media cooperation in drills (PMI needs to included) Focus on vulnerable citizens Media to stimulate a culture of resilience and work with community Community involvement Local funding for preparedness	Tsunami

Padang evaluation 2010	National gov. agency BNPB, district agency BPBD Local government and NGO representatives Volunteers, Community International agency AIFDR, Gov. departments (transportation, health, educational), RAPI and ORARI (radio ama- teurs), Armed forces Media School	Television TVRI, radio, leaflets, billboards, posters, banners, notice boards, film Mobile communi- cations RRI Padang Simulations Journalistic Net- work for Disaster Preparedness	Gov, NGO, and media co-operate and form public- private partner- ships. Response teams established Local funding for preparedness Media outlets synchronize their communication	E-quake
Padang map study 2010	Community - masyarakat NGOs Government Media	RRI and TVRI Private and com- munity radio sta- tions Cell phones Internet Personal commu- nication Newspapers as focusing source	Educate the pub- lic using infor- mation channels relevant to citi- zens	E-quake

ORIGINAL PAPERS

I

**THE ROLE OF BROADCAST MEDIA IN DISASTER
PREPAREDNESS EDUCATION: LESSONS LEARNED IN THE
SCIENTIFIC LITERATURE 2002-2012**

by

Romo-Murphy, E. & Vos, M. 2014

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The role of broadcast media in disaster preparedness education: Lessons learned in the scientific literature 2002–2012

EILA ROMO-MURPHY & MARITA VOS

This paper aims to clarify the role of broadcast media in disaster preparedness education concerning natural disasters such as earthquakes and tsunamis. Media is a strong facilitator in disaster awareness even as preparedness includes actions to reduce risks, which also needs community interaction, resources and motivation. Disaster preparedness education adds to indigenous knowledge and experiences, and may combine self-education through the media, school and community efforts for disaster risk reduction. An inclusive approach is also called for in order to involve vulnerable groups, such as the elderly or handicapped. Findings of this research show that the role of the media is seen in a positive way, such as providing warnings and updated information on the crisis situation. However, there is a negative side, i.e. in the framing of response activities and in sensationalising events, which may result in disseminating an inaccurate picture. This paper brings together insights on the topic, identifies the issues addressed and current trends in the scientific literature. This was done by means of a systematic review of the scientific literature on this topic over the last 10 years.

Initially, the role of the media was seen as informing and warning publics about natural disasters but in the last few years the media have also been regarded as a mediator, raising the awareness of disasters and increasing disaster preparedness. In this paper the role of broadcast media in disaster preparedness education is investigated via a review of insights gained over the last

10 years in refereed scientific articles on this topic.

The literature review focuses on the preparedness for natural disasters. Different regions are prone to different disasters, for example, a region may have recognised geo-risks such as earthquakes. This makes preparedness important and also feasible, because one can connect with existing knowledge and experiences in communities. This paper

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 MEDIA ASIA 41(1), pp. 71–85

is a first attempt to bring lessons learned about disaster preparedness education and the use of broadcast media together in the same study.

Objectives and Methodology

This paper aims to clarify media use in disaster preparedness education by means of a systematic review of the scientific literature published in peer-reviewed journals from 2002 to 2012. The following research questions guided this literature review.

- RQ1 How is disaster preparedness defined in the literature?
- RQ2 What have investigations of previous disasters taught us about disaster preparedness education?
- RQ3 What, according to the literature, is the contribution of broadcast media to disaster preparedness?
- RQ4 What trends are found in research regarding the role of broadcast media in disaster preparedness education?

The search was conducted in December 2012 in multiple databases via EBSCOhost and ProQuest, focusing on peer-reviewed journals. The search fields covered abstracts, titles and keywords, depending on the possibilities offered by the databases. After trying out several search terms, the search words included [disaster] and [preparedness or readiness] and [media, radio, message or broadcast]. The process is explained in Table 1. All in all, the initial sample consisted of 392 records. The records were collected in Refworks and scanned for relevance.

The inclusion criteria were that the article dealt with the preparedness or readiness of publics, mentioned broadcast media, and concerned natural disasters such as earthquakes and tsunamis. For example, articles on response, or concerning terrorism or pandemics were excluded. The final sample consisted of 87 articles that were read thoroughly.

The articles were listed chronologically and coded for the different research questions, using

Table 1
Results of the search

Databases	Search words	Number of records
EBSCOhost (communication, academic search and e-journals)	[disaster] and [preparedness or readiness]	446
	[disaster] and [preparedness] and [media]	106
	[disaster] and [preparedness] and [radio]	56
	[disaster] and [preparedness] and [message]	58
	[disaster] and [preparedness] and [campaign]	49
	[disaster education]and [media] and [preparedness]	3
	[disaster preparedness] and [broadcast]	6
ProQuest	[disaster] and [preparedness or readiness] and [media or campaign] and [natural]	132
	[disaster] and [preparedness or readiness] and [message]	36
	[disaster] and [preparedness or readiness] and [broadcast]	7
Total of databases	After removing duplicates	392
	Included in the analysis after scanning	87

thematic analysis. Some of the articles were relevant to one of the research questions and were assigned one code while others were assigned more codes, according to the number of research questions they dealt with. Relevant data were written down with the help of a predesigned data extraction sheet, including columns for title, informal summary and the four research questions.

This literature review focuses on articles dealing with severe natural disasters such as earthquakes and tsunamis. Articles about emergency preparedness were included in the analysis, provided they emphasised the use of media. Studies on hurricanes, fires and floods were included whenever they shed new light on the issue of preparedness in natural disasters.

Findings

We present below the results, reporting how preparedness is defined in the literature, addressing disaster preparedness education and clarifying the contribution of the media, and discussing trends in the literature.

Preparedness defined in the literature

In the sample, 22 articles illuminated the concept of preparedness by offering a definition or discussing what the concept includes. Half of the articles dealt primarily with this preparedness concept, while the remaining 11 also discussed other topics.

In the literature the concept of 'preparedness' was often used in tandem with 'awareness' (Anderson-berry & King, 2005; Ismail-zadeh & Takeuchi, 2007). There is no disaster preparedness if there is no awareness of risk. Awareness is related to risk perception. Naturally a risk is easier to perceive when there is a history of past experience of disasters (Colten & Sumpter, 2009; Paek et al., 2010) but risk perception can also be enhanced via education (Yong-Chan Kim & Kang, 2010).

Awareness of natural disasters can be enhanced or raised by several means, such as information, education and campaigns (Eraybar et al., 2010; Shiwaku & Shaw, 2008; Martel & Mueller,

2011). Research studies in Japan have shown that information given to students about the risk of future earthquakes enhanced students' awareness. Although awareness precedes preparedness (Ismail-zadeh & Takeuchi, 2007), it does not automatically lead to preparedness (Shaw et al., 2004; Shiwaku & Shaw, 2008). Studies in Japanese schools have proved that self-education and the media are good for raising awareness about earthquakes but have also reported that community and family interaction are necessary to actually being prepared in practice (Shaw et al., 2004; Shiwaku & Shaw, 2008).

Rajib Shaw (2004) defines preparedness as a willingness to take action to reduce risk (Shaw et al., 2004). The proposition is that once the general public is aware of the probability of disaster, preparedness and other preventive actions can then be implemented (Ismail-zadeh & Takeuchi, 2007). This is also called 'preparation action' (McClure et al., 2009).

Many researchers see preparedness as something practical (Barnes et al., 2008; Paek et al., 2010; Cloudman & Hallahan, 2006; West & Orr, 2007), with some providing exact lists of items to be acquired in preparation for a given type of natural disaster, such as the ERS, an earthquake preparedness scale (Spittal et al., 2006). Various measures are listed regarding the level of preparedness on the household level, such as having an emergency kit, stockpiling medication, knowing the danger areas in the vicinity of the home, the location of shelters and evacuation routes, having family contact information and an escape plan or listening to the weather forecast (Lachlan et al., 2009; West & Orr, 2007; Jacob et al., 2008; Nozawa et al., 2008; Tomio et al., 2012; Tomio, Sato & Mizumura, 2011; Burke et al., 2012). In future preparedness guidelines, connectivity should be added, since connecting to the Internet is "as important as having batteries and bottled water" (Procopio & Procopio, 2007, p. 85).

Researchers have various ways of explaining the association between awareness and

preparedness. Figure 1 shows the various explanations. Awareness and preparedness are conceptualised as two parts of a circle, complementing each other. Awareness of the perceived risk increases the willingness to prepare (Martel & Mueller, 2011). Awareness, both on the individual and collective level, is a starting point for behavioural change in preparedness. Knowledge about disasters, such as newspaper stories on disasters (Smith et al., 2007), is not enough to bring change: knowing how to prepare and motivation to prepare are also needed for disaster readiness.

According to the literature, disaster preparedness can be viewed from either a cognitive or non-cognitive perspective. The cognitive perspective focuses on disaster preparedness as a matter of gaining knowledge and information about preparedness, e.g. including a checklist of emergency items (Paek et al., 2010) while the non-cognitive perspective underscores appropriate attitudes and beliefs (Burke et al., 2012). But both are needed, as “encouraging people to routinely stock emergency kits requires the full set of emotions and cognitions felt by those who routinely engage in this behaviour to be identified” (Veil et al., 2009, p. 450).

Yong-Chan (2010) emphasised resources and motivation as important parts of preparedness, defining resources as administrative, financial, informative, social and technological, while ‘motivation’ is defined as motivating people to prepare. He also raised disaster preparedness to the communication and social level, proposing

that community actors provide knowledge and access during disasters while the neighbourhood social level network acts as a source of motivation (Yong-Chan & Kang, 2010). All in all, effective disaster preparedness is ultimately facilitated by raising awareness and providing knowledge of the risk, identifying the specific resources required for preparedness, and motivating communities to prepare for natural disasters.

Preparedness is part of the process of disaster management and its purpose is to strengthen communities, enabling them to become less vulnerable and more resilient. Improving preparedness entails the loss of fewer lives, fewer injuries and material damage (Levental 2012; Eisenman et al., 2009). This calls for the cultivation of a culture of disaster preparedness (Shaw et al., 2004; Davis & Izadkhan, 2008).

To conclude, disaster preparedness consists of preventive action taken by a government, an individual, a household or a community before and during the early stages of a disaster in order to reduce risk. Such actions include the seeking, processing and sharing or distribution of disaster-related information. The following section describes how both awareness and preparedness can be enhanced through education.

Disaster preparedness education

This section focuses on what, according to the literature, previous disasters have taught about disaster preparedness education. First, the focus is on the implications of these lessons for designing disaster preparedness messages and, second, on the role of the local community in the process.

Disaster preparedness education sources

In the sample, 11 articles shed light on disaster preparedness education, six of which focused on this topic, while the scope was broader in the remaining five. Indigenous knowledge has proved to be associated with mitigation of natural disasters. Those who have learnt from the behaviour of nature in the local area have saved lives, protected

Figure 1
Awareness and preparedness



livelihoods and have been able to behave appropriately in the face of disasters (Mcadoo et al., 2009).

This last-mentioned study, conducted on the Salomon island tsunami, showed that immigrant populations on the island were not aware of the danger posed by emptied lagoons after a strong earthquake, while the local populations in turn—based on local knowledge—lived on hills, and had access to paths providing an escape route (Mcadoo et al., 2009).

In addition to indigenous knowledge, past experience provided a framework for risk awareness and an estimation of the probability of a disaster, and for mindfulness about planning for future natural hazards (Dudley et al., 2011). Sometimes, past experience also had a positive effect on the credibility of warning messages (Sharma et al., 2009; Sharma & Patt, 2012). However, this experience of disasters, also termed the 'social memory' of the community, may result in the failure of these communities to adapt after new experiences (Colten & Sumpter, 2009; Paek et al., 2010; Yong-Chan & Kang, 2010).

Not all people acquire indigenous knowledge or have experienced a disaster, and not all communities have the reservoir of social memory that future generations could tap into. Neither indigenous knowledge nor experience automatically translates into practice. Citizens and communities need to be educated by being given information about the nature of disasters, and shown how to prepare to withstand disasters. A study in a Vietnamese school disaster preparedness study showed that teachers were lacking the knowledge of what to do when a disaster occurred (Tong et al., 2012). The need to educate about both response and the nature of hazards was also found among the survivors of the Samoa tsunami in 2009.

In contrast to improving our scientific knowledge of the tsunami phenomenon, several interviews revealed a troubling lack of understanding of tsunami waves, which was translated into their embodiment/manifestation/personification as a

'thief', or as 'beasts' and 'monsters.' Superstition produced a sense of hopelessness or predestination of events, which at the extreme resulted in a feeling of 'why bother to prepare.' ... It also seems likely that this feeling of hopelessness increased the psychological stress associated with the event. (Dudley et al., 2011, p. 205).

There is consensus among researchers that educating citizens improves preparedness (Vihalemm et al., 2012). Education is transmitted via four channels: community, school, family and self-education. In this classification, the media are placed under 'self-education' (Shaw et al., 2004, p. 43). Training is called for in schools and using the media for public education in disaster preparedness (Campbell, 2005).

Shiwaku (2007) and Smith (2007) argue that although education enhances awareness (Smith et al., 2007; Shiwaku et al., 2007), and information and lectures raise awareness, on their own, they are not enough to create preparedness. For readiness education, participatory methods are needed. One example of such a teaching method was reported in a research study in a Japanese school, where lectures, talks, searching for information on the web and creative methods such as making wallpaper about disasters, yielded positive results (Shiwaku & Shaw, 2008). A similar finding on the successes of school education combined with community efforts have been observed elsewhere in Japan (Ronan et al., 2012).

Vulnerable groups, such as the elderly or handicapped, or those with less formal education or low income, have been recognised as having a special need for education in preparedness. (Tomio et al., 2012; Tomio et al., 2011; Burke et al., 2012; Veil et al., 2009; Eisenman et al., 2009).

The role of the local community in disaster preparedness education

In the sample, 18 articles addressed community participation in disaster preparedness education:

11 focused on a community approach, while the remaining seven included it among other topics.

In many areas, and especially within an Asian context, the community forms the basic growth platform of the culture, and the community's collective memory stores myths and family stories from generation to generation. Disaster preparedness plans should take the social memory of the community into account, as it is as critical for resilience as are future-oriented elements (Colten & Sumpter, 2009).

The literature included several examples of a community approach where disaster preparedness was addressed via a participatory process. In Taiwan, community groups were established that collected information on past disasters and learnt how to analyse vulnerable conditions, solve problems and establish an organisation to implement disaster management tasks (Chien-yuan et al., 2008). In Japan, a voluntary organisation (VDPO) in the coastal villages improved community preparedness. A survey showed that residents with a VDPO group in their village were more knowledgeable about evacuation routes, had prepared a disaster backpack, and followed disaster notifications via radio and other media more than the residents of villages who did not have such a group (Mimaki et al., 2009).

Another finding from Japanese community groups, known as 'Jishubo', confirmed the usefulness of neighbourhood associations in preparedness education, as the sense of belonging correlated with perceived learning and perceived practical use of knowledge acquired in the meetings (Bajek et al., 2008). Community preparedness education was also considered useful in off-track mountain villages that are vulnerable to debris flows, where residents needed to be taught self-rescue skills and the entire community needed to learn to be 'disaster resistant' (Chien-yuan et al., 2008). Research in Nepalese schools showed that community talks and knowledge about vulnerable people and dangerous areas in various neighbourhoods had been crucial for students in taking

preparedness actions (Shiwaku et al., 2007).

An analysis of disaster preparedness in Indonesia showed that community outreach should be the main concern in developing an early warning system in Indonesia (Djalante, 2012). The author called for community-based disaster risk reduction (DRR), including improved learning processes through shared knowledge and experiences of different stakeholders (Djalante et al., 2012). In Iran, after the Bam earthquake, the local community had an important role in helping the wounded. As a result, further training of local volunteers for future disasters was proposed, since they were familiar with the cultures, customs and characteristics of the local people (Sadeghi & Ahmadi, 2008).

Contribution of broadcast media to disaster preparedness

This section focuses on the contribution of broadcast media to disaster preparedness. First, it reviews the role of the media in disaster preparedness education as found in the literature. Second, it describes in more detail how the media were used, for example, in the kinds of campaigns, messages and channels involved.

The role of the media in disaster preparedness education

In the sample, 20 articles discussed the role of the media in crisis communication: eight dealt exclusively with the media's role while 12 articles included other topics as well.

The role of the media in disaster situations is seen in a controversial light in the literature. On the positive side, the media provided disaster warnings and kept the audience updated about the situation as it unfolded (Savova, 2004; Cretikos et al., 2008; Tekeli-yesil et al., 2011), which enhanced civil supervision after the disaster (Xu & Lu, 2012). On the other hand, the media framed the situation to emphasise, depending on the selected focus, the response by the government or the responsibility of individuals and communities (Barnes et al., 2008; Mirón & Ward, 2007; Stock, 2007; Belle, 2006).

Examples of mixed attitudes towards the media within the same study were also found. One example concerned a study reporting how media personalities provided a vital and trusted link between authorities and the public while at the same time the media coverage of tropical cyclones were criticised for a tendency to sensationalise, thereby dispensing inaccurate information to residents (Anderson-berry & King, 2005). Another study praised the ability of the media to place other people's stories in the public domain but also reported that residents had expected a more accurate portrayal without sensationalism when covering bush fires (Nicholls et al., 2010).

The findings on the role of the media in constructing public perceptions of risk associated with natural hazards were conflicting. One survey among residents in Rhode Island showed that communication channels (whether media, government, US weather service, friend or family) did not seem to have much effect on residents' perceptions of vulnerability (West & Orr, 2007). Another study, using interviews in coastal Indian villages, pointed out that the number of media channels reporting on a risk was associated with evacuation behaviour, especially when a government warning was confirmed by friends and neighbours, or village leaders, the media, or by environmental cues (Sharma et al., 2009). In Bangladesh, while disaster warnings transmitted via television and radio about the cyclone Sidr made residents aware of the threat, other variables, such as being convinced about the seriousness of the threat or fatalism, resulted in people not evacuating as a preparatory behaviour (Paul & Dutt, 2010).

In the literature being reviewed, the role of the media was also discussed in relation to the different phases of a crisis. In Georgia, a survey showed that respondents who paid attention to news about emergencies were more likely to have survival-kit items at home, and were cognitively prepared for emergencies (Paek et al., 2010). This shows that the media can have a facilitating role in the preparedness phase. A survey among residents

in Istanbul revealed that the media were seen as the leading source of information about earthquakes; However, they did not provide encouragement or information about precautionary measures for earthquakes, or how to cope with earthquakes (Tekeli-yesil et al., 2011). In covering the recovery from Hurricane Katrina, the media focused on the role of the political and economic systems, following the concerns of the public in building up the human and social capital component of hurricane vulnerability and risk (Miles & Morse, 2007).

The media are recognised as providing crucial information about earthquakes, which can enhance citizens' awareness (Shiwaku & Shaw, 2008). Information on how to react in an earthquake and protect oneself could relieve the shock a population experiences during and after a real earthquake (Seid-Aliyeva, 2006). This information function applies to tsunami education as well when the media explain the nature of a tsunami and its probability as well as to inform on what areas are at risk and what is an appropriate response to the warning (Dudley et al., 2011). Thoughtful media advocacy efforts have been shown to have an important role in building public awareness in fire prevention (Smith et al., 2007). Community-based flood-alert and vulnerability education programmes targeting flood preparedness with the help of local radio have been initiated in small valleys in Central America (Savova, 2004).

A positive example of the impact of radio in disaster preparedness was found in a study in Australia, where radio turned out to be the most useful source of information. The study emphasised that health services should work with broadcast media to promote disaster preparedness and enhance awareness of the disaster role of broadcast networks (Cretikos et al., 2008).

A tsunami project in Malaysia pointed to television as the most effective means of raising tsunami awareness and knowledge. When it came to warning messages, television was mentioned along with radio, public address and a patrol car. Local agencies and community leaders rated risk

communication, public awareness and education as very important to improve disaster preparedness. Tsunami awareness and education call for both a media and a community approach. (Said et al., 2011)

Another tsunami-related study, on Banda Aceh, Indonesia, revealed that local radio programmes had positively contributed to respondents' attitudes to preparedness. According to key informant interviews, mobilising media outlets in the community is the most efficient way of passing information about preparedness to the community (Romo-Murphy et al., 2011).

In some cases, the traditional media were found to be the primary means of obtaining information about an approaching crisis and the prospects of evacuation, such as in the case of Hurricane Katrina, while new media were frequently used during the crisis and in the post-crisis situation (Procopio & Procopio, 2007; Spence et al., 2007).

In crisis communication, trust in the source of information is crucial. Longstaff et al. (2008) analysed 82 crisis cases, including seven natural disasters, and found that building trusted communications within and among emergency responders, including the media, helps to generate rapid reactions in a crisis situation. On the one hand, citizens need information from trusted sources. On the other hand, sources tend to be reliable if they trust the people with whom they are communicating (Longstaff & Yang, 2008).

To conclude, the literature showed that the attitude towards the role of the media differs. In the preparedness phase it is mostly a positive role that is mentioned, though in some cases this could not be proved or was just one factor that needed to be co-joined with other factors to have an effect on preparedness. During and after crises, the evaluations were both positive and negative. The negative evaluations were related to framing and reporting in a sensational style. The media can effectively function as a disaster preparedness educator by showing themselves as trustworthy to

citizens, and by building self-confidence among citizens, which enables them to make constructive preparations. Media participation in disseminating messages on disaster risk reduction is called for by various authors (Barnes et al., 2008; Ismailzadeh & Takeuchi, 2007; Khan & Rahman, 2007).

Media campaigns, messages and channels

In the sample, 29 papers discussed media campaigns, messages and channels; 19 of the articles focused on these topics and ten articles included additional topics.

Past experience in disasters is associated with being prepared for future disasters, although citizen interest in disaster-related issues decline with time (Sied, 2006). Therefore, preparedness education should be seen as a continuous process (Paek et al., 2010). The mass media could be active in increasing the educational culture of the population, especially in areas with recognised georisks. A well-informed and educated population facilitates sustainable development (Seid-Aliyeva, 2006).

Even though the need for public information campaigns and more education on disaster preparedness is increasingly being recognised in the literature (Paek et al., 2010), very few articles deal with the actual topic of 'disaster preparedness education using media'. Little research has been done on communication and media campaigns enhancing citizens' preparedness for natural hazards, and even less on the outcomes of such campaigns (Veil et al., 2009). The results of the studies included in this overview may have practical implications for the design of messages geared to preparedness, and for the choice of channels for delivering such messages. Even so, the overall conclusion of findings is that the community, along with and social networks, are vital in the actual steps leading to preparedness. Media education, complemented by a community participatory approach, is needed (Gamboa-Maldonado et al., 2012).

Research suggests some guidelines concerning the design of media messages for preparedness

education. A study on warning messages pointed out that racial and ethnic communities (underprivileged audiences), in particular, are more likely to perceive a message as credible once it has been confirmed by their interpersonal network (Lachlan, 2009). The importance of the interpersonal network (besides television and radio) as a source of evacuation information or a warning message is also prevalent among African Americans in the US (Spence et al., 2011) and among the coastal villages in Andhra Pradesh, India (Sharma et al., 2009; Sharma & Patt, 2012).

Issues related to educational campaigns in developing countries differ from those faced by developed countries. For example, in Bangladesh the focus is on radio message content and infrastructure to better support the transmission of the messages. In Australia, on the other hand, the use of Social Networking Technologies (SNT) during natural disasters received the most attention. SNT, such as using Twitter, were an integral part of information transfer for citizens in geographic regions affected by a natural disaster. Their use has been investigated during and in the aftermath of natural disasters in Australia between 2009 and 2011. According to Freeman (2011), traditional methods such as television and radio broadcasts are only one-way, as opposed to SNT technologies, which are dynamic in their approach, allowing for knowledge sharing of all the parties involved.

In message design, cultural sensitivity is needed. Eraybar (2010) studied seismic risk and mitigation perceptions in two districts of Istanbul. While protecting family members is perceived as the most important task, very little is known about structural mitigation. In disaster education, message content needs to deal with, for example, seismic strengthening of houses, obtaining earthquake insurance and awareness raising within the family. The default stance in disaster preparedness education in earthquake areas should always be that people do not know much about the risk, as “the notion that people who live in earthquake prone areas are more aware of seismic risk may

be misleading” (Eraybar et al., 2010, p. 91). On the other hand, in the case of hurricanes, a study showed that the residents in hurricane areas were very aware of the probability of hurricanes, and that they were prepared for them by having a portable radio (Perez-Lugo, 2004).

Another study shed light on public information campaigns related to service interruptions such as electricity, gas, running water and medical services during disasters. The study showed that by increasing participants’ anticipation of service interruptions, it is possible to increase their intention to prepare for a disaster. Regardless of the type of disaster, “much of preparedness can be achieved by a universal and relatively small set of actions needed to compensate for basic service interruptions” (Martel & Mueller, 2011, p. 307).

Message framing may affect intentions to prepare for disasters. Messages need to outline the steps that individuals can take to reduce their susceptibility to risk (Lachlan et al., 2009). A study in New Zealand concluded that the negative framing of outcomes enhanced judgement of the importance of earthquake preparation (McClure et al., 2009). Moreover, a study on websites showed that when educating children fear appeals should be avoided, as in a campaign this triggers responses to control the feeling of fear, instead of preparedness responses (Ryan et al., 2012).

The content of media messages after the disaster needs to be positive, as shown by an experiment measuring adolescents’ reactions while watching the news (Lau, 2010). With respect to post-traumatic stress disorder and other psychological distress outcomes, protective factors for young people’s mental health included: (a) a sense of security obtained from significant others, (b) post-earthquake social support, and (c) exposure to positive media messages about the earthquake (Lau et al., 2010).

In the healthcare sector, it is understood that communication needs attention, both before and during the disaster, incorporating lessons learned into future disaster plans, and acknowledging

that, next to warning messages and information via the media during the disaster response, public education is needed for disaster preparedness (Rebmann et al., 2008). A study among the Latino community in the US concluded that key public health messages need to be transmitted via trusted sources such as healthcare personnel, community leaders, radio and television announcers as well as Spanish-language newspapers, while trained volunteer health promoters also proved effective in conducting educational sessions, and emphasising practical steps in preparedness (Carter-Pokras et al., 2007). To reach low-income or disadvantaged communities, a grassroots approach is needed that relies on trusted agencies and leaders in risk communication activities (Rowel et al., 2012).

As media-use habits differ among public groups, a multi-channel approach is recommended, taking into account that in order to emotionally cope with a disaster, citizens may need more than institutionally framed warnings, information from the Web or informal networks, or reliance on their own views (Vihalemm et al., 2012).

To conclude, disaster preparedness campaigns and their messages should be tailored to the local culture and media landscape, that is, the media used and trusted in the community.

Trends in the literature

Of the articles in the sample, 15 explicitly addressed trends in the literature: nine of these focused on research trends and six addressed such trends while also dealing with other issues. Looking at the sample as a whole, attention to the topic increased after 2007. Of the total of 87 articles, 26 were published in 2002–2007, and the remaining 61 papers were published from 2008 onwards. The year 2007 seems to be a turning point in the disaster preparedness literature. Hurricane Katrina was the main topic of ten articles, while several Asian disaster cases were also discussed. In 2012, the emphasis in the literature was on community participation in preparedness. Consequently, the earlier focus on media messages as such has shifted towards

the media as being just one important part of the preparedness training system.

Much of the literature in the sample addressed a specific disaster, such as a hurricane, tsunami or earthquake. Preparedness studies in America have increased in the aftermath of several hurricanes in the US and Central America. For example, response to Hurricanes Mitch, Katrina and Wilma has been investigated (e.g. Savova, 2004; Barnes et al., 2008; Lachlan et al., 2009; Baker, 2011). Lessons learnt from these studies were that there should be more research on failures to prepare, and that the media should focus more on preparedness.

In Asia, the Great Indian Ocean tsunami started an influx of preparedness research, with the emphasis on resilient communities (Levental, 2012). During the past ten years, Asia has faced several natural disasters, prompting researchers to study how community resilience can be enhanced after, for example, tsunamis in Indonesia, Malaysia and Japan (e.g. Romo-Murphy et al., 2011; Said et al., 2011; Ronan et al., 2012), earthquakes in China, Central Asia, New Zealand and Indonesia (Yang et al., 2009; Eraybar et al., 2010; McClure et al., 2009; Kusumasari & Alam, 2012). The overall conclusion, in the literature, leans towards the necessity of disaster preparedness; especially considering since the scientific community observes the probability of natural disasters increasing as a result of climate change.

Although the need for disaster preparedness is recognised in publications, as there is evidence of failing to be prepared, most of the articles deal with disaster management or the creation of models for predicting future disasters, rather than the actual preparation of ordinary citizens for disasters. However, calls have been made during the past few years for preparedness as an integral part of the disaster cycle (Hilliard et al., 2011; Maricle, 2011).

The media were mentioned in various ways. Much has been written about the media coverage of disasters and critical voices have been raised against the framing of citizens as victims

(Camp, 2009; Tekeli-yesil, 2006), or the tendency of the media to focus on well-known organisations instead of contacting local-level information sources (Robinson & Reed, 2010). A few—mostly recent—studies were attentive to the role of the media as a possible source for disaster preparedness education. Media campaigns to familiarise residents with warning signals have been called for (Nicholls et al., 2010). The issue of ownership has been used as one measure of disaster preparedness (Baker, 2011). However, little has taken place on evaluating the significance of radio and other media in improving the disaster awareness and readiness of citizens and communities.

Conclusion

This paper has brought together insights on disaster preparedness education, clarified issues addressed and identified current trends in the scientific literature. Increased attention has been paid to the topic since 2007, in the aftermath of several hurricanes in the US and Central America, and the Great Indian Ocean tsunami. However, despite recognition of the need for disaster preparedness, little research has been carried out on the subject of disaster preparedness education or campaigns related to it. Most of the articles reviewed here focus on disaster management or building models for predicting future disasters rather than the actual preparations of ordinary citizens in the event of a disaster.

Awareness of risks 'precedes' but does not automatically 'lead to' disaster preparedness that includes action to reduce risks. Preparedness education adds to indigenous knowledge and experience of disasters, and may combine self-education via the media, school education and community efforts for targeting disaster risk reduction.

Some lessons can be learnt from studies related to warnings about disasters, and from preparedness education studies. First, it is important that a warning message communicates the seriousness of a risk in an accurate, simple and timely manner without creating too much fear. Second,

the message should acknowledge the citizen's need for control and include practical steps for implementing preparedness. Finally, the message should originate from a trusted source and fit the local culture.

Similarly, preparedness-related issues were found in studies on Asian communities and in studies on Latino and African American communities in the US. One such similarity is the need for preparedness messages to be confirmed by the individual's interpersonal network. Besides the traditional media, a person's social network is used to validate information. An inclusive approach would also involve vulnerable groups, such as the elderly or handicapped.

The media position themselves in several roles in disaster situations, including warning, informing and advising on future preparatory actions. However, the literature reveals conflicting findings on media disaster-related performance. On the positive side, the broadcast media inform publics about risks and how to prepare for natural disasters, while on the negative side, the media frame response actions and may resort to sensationalism, which in turn may result in presenting an inaccurate picture of the situation.

In the literature, the role of the media is discussed in relation to the various phases of a disaster. The review shows that media information is a strong facilitator of disaster awareness. The media are also, in many cases, seen as a primary source of information about an approaching or developing crisis. Apart from advice on how to prepare, the media should inform citizens about the nature of the disaster. Their role is valuable, if they are perceived as a trusted source in volatile situations, providing sensationalism does not get the upper hand.

In the recent literature, the media are studied as a part of the wider preparedness training system. Mobilising media outlets in the community helps dissemination of information within communities. Preparedness calls for both the media and the community approach. Many factors need to be

taken into account. In designing preparedness education via the media, it is important to remember to take nothing for granted, and also to adopt an approach that embraces disaster preparedness education as sustained component of everyday life.

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II

FACILITATING DISASTER PREPAREDNESS THROUGH LOCAL RADIO BROADCASTING

by

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Facilitating disaster preparedness through local radio broadcasting

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The 2008 Disaster Mitigation Preparedness (DMP) study took place in Aceh province, Indonesia. It sought to help develop radio programmes and messages to increase resilience to disasters. The role of radio was evaluated during and after the 2004 Asian tsunami disaster. The study team interviewed 984 tsunami survivors from nine sub-districts of Banda Aceh, and local non-governmental organisations convened eight focus groups around the area of Aceh Besar. Six key informant interviews were held with government disaster management agencies. The DMP survey is the first of its kind to interview a representative random sample of Banda Aceh residents. It reveals the importance of community and social networks, during disaster situations, when essential communications are down. A disaster warning information system based on a multi-media approach needs to be developed. The wider community should be involved in the planning, education and training of Banda Aceh and Aceh Besar residents to facilitate appropriate personal and community survival strategies.

Keywords: Banda Aceh, crisis communication, disaster mitigation, disaster preparedness, rapid-response radio, tsunami

Introduction

The Asian tsunami of 26 December 2004 is described as being among the deadliest natural disasters in recorded history. More than 225,000 people in 11 Asian countries are estimated to have lost their lives.² Because of the unprecedented scale of the event, the world's media followed developments as they unfolded. It was the day after Christmas and thousands of local and international tourists were spending their holidays in what proved to be disaster zones.

A keyword used to describe this natural disaster is 'unpredictability'. Even though geologists and seismologists had predicted activity at some time in the future at the location of the subsurface tectonic plate off the Indonesian island of Sumatra, no one could have forecast the vast destruction caused by the tsunami following the earthquake.

Residents of Banda Aceh and the surrounding regency of Aceh Besar, the subject of this study, were faced with a crisis beyond their experience. It was something no one had told them about, and it was something that they had not seen before or could have imagined. It was different on Simeulue Island, west of Banda Aceh, since it had experienced a tsunami in 1907. Oral history informed the local community to run to higher ground once the seawater receded, saving the lives of countless

Simelue residents when the Asian tsunami hit their island (UNISDR INFORMS, 2006, p. 37). Since the residents of Banda Aceh and Aceh Besar did not have any oral history of tsunamis, few were prepared for the rising wave, a 30-metre high wall of water, that swept over the northern tip of Sumatra with unprecedented force.

The purpose of this paper² is to present and discuss the key findings of the Disaster Mitigation Preparedness (DMP) survey in the Indonesian province of Aceh, the first of its kind to interview a representative random sample of Banda Aceh residents. Local stakeholders in the project included the local community radio station, Radio Djati FM, the Ar-Raniry State Institute of Islamic Studies, as well as nine non-governmental organisations (NGOs).

Literature review

A common thread in the literature published on the 2004 Asian tsunami is the instinctive capacity of local communities to respond to a crisis and the resilience displayed in post-crisis phases. Since local recovery in the long term is handled, for the most part, at the community level, the priority, after the response agencies leave, is to strengthen the capabilities of the local communities (Carballo, Bryan and Horbaty, 2006; Chandra, Pandav and Bhugra, 2006). Religious and community leaders, teachers and other key stakeholders have important roles in facilitating a rapid community response in disaster/crisis situations. Bhugra and van Ommeren (2006), in particular, argue strongly for post-disaster support systems to rely on kinship in cultures based heavily on family relationships and Rowland et al. (2007) advocate the inclusion of those with disabilities in disaster mitigation.

Special attention needs to be paid to the most vulnerable in a disaster (Bryar, James and Adams, 2006). In the case of Aceh, the tsunami harmed most those who were least able to withstand its force: the disabled (Rowland et al., 2007) and females (1.44 times as likely to die in the tsunami as males). In addition, there were high mortality rates among children under the age of four and adults aged 70 and over (Doocy et al., 2007a, 2007b).

Although the Asian tsunami contributed to a global effort to develop high-technology disaster preparedness systems using seismological, ocean floor, tidal, or satellite technologies, appeals have been made to ensure that communication systems are accessible, affordable and interactive, especially for those in rural areas where some technologies and associated disaster information are simply unavailable (Tait, 2000; Bryar, James and Adams, 2006). As a consequence, effective communication systems will recognise the process of communication at the community level.

Culturally-embedded information-sharing and decision-making communication processes among peer, kin and leadership systems facilitate dialogue, build trust, and permit an exchange of knowledge and expertise (Mefalopulos, 2003; Guion, Scammon and Borders, 2007), benefiting both those affected by a disaster and those responding to it. Communication systems, after all, should not only deliver information and instructions to those affected by the disaster (such as how to prevent disease and

advice on the availability of food, medication and water) but also information for response workers (such as aid requests from rescue centre workers and coordination for response agencies) (Tait, 2000; Bryar, James and Adams, 2006; Ganesan, 2006; Chib and Lwin, 2007; Sarrell, 2007).

Reinforcing this important point about communication processes, Seeger (2006) emphasises the need of response agencies to be interactive with communities at risk in order to develop credibility before a crisis, to establish trust in the communicator for when a crisis occurs. Indeed, in extreme cases of an absence of communication competence and credibility, NGOs have been excluded from disaster response because they lacked awareness of the local culture and language (Chandra, Pandav and Bhugra, 2006; Ghodse and Galea, 2006).

Apart from community-level communication processes, media in general can be a strategic resource for assisting crisis management, with radio notable for its flexibility and wide availability (Tait, 2000; Seeger, 2002; Bryar, James and Adams, 2006).

The DMP study sought to determine what communication processes were operative in Banda Aceh at the time of the tsunami and after it, and how communication could strengthen the capacity of communities to create a 'culture of resilience' (Tolentino, 2007, p. 147). Of particular interest was whether media could be mobilised as a trusted source of information for the most vulnerable to disasters to support their personal communication networks.

Method

The research was carried out in three main parts: a random-sample field survey consisting of 984 interviews in Banda Aceh; a series of focus-group discussions with vulnerable people in the surrounding district of Aceh Besar; and a series of key informant interviews with government officials in Banda Aceh.

Two-stage cluster sampling, utilising a probability-to-population size method, was used to obtain a sample of 1,000 households in the city of Banda Aceh in November 2007. The sample in each Banda Aceh sub-district was drawn, first, at the *desa* (village) level and second, at the *dusun* (sub-village) level with data from the 2005 Nanggroe Aceh Darussalam, (NAD) census of August and September 2005. A booster sample of 50 households was chosen from the tsunami-torn Meuraxa area, since many houses were rebuilt there after the 2005 census. As some interviews did not materialise the final sample was $N=984$. Interviewers used the Kish grid to select randomly a household respondent. If the chosen respondent was not available after three attempts, the interviewers chose another respondent from a different household. The sample was weighted by education to match the census.

Table 1 lists the nine sub-districts of Banda Aceh that were surveyed, along with the population of each district as of the 2005 NAD census, the population share of each sub-district, the number of interviews for each sub-district, and the share of respondents from each sub-district. The proportion of interviews by each sub-district was close to the 2005 NAD census; the results can be applied, therefore, to the whole

Table 1 DMP sample

Sub-district	Population (NAD, 2005)	Percentage of population, 2005	Number of interviews, 2008	Percentage of interviews
Meuraxa	2,221	1.25	20	2.0
Jaya Baru	12,340	6.94	80	8.1
Banda Raya	24,257	13.64	135	13.7
Baiturrahman	33,582	18.88	160	16.3
Lueng Bata	19,284	10.84	106	10.8
Kuta Alam	35,033	19.69	199	20.2
Kuta Raja	2,978	1.67	20	2.0
Syiah Kuala	25,418	14.29	150	15.2
Ulee Kareng	22,768	12.80	114	11.6
	177,881		984	

of Banda Aceh. It is possible, however, that the area of Meuraxa, a sub-district of Banda Aceh, was not covered representatively, since at the time of survey design, there was no updated census to record people who had moved into the rebuilt area since the 2005 census.

Meuraxa along with the Banda Aceh sub-districts of Jaya Baru, Kuta Alam, Kuta Raya and Syiah Kuala are all situated along the coast and were affected by the tsunami. Approximately one-half of those interviewed lived in this area.

Ar-Raniry Islamic Studies University students, drawn from social-science disciplines, were trained to administer the questionnaire. The survey instrument was

Table 2 Survey questionnaire domains and examples

Question domain	Example of related questions
Recall of the disaster	Where were you when the earthquake struck?
	Where were you when the tsunami waves came?
	How did you know the waves/flood were coming?
Survival	What helped you to survive the 2004 tsunami?
Information-seeking	During the first 24 hours after the disaster, where did you start looking for information?
	What specific information did you start looking for?
	How did you learn about the disaster in the first 48 hours (two days) after it had happened?
	Today, where would you look for help when disaster happens?
	How do you usually get the news about Banda Aceh?
Disaster preparedness	What have you learnt about disaster preparedness from radio?
	Besides radio, where else do you get disaster preparedness?

constructed in the English language and then translated into the Indonesian language, and back translated to English for checking. The survey timetable did not allow for back translation to Acehnese. Revision of the questionnaire took place during the training of the interviewers and again after pre-testing. SPSS (statistical package for the social sciences) software was used to analyse the data.

Table 2 contains examples of the 34 multiple choice or open questions. Detailed questions focused on the domains of recall of the event, the survival mechanism adopted by the respondent and sources of information.

To complement the survey results, eight focus groups were convened in Aceh Besar, and six key interviews were held with Banda Aceh officials. Focus groups, conducted by collaborating agencies in the Aceh Besar district, represent the views of Aceh Besar's vulnerable groups, such as the elderly, disabled, women and children. Focus groups and key interviews were transcribed into English for content analysis.

Limitations

As noted, Meuraxa may be under-represented in the sample since the 2005 NAD census, the most recent available, did not include reconstructed areas of the sub-district.

Communication between the research team and the interviewers may have been compromised by translators. However, the translation issue did not affect the actual survey interviews and coding, because both were carried out in the local languages.

Table 3 Basic demographics of the survey interviewed (percentages; N=984)

Gender		Male		Female			
		52.3		47.7			
Age	15–24	25–44	45–65+	Missing			
	27.6	44.1	28.0	0.3			
Marital status	Single	Married	Widowed	Divorced	Missing		
	33.4	60.0	6.4	0.1	0.1		
Residence	Temporary living centre/ barrack	Own house	Rented house	Living with relatives	Boarding house/ with friend	Rebuilt area	Missing
	7.0	67.0	15.3	3.5	1.2	5.5	0.5
Education	No school/ illiterate	Unfinished primary	Primary school	Junior high school	Senior high school	University/ academy	Missing
	2.1	11.6	10.7	14.6	47.5	13.4	0.1
Employment	Student	House-wife	Employed	Self-employed	Unemployed	Retired/ handicapped	Missing
	22.3	17.0	42.0	8.8	4.1	5.3	0.5

In response to the survey question ‘What personal impact had the earthquake-tsunami on you or your household?’; every tenth Banda Aceh resident claimed to have been physically disabled. However, the survey did not follow up on this response to clarify how the respondent became disabled, to what degree, and whether the disability was permanent or temporary.

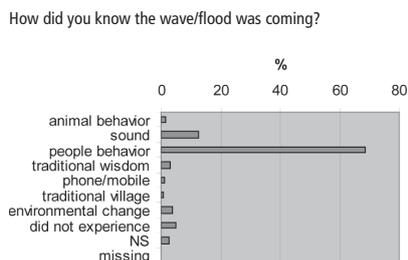
Demographics

A demographic profile of the survey respondents (see Table 3) shows that, four years after the tsunami, around five per cent of Banda Aceh households were in a rebuilt area, whereas seven per cent of households remained in a temporary living centre or barracks. There were a higher proportion of males than females among the population aged 15 years and older. Almost three-quarters of the surveyed were under the age of 45 years. Only 6.9 per cent of those interviewed were aged 65 and older, slightly higher than the 2005 NAD census, which found this age group to comprise 3.5 per cent of the Banda Aceh population.

Results and discussion

At the time of the tsunami one-third of the survey respondents lived in the areas of Banda Aceh that were closest to the Indian Ocean and most affected by the tsunami waves. Accustomed to leaving buildings during earthquakes, one-fifth of those interviewed had moved to the streets after the earthquake which preceded the tsunami. Since there was no warning information about the tsunami, the majority of Banda Aceh residents (see Figure 1) learned about the approaching wave from other people’s flight behaviour, such as from people living closest to the water who told others how the sea first had receded. The next common source of information (mentioned by every sixth person interviewed) about the coming wave was the sound, either the sound of moving water, or the noise of buildings collapsing due to the force of the oncoming wave. However, focus-group participants explained that at first they thought the sound was thunder or

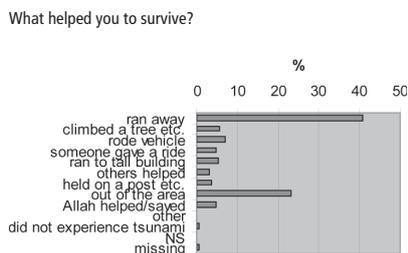
Figure 1 Tsunami recognition (N=984)



Note: NS = Not specified.

Source: DMP 2008.

Figure 2 Survival (N=984)



Note: NS = Not specified.

Source: DMP 2008.

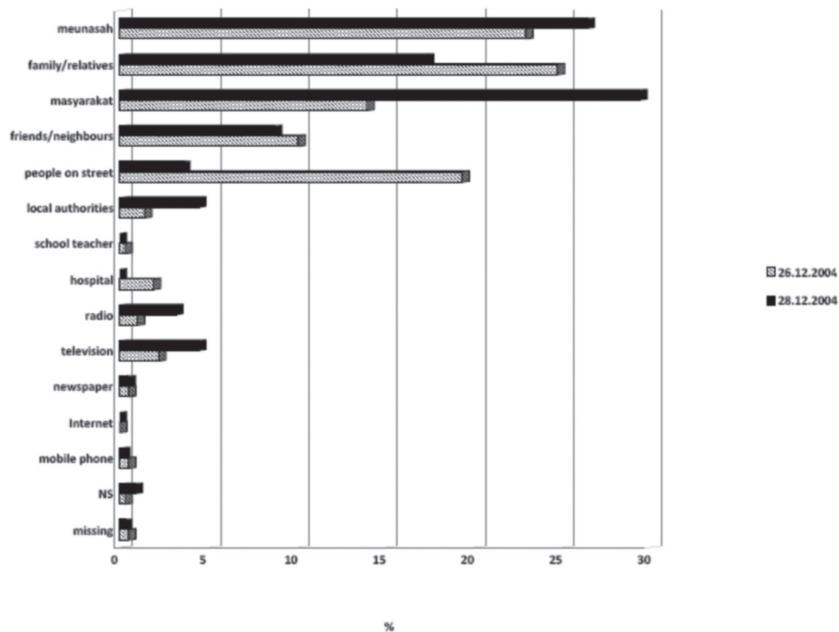
soldiers fighting—until they saw the water. Few mentioned traditional knowledge as a source of information about the tsunami.

The most common means of surviving the tsunami was running away (see Figure 2), mentioned by 40 per cent of survey respondents. Running was possible in areas further from the coastline where the power and height of the tsunami had dissipated. Those who survived closer to the coastline clung to posts or tall trees, or escaped into tall buildings. One-sixth of those interviewed survived in this way. The third most common method of survival was to use a vehicle to flee the wave. Other survival behaviours include climbing a tree, running to a tall building, being helped by others, holding on to a post, or being helped by Allah. Every fourth person interviewed was not in the area heavily affected by the tsunami wave ('out of the area', see Figure 2).

The DMP survey investigated the primary information channels used by respondents immediately after the tsunami (26 December) and 48 hours after the tsunami (28 December). Figure 3 illustrates how the communication channels changed over time.

The most mentioned primary sources of information in the first 24 hours were interpersonal communication or community networks: family, a public prayer hall (*meunasah*), people on the street, the local community (*masyarakat*), or friends and neighbours. With the exception of 'people on the street', these sources remain as

Figure 3 Primary information source on the day of the disaster, and two days later (N=984)



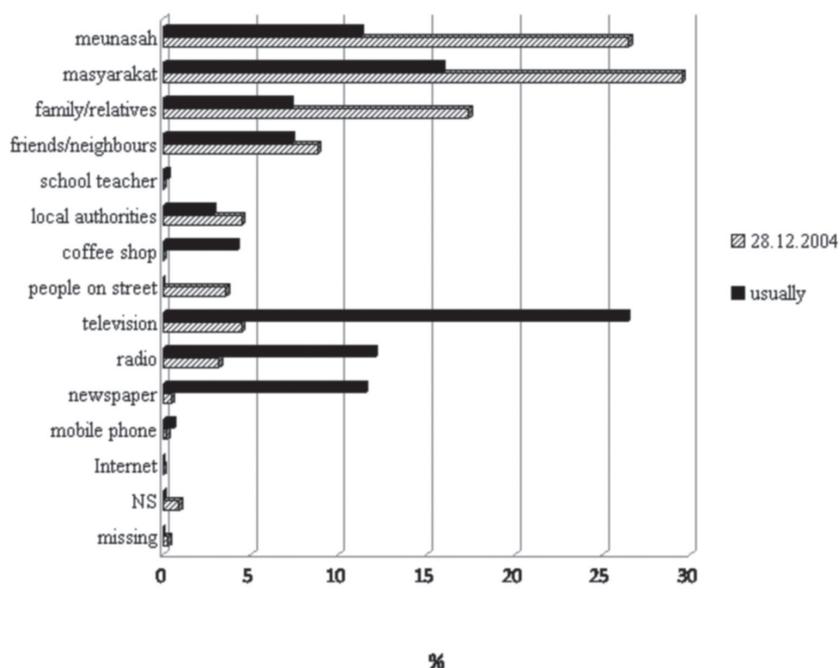
Note: NS = Not specified.
Source: DMP 2008.

the top ranked information channels 48 hours later (see Figure 3). Two days after the tsunami usage of additional sources of information—local authorities, television and radio—increased. It is to be noted, however, that reported usage of media was non-existent to minimal because the tsunami wiped out most media channels for a week. The Department of Information and Communication (INFOKOM) was not functioning for a time, since its head had died in the disaster. An information centre was set up in the governor’s house, and was coordinated by the Provincial Disaster Coordinating and Implementing Unit (SATKORLAK).

When regular news media channels collapsed, individuals and community structures emerged in their place (see Figure 4). During the crisis, and two days after it, *meunasah* and *masyarakat* were the principal information channels for Banda Aceh residents. In normal circumstances, however, the usual primary news channel on a daily basis was television followed by *masyarakat*, radio, newspaper and *meunasah*. It is not surprising that the internet was not mentioned given that only four per cent of Indonesia’s population reportedly uses it regularly (Intermedia, 2009).

A study that evaluated the dissemination of tsunami warnings in Mauritius (Perry, 2007) found that both television and radio were equally effective in disseminating the initial tsunami warning and that television became more important later. The

Figure 4 Source of news two days after disaster, and usually (N=984)



Note: NS = Not specified.
Source: DMP 2008.

impact of an interpersonal warning system was minimal, though, and media messages did not provide sufficient and accurate enough information about the disaster.

The findings of this study, however, support recommendations in the literature for effective communication systems that employ a mixture of mass media as well as culturally-embedded information-sharing and decision-making communication processes (Tait, 2000; Mefalopulos, 2003; Bryar, James and Adams, 2006; Guion, Scammon and Borders, 2007). The results suggest that, in the case of Aceh, crisis communication information strategies would be strengthened by an emphasis on personal and community communication, particularly through the *meunasah* and the coffee-shop (*warkop*), with regard to the exchange of information and decision-making. Broadcast media, however, can disseminate accurate and reliable information from coordinating and response agencies to counter *masyarakat* (community level) rumour and incorrect information (Tait, 2000; Bryar, James and Adams, 2006). *Radio broadcasting for disaster response and mitigation*

While much of the DMP survey sought data on sources of information in the first few days after the 2004 tsunami, it also investigated the particular role of radio in preparing Banda Aceh residents for disaster preparedness in the post-disaster recovery and rehabilitation years.

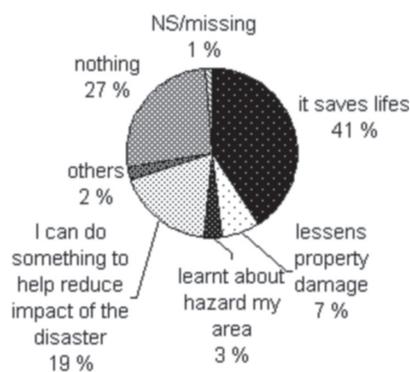
To give context to the results (see Figure 5) it is necessary to explain an intensive radio programming communication strategy in effect prior to the 2008 survey. Using plans derived from Tait's (2000) feasibility study, Health Communication Resources (HCR) volunteer consultants flew to Indonesia four weeks after the tsunami at the invitation of Radio Djati, a local broadcaster, to design and implement a rapid response to the wide-scale disaster. Mobile equipment included:

- a radio studio in a suitcase to maximise portability (mixer, laptop, Compact Disc, MiniDisc);
- a 500-watt FM (frequency modulation) transmitter in a suitcase with associated portable antenna, cables and generator; and
- 1,000 radios for immediate distribution to people affected by the disaster and to evacuation or recovery centres.

Radio Djati journalists and presenters were trained to provide sensitively chosen and familiar music to help restore a sense of community identity as well as information, education and opportunities for people to express their feelings and grief on air. Listeners were continuing to

Figure 5 Topics learned about DMP from radio (N=984)

What learnt from radio about DMP?



Note: NS = Not specified.

Source: DMP 2008.

look for missing family members, there was great uncertainty as to whether the tsunami would be repeated, and many people were refusing to return to their low-lying villages from their mountain safe havens. Concern for the future and preoccupation with rehabilitation and recovery were dominant themes in live conversations with listeners. More recently, Radio Djati has made preparations and implemented training and procedures to ensure the station survives future disasters or, at the very least, returns to the air quickly, and training has been conducted for relief workers and government personnel in radio programming for a disaster situation. Radio Djati has entered into agreements with government authorities for dedicated communication facilities in the event of future disasters.

Respondents to the survey were asked what they had learned from radio about disaster mitigation (see Figure 5). Most learned that lives could be saved by good preparation (41 per cent) and one-fifth stated they had learned that they themselves, as individuals, can do something to reduce the impact of a disaster. Others had learned either how to lessen property damage (seven per cent), or about hazards facing their area (three per cent). Approximately one-quarter (27 per cent) of the survey sample reported that they had learned nothing about disaster preparedness from radio programming. However, one-half of those claiming that they had learned nothing did not have a working radio at home.

An analysis of respondents and their listening to Radio Djati shows a correlation with learning about DMP from radio and listening to Radio Djati (Chi-Square 3, $N=980$)= 138.52 , $p<0.001$). For example, 30 per cent of Radio Djati listeners ($n=437$) agreed with the statement 'I can do something to help reduce the impact of the disaster' whereas 10.3 per cent of those who do not listen to Radio Djati ($n=484$) agreed with the statement.

Personal impact and disabilities

In response to the survey question about the personal impact of the tsunami, respondents identified three key consequences: the loss of family members or friends (66.1 per cent); emotional or psychological trauma (51.2 per cent); and house damage (45.7 per cent). Every fourth person had lost their house (28.3 per cent), and every tenth respondent had become physically disabled as a result of the Aceh tsunami (9.6 per cent). The latter was a surprise finding. The survey did not follow up on the response to clarify what disabilities were caused although some indication emerged in focus groups. For example, a female focus-group participant said:

My disability was caused by falling down to the ground while running away from what the people called 'tsunami'. . . I don't have strong legs as the others after the tsunami disaster, when my legs were broken.

An analysis of the findings showed that an above-average proportion (27 per cent) of those with tsunami-inflicted disabilities were living in the Jaya Baru sub-district

of Banda Aceh at the time of the disaster. This suggests that certain sub-districts are more dangerous than others, requiring special attention in city planning for disaster mitigation.

One can create a profile for those 95 people from the randomly selected sample of 984 who claimed tsunami-induced disability (see Table 4). They tend to be mostly male (64.2 per cent), and less educated than the rest of the sample: 11.6 per cent of the disabled never attended school (compared to 0.9 per cent for the rest of the sample). In addition, 40.0 per cent (32.5 per cent) are single, 49.5 per cent (61.5 per cent) are married, and 10.5 per cent (5.8 per cent) are widowed; 22.3 per cent (7.4 per

Table 4 Profile of the people who sustained disabilities in the tsunami

	People with disabilities (n=95, %)	Survey sample (N=889, %)
Male	64.2	53.6
Never attended school	11.6	0.9
Marital status		
Married	49.5	61.5
Single	40.0	32.5
Widowed	10.5	5.8
Employment		
Self-employed	22.3	7.4
Employed	31.9	43
Current residence		
Now lives in rebuilt areas	18.9	4.1
Location at time of earthquake		
At home	52.7	61.1
On the sea	6.5	0.7
Location at time of tsunami		
On the street	46.3	33.6
At home	23.3	42.1
On the sea	6.3	0.7
Source of awareness of the tsunami		
Behaviour of other people	50.5	70.8
Sound of the sea	24.2	11.4
What did you learn from radio about the DMP?		
'I can do something to help reduce the impact of the disaster'	43.2	16.3

cent) are self-employed and 31.9 per cent (43.0 per cent) are employed; and 18.9 per cent (4.1 per cent) now live in the rebuilt areas of Kuta Alam or Lueng Bata.

Those disabled by the tsunami also share other characteristics (see Table 4). During the earthquake those who sustained disabilities were less prone to be inside their home (52.7 per cent) and more likely to be at sea (6.5 per cent) compared to the rest of the sample (61.1 and 0.7 per cent, respectively). When the tsunami wave struck, only 23.2 per cent (42.1 per cent) of the disabled were inside their home, 46.3 per cent (33.6 per cent) were in the street, 6.3 per cent (0.7 per cent) were at sea, and 0.0 per cent (6.3 per cent) were in the mosque.

The sound of the approaching sea played a greater role in alerting respondents who claimed disability (24.2 per cent) than with the rest of the sample (11.4 per cent) (see Table 4). A significant percentage (50.5 per cent) of those disabled were alerted to the tsunami by observing the behaviour of other people, but this was less than for the rest of the survey sample (70.8 per cent).

Although people had become disabled while fleeing the tsunami wave it is evident from focus-group discussions that people died because accidental injuries prevented their escape. For example, one female focus-group participant said:

Not all children died because of the tsunami, some of them because of accidents. For instance, my brother had a broken rib. He and my father went to a pool. They could not cross the road since crowded people. But they tried to cross it.

Focus-group discussions with disabled people revealed their vulnerability to disaster because of their dependence on others for assistance in escaping, and if they could not take refuge in a building that withstood the onslaught of the tsunami. Both of these findings have implications for disaster mitigation for disabled people and they have been addressed in part by disabled groups in radio messages.

Since the tsunami, Radio Djati has provided training for disabled and other vulnerable groups in designing disaster mitigation messages for and disseminating them to those with disabilities. The focus groups revealed that the disabled, more so than the rest of the sample, had become more convinced that they can do something to help themselves reduce the negative effects of disasters.

Key interview results

Key informant interviews highlighted the need to turn over responsibility for the early warning system to provincial authorities. At the time of the present study (November 2007), authorities had decided to move the alarm facility located at Medan, some 300 kilometres from Banda Aceh, to the crisis-centre building in the governor's office in Banda Aceh.

The informants agreed that more information and education are necessary to develop a culture of safety and to mitigate disaster, such as preparing personal and family escape procedures and not building housing in vulnerable areas. Education

campaigns also are needed to explain official early warning alarm systems and response processes.³

Opinions differed on the most influential media at the time of a disaster. Some key informants considered television best for its pictures. One person noted that television was helpful in broadcasting pictures of lost people. Radio was regarded as an advantage because of its immediacy and interviews, particularly when programmes are locally produced. Officials emphasised that, when back on air in the response phase, both television and radio should air short key messages or provide promotional spots during regular programming and coverage of the disaster.

Informants also argued for mobilisation of media outlets that are most efficient in passing on information to the community.

Conclusion

The DMP survey was the first of its kind to be conducted in the Banda Aceh area, representing city residents. Focus groups and key interviews were used to complement the survey findings.

The DMP study found that village-based *masyarakat* are important communication centres, and that the *meunasah* ranks as high as radio and newspapers as a source of daily news. Consequently, these sources of information must be included in education initiatives for disaster mitigation. The main information demands immediately after the tsunami were the location of loved ones, the site of safe areas, and news on what had actually occurred.

The findings support the literature that radio broadcasting can contribute to individual and community information-sharing and decision-making communication processes (Tait, 2000; Bryar, James and Adams, 2006), as well as to strengthening the capacity of communities through the creation of a 'culture of resilience' (Tolentino, 2007, p. 147). In addition, it can facilitate mental and physical preparedness for future disasters, particularly when messages are designed with the participation of vulnerable communities.

Radio Djati has trained disabled and other vulnerable groups in designing and disseminating radio-based disaster mitigation messages. This study reveals that disabled people, more so than the rest of the sample, are confident that they can do something to help themselves reduce the negative effects of disasters. Ongoing radio-based messages designed by and for vulnerable communities in Aceh have transformed mitigation concepts into tangible realities, such as recognising tsunami signs, preparing an emergency bag, knowing where to get information when the emergency siren sounds, minimising injury by keeping a residence and surrounding grounds free of refuse, and being aware of how to help others in a crisis situation.

Radio Djati has established the equipment and procedures needed to operate as a rapid-response radio unit in a future disaster. Relevant and consistent disaster information has been formulated in collaboration with the state radio network of Indonesia, Radio Republik Indonesia, and other stakeholders in the province of Aceh.

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Endnotes

- ¹ Eila Romo-Murphy was the lead consultant on the 2008 Disaster Mitigation Preparedness study and Mike Adams was the coordinator of the rapid-response radio unit.
- ² The complete research report, *Aceh Community Disaster Preparedness 2008*, can be downloaded from http://h-c-r.org/downloads/cdmp_master_book_english.pdf.
- ³ In the years since the 2004 tsunami in Banda Aceh an internet-based radio system to monitor earthquake activity ('Ranet') has been developed and set up in strategic government offices. Geomobile, a mobile library and information centre for schools, has educated children and teachers in how to respond to disasters. As of February 2007, the Government of Aceh was identifying evacuation sites and the Department of Mining and Energy of NAD was focusing on potential and future scenarios for geological disasters in the province of Aceh, such as earthquakes, erosion, tsunamis and volcanic eruptions.

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III

MONITORING DISASTER PREPAREDNESS EDUCATION IN NORTHERN SUMATRA

by

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Monitoring Disaster Preparedness Education in Northern Sumatra

As part of a wider Disaster Preparedness project, initiated by Tearfund UK, and conducted by H-C-R, Health Communication Research, an Australian NGO; a crisis communication evaluation was carried out in Banda Aceh, Indonesia, the capital of Aceh province, from October to November of 2009. Local NGO volunteers interviewed 15 key people from various governmental agencies; help organisations and village leaders in Banda Aceh and Aceh Besar. This presentation reviews the results of the key interviews. The interviewees were asked 10 questions to determine their opinions of what the residents of Banda Aceh and Aceh Besar have learnt about disaster preparedness in the past two years and what they still need to learn. The decision makers and leaders also evaluated the use of various media in contributing to disaster preparedness training. The government and NGO representatives held more positive views of the effectiveness of disaster management and disaster reduction improvement than did village leaders. The government has made solid contributions to disaster preparedness in organising the simulations and the BMKG (*Badan Meteorologi Klimatologi dan Geofisika*, a system which is responsible for meteorology, climate and geophysics including the tsunami warning) system in cooperation with the media and they have made additional contributions by creating dialogue concerning the overall issue of disasters and what to do during disasters. At the same time, village leaders believe the government has not done enough to keep the people informed in all circumstances, for example in a situation when there was an earthquake but no tsunami followed. Village leaders expect more community (*kampung*) level disaster training, and printed materials and lectures on disaster preparedness given in local offices and mosques.

EILA ROMO-MURPHY

Natural disasters have gained media attention globally since the Indian Ocean tsunami of 2004 took the lives of close to a quarter of a million people. Geologists predict more strong earthquakes in the area of the Indonesian archipelago in the future and this challenges those affected with the importance of being prepared. This challenge can be answered producing such media messages that help the local people to know what to do before, during and after nature's hazards, such as earthquakes, floods and tsunamis.

The Disaster Mitigation and Preparedness (DMP) radio project was launched in response to the 2004 Indian Ocean tsunami. The target was to help tsunami-affected areas on the Indonesian island of Sumatra to prepare for future catastrophes in such a way as to give the communities more resilience in the event of a natural disaster. Tearfund UK initiated a two-year project which began in 2007 with a baseline assessment using three methods: first, a city wide survey in Banda Aceh, second, eight focus groups were conducted in Aceh

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Besar, and third, by carrying out 15 key interviews with representatives of government departments, NGOs and communities, relating to disaster response. Based on the findings of the DMP project, a Disaster Risk Reduction outreach was designed for the city of Banda Aceh as well as the surrounding communities in Aceh Besar. It was a collaborative exercise, endorsed by the United Nations Development Program called 'Disaster Risk Reduction' (UNDP-DRR). The purpose of the collaborative exercise was to integrate disaster risk reduction in radio programming, and to work together with government departments, NGOs and local communities.

Radio programmes and public service messages, grounded on the baseline research findings and geared towards disaster preparedness, were produced by local Radio Djati programmers, starting in June 2008. Besides radio programmes, other media messages were delivered via TV programmes and using banners at street level. Moreover, the community organised tsunami drills. Key people assessed the evaluation of the impact of the media messages programming and they were interviewed in October 2009.

Radio Djati had produced special programming targeted to disaster preparedness. The preparedness raising programming was described in a local newsletter as follows:

Features were developed, for example, where implementers of the DRR projects were able to share good practices and lessons learned. Interviews were made with important personnel and beneficiary communities, thereby helping to promote information-sharing and better coordination among the various organisations and civil society actors working in the province to facilitate DRR. To assist communities in preparing and responding to disasters, public service messages (PSMs) were developed taking into account the cultural context. An important approach in developing these PSMs, explains one member of the partnership, was to “listen to the community before we want them to listen to us”. This approach made it possible to first consider the environmental context of the listeners before developing the messages. The PSMs brought simple, hazard-specific instructions in the local language weaved into a story-like form to illustrate how best to reduce disaster risk. Instead of using voices of professionals, the scripts were taken to village communities, where the members were more than excited to help out by voicing the scripts themselves. This approach helped in making the messages more appealing and effective to the larger community and it enhanced their awareness. Another activity incorporated talk shows where stakeholders in Disaster Management (DM) from various government departments, INGOs and NGOs, as well as community representatives, were brought together to discuss and share knowledge on initiatives in disaster management policy, programming, and planning. The talk show offered a platform for listeners to call in with questions and seek clarifications on issues related to DM. Gender, education and warning systems were just some of the issues dealt with. (Aceh Recovery Newsletter, 2008, 19)

This article reports the evaluations of the key interviews. Fifteen key people from the local government, NGOs and communities were asked to evaluate how the communities’ preparedness for disasters has changed during the past two years (from the end of 2007 till the end of 2009) and what the residents of Banda Aceh and Aceh Besar have learnt from the various media, and particularly from Radio Djati’s programming about DMP over the past two years.

THEORETICAL BACKGROUND

Gaillard et al. (2008, pp. 17–38) claims that various contexts, whether ethnic, cultural, social, economical or political, can affect how people survive in natural calamities. The article points out how the 170,000 Acehese and Minangkabau people died in the December 2004 earthquake and tsunami, while only 44 died in Simeleu Island, which was next to the epicentre of the earthquake. This disparity is partly attributed to the fact that the Simeleu people started running or evacuating immediately to the mountains, while the other two groups failed to do so. There were various reasons given for this, such as fear of running into the forest or lack of gas in their vehicles. Other researchers have adopted similar

conclusions on the importance of running away to survive a tsunami (Iemura et al., 2006, Aceh Community Disaster Preparedness, 2008).

Indeed, evidence seems to support the claim that the Simeleu community was more informed and aware of the proper response behaviour than the Acehese and Minangkabau communities, and therefore it can be said that the Simeleu residents’ behaviour was more appropriate following the earthquake and tsunami of 2004. Their proper response is attributed to the fact that the local community in Simeleu had learnt by local wisdom, based on the tsunami of 1907, that when the seawater recedes from the shore, it is time to run to higher ground (UNISDR 2006).

There are studies that also suggest disaster education is necessary to create an awareness and readiness for action at the time of disaster, and that mass media messages are related to how people behave in disaster situations (Nozawa et al., 2008, Seid-Aliyeva, 2006). This article approaches the matter of disaster preparedness from an educational and a communications point of view. As a communications researcher myself, I acknowledge the importance of using media to inform and educate, and thereby build an overall public awareness and preparedness which can save lives in the event of a disaster situation. The DMP survey (Aceh Community Disaster Preparedness 2008, 32) results showed that the majority (70 percent) of those interviewed had learnt something from radio about DMP. The survey results confirmed that almost half of the respondents (41 percent) had learnt that DMP saves lives, while 7 percent had learnt DMP lessens property damage, 3 percent had learnt about the hazards in their area and 19 percent had learnt they ‘can do something to help reduce the impact of the disaster’ (Romo-Murphy, 2011, p. 809).

Besides the DMP survey, which I was conducting, my views arise from the Hyogo Framework for Action 2005–2015, stated in the World Conference on Disaster Reduction (Hyogo Framework, 2006) and the Yokohama strategy adopted in 1994 (World Conference 1994, World Conference 2005). Both the Hyogo Framework and the Yokohama strategy encompass disasters brought about through hazards of natural origin and disasters related to environmental and technologically induced risks as well. The Hyogo paper states that disaster risk arises with physical, social, economic and environmental vulnerabilities (Hyogo Framework, 2006, p. 1). This goes along with the thinking of Maskrey (1989, p. 1) stating that natural disasters coincide between natural hazards (such as floods, earthquake, cyclone and drought) and a condition of vulnerability. That means, there is a high risk of disaster when one or more natural hazards occur in a vulnerable situation. The best way to reduce the risk is to educate those in the community that are most vulnerable, such as women, the poor, disabled, minorities, the children and youth and the elderly (Wisner et al., 1993, pp. 131–137).

In mitigating the effect of disasters, it behoves those responsible to recognise the importance of informing, motivating and involving people in all aspects of disaster

risk reduction in their own local communities. Both the Yokohama strategy as well as the Hyogo Framework stresses the importance of disaster risk identification, reducing the risk factors, education and creating preparedness for effective response and recovery. The main objective, first, is to increase the awareness of the importance of disaster reduction policies and promote the implementation of those policies (Hyogo Framework, 2006, p. 3). Second, to use knowledge, innovation and education to build a culture of safety and resilience at all levels by promoting the engagement of media to stimulate a culture of disaster resilience and strong community involvement in public education campaigns and public consultations at all levels of society (Hyogo Framework, 2006, pp. 9–10).

Research has been carried out on the media's role during the response phase of catastrophes, such as during Hurricane Katrina (Lee et al., 2008) and the Asian tsunami; however, very little is known about media effects during the recovery phase. There has also been a study to look at the contents of radio, television, newspaper and the Internet, resulting in the conclusion that mass media can be "a useful conduit for safety behaviour during the recovery phase of a catastrophe" (Beaudoin, 2007, pp. 695–706). And there have been studies on radio's role in helping to improve the level of relevant information and action in the area of health (Jallov, 2005, p. 32) but no studies on the media's role in improving disaster preparedness. This study and the results that follow, will bring new light in the area of DMP via media.

METHOD AND RESEARCH QUESTIONS

The purpose of conducting key interviews was to ascertain the effectiveness of the disaster preparedness project in the eyes of the decision makers and leaders of the affected communities. In October and November 2009, local university students of Unsyiah and IAIN interviewed 15 key people including government representatives, a number of NGO representatives and village leaders as well. The students received interview training from the local project leaders. The interviews were transcribed by a Radio Djati programmer and e-mailed to the researcher to be content analysed. Due to time constraints, the interviews were initially translated using the 'Google Translator', with the radio station staff being consulted when further translation was deemed necessary.

Altogether 10 questions were used to establish what key people thought the residents of Banda Aceh and Aceh Besar might have learnt about disaster preparedness in the past two years and what they still need to learn. Key people also evaluated the use of the various media for its effectiveness in providing disaster preparedness training. The 10 questions are listed below. The questions were asked from government representatives, NGOs and village leaders, with the exception of question nine, which was not asked from village leaders.

1. How has the community preparedness to disaster changed in the past two years in this area?
2. What have the residents of Banda Aceh / Aceh Besar learnt about DMP?
3. What else does the community need to learn about DMP?
4. How do you see the media in Banda Aceh / Aceh Besar contributing to DMP?
5. Have you seen DMP-related messages on TV? If so, what kind?
6. Have you heard DMP-related messages on radio? If so, what kind?
7. Have you read DMP-related messages on papers or leaflets? If so, what kind?
8. How do you see the role of Radio Djati in helping to improve disaster information dissemination?
9. What kind of action does the government do with media to improve the people's awareness about disasters?
10. In your opinion, has the information about earthquakes and tsunami that has been given by the officials here, reached all the people?

The researcher categorised the answers to each question by topics, such as this example of the analysis of question one in Table 1.

TABLE 1
Example of the content analysis of question one
'How has the community preparedness to disaster changed in the past two years in this area?'

Topic (answers to question one)	Who mentions (number of the key interview)
Media inform the public about disaster	01, 03, 08, 11
What to do in disaster, how to cope	01, 04, 06, 08, 10, 13, 15
Agencies work together in disaster management	02, 05, 06, 08, 13
Community-based disaster management, disaster reduction and preparedness	02, 03, 04, 05, 06, 09, 13
Research, training, tools to cope – a package	06, 10, 12, 14
Better prepared because of the drill	03, 07
Atmosphere of being alert, anticipation and awareness has increased	03, 04, 10, 12
Teach children about disaster	03
Community knows we live in disaster area	03
Too much education, people getting bored and the need for creative methods	05

RESULTS

Results show that government and NGO representatives both shared more positive views on disaster management and disaster reduction improvement than the corresponding views of the village leaders. The government has been doing well with regard to its share of the DMP in organising the simulations and they have been working in cooperation both with the *Badan Meteorologi Klimatologi Dan Geofisika* (BMKG) system (which is responsible for meteorology, climate and geophysics including the tsunami warning), as well as with the media. In addition to facilitating cooperation, the government has been doing well to help in creating dialogue on the overall subject of disaster and what to do during disaster. However, the village leaders feel that the government has fallen short as far as keeping the public informed, for example in a situation when there is an earthquake but no tsunami has followed. Village leaders expect more community (*kampung*) level disaster training and specifically how to prevent disaster such as floods.

All key interviewees offered lessons learnt by the community, most importantly, practical accomplishments including how to cope and how to deal in various disaster situations. Disaster management has reached the local level and residents have learnt practical skills in surviving, while the city has built infrastructure for survival, such as escape buildings and escape routes. Residents have also learnt to find information from TV and radio about disasters and their management.

The majority of interviewees agreed on the media's contribution to enhancing the community disaster preparedness. They saw media as contributing to the DMP in two ways: one, in disseminating information about the events, drills and the training conducted, as well as helping to be familiar with disaster alarms and directions to be followed in disaster situations; and two, acknowledging how the media work to educate the public on the different types of disaster and how to face them properly, as well as presenting helpful scientific facts on various disaster. TV in particular was considered effective by interviewees for teaching scientific facts on tsunamis.

Interviewees were asked to evaluate how the different media fared in their DMP-related tasks. First of all, TV and radio have their supporters, especially village leaders who appreciate TV since 'you can see'; while those who appreciate radio, explained that it is a medium you can take everywhere and listen to anywhere. TV's role, in addition, was appreciated as a medium that brings the news and facts but also shows simulations of disaster situations and interviews 'on-air' by disaster management experts. Radio's role was seen as a kind of advertiser of the DMP. Some interviewees appreciated dramas on radio and called for more narrative voice clips. In printed media, billboards have been seen as effective to inform about the drills and leaflets of such messages are being delivered to offices. One suggestion was that leaflets should also be available in the mosques and another suggestion was that disaster preparedness topics should be included in religious lectures in mosques.

Radio Djati's role was seen as positive in informing and educating the public about DMP. Djati was especially recognised for its cooperation with other organisations and communities, and inviting people on air. One key community group interviewee emphasised that radio not only informs people but also reduces the panic that is related to disasters. Some interviewees suggested Djati have more consideration to improve broadcasts to both children and adults. Village leaders do not listen to Djati; therefore they could not evaluate its function.

Some interviewees reminded that there are still more things to be learnt, while one interviewee called for more creativity in the education.

The government representatives emphasised that over the past two years, the role of electronic media had increased in disseminating information to the public and one government representative commented that media had started to work with the community. But some of NGO representatives and village leaders did not know that government information was available in print. One suggestion was that printed information should be read over electronic media as well.

For DMP, in the future, there should be more simulations at the community level; and villages should learn to provide announcements during disasters. The government should inform more about the technical errors related to the sirens. At the same time, the government has improved in creating policies for disaster management and coordination, as well as implementation. What is missing is budget and funding for disaster preparedness. The government in general is seen to be working well with the media but the link between the media, the government and Padang Merah Indonesia (PMI, Indonesian Red Cross) seems to be lacking. Interviewees appreciate the disaster education but there are opposing views – some think it is too repetitious, while others think repetition is good and functions as diminishing the panic related to disaster.

CONCLUSION

In Aceh, key interviews of local government representatives, NGO representatives and village leaders revealed that village leaders hold negative views on disaster mitigation education. At the same time, the interview results showed that both government and NGO representatives viewed the media's role as positive in both facilitating the awareness of disasters and in educating the local residents on how to be prepared for disaster by organising drills. Government and NGO representatives both shared more positive views on disaster management and disaster reduction improvements than village leaders. The government had cooperated well with the *Badan Meteorologi Klimatologi Dan Geofisika* (BMKG) system (which is responsible for meteorology, climate and geophysics including the tsunami warning), as well as with the media. The government had also facilitated dialogue on what to do in disaster. However, village leaders felt the government had fallen short in keeping the public informed, for

example in a situation when there was an earthquake but no tsunami had followed. Village leaders expect more community-level disaster training and drills in the villages. Disaster preparedness information needs to be available in local offices and mosques, either through lectures or in print form.

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IV

EVALUATING DISASTER PREPAREDNESS EDUCATION IN WEST SUMATRA THROUGH MEDIA

by

Romo-Murphy, E. 2013

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Evaluating Disaster Preparedness in West Sumatra through Media

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Abstract – Since the Indian Ocean Tsunami, disaster preparedness has been acknowledged as a key need in communities near the Sumatran fault line. This article presents the results of an evaluation of community disaster preparedness in Padang, West Sumatra. The disaster preparedness of the community was measured from interviews with key informants focusing on disaster matters. Even as awareness campaigns conducted by local media have improved disaster preparedness, more disaster simulations are needed in districts outside Padang. The interviews show that the local government officials and the NGOs think the community has learned disaster preparedness via media, including television, radio, leaflets and billboards. The topics focused on construction, evacuation routes, and what to do when an earthquake happens. Key individuals still see many needs remaining in the development of disaster preparedness for the community. Key informants recommend that the efforts of the local government to implement disaster preparedness programs should be based on public-private partnerships; it is noted that media and NGOs, as well as other interested stakeholders, should participate.

Keywords – disaster preparedness, campaign, community, resilience, media

1. Introduction

The Padang Pariaman area was hit by an unusually strong earthquake on September 30, 2009 at 5:16 pm local time. The epicenter of the 7.9-magnitude quake was located 60 km off the coast of Padang, and at a depth of 80 km. It took place along the same Sumatran fault line that caused the 2004 Indian Ocean Tsunami¹.

As a result of the Indian Ocean tsunami, followed by the earthquake in Padang in 2005, the need for raising the awareness of disaster preparedness became obvious. Volunteer-based groups were formed in Padang. The government improved their organizational operations towards better disaster preparedness planning and readiness on all levels. In addition, the Padang earthquake prompted the local government, private sector organisations, and the media to work together to educate the communities on disaster preparedness.

This disaster preparedness research is part of a wider Disaster Mitigation and Preparedness (DMP) project launched in Aceh in 2007, with the purpose of developing disaster preparedness radio programs together with

communities. The first evaluation of the DMP project showed that radio educates local communities in disaster preparedness; however, village leaders voiced their need for more disaster preparedness education on a community level (Romo-Murphy et al. 2011:812).

This evaluation was conducted in Padang in November 2010, one year after the earthquake. Key informants were interviewed about the disaster preparedness of the local community. Padang residents had experienced several recovery and construction programs organised both by local and international agencies. One of them was a media campaign towards better construction methods. Australia-Indonesia Facility for Disaster Reduction (AIFDR) and the National Agency for Disaster Management (BNPB) organized a building project and media campaign 'It's not the earthquake but it is the construction' ('Bukan gempa, tapi bangunannya') from February to June 2010. This multimedia 'Build Better' -campaign transmitted the slogan via several media outlets².

¹<http://www.earthobservatory.sg/images/footer-graphs/origin-sumatran-earthquake.pdf> (10 October 2012), http://www.eeri.org/site/images/eeri_newsletter/2009_pdf/Padang-eq-report-NL-insert.pdf (10 October 2012)

²<http://www.rn-unrc.org/activities/workshop/internationalseminar> (10 October 2012)

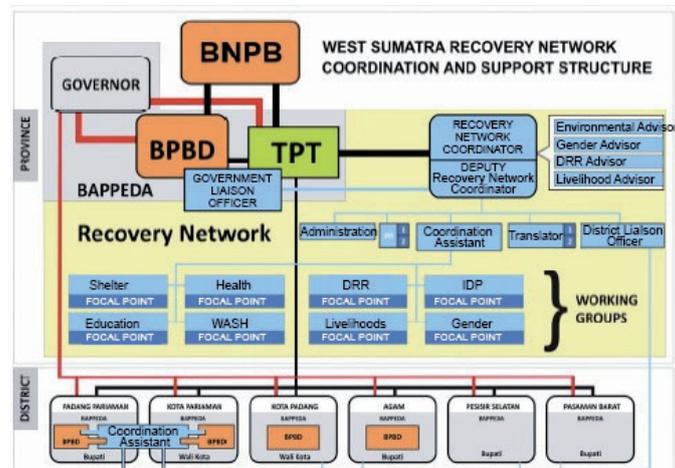


Figure 1: Framework of Early Recovery Network

2. Methodology and data

For this study, two groups of key informants were chosen by discretion; one group were officials from the district government level, and the second group consisted of representatives of non-governmental organizations. Informants of each group were knowledgeable about Padang and Pariaman disaster preparedness coordination and recovery. Key Interviews were carried out at first to those in the local government who are responsible for disaster preparedness education in the community, and secondly to representatives of NGOs who had been active in DRR. The questions were the same as those used in a similar evaluation in Aceh 2009 (Romo-Murphy, 2012:127).

Local research assistants conducted the interviews during November 2010. Three of the interviewers were post-grad students, who possessed experience in face-to-face interviews, while the other three were Respon radio programmers, and were trained in using the interview questions.

2.1. District key informants

The Indonesian government has reorganised its network of response to natural disasters. Each province has its district agency, since a district-based coordination mechanism is considered more relevant in the early recovery process, in comparison to having several agencies using different approaches. District coordination is a means to facilitate the early recovery process (Ratnanto, 2010: 71). Figure 1 (Ratnanto, 2010:73) identifies the West Sumatra early recovery coordination model. The purpose of the framework is to interlink various stakeholders from working groups, districts and levels of authority. The model

covers eight working groups and the six most-affected districts with the purpose of making it easy for the information to flow in between the districts, and between the districts and financial bodies. Near the top level there is BPBD (Badan Penanggulangan Bencana Daerah = Disaster Management District Agency), with the BNPB, at the very top, which is the equivalent at the national level. Identifying other actors at the district level; 'Bupati' or 'wali kota' is leading, while 'camat' leads the subdistrict, and 'nagari' or 'kepala desa' leads the village. BAPPEDA (Badan Perencanaan Pempangunan Daerah) is equivalent to the Regional Body for Planning and Development.

One option was to look for key informants from the top levels within the Framework of the Early Recovery Network; such people as the BNPB representative, the DRR advisor, the DRR working group advisor, and the district coordination assistants of Kota³ Pariaman and Kota Padang. Based on the local researcher's advice, the key informants were not chosen from officials at the Kota level, but from the Kabupaten⁴ level. These district officials were chosen since they know the Padang and Pariaman Districts best.

For this research, five district coordinators were interviewed from four districts; two from the Padang Pariaman District, and one each from Pariaman City, Agam District and the Pesisir Selatan District with no interviews conducted in the Padang City District and the Pasaman Barat Districts. The informants interviewed represent the views of the district coordinators in the four districts. (Kota Pariaman and Pesisir Selatan did not have a district disaster management agency at the time of the interviews). In addition to the five district coordinators, another three officials were interviewed from the Padang Pariaman legal office, the tourism planning board and the BPBD.

³Kota (Indonesian) = Municipality

⁴Kabupaten (Indonesian) = District

2.2. NGO key informants

The NGO key informants interviewed represented six organizations; Habitat for Humanity, Handicap International, the Ibu Foundation, KOGAMI, Mercy Corps, and World Vision. I interviewed Disaster Management Program Manager Endang Trisna from Mercy Corps, while the local research assistants interviewed all the others.

3. Data analysis

The interviews consisted of ten questions focusing on two main aspects: the level of disaster preparedness in the community, and what media has accomplished in educating the citizens. The interviews were transcribed and translated for the researcher to be analysed, using content analysis. From the interviews, patterns and themes were identified from the answers to the questions that follow. While reading the interviews several times, topics were listed from each informant. The researcher then categorized the topics into larger issues according to each question.

Questions asked are as follows:

1. How has community preparedness to disasters changed in the past year in this area?
2. What have the residents of Pariaman / Padang learned about DRR?
3. What else does the community need to learn about DRR?
4. How do you see the media in Pariaman/Padang contributing to DRR?
5. Have you seen DRR related messages on TV? What kind?
6. Have you seen/listened DRR related messages on radio? What kind?
7. Have you read DRR related messages on papers or leaflets? What kind?
8. How do you see the role of Respon Radio 94.7 in helping to improve disaster information dissemination?
9. What kind of action does the government take with media to improve the people's awareness about disasters?
10. What do you think: What is the response of the public towards DRR radio programs?
11. What kind of information has the government given about earthquakes and tsunamis to the public?
12. What do you think: Has the information about earthquakes and tsunamis that has been given by the officials reached all the residents of Padang and Pariaman?

4. Results

According to the district officials, community members use various media to learn about earthquakes, including television, radio, and local papers, as well as mobile communication. To make community disaster preparedness more effective, district officials suggest cooperation between the local government and the media.

Among all districts, Padang is a positive exception in that the Mayor uses RRI Padang (Radio Republic Indonesia Padang) to disseminate earthquake information. NGO informants agreed with this view in that they have noticed RRI Padang organising radio specials in response and recovery (R&R). However, on a wider scale, in other districts there is no disaster cooperation shown between the local government and the media.

Media's accomplishment of educating the community in disaster preparedness was recognised by both groups of informants, as there had been a media campaign on construction practises a few months before the interviews. The campaign message 'It's not the earthquake, but it's the construction' was delivered via posters, notice boards, banners, several radio stations, TVRI (television station), newspaper, bus, and film. The entire community was informed on how to build houses that withstand earthquakes.

The media gathered two negative mentions among the NGOs: first, the information given by the media has increased stress and led to panic in the community. (This actually took place just before the research project, when inaccurate information was aired after the Mentawai tsunami in October 2010.) Secondly, NGO informants evaluated the television messages claiming they tended to exaggerate the impact of disasters, and discuss details of less importance.

According to local officials, the districts seem to be at different levels of disaster preparedness. For example, the district of Agam is still dealing with reconstruction following the September 2009 earthquake. The district of Pesisir Selatan established its disaster management agency (BPBD) one year after the earthquake, while the district of Padang Pariaman had their BPBD established a few months after the earthquake. On a positive note, the BPBD of Padang Pariaman has been very active in cooperating with the NGOs and has even organized disaster simulations in Ulakan Tapakis and in other disaster-prone areas. There are also plans to install evacuation route signs. In addition to this, a rapid response team has been established in Padang Pariaman, consisting of government agencies, the health department, the department of transportation, RAPI (Radio Antar Penduduk Indonesia) and ORARI (Organisasi Amatir Radio Indonesia).

District officials have emphasized the fact that even though they realize that community members have a low level of preparedness for disasters, the local governments of the four districts (Padang, Padang Pariaman, Pariaman and Pesisir Selatan) do not have the funding to pay for such preventive activities. Officials suggest that one way of solving the financial issue is to team up with the NGOs in construction, and together supply materials as well as instruction. Currently, the community sees the NGOs, along with the private sector, as being active in disaster preparedness, which in turn decreases trust in the local government to carry out preventive activities. Yet, since there is such an obvious need for community based disaster preparedness programs, officials felt the government should work together with the media and the NGOs to build effective public-private partnerships.

NGO informants pointed out that the local government has provided notifications to keep the public alert, and has asked schools to instruct students on disaster preparedness. According to the NGOs, the government has carried out simulation drills to include the media, the army, the schools, the private sector, the community, and four villages. On the other hand, some NGO informants were critical about the government's actions saying there is a lack of systematical preparation in achieving proper results. When disaster occurs, there is emergency response, however, it lacks follow-up and simulations, and in addition to this the information delivered is not uniform throughout the various media outlets.

5. Discussion

This study confirms media's importance before disasters. Media, especially community media, can take the role of an educator and facilitator for citizens' disaster preparedness. Similar research was conducted in Aceh in 2009, showing that both local government and NGO representatives viewed disaster preparedness education positively. However, in Aceh, village leaders expressed discontent with the disaster preparedness education in villages. In this study, it would have been interesting to hear the opinions of village leaders from outside Padang.

These interviews resulted in the recognition of the need for disaster preparedness in communities. Both local district officials as well as NGO informants unanimously agree that Padang, and especially the surrounding districts still need preparedness education, even though much has been accomplished through the media campaign. District officials welcome NGOs and private organisations to partner with local governments in organizing disaster preparedness education, especially in districts outside the city of Padang. There is a crucial need for construction funding for those households desiring to improve construction methods. In addition to proper construction planning, all coastal areas need preparedness education on how to utilize evacuation maps, and on how to mark the evacuation routes effectively.

6. Conclusion

Two groups of informants were interviewed to evaluate the level of the society's disaster preparedness. On the dis-

trict government level, one group was actually involved in the West Sumatra recovery network coordination and support structure. The second group consisted of NGOs who had been working in disaster preparedness and in the recovery process.

In conclusion, the interviews show that both local government officials and NGOs affirm the community has learned disaster preparedness via media, including television, radio, leaflets and billboards. The topics covered were construction, evacuation routes, and what to do when an earthquake happens. The RRI Padang has been recognized by officials as educating in disaster preparedness. NGOs also approved of the Journalistic Network for Disaster Preparedness that was established to promote awareness campaigns. Both local officials and the NGOs voiced concerns that the media must give accurate information when reporting disasters, and to do so in such a manner as to avoid creating panic and undue stress within the community.

Local officials seem to appreciate all the disaster preparedness efforts organized by the NGOs, and see them as good partners for local governments to cooperate in DRR matters in the future. Although Padang Pariaman is acknowledged as being prepared as far as disaster simulations, both officials and NGOs agree the government needs to carry out additional simulations in other districts.

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V

**INFORMATION SEEKING FOR EARTHQUAKE
PREPAREDNESS**

by

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Information Seeking for Earthquake Preparedness Evaluating the Role of Media in Teaching Residents in Disaster Prone Areas of West Sumatra

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This study scrutinizes the role of media in disaster preparedness in West Sumatra, Indonesia. For this purpose an information mapping exercise was conducted in Padang Pariaman regency of West Sumatra, in November 2010. What information sources do villagers and community radio listeners utilize when seeking information about earthquake preparedness? The respondents were asked to draw a map of their information sources for earthquake preparedness. The findings show that newspapers are seen as an important source for preparedness. Villagers also stressed personal communications and phone contacts with family and neighbors, while community radio listeners emphasized radio and the local community as important sources for earthquake readiness. The findings can help improve media education strategies to facilitate improved disaster preparedness in Indonesian villages. Discussions on preparedness need to be brought into village life, using personal communication channels such as community meetings.

Keywords: Disaster preparedness, Role of media, Information seeking.

1. Introduction

Natural disasters have gained media attention globally since the Indian Ocean Tsunami of 2004 took the lives of close to a quarter of a million people. Geologists predict more strong earthquakes in the Indonesian archipelago area in the future.¹ This calls for media messages that help the local people to know what to do before, during and after an earthquake or tsunami, see Refs. ²⁻⁹ for examples.

The Disaster Mitigation and Preparedness (DMP) project was launched in response to the Indian Ocean Tsunami. The target was to help tsunami prone areas in Sumatra, Indonesia to prepare for future catastrophes, using media to educate residents and foster resilience. Tearfund UK and Health Communication Resources from Australia initiated the two-year project in 2007 in Aceh province.

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This was followed by another media related research project in Padang Pariaman regency, West Sumatra in 2010. The Aceh project surveyed the survivors of the Indian Ocean Tsunami 2004, to learn what helped people to survive, what media they were using and what information they needed during the initial period following the tsunami. From the survivors' stories, it became evident that for Acehnese, besides the traditional media, the local community, known as the '*masyarakat*' in Indonesia, was an important source of information and help in this disaster. See Ref. ¹⁰ for examples.

In Aceh, key interviews of local government representatives, NGO representatives and village leaders revealed village leaders felt the government had fallen short in keeping the public informed, for example in a situation when there was an earthquake, but no tsunami had followed. At the same time, the interview results showed that both government and NGO representatives viewed the media's role as positive in facilitating both the awareness of disasters and in educating the local residents on how to be prepared for disaster by organizing drills. Government and NGO representatives both shared more positive views on disaster management and disaster reduction improvements than village leaders. The government had facilitated dialogue on what to do in disasters and cooperated well with the Badan Meteorologi Klimatologi Dan Geofisika (BMKG) system (which is responsible for meteorology, climate and geophysics including the Tsunami Warning), as well as with the media. Even so, village expect more community level disaster training, and specifically on how to prevent disasters resulting from floods. See Ref. ¹¹ for examples.

As a result of the key interview findings in Aceh, which showed village leaders as holding negative views on the success of disaster preparedness education, the Padang Pariaman research focused on the need for effective disaster preparedness education in villages. There was very little research done in the villages outside the cities of Padang and Pariaman, even though such areas are also prone to serious damage and loss of life during natural calamities. For example, Padang experienced an earthquake of 7.9 on the Richter scale in September 2009; most of the resulting fatalities were outside the city of Padang (death toll outside the city was 734 people in comparison to around 383 in the city). Most of the casualties were in villages near Pariaman city; in the Agam district one village was completely buried by landslide following the earthquake.¹²

As a result of this tragedy, the media have taken an active stand on educating the West Sumatran public in disaster mitigation. Indonesian government television and radio, as well as some private and community radio stations, have produced additional disaster preparedness programs. In addition, during the first half of 2010, there was a media campaign on disaster preparedness. This campaign, entitled '*Bukan gempanya, tapi bangunannya*', was launched in co-operation with the government (Badan Penanggulangan Bencana Daerah, BNPB, Disaster Management District Agency), the Australia-Indonesia Facility for Disaster Reduction (AIFRD), the University of Andalas and some other organizations. The campaign

emphasized that it is not the earthquake but the building that affects the severity of damage in the event of an earthquake. The buildings must be constructed to withstand earthquakes. See Ref. ¹³ for example.

2. Method

The Aceh research from 2007 showed that crisis communication information strategies are strengthened when they are channeled face to face via the local community (*masyarakat*), the local mosque (*meunasah*), or coffee-shops (*Warung Kopi*), at the same time broadcast media are needed to disseminate accurate and reliable information to counter community level rumors.¹⁴ The aim of this study in Padang Pariaman was to identify what sources of information villagers and community radio listeners use to increase their knowledge of earthquake preparedness. The information source was left open to include human beings as sources. Based on the Aceh survey, we can hypothesize that villagers would utilize both the media, and the community (*masyarakat*), as sources of information to learn more about disaster preparedness.

Purposeful sampling was done to select villages from the vicinity of Pariaman city and Painan city, each lying about 20 km either north or south of Padang city. The villages in the north of Padang city were chosen because they were close to the worst hit areas of Agam, and in the vicinity of the community radio station Respon Radio, which was established during the aftermath of the September 2009 Padang earthquake. The villages in Painan, in the south of Padang city were chosen for their proximity to the sea because in the event of an earthquake followed by a tsunami disaster preparedness education could save lives. The respondents in the villages were chosen by discretion.

The information horizons mapping results represent the views of village leaders and villagers in the coastal areas of Painan and Pariaman. Villagers, and especially village heads, have an important role as local coordinators in disaster situations; therefore this research provides valuable information on how to educate them in the future.

Village leaders and villagers were both interviewed by three sets of research teams made up of three Andalas University students and three community radio station staff members. Each team was trained to ask the respondents to draw a map of his/her earthquake preparedness information sources. A key issue was to ascertain where villagers go to find information on how to prepare an earthquake kit bag; how to find the evacuation routes and special evacuation buildings in their areas; how to prepare furniture to withstand earthquakes, and what should you do when an earthquake hits; including how would you know if a tsunami was coming following an earthquake?. After drawing the sources, the respondents were asked to rank the order of using them. The map drawing was adopted from the 'Information horizons map'. Sonnenwald created this method in which

respondents are asked to draw a map of their sources of information in particular context, after which the graphical presentation of their information horizons is analyzed in conjunction with the interview data using techniques derived from social network analysis and content analysis. See Ref. ¹⁵ for examples.

In the Padang Pariaman study, the respondents were asked to draw a map of their information sources for earthquake preparedness. The rankings for sources were analyzed using the social network analysis. In the example drawing (Fig. 1.), the respondent first drew the four sources, and after that, listed 'TV' as the number one source, followed by father and mother/family as the second source etc.

The method was first tested among 28 students in Andalas University near Padang. In the pretest, with the help of the translator, the researcher asked the respondents to think of information sources they use when they want to learn about preparing for an earthquake. When a horizon map didn't show the order of information source, or the question was misunderstood, as for example, 'What is your information source when the earthquake happens and you want to know more', the answer was not included in the analysis, since the purpose was to identify sources for being prepared for an earthquake before it happens. The pretest helped the research team to convey the question correctly to the respondents.

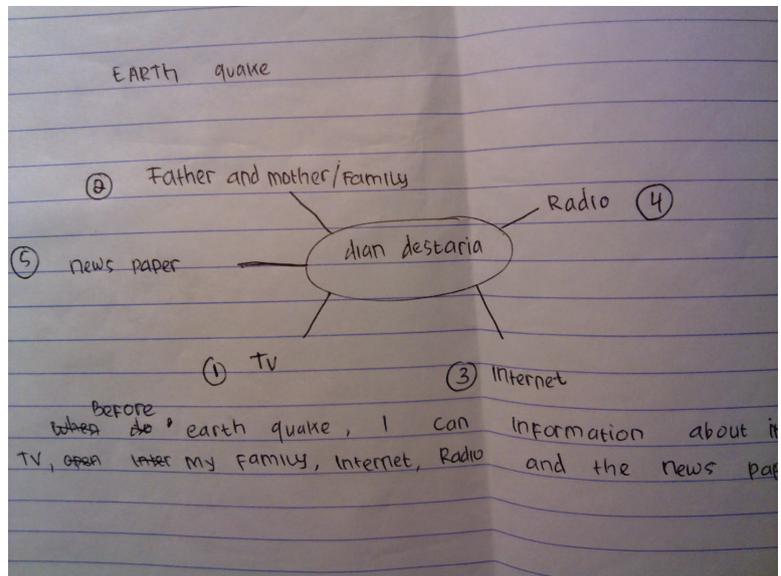


Figure 1 Example of an information horizon map for earthquake preparedness.

The mapping task itself was given to two separate groups: at first to 21 village leaders and villagers in Painan and Pariaman, and secondly to 12 community radio listeners in Pariaman. The two groups represent views from the small villages. They are the core groups for designing disaster preparedness communication.

3. Results

The maps drawn were coded to a matrix, where rows present the information sources used by respondents and columns represent each respondent. By rows it was calculated how many times each source was mentioned, and summing up the rankings.

Another means of analyzing the information sources was to convert the respondents' rankings of information sources into arrows from the first source to the second, etc. For example, a respondent's information sources: 'tv → radio → friend' was coded so that the tv (called 'node') got one outgoing link, radio (node) got one incoming and one outgoing link, and friend (node) got one incoming link.

The markings were totaled for outgoing and incoming marks. The Node type was named, depending on the links – when the number of outgoing links exceeded the number of incoming links, the node was called a recommending or starting node for information seeking. But, when the number of incoming links exceeded the number of outgoing links, the node was narrowing down the search process and called a focusing node. Finally, when the number of incoming and the number of outgoing links were close to each other, the node was called a balanced node.

In this way the analysis showed the starting point for earthquake preparedness information, and which information sources served as focusing nodes.

3.1. Villagers' Information Sources

Out of 21 information horizon maps, 17 maps were drawn by village heads and secretaries, and the remaining four by villagers. The majority of respondents were village heads or 'wali nagaris'; the rest were civil servants, or fishermen. Only five women drew the map, so the results reflect more the men's view of information sources.

With the exceptions of '*masyarakat*' (local community), non-governmental organizations, and Indonesian Radio Amateurs, most of the information sources were drawn by at least one third of the village respondents. Cell phones (Table 1, average rating 2), neighbors, and family are considered as primary information sources for village heads, and social network analysis shows that cell phones and family are starting nodes. This could mean that learning about earthquake preparedness first of all happens in personal exchanges of communication. Government is ranked as 2.43 on average – this could mean the local government carries an important role in disaster preparedness for village leaders, after personal

Table 1 Information sources of villagers N = 21
 (in the table, Average rating = sum of ratings divided by n of mentions)
 NGO = non-governmental organisation
 IRAS = Indonesian Radio Amateur Society

Media	N of mentions	Sum of ratings	Average rating	N of outgoing links	N of incoming links	Node type
Television	19	50	2.63	17	16	balanced
Internet	8	22	2.75	7	6	balanced
Newspapers	6	25	4.17	3	6	focusing
Radio	16	55	3.44	9	12	focusing
Masyarakat	3	7	2.33	2	2	balanced
Cell	11	22	2	8	6	starting point
Neighbor	6	14	2.33	5	4	balanced
Family	7	14	2	5	3	starting point
Government	7	17	2.43	6	6	balanced
NGO	2	2	1	2	0	loner source
IRAS	1	1	1	1	0	loner source

communication.

Looking into electronic media (Table 1.) shows that television and the Internet are more likely to be explored before radio and newspapers. Since radio and newspapers have more incoming than outgoing links, they are seen as 'focusing nodes'.

3.2. Listeners' Information Sources

During the course of this research study, community radio, 'Respon Radio,' in Pariaman held an open doors day on Nov 7th, 2010. Listeners were invited to visit the radio station and to get to know the announcers. During the visit, they were given an opportunity to fill in a small questionnaire to evaluate Respon Radio's programming. At the end of the questionnaire was the information horizon drawing exercise. All in all, 13 listeners filled in the questionnaire and 12 did the mapping exercise. The respondents were female listeners of Respon Radio, with the exception of one man who drew the information sources map. Since these were Respon Radio listeners, they see radio as the most important source of earthquake preparedness, and for many of them, it is a starting node for the information search. Radio is followed by television and newspapers, as shown in Table 2.

Table 2 Information sources of Respon Radio listeners n=12
(in the table, Average rating = Sum of ratings divided by N of mentions)

Media	N of mentions	Sum of ratings	Average rating	N of outgoing links	N of incoming links	Node type
Television	7	20	2.86	6	5	balanced
Internet	3	12	4.00	2	3	balanced
Newspaper	7	21	3.00	4	6	focusing
Radio	12	26	2.17	11	7	starting point
Masyarakat	6	19	3.17	5	6	balanced
Friends	2	2	1.00	2	0	starting, loner
Teacher	1	3	3.00	1	1	balanced
Government	2	9	4.50	0	2	ending source
Walkietalkie	1	1	1.00	1	0	loner source
Cell	1	7	7.00	0	1	ending source
Leaflet/book	2	6	3.00	2	2	balanced

Compared to the information sources drawn by village heads and villagers, '*masyarakat*' is mentioned more often by Respon listeners; half of the listeners drew '*masyarakat*' as an information source, even before the Internet. Could this difference be due to the fact that it is mostly women (with the exception of one man) who drew the maps at Respon, meaning that '*masyarakat*' is more important for women than for village heads (most of whom were male)? Or it could be they don't have access to the Internet?. Another explanation for Respon listeners valuing '*masyarakat*' could be the emphasis of the radio station to be 'community' radio, and its programming which focuses on '*masyarakat*'.

4. Conclusions and Discussion

Comparing all the maps drawn, the images differed between the villagers and the Respon listeners. However, there is one media group pictured in the same way – the newspapers are seen as a focusing node by both groups of people. This is an important observation to consider when designing media campaigns on disaster preparedness. Articles about disaster preparedness could be placed more in the newspapers.

What does this study tell about other information sources? Village heads and villagers alike seek preparedness information via personal communication, while community radio listeners also draw from radio and masyarakat as well for earthquake preparedness information.

These uses of information need clarification – how are the village leaders using cell phones for information seeking? What type of television content is most helpful in learning about earthquake preparedness? And what information is gathered through voice and text messaging when villagers contact friends, relatives, or authorities by voice or by text messaging? In this study, respon-

dents were not interviewed about their drawings. However, more comprehensive interviewing would certainly result in a more detailed view of the information sources and their selections. Sonnenwald's information seeking research method, utilizing horizon map drawing, seems well suited to identify ways of information seeking for a specific task, such as earthquake preparedness.

Disaster mitigation has been considered increasingly important, as there is evidence that proper preparation helps people to survive disasters. Educating the public, using information sources relevant to the citizens, and emphasis on proper attitudes and behaviors in the event of disaster, can enhance preparedness. This study shows that for the West Sumatran coastal villages, personal communication within the community provides a primary information source of earthquake preparedness. Similar findings have been shown from the Disaster Mitigation Preparedness study in North Sumatra (Aceh Community Disaster Preparedness, 2008). Family, neighbors, and the rest of the community 'masyarakat' are the starting sources for earthquake preparedness, and therefore, disaster preparedness campaigns should focus on these groups of people. This study does not show one particular mass media that would be the best means for disaster preparedness education, but it points out that specific groups prefer specific media – for some villagers it is cell phone and television, and for others it is local radio where special focused programming can function as a civic education agent in local communities.

This study shows newspapers as a focusing source for seeking earthquake preparedness information. In other words, in West Sumatran villages, newspapers are not the first information source, but rather the ending source. Villagers and the community radio audience alike picture newspapers as a focusing source, which means that after newspapers, there is less seeking information from other sources.

West Sumatran coastal villagers use television first followed by the Internet, and of course cell phones where family, friends, and the neighboring community at large are then brought into the mix and must be considered as educational sources for disaster mitigation. These findings are specifically applicable in designing disaster mitigation education strategies for the coastal areas of West Sumatra.

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