Building disaster resilient households through a school-based education intervention with children and their families

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Candidate's Statement

I certify that: this work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself. The content of the thesis is a result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

This study was approved by the Human Research Ethics Committee of Macquarie University (Ref Number: 5201400846), which conforms with the guidelines of the National Health and Medical Research Council (NHMRC) Australian Code for the Responsible Conduct of Research (2007), the National Statement on Ethical Conduct in Human Research (2007) and to other relevant legislation and guidelines.

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Abstract

This thesis investigates the development of a child-centred participatory household preparedness tool disseminated through three flood prone primary schools in Jakarta, Indonesia. In the last decade, Disaster Risk Reduction (DRR) education programs have been promoted in schools and at the community level; however, little research or practice has focused on household preparedness through the participation of children and parents.

This thesis uses a case study approach to develop and then assess the effectiveness of a participatory household preparedness tool. A literature review exploring the involvement of children as agents of change in DRR, in addition to other sectors, such as health and the environment is presented, evaluating the lessons learned in promoting children's participation in delivering change in their communities.

Based on this review, and consultation with DRR education practitioners, as well as children and their parents, a household preparedness planning tool was developed. The tool is in the form of a poster that children and parents complete together as part of a school assignment. The aims were that the poster can be utilised in schools, can engage parents and can support children to influence change within the home. In addition, it was intended that the tool can be easily scaled-up and replicated in other locations. The study captured the perspectives of children and their parents regarding their experiences in contributing to and using the tool through a mixed methodology of family group interviews and questionnaires. The study revealed a significant increase in household preparedness knowledge and planning, i.e. identifying actions to anticipate disaster risks, assessing evacuation procedures, and emergency pick up procedures, for both children and parents. Furthermore, parents and children built consensus in developing a preparedness plan together, with parents noting the crucial importance of their children's role and other household members in household preparedness and children expressed their interests in making the plan together with their parents. The research also demonstrated opportunities for application of the tool at-scale, including the development of a comprehensive preparedness toolkit, called PREDIKT. Future areas of research for further development of Child-Centred DRR (CCDRR) are also discussed.

The thesis consists of nine chapters and is structured using a hybrid approach, consisting of four journal articles and five conventional chapters.

Acknowledgements

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Contribution to papers

This PhD thesis is presented by a combination of publication and traditional chapters. Four papers are presented in the thesis as stand-alone papers. These papers are prepared for publication as indicated in Chapter 1. The four papers are co-authored by the PhD candidate and supervisors. The table below summarises the respective contributions of authors to each of the papers included in this thesis.

Table of candidate's contribution to each contained in this thesis

Chapter	Paper title	Concept	Data collection & analysis	Writing
2	Disaster risk reduction education policies and practices in Indonesia: Bridging the research-policy gaps	85% Amri 15% Haynes	100% Amri	80% Amri 15% Haynes 5% Bird
4	Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan	85% Amri 10% Haynes 5% Bird	100% Amri	85% Amri 10% Haynes 5% Bird
5	Application of Participatory Child-Centred School-Based Planning Tool to Improve Household Disaster Preparedness	85% Amri 15% Haynes	100% Amri	80% Amri 20% Haynes
7	Building Disaster Resilience Together as a Family	90% Amri 10% Haynes	100% Amri	90% Amri 10% Haynes

List of Abbreviations

ADAPT	**Adaptive, Dynamic, Active, Participatory, and Thorough**
ADPC	Asian Disaster Preparedness Centre
AIDS	Acquired Immune Deficiency Syndrome
APG	AADMER Partnership Group
ASEAN	Association of Southeast Asian Nations
AU$	Australian Dollar
BNHCRC	Bushfire & Natural Hazards Cooperative Research Centre
BNPB	*Badan Nasional Penanggulangan Bencana* (or Indonesia's National Disaster Management Authority)
BPS	*Badan Pusat Statistik* (or Indonesia's Statistics Agency)
CCA	Climate Change Adaptation
CCDRR	Child Centred Disaster Risk Reduction
CDE	Consortium for Disaster Education (CDE)
UN CRC	United Nations Convention on the Rights of the Child
CRED	Centre for Research on the Epidemiology of Disasters
CSR	Corporate Social Responsibility
CSS	Comprehensive School Safety
DKI	*Daerah Khusus Ibukota* (or Special Capital Region)
DMA	Disaster Management Authority
DRR	Disaster Risk Reduction
EMIS	Education Management and Information System
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GADRRRES	Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector
GAR	Global Assessment Report
HIV	Human Immunodeficiency Virus
ICRC	International Committee of the Red Cross
ICT	Information and Communication Technology
IDMC	Internal Displacement Monitoring Centre
IDR	Indonesian Rupiah
IEC	Information, Education, and Communication
IFRC	International Federation of Red Cross and Red Crescent Societies
INEE	Inter-agency Network for Education in Emergencies
IPCC	Intergovernmental Panel on Climate Change
MOEC	Ministry of Education and Culture
MORA	Ministry of Religious Affairs
MRHE	Ministry of Research and Higher Education
MWECP	Ministry of Women Empowerment and Child Protection
NDMA	National Disaster Management Authority
NGO	Non-Governmental Organisation
ODI	Overseas Development Institute
OHCHR	Office of the United Nations High Commissioner for Human Rights
PHVCA	Participatory Hazard Vulnerability Capacity Assessment
Posko PDB	Pos Komando Penanganan Darurat Bencana (or Disaster Response Command Post)
SD	Sekolah Dasar (or Primary School)
StDev	Standard Deviance
UN	United Nations

UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
UNISDR	United Nations Office for Disaster Risk Reduction
US$	US dollar
WHO	World Health Organization
WMO	World Meteorological Organization

Chapter 1

1. Introduction

Overview and rationale

Global political commitments, such as the Declaration of the United Nations Conference on the Human Environment (1972), Millennium Development Goals (2000), and the Global Strategy for Women's Children's and Adolescent's Health (2010), have significantly influenced the school curricula in many countries over the past 20 years, particularly in relation to conservation and sustainable development, and health and wellbeing (see Aikman et al., 2005; David Gartner, 2010; P. Jones et al., 2010). Similar goals are apparent within the field of disaster risk reduction and climate change adaptation, where recent global commitments have underpinned the importance of education to achieve the intended development goals (UNISDR, 2015b; United Nations, 2015c, 2015b).

In the last decade, disaster resilience education programs in schools – including subjects related to climate change – have been piloted and implemented in more than 100 countries, including Indonesia (UNESCO et al., 2012a; BNPB, 2014; Ronan, 2014). The programs aim to increase the knowledge of children and promote increased awareness and behaviour change within the home. Recent studies have generated evidence that children who have been through a disaster resilience education program have increased awareness and knowledge; however, these initiatives rarely influence significant improvements outside of the school (Finnis et al., 2010; Ronan et al., 2010; Amri, Bird, et al., 2017).

The concept of children as agents of change has long been a goal promoted by development agencies (Fielding, 2001; Flanagan et al., 2001; Mitchell et al., 2008; Malone, 2013; Percy-Smith et al., 2013). Many studies have shown that irrespective of the main goal of the program, children who are involved in a well-run development initiative experience a number of positive outcomes, such as increased confidence, willingness to take part in positive activities and increased life skills (Mwanga et al., 2008; Nicotera, 2008; Venka et al., 2012; Haynes et al., 2015).

In the disaster risk reduction field, a child-centred approach that promotes children as agents of change has been increasing in popularity over recent years (Amri, Haynes, et al., 2017). Children from all cultures and backgrounds have a valuable and unique ability to conceptualize and analyse risk (Mitchell et al., 2009; Haynes et al., 2010; Children in a Changing Climate, 2017). They also have the right to be heard and express their views on disaster risk reduction

and climate change adaptation (Children in a Changing Climate, 2011; UNISDR et al., 2012). Children and young people therefore represent an untapped resource in larger community-wide efforts to promote disaster risk reduction and resilience.

A limited number of studies have demonstrated that children, who receive a good education and are supported by adults, can express their views and influence change in their communities. In the Philippines, for example, mangrove planting and regeneration has reduced the risk of tsunami impacts and, tree planting has reduced landslides and advocate the closure of illegal mines (Back et al., 2009; Tanner et al., 2009; Haynes et al., 2015). However, most disaster resilience education programs are not designed to empower children or to encourage them to discuss disaster risk reduction with their parents (Amri et al 2017). Thus, it is important to ensure that disaster resilience education can enable children to share and discuss their perspectives on risks to their parents. Furthermore, the role of parents and their engagement is crucial in enabling children's participation and ensuring wider impacts (Save the Children, 2005; Seballos et al., 2011; Lansdown et al., 2014; Haynes et al., 2015).

Furthermore, a good program has limited utility if it is not sustainable and cannot be implemented at scale. A recent study by Amri, Bird, et al. (2017) discussed how disaster resilience education programs have several barriers to large scale implementation, particularly when external support (for example, from NGOs) has ended.

Aims of the research

This research aims to develop a tool that can be utilised in schools, engages parents and supports children to influence change within the home. It is intended that the tool can be easily scaled-up and replicated in other locations. Specifically, this research aims to address how disaster resilience education program in schools can enable children to be as agents of change by increasing disaster preparedness and resilience measures at the household level.

The specific research questions are:

1. Is it possible for children to influence their parents in household disaster preparedness?
2. To what extent a household preparedness tool can be developed using participatory approach involving children and their parents?
3. How effective is the tool when implemented through a school-based intervention?
4. To what extent can the tool be scaled up and replicated in other locations?

This thesis will assume a working hypothesis that, if provided with proper support (capacity and knowledge) and resources (policies, mechanisms and tools), children can play a vital role in the communication, decision making and direct actions to reduce the risk of disasters.

Why Indonesia?

Indonesia is the most populated archipelagic state in the world and is highly prone to both geological (earthquake, volcanic eruption, tsunami) and climate related (flood, landslide, drought) hazards. Damage and losses from the tsunami that struck Aceh and Nias in 2004 was estimated at US$6 billion, the Mt. Merapi volcanic eruptions in 2010 cost approximately US$ 36.2 billion, and the forest fire and haze crisis in 2015 was estimated to have cost Indonesia at least US$ 16 billion (Bappenas, 2006; World Bank, 2016).

Over the most recent 15 years, there have been over 21,000 disasters recorded in Indonesia, primarily weather-related (floods, landslides, droughts, and strong winds), but also earthquakes, volcanic eruptions, and tsunami (BNPB, 2019). Indonesia is also prone to human-induced hazards such as the forest and peat land fire in 2015, which resulted in a haze that shut down more than 21,000 schools and affected more than 1.4 million students in 41 municipalities and districts (MOEC, 2016b).

As the fourth largest population in the world (230 million), growing industrialization and high levels of economic disparity means that large segments of society are highly vulnerable to disasters. Given that more than one third of the population is under the age of 18, the research proposed here is of particular importance.

Indonesia has been recognised as a leader in Disaster Risk Reduction (DRR). The first global champion in DRR was awarded by the United Nations International Strategy for Disaster Reduction (UNISDR) to President Susilo Bambang Yudhoyono in 2011 due to his effort in making DRR a national priority. Indonesia is the most mentioned country in the 2015 Global Assessment Report (GAR) on DRR and is one of the 21 safe school leaders committed to support the implementation of the World-Wide Initiative for Safe Schools (UNISDR, 2014b, 2015a). According to government data from the Ministry of Education and Culture, National Disaster Management Agency, and the Ministry of Religious Affairs (2017b), at least 47 institutions (government and non-government) have programs related to DRR education, which is an indication that there is a large interest in promoting DRR education in Indonesia.

The combination of high risk and DRR initiatives makes Indonesia a good case study location to conduct this research, particularly as research examining and evaluating DRR education is limited in developing countries (Amri, Haynes, et al., 2017).

2. My journey

I have been involved in disaster risk management since 2006 when I began working for Plan International, a child focused Non-Governmental Organisation or NGO (www.plan-international.org). From 2007 to 2010, Plan's disaster management program in Indonesia grew significantly and we became the largest team compared to other Plan programs in Indonesia, responding to many emergencies as well as initiating a Child-Centred Disaster Risk Reduction (CCDRR) program in two districts in Indonesia. In the CCDRR program, I met with my now-principal supervisor, Dr Katharine Haynes, where we initiated some of the early research related to CCDRR, as part of the Children in a Changing Climate Coalition (Amri, Haynes, et al., 2017).

In this period, I was exposed to many emergencies – in Indonesia where we responded to floods, earthquakes, and volcanic eruptions, as well as overseas deployments to assist with the Haiti earthquake in February 2010 and the Pakistan floods in August 2010. I began to feel frustrated in delivering relief programs and post-disaster measures, where we repeated the same interventions (distributing relief items) in the same communities and did little to actually reduce the underlying vulnerabilities. I became very interested in the CCDRR program, where I saw first-hand how children, when provided with the right knowledge and tools, were able to influence their communities. I've seen bright and outspoken children talk with our President and other prominent leaders and observed how they were able to get their message across and advocate for policy change (Haynes et al., 2015).

In 2012, I started a new initiative forming an alliance of 7 international NGOs and the Association of Southeast Asian Nations (ASEAN) Secretariat to form the ASEAN Safe Schools Initiative. I believe that if we want to deliver a large-scale child-centred program, the school setting is a strategic place to start. Simply because almost 9 out of 10 children in ASEAN countries are in schools where they spend half of their waking hours (APG, 2013). I left Plan in 2014 to pursue my Master and PhD study, determined to explore school-based child-centred initiatives combing current academic theories and methodologies with my experience working in this sector.

3. Thesis outline

This thesis comprises nine chapters and is structured using a hybrid approach, bringing together four journal articles and five conventional chapters (Figure 1). All papers are in preparation for submission.

Chapter 1. Introduction

This chapter provides an overview of the research, the rationale and aims. A description of Indonesia and why it was chosen as the case study location is briefly discussed.

Chapter 2. Paper 1: Disaster risk reduction education policies and practices in Indonesia: Bridging the research-practice gaps

This paper investigates the progresses to date of research and practice on the implementation of DRR education in Indonesia. The paper sets the scene for the thesis and captures the views of stakeholders from government, NGOs, and research institutions.

Chapter 3. Literature Review

This chapter review current research regarding children's movements in a range of areas that influenced and lead to change in communities. It also describes factors that enable children as agents of change.

Chapter 4. Paper 2: Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan

This paper outlines and explains the different stages of development of a participatory household preparedness planning tool. The methodological steps of tool development, evaluation, research locations, and participants are described.

Chapter 5. Paper 3: Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan

This paper documents the experience of the use of a participatory household preparedness planning tool in Jakarta. Results from pre and post surveys are analysed to measure the effectiveness of the tool

Chapter 6. Content Analysis of Household Preparedness Plans in Jakarta, Indonesia

This chapter assess the content of the household preparedness plans that have been developed by families in Jakarta. The results have informed the preferred method of people in Jakarta for disaster preparedness.

Chapter 7. Paper 4: Building Disaster Resilience Together as a Family

This paper outlines the perspectives of families in developing household preparedness plan together. The paper also explains the use of family group interviews in assessing the effectiveness of a child-centred initiatives. This method is relatively new to be applied in disaster-related studies.

Chapter 8. Scaling up and replicability: Results from replication of a child-centered disaster preparedness tool in Bandung, Indonesia

This chapter document the testing of replicability of the household preparedness planning process in areas outside Jakarta with similar hazard. Aspect of sustainability and replicability are discussed and updates regarding the real-world application of the preparedness tool are also provided

Chapter 9. Discussion and conclusions

The overall research findings are discussed in relation to the conceptual framework and literature reviewed in the systematic review paper. The thesis concludes with a discussion on the role of children as agents of change in building resilience in their community and the prospects for future research

Figure 1. Thesis Outline

Chapter two, in the form of a paper, discusses progresses to date on the implementation of DRR education in Indonesia. The paper bridges this PhD thesis with research carried out for my MRes study that was completed in 2015. The paper documents a workshop held in Jakarta in 2015 that explored the barriers and challenges of DRR education in Indonesia and invited key stakeholders of DRR education in Indonesia – representatives from government, non-government, private sector, and research institutions. The paper also highlights significant changes that have occurred regarding policy and practice in Indonesia and research priorities since 2015. The paper has influenced the research questions for this thesis and provides the policy background in terms of DRR education in Indonesia.

Chapter Three is a literature review in relation to three main areas that drive this research: a) children's vulnerability, b) implementation of DRR involving children, and c) children as agents of change. Each area of research is described in separate sections. The review starts with a description of disaster trends and their impact on children. The review then outlines children's active participation in their communities by depicting previous examples of children's participation in DRR, followed by practices from other sectors. Subsequently, the factors that influence children's participation are explained. In the last section, two examples of children's activism in recent years are explored and conclusions are drawn that influence the later stages of the research.

Chapter Four is a paper describing the methodological approach utilised in the thesis. Firstly, it explains the different stages of development of a participatory household preparedness planning tool. The latest literature on participatory tools are discussed and referenced. This chapter documents the process in developing the household preparedness tool using a participatory approach involving children and their parents as well as DRR education practitioners.

Chapter Five, Six, and Seven outline the results from pilot-testing of the tool in three schools in Jakarta, Indonesia. Chapter Five describes the analysis from quantitative methods (using pre and post-implementation questionnaires). Chapter Six outlines the preferred actions that families in Jakarta selected as part of their household preparedness plans. The actions listed in their posters are then compared against the guidelines available in the accompanying booklet. Several actions that are not listed in the booklet are identified and thus the results form a database on preferred actions before, during, and after flooding for people in Jakarta.

Chapter Seven is a paper exploring the use of family group interviews in assessing the effectiveness of the child-centred household preparedness planning process. The paper argues that family group interviews can be an effective tool to capture knowledge, practices, and perspectives of a family as a unit and test the efficacy of the tool. It also describes the strength in using this method to gain a deeper understanding of the dynamics of a family and the role of each member of the household, including the different perspectives of children and adults in assessing disaster risk.

Chapter Eight presents the results from the replication and testing of the tool in Bandung, Indonesia, including the findings from pre- and post-implementation surveys. Participant observation and informal interviews are added to complement the analysis. This paper explores the barriers and opportunities for sustainability and replicability. Challenges in scaling up (focusing on limited access to electricity, good internet connection, as well as access to knowledge and information) is outlined. A review of experiences from other thematic areas outside disaster management, including agriculture, microfinance, and public health, is provided to contextualise the analysis and draw learnings. In the last section, updates are provided regarding the real-world application of the household preparedness tool used in Indonesia.

In chapter Nine, the overall research findings are discussed in relation to the conceptual framework and literature reviewed in Chapter 3. The thesis concludes with a discussion on the role of children as agents of change in building resilience in their communities and the important role of parents/caregivers in the CCDRR process. The prospects for future research are also outlined.

4. Timeline of Research

This research uses various methods in collecting data with a range of DRR education stakeholders. Figure 2 outlines the steps that have been undertaken for the research.

The research began with a workshop in December 2015 to present the findings from previous research (MRes) to key stakeholders / Amri (2015). The aims and research questions for this PhD were discussed and refined at the workshop. Following the workshop, a period of literature reviews and further consultation was conducted. Data collection was undertaken in three schools using pre and post-test questionnaires (March – May 2016) and family group interviews (August 2016). After data collection was completed in 2016, the research continued with a study in a different location to test its replicability. The replication study utilised pre

and post-test questionnaires to assess the effectiveness of the intervention. The data collection ends with an online questionnaire with DRR education stakeholders to assess the use of research-based evidence and to examine factors that may facilitate or impede such use. The online questionnaire participants were those who had attended the December 2015 workshop.
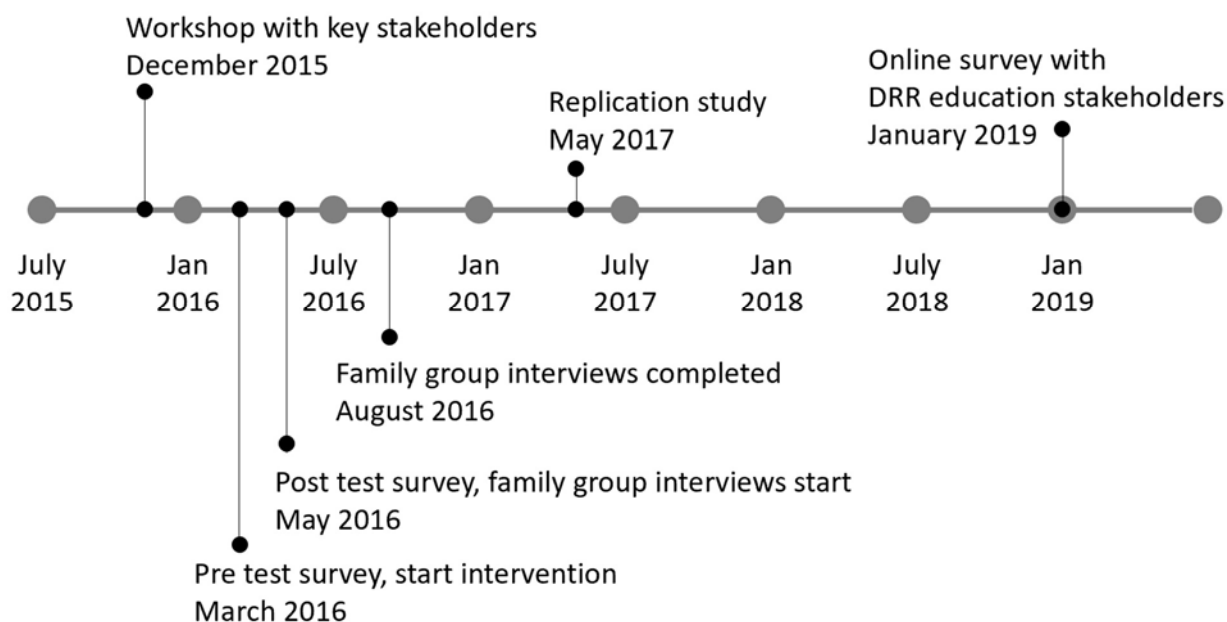
Figure 2. Research Timeline

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Link to Paper 1 (Chapter 2)

Chapter 1 provided an overview of my research and outlined the aims and rationale of the study. Chapter 1 also provided background of the research and reveals the importance of evidence-based decision-making in DRR and collaboration between researchers, practitioners, and policymakers on DRR education, especially in developing countries such as Indonesia. Chapter 2 (Paper 1) documents progresses to date on the implementation of DRR education in Indonesia and demonstrated that sharing research findings, developing joint action plans, creating continuous partnerships between researchers-practitioners and policymakers, and making decisions based on robust scientific research are helpful and effective.

The key contribution of this chapter is that it connects my previous Master's research regarding DRR education in Indonesia with the current PhD thesis. The Amri et al., (2017) study identified seven key issues and nine recommendations for scaling-up DRR education in Indonesia. The findings from this study were presented in a one-day workshop inviting key stakeholders of DRR education in Indonesia, including relevant government agencies, leading NGOs on DRR education, private sector organisations, and universities. The workshop has influenced the research questions for this thesis, fostered relationships with local government authorities and DRR education stakeholders that supported the research and documents the policy background in terms of DRR education in Indonesia.

Paper 1 is planned to be submitted to *Progress in Disaster Science*, an international journal that focuses on integrating research and policy in disaster research.

Chapter 2

Paper 1: Disaster risk reduction education policies and practices in Indonesia: Bridging the research-policy gaps

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1. Abstract

The global framework for Disaster Risk Reduction (DRR) highlights the importance of collaboration between researchers, practitioners, and policy makers to ensure policy is evidence-based. Unfortunately, such collaborations have been limited, including within the area of DRR education. In Indonesia, there has been significant progress in DRR education policy, however, this advancement has not always been based on the best available evidence and research. This paper documents efforts to bridge research and practice on DRR education in Indonesia. Key stakeholders from government departments responsible for education and disasters, along with NGOs, academics and two teachers were invited to a one-day forum in December 2015 where the latest research on DRR education in Indonesia was presented. Small group discussions were facilitated where participants were encouraged to discuss the research presented, outline their priorities for action, and the barriers and facilitating factors to the uptake and utilisation of the research. Qualitative data was collected and analysed thematically. Following this workshop, documentary analysis, unstructured interviews, and participant observation mapped the progress in Indonesian DRR education policy and practice between January 2016 and December 2018. An online survey was conducted in January 2019 to assess the use of research-based evidence. The research demonstrates that making decisions based on robust scientific evidence has proven to be helpful and effective. In particular, building inclusive relationships, developing a joint action plan, and the presence of facilitators in advocacy roles are key factors in bridging the research-practice gap. The paper concludes with additional recommendations to increase the effectiveness and speed of current progress on DRR education in schools.

Keywords: Bridging research and practice, disaster risk reduction, education, policy, implementation

2. Introduction

The latest global framework on disaster risk reduction explicitly describes the importance of collaboration between researchers, practitioners, and policy makers (UNISDR, 2015). In particular, the framework emphasises the need for policy and practice to be based on sound and rigorous research,

with close collaboration between partners the key to ensuring evidence-based science meets the needs of practitioners (UNISDR, 2015b).

A long-term partnership between researchers and practitioners has been shown to develop innovative and well-documented interventions. An example is the Children in a Changing Climate Coalition that promotes children's participation in DRR. The coalition has produced toolkits, publications and academic papers (e.g. Plush, 2009; Plan International, 2010a; Seballos et al., 2011; Haynes et al., 2015). Furthermore, the coalition has developed advocacy tools that have influenced policies and practices related to children's participation in DRR at the global, regional, and country level (Back et al., 2009; Children in a Changing Climate, 2011; UNISDR et al., 2012). Following on from this, the coalition members formed a larger alliance, the Global Alliance for Disaster Risk Reduction & Resilience in the Education Sector (GADRRRES) and produced the Comprehensive School Safety (CSS) Framework (GADRRRES et al., 2017). The CSS framework is endorsed by many child-centred organisations as a guiding document providing a comprehensive approach for school safety that uses a child-centred approach and encompasses three components: safe learning facilities, school disaster management, and risk reduction and resilience education (GADRRRES et al., 2017). At the regional level, the framework was advocated and later endorsed by the Association of Southeast Asia Nations or ASEAN (2016) and in Indonesia, the CSS Framework was also adopted by the government (MOEC et al., 2015a).

Another example of cooperation between researchers and practitioners is the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC) in Australia. The research centre is a collaboration between government and universities, to ensure researchers and emergency management end-users (from government and non-government institutions) work together on all stages of disaster management from prevention and mitigation, preparedness and response, and also recovery (BNHCRC, 2017). In this partnership scheme, there are approximately 30 end-user organisations (as practitioners) and 20 research institutions with over 200 researchers are involved. The research centre manages various levels of collaboration between end-users and researchers from the problem definition stage through to utilisation and research use (Table 1).

Table 1. Levels of collaboration and responsibility for end-users, researchers and BNHCRC management, reproduced from Thornton (2018)

	End Users	Researchers	BNHCRC Management
Problem definition	High		Low
Research questions	Medium	Medium	Low
Research definition	Low	Medium	Low
Contracting		Medium	Medium
Research	Medium	High	
Communications	Low	Low	High
Publications		High	Low
Utilisation planning	High	Medium	High
Research use	High		Low

Importantly, as shown in Table 1 researchers are not involved in the problem definition stage and have equal responsibility with end-users to determine the research questions. This ensures all research funded through the CRC meets the needs of the end-users. In addition, the CRC also ensures through regular workshops, conferences and reporting that end-users remain central during the actual research process.

Due to the collaborative approach of the BNHCRC there have been many improvements in policy and practice particularly in DRR education. Close partnership between researchers and end-users has led to the increased effectiveness of DRR education for children on bushfire risk and the development of an evidence-based implementation framework (Towers, 2015b; Towers et al., 2016). However, to date, there has been little evidence of such collaboration elsewhere, particularly in developing countries, including Indonesia (Amri, 2015; Amri, Bird, et al., 2017).

This lack of collaboration between policy makers, academics and practitioners in the DRR education field is unfortunate as Indonesia has been designated as a model country that advances DRR education agenda and become one of the safe school leaders (UNISDR, 2014b). In Indonesia, approximately 47 institutions are working in this field however, only three are universities or research institutions (MOEC et al., 2017b). This is not due to a lack of expertise in Indonesia, well demonstrated by the fact that there are 46 universities with research interests in disaster-related studies, with 53 disaster research centres offering 25 disaster related courses (Pribadi et al., 2016). What this indicates is a disconnect between DRR researchers and those working within the field of DRR education.

The lack of collaboration between researchers and practitioners in Indonesia is a serious concern, especially as most education facilities in Indonesia are highly vulnerable to hazard impacts. As of February 2019, there were 498.729 education institutions (kindergartens, primary and secondary schools, and vocational schools) in Indonesia (MOEC, 2019). However, based on the mapping completed by the Ministry of Education and Culture (MOEC) and the National Disaster Management Authority (NDMA or commonly known as BNPB), there are almost 40,000 schools located in highly disaster prone areas (MOEC, 2017c). Disaster impacts to education infrastructure in Indonesia has been devastating. Between 2004 to 2018, nine major disasters occurred in Indonesia -including the 2018 Central Sulawesi Earthquake and Tsunami and 2018 Lombok Earthquakes- with more than 13,000 schools either completely destroyed or heavily damaged due to tsunami, earthquakes, and floods (MOEC et al., 2017a). The disruption to education was also significant, for example the 2015 forest fires and haze disaster alone impacted over 24,000 schools that were forced to close for up to two months affecting almost 4.7 million students and 317,579 teachers (MOEC, 2015a).

In response to the level of risk, the Government of Indonesia made DRR in the education sector one of the priorities in disaster management programming in 2012 (MOEC, 2015b; BNPB, 2016a, 2016b; Bisri et al., 2017). However, this program is still being implemented in just a small number of schools with

programs based on little evidence, limited sustainability and an absence of a scaling up strategy (Amri, Bird, et al., 2017). From 2015 to 2017, the Government of Indonesia supported less than 600 schools by providing training for the school teachers and children, developing Standard Operating Procedures (SOPs), and funding to procure emergency-related equipment (MOEC, 2017b). This is just a fraction of the total schools in Indonesia. Looking at these facts, greater collaboration between researcher, policy makers, and practitioners is needed to improve the implementation of policies and programs in ensuring schools are safe from all kinds of hazards.

To discuss DRR education policy and research in Indonesia that is a collaborative effort between academics, policy makers and practitioners, the lead author interacted with key stakeholders of DRR education in three stages. The first stage was a workshop, facilitated by the lead author, with key stakeholders of DRR education in Indonesia. The aim of the workshop was to present the latest research on DRR education in Indonesia and discuss how this could be applied to future DRR education policy, practice, and research within Indonesia. The workshop was co-organised with a Non-Governmental Organisation (NGO), Plan International, a leading agency in promoting DRR education in Indonesia and the founder and board member of the Consortium for Disaster Education (CDE)[1].

The second stage was the regular interactions between the lead authors and stakeholders of DRR education in Indonesia from December 2015 to November 2018, with the aim to foster relationships and encourage key stakeholders to integrate evidence of DRR education research into relevant policies and practices. These interactions included workshops, training sessions, and informal meetings taken with the MOEC, the NDMA, local government institutions, and NGOs.

The third stage is the reflections on the progress of research, policies, and practices related to DRR education in Indonesia. An online survey on the use of research for DRR education policies and practices was conducted in January 2019 (please see Figure 2. Research Timeline). The survey was designed to assess the perspectives, concerns, and ideas of researchers, policymakers, and practitioners on the use of research for improving the quality of DRR implementation in the education sector.

This paper begins with a brief overview of factors driving policy changes through evidence-based research. The following sections describe the methodology and process of the workshop and the lead author's interactions with key stakeholders of DRR education. Afterward, the discussion section deliberates and documents how policy and practice have progressed in the three years since the workshop, including the successes and challenges that were faced.

Previously, there has been a lack of published studies on the interactions of researchers in influencing policies and practices, particularly in the DRR field. Therefore, the overall aim of this paper is to

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[1] The Consortium for Disaster Education is an influential network of DRR education practitioners, government agencies, and research institutions.

facilitate discussions that strengthen the use of evidence-based research to improve the implementation of DRR education.

3. Bridging the research and policy gaps

Linking evidence-based research and policy advocacy has been a growing area of interest in the last forty years, particularly in development studies, according to Start et al. (2004). This also includes the topic of disaster risk reduction (see Gaillard et al., 2013; Calkins, 2015; Aitsi-Selmi et al., 2016). The process in influencing policy through evidence-based research is "*complex, multi-factoral, non-linear, and highly context specific*" (Young et al., 2009). Therefore, influencing policies for the same issues in two different locations may require two different strategies, processes and timelines.

Past studies have indicated that there are at least four key factors at play to drive successful policy advocacy. First, a good understanding of the policy environment is needed. This includes knowing the perspectives, behaviours, and priorities of the policy makers (Rayner, 2003; S. Jones et al., 2014).

Second, the ability of researchers in delivering timely, credible, and trustworthy research, that provides actionable and reasonable recommendations (Young et al., 2009; Bennett et al., 2011). Research reports are often not written with policy makers in mind and important messages and recommendations may be lost if an agency relies on scientific reports only (Young et al., 2009). Hence, a skilful facilitator is often useful in translating the science into policy relevance, essentially building a bridge between policy makers and researchers and providing effective risk communication (Haynes, 2005; Haynes et al., 2008; Young et al., 2009; Bird et al., 2010). An example of this comes from the area of climate science where communicating climate risks is fundamentally important to enable public and policy engagement (Susanne C. Moser, 2010; Susanne C Moser et al., 2011).

A deep understanding of the context and power dynamics is essential for the facilitator to ensure successful engagement (Start et al., 2004; Young et al., 2009). Therefore, and lastly, fostering the productive relationships between key stakeholders is imperative (S. Jones et al., 2014). This can be conducted through close personal contact with policy makers and identifying actors that are not interested or could potentially create obstacles (Bennett et al., 2011). For example, some corporations have interests in supporting business activities that may enhance disaster or climate risks and thus may create obstacles for a pro-climate policy, however this can be mitigated by public pressure or convincing their shareholders (Clark et al., 2012). It is also beneficial to look for powerful actors who are sympathetic to the case and who can influence the policy makers (Young et al., 2009).

4. Methods

4. 1. Workshop with key stakeholders of DRR education

A one-day workshop was organised in Jakarta in mid-December 2015 by the lead author. A total of 53 participants attended the workshop, consisting of 21 females and 32 males. This included 33 NGO staff,

eight government officials, five people from corporates/ businesses, three donor agency representatives, two school teachers, and one academic. Participants were invited through an Indonesian-based disaster mailing list[2] and the network of CDE as well as targeted invitations based on consultation among DRR education practitioners. All participants had interests and/ or were working in DRR programming in the education sector.

Data from the workshop was collected utilising focus groups, with groups randomly divided to discuss the key issues. This approach was considered the most appropriate method to investigate the issues in detail with a large group of people (Kitzinger, 1995; Parker et al., 2006). The workshop was moderated by the lead author with support from Plan International staff who were tasked with note taking and photographing proceedings.

The workshop introduction included a description regarding its purpose, that the process was being documented for research purposes and all ethical considerations concerning how data would be used. Participants were told that they could leave at any time without consequence and all data collected would remain anonymous, as per the ethics agreement approved by Macquarie University Human Research Ethics Committee.

The workshop was divided into two parts. Part one covered the presentation of the latest research findings exploring the implementation of DRR education in Indonesia, specifically focusing on key challenges and recommendations. The first presentation covered results from Amri et al., (2017), which was conducted from November 2014 to January 2015 and investigated the sustainability and scaling-up challenges on DRR education in Indonesia. A multi informant, mixed method sequential approach was used in that study focusing on three groups: school personnel, NGOs working on Child-Centred DRR (CCDRR), and school children, using questionnaires and focus group discussions. The study identified seven key issues and nine recommendations (Table 2).

The second presentation was by Plan International who presented research they had conducted to assess vulnerability and risks in Jakarta schools. The Plan study involved questionnaires with 720 teachers and 2,160 students in 360 primary schools in Jakarta. The data collected included knowledge of risks, disaster preparedness, survival skills, risk reduction behaviour, and access to information and education (Plan International, 2015a).

Survey data was collected between October to December 2015. The initial findings demonstrated that: 1) students and teachers have low knowledge of risks and skills for survival; 2) the majority of respondents (teachers and students) learned about disasters from television and fellow teachers/ school principals, 3) partnerships between school and local education office and disaster management

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[2] The Indonesian-based disaster mailing list (https://groups.google.com/forum/#!forum/bencana) has over 5,000 subscribers (as of November 2017) and the most active communication platform related to disasters in Indonesia.

authorities are needed, and that 4) further advocacy efforts are needed to ensure schools are provided with support for their DRR program. These findings are in line and reinforce the issues identified by the (Amri, 2015), particularly on issues related to policy (see Table 2).

Table 2. Key issues and recommendations for scaling-up DRR education in Indonesia (Amri, 2015; Amri, Bird, et al., 2017)

Key Issues	Proposed Recommendations
1. **Weak policy implementation on DRR education in Indonesia**	1. Raise awareness of policies related to DRR education 2. Include DRR aspects in the school monitoring process
2. **Limited awareness of and access to DRR education materials**	3. An online knowledge hub as a repository of educational resources 4. Development of standardised key messages for DRR
3. **Lack of teachers' capacity**	5. DRR education training should be integrated into higher education programs 6. The use of e-learning and computer-based training
4. **Absence of partnerships between schools and other stakeholders**	7. Joint activities to enhance preparedness should be fostered 8. Schools should also be part of the local DRR forum.
5. **No platform for teachers**	9. A live and online discussion platform 10. A competition at the national level
6. **Limited dedicated personnel and budget**	11. Obtain additional funding from the village funds[3]
7. **Low children's participation in DRR**	12. aware on the benefits of children's participation in DRR

Following this, five panellists were invited to present their feedback and comments related to the presentations. Each panellist took around 5 to 10 minutes to deliver their response. The five panellists were chosen as key stakeholders in DRR education in Indonesia, including:

a) Safe School Secretariat (from Ministry of Education and Culture or MOEC)
b) Provincial Disaster Management Agency (DMA) of DKI Jakarta
c) Provincial Education Office of DKI Jakarta
d) Consortium for Disaster Education (representing NGOs network)
e) A school representative that participated in the research

The panellists were informed beforehand that they would be requested to provide an official response on the research and had been provided with the original research reports and publications prior to the workshop. Workshop participants were then divided into four focus groups and were given the following questions to guide discussions:

1) Are the recommendations relevant? Can the recommendations be implemented? Is there any recommendation that was missed? And why should this missed recommendation be relevant?
2) Which recommendations need to be prioritised? And why?

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[3] A village fund is funding received from the state budget that is managed and supervised by village officials as the lowest administration level in Indonesia. There are more than 82,000 villages in Indonesia with variety of population and area sizes (BPS-Statistics Indonesia, 2017).

3) How can these recommendations be implemented? Which institution needs to lead? And who needs to be involved?
4) What resources (people, funding, policies) are required?
5) How long will it take? What is the timeline for implementation?

Participants were given an hour to discuss these issues and then present their discussion results back to the group.

The final session at the workshop covered future research ideas as well as future DRR education policy. A presentation by the lead author described the development of a household preparedness plan as a school assignment to scale-up disaster preparedness measures through school-based intervention. After the presentation, a final session for open discussion was provided to gather participants' comments, views, and perspectives regarding the plan for future research. The discussion session took approximately one hour.

The notes from the focus group discussion and plenary sessions were analysed through thematic analysis according to the key issues and recommendations that were identified by Amri et al., (2017).

4. 2. Fostering and maintaining relationships and influencing change

Following the workshop, the lead author recorded the progress of DRR education in Indonesia through participant observation, unstructured interviews with relevant stakeholders and a review of government and NGO documents. Participant observation is a qualitative method of social investigation, which involves the researcher participating in the everyday life of a social setting, actively looking, conducting informal interviews, and learning about the activities of the people under study in the natural setting (Coffey, 2006; DeWalt et al., 2011). Informal interviews were used as it assists in enabling a relaxed and honest conversation between peers as well as building trust and rapport (J. M. Johnson, 2001; Kvale, 2007; J. M. Johnson et al., 2012). The lead author was regularly involved in initiatives related to DRR in the education sector and has provided technical advice to the MOEC as well as the CDE. Approximately twenty-five meetings (i.e. workshops, training sessions or forums) were attended after the workshop (in mid-December 2015) until December 2018, where participant observation and informal interviews took place. Eleven of the meetings are considered has significant importance (Table 3).

These key meetings provided opportunities to advise on strategic decisions, including the development of a road map for DRR in the education sector, establishment of the National Secretariat (and development of its work plan), drafting of guidelines for education in emergencies, and drafting a ministerial regulation (MOEC, 2015b, 2017d, 2017e, 2018).

4. 3. Reflections on the collaboration between research, policy, and practice nexus

Three years after the workshop, an online survey was conducted in January 2019 with 29 key stakeholders of DRR education in Indonesia, consisting of officials from MOEC, NDMA, and key non-government organisations. The online survey was designed to assess the use of research-based evidence and examine factors that may facilitate or impede such use.

Table 3. List of key events participated in relation to DRR education in Indonesia

No.	Event	Date and Place	Purpose of The Event	Participants
1	Training on DRR education for Education Officials at Provincial level	Yogyakarta, Indonesia March and May 2016	Training related to DRR in schools	Education officials at the sub-national level
3	Meeting on Development of Technical Guidance on DRR in Schools	Jakarta, Indonesia 26 May 2016	Synchronising technical guidelines between MOEC and NDMA	MOEC, NDMA, UNICEF, CDE members
4	Workshop on Road Map for Safe Schools in Indonesia 2016-2019	Bali, Indonesia 1-4 June 2016	Revisiting road map for Safe Schools in Indonesia 2016-2019	MOEC, NDMA, UNICEF, CDE members
5	Finalising Road Map for Safe Schools in Indonesia 2016-2019	Jakarta, Indonesia, 23 June 2016	Finalising the Safe Schools road map	MOEC, UNICEF, CDE members
6	Technical assistant on the Ministerial Decree for the National Secretariat	Jakarta, Indonesia September 2016	Providing input for the draft decree on the establishment of the national secretariat	MOEC, UNICEF, selected DRR education stakeholders
7	Training on Education in Emergencies for Education Officials at Provincial level	Yogyakarta, Indonesia 15-18 March 2017	Training on Education in Emergencies	Education officials at the sub-national level
8	Meeting on monitoring parameters for Safe Schools in Education Monitoring Information System (EMIS)	Jakarta, Indonesia 18 May 2017	Identifying monitoring parameters to be inserted in the EMIS	National Secretariat members
9	Development of App-based for School on Tsunami Preparedness Assessment	Jakarta, Indonesia September 2017 – August 2018	Development of application to assess tsunami preparedness in schools	UNDP, UNICEF, UNESCO, MOEC, tsunami researchers
10	Workshop on Finalisation of Lessons Learnt on Safe Schools	Bandung, Indonesia 5-7 October 2017	Writing Lessons Learnt on Safe Schools in Indonesia	MOEC, NDMA, UNICEF, Plan International, Save the Children,
11	Workshops on Drafting of Ministerial Regulation on Safe Schools	Jakarta, Indonesia November to December 2017	Drafting Ministerial Regulations on Safe Schools	MOEC, NDMA, UNICEF, CDE Members

Questions related to the relationship between research, policy and practices were explored, including issues related research on DRR in the education sector in Indonesia (i.e. quantity, quality, relevance,

applicability, and influence) as well as the level of collaboration between stakeholders. At the end of the survey, participants were asked to suggest ideas for future research agendas.

Survey participants were recruited based on the participants of the December 2015 workshop, who are representatives from the central government, local government, NGOs, and academia.

Overall, 29 respondents participated in the survey (15 of whom are female). Respondents were between 22 and 54 years old, with an average age of 40 (M=39, St.Dev=7.77). The majority of respondents were local NGOs (38%), government agencies (34%), and followed by universities (14%). Most respondents were practitioners or policy makers (59%) and researchers (21%). Almost all respondents (93%) have a graduate or post-graduate degree and have received some DRR training.

5. Results

This section is divided based on the key issues identified by Amri, Bird, et al. (2017) and further supported by the findings from Plan International (2015a). Priority issues are listed first, and consist of teachers' capacity, awareness of and access to DRR education materials, policy on DRR education in Indonesia, and dedicated personnel and budget.

Within each of these sub-sections, a brief description regarding the key issues is given followed by an outline of related responses from the participants during the workshop. Specific comments from the participants relevant to the issues are provided as quotes. This is followed by a detailed account of the progress that has occurred up to November 2018.

The final section of the results details the online survey results.

5. 1. Teachers' capacity

There is high demand and need for capacity building for teachers on DRR education. Recognising the large numbers, Amri, Bird, et al. (2017) recommended that DRR education be integrated in teacher's professional development programs, and the use of e-learning and/ or computer-based training. The MOEC responded positively stating:

> "(the idea of) online learning can be inserted, (because) right now there is a
> program for online secondary schools from Grade 7 to 12... even though they will
> need simulation (practice), it can also be that (we use) videos for simulation
> through online"

However, this idea drew criticism from a CDE representative who highlighted that people on the Indonesian side of the Island of Kalimantan have easier access to education from neighbouring Malaysia, compared to receiving it from Indonesian programs. These schools, like many in Indonesia are in isolated areas and have no access to internet or electricity, therefore e-learning and computer-based training is not practical.

The focus group discussions highlighted that an online learning platform already exists and is managed by the MOEC where anyone, including teachers can access and learn. DRR content was not available on this learning platform at the time of the workshop, however, participants discussed that DRR material should be added by the MOEC soon. The MOEC welcomed the suggestion. Furthermore, the group raised the point that *"Teachers should be certified ready to teach (and understand) DRR aspects"- an area that is not yet regulated.*

Progress to date: In mid-2018, the lead author was providing technical advice for United Nations Children's Fund (UNICEF) and other child-focused NGOs to develop an e-learning module on DRR using the MOEC's existing learning platform, "*Rumah Belajar*". Through this online learning platform, it is expected that teachers and other education personnel will be able to access free and self-learning training modules related to the basics of disaster management in schools. A certificate of completion can be generated and provides incentives for teachers and other education personnel, as this certificate can contribute towards promotion assessments. The idea is inspired from an e-learning module that was successfully implemented in Turkey, evaluated by Petal et al. (2012).

Since 2015, the MOEC started to allocate budget to conduct conventional training for teachers and other education personnel on DRR in schools. This type of training is another option to reach education personnel who do not have access to the e-learning tool. Between 2016 and 2018, more than 20 DRR-related training sessions have been organised by the MOEC and NDMA involving at least 1,000 participants, consisting of local education officials, school principals, teachers, and other education personnel. Unfortunately, there has never been an evaluation of the effectiveness of the training. There has also been no progress on the issue of inserting a DRR education subject into the higher education program.

5. 2. Awareness of and access to DRR education materials

Amri, Bird, et al. (2017) highlighted that there are already many education materials on DRR however, there remains a lack of access and awareness. Furthermore, there is no consistent key messaging across the various materials published by many different agencies. Therefore, the recommendation was to establish an online knowledge hub and to develop standardised key messages for DRR.

The workshop participants did not comment directly on the online knowledge hub as participants were aware that this issue was going to be addressed with a new dedicated website that will serve as a repository. However, participants agreed that standardised messages were important. The MOEC indicated that standardised messages were needed however, he also noted that at the local level, these messages may need to be adjusted based on the local context and situation, as stated,

> *"I agree that there is a need to have standardised key messages and therefore we*
> *need to discuss more often (regarding this), even though this cannot be*

prescriptive ... for example, like a dictionary for people with disabilities, every

community has their own styles and languages"

For example, there was a popular guidance that if you felt shaking for more than 20 seconds, you only have 20 minutes to evacuate to a safe place and you should run to a location of more than 20 meters in height (Nugroho, 2018). This is called the 20-20-20 rule. However, there are many places in Indonesia where this rule does not apply. The recent Sulawesi Earthquake and Tsunami in 2018 was evidence where the tsunami struck in less than 15 minutes (Lassa, 2018).

The DMA of Jakarta and Jakarta's education office also agreed that knowledge on DRR is very important and this requires training and the preparation of standardised key messages.

Progress to date: In October 2016, the MOEC, with the support from the UNICEF, launched a new website dedicated to Safe Schools (http://smab.kemdikbud.go.id). The website provides news and information related to DRR programs in schools, including a repository of Information, Education, and Communication (IEC) materials produced by various agencies (government and non-government). These materials consist of policies and regulations, guidelines, manuals for teachers, videos, and campaign materials. Currently, the website is frequently updated, particularly with updates on the on-going disaster response operations in the education sector. The website appears to be designed for safe school facilitators and teachers. One thing that is still lacking is for the website to be child-friendly where children can learn more about safe schools.

The MOEC, with the support from UNICEF and other NGOs, has also produced two publications related to safe schools, as an effort to standardise DRR programming in schools. The first publication was released just after the workshop, which is a three-series module developed by MOEC with the support from UNICEF. The module consists of: a) safe school facilities; b) school disaster management; and c) disaster risks reduction and prevention education (MOEC et al., 2015c, 2015b, 2015a). The three documents correspond to the global framework on CSS developed by GADRRRES et al. (2015), as described earlier at the beginning of this paper.

The second publication is a technical guideline on Safe Schools (2016), in collaboration with the NDMA. This guideline is also being used for facilitators to support schools that receives grant funding for DRR program implementation.

However, the process above still dominated by the collaboration between government and NGOs and lacking the involvement of academics. Many research institutions in Indonesia should be able to contribute to improving the quality of the publications as well as the materials in the website to ensure that the education material is supported by robust research and credible sources.

5. 3. Policy on DRR education in Indonesia

The research presented at the workshop identified that many school personnel were not aware that there are policies related to the integration of DRR in the education sector. In addition, the enforcement of policies was weak and were not monitored. This issue was also emphasised in the workshop by a representative from CDE who stated that the existing policies were not enough for the teachers to integrate DRR and required official enforcement.

Furthermore, the DMA of Jakarta also mentioned that,

> "There is a frequent turnover of staff. Thus, it is often that we must start from scratch (on advocacy efforts) …"

In order to improve this the DMA of Jakarta is currently trying to pass a regulation that for every building with over 500 people, it is mandatory to do a disaster simulation at least once a year, including schools.

On another issue, related to the school monitoring system, the MOEC agreed with the recommendation to monitor implementations of DRR education in Indonesia by integrating DRR aspects into the regular Education Monitoring Information System (EMIS), and stated that the ministry intended to:

> "… (The MOEC) will develop tools, instrument, and monitoring to the schools directly".

However, the results from the focus group discussion demonstrated that although the recommendation was relevant it couldn't be implemented yet as the school supervisors –who monitor the education quality in each school- have limited awareness and understanding on DRR in schools and their monitoring tools do not yet incorporate DRR aspects.

Many workshop participants agree with the MOEC's ideas, however participants also expressed that the existing policies and regulations were too weak to advocate for change in the EMIS. Nevertheless, this is expected to change, as the staff of Safe School Secretariat stating:

> "we are advocating for a new Ministerial Regulation (on Safe School), so when this is issued, we will have enough grounds to talk to the Centre of Data and Statistics of MOEC to insert DRR parameters into the EMIS"

At the time of the workshop, the only policy in MOEC related to integration of DRR in the education sector is a 2010's circular letter from the Minister of Education to recommend that all heads of local government implement DRR in schools. This circular letter only serves as a recommendation and is not legally binding.

Progress to date: In Jakarta, the then-Governor signed a declaration in January 2016 as a commitment for the Jakarta province to ensure all 5,000 schools in Jakarta are safe from disasters by 2019 and it was backed by NGOs (Antara, 2016). In addition, a Governor Regulation was signed that instructs schools to provide ten key components related to DRR[4] as well as a mandatory disaster management system for buildings that host more than 500 people, including schools (Pemerintah Provinsi DKI Jakarta, 2016b, 2016a). However, based on informal interviews, the safe school program in Jakarta lacks a strategy for scaling-up to achieve the 5,000 schools target, progress in 2017 only covered 50 schools, with funding provided mainly for campaign and awareness raising purposes. Notably there was a one-day campaign in January 2017 involving 10,000 school children to raise awareness of the importance of safe schools (Berita Jakarta, 2017). Other than that, there was no significant funding, action or policy change and the program is already dwindling as the then-Governor lost the re-election bid in mid-2017. Under the new Governor, inaugurated in October 2017, the future of the safe-schools program in Jakarta remains uncertain with little progress in 2018.

At the national level, the outlook is more promising. In May 2017, the MOEC issued a decree on the establishment of the National Secretariat of Safe Schools. In the past, this secretariat has been managed by different agencies and without proper legal framework, however, with this decree, there is a stronger legal framework signed by the Minister himself (MOEC, 2017d). The secretariat consists of key heads of divisions within the MOEC, including directorates that oversee: 1) basic and secondary education; 2) early childhood education; 3) teachers and other education personnel; 4) special education and special services; 5) public relations; and 6) program planning and budgeting.

This approach in forming a joint secretariat has also been replicated and adapted at the local level (provincial and districts), where key agencies such as the district disaster management authority and the district education office formed Secretariat of Safe Schools, along with NGOs and universities that have the same interests. A recent study by Plan International (2018) shows that this type of arrangement is useful for coordinating funding allocation for safe schools, agreeing on who is doing what and where, and for joint advocacy.

In August 2017, the CDE organised the National Conference on Disaster Education which resulted in the Magelang Declaration which includes a call for the MOEC to issue a Ministerial Regulation that specifically regulates the implementation of DRR in the education sector. There was also a call for greater collaboration with other relevant ministries including the Ministry of Religious Affairs (or MORA, that oversee the religious schools), and the Ministry of Research and Higher Education (or

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[4] The ten components are: 1) school's risk map; 2) standard operating procedures on disaster management; 3) action plan; 4) a school disaster preparedness team; 5) learning materials related to floods, earthquakes, fire, and strong winds available and educated; 6) provision of safety equipment and facilities; 7) presence of school teachers with adequate capacity for disaster management; 8) school drill at least once a year; 9) monitoring and evaluation conducted; 10) campaign and awareness raising about safe school for all school community.

MRHE, that oversees universities and higher degree education institutions), as documented in MOEC (2017b). It is also worth noting that the Minister himself read the declaration, which is uncommon.

The conference along with the consistent efforts of agencies were welcomed by the MOEC, in September 2017, the MOEC commissioned a study to prepare for a Ministerial Regulation related to DRR in the education sector. The study was conducted by CDE and the draft regulation is currently under legal review. It is expected that the regulation will secure support for key DRR activities for schools, especially for schools located in high risk areas, including mandatory school drills, allocation of budget for DRR in schools, provision of safety facilities in schools, establishment of school disaster preparedness teams, and development of standard operating procedures related to disaster management.

Furthermore, DRR parameters to be inserted in the national education monitoring system, where schools are required to report biannually online were submitted in May 2017. The twelve parameters assess the state of preparedness in schools including the allocation of funds for DRR, external institutions that support the schools on DRR, hazard assessment, review of safety equipment and facilities, audit of the safety of school structures, preparedness planning, school drills, and collaboration with Kelurahan (village) related to DRR. The proposal has been submitted to the Education and Culture Statistic Data Centre within the MOEC for their review, however unfortunately there is no progress as of November 2018.

5. 4. Dedicated personnel and budget

The Amri study (2017) argued that budget should not be a significant issue in implementing DRR in schools. However, additional funds may be required for mitigation and capacity building initiatives. Accessing funding from the village council fund is the proposed way to solve this.

During the workshop the MOEC and the Jakarta's education office discussed that there is funding available at the national and municipality level to support DRR program in schools. The MOEC disbursed grant funding to schools as well as the city's education office. Nevertheless, DRR programs in the past did not require large funding for the school, as it involved inviting volunteers/ experts to conduct education session or conducting school drills. Schools are also allowed to build partnership with external agencies, including corporations, to support their DRR programs. One workshop participant who is a DRR practitioner raised,

> *"… many schools requested additional funds to implement DRR programs,*
> *meanwhile a lot of DRR initiatives can be implemented even without a lot of*
> *funding… one that needs to be explored further is the support from outside*
> *government, for example the private sector"*

Progress to date: There has been an increase of interests from the private sector in supporting DRR initiatives in schools. Multi-national companies such as Unilever and Prudential have projects related to DRR in schools in Indonesia (Prudence Foundation, 2013; Indonesia CSR Society, 2016). According to the Regulation of the Ministry of Education no. 19 Year 2007, schools can build partnership with other relevant institutions, including with the private sector. Therefore, collaboration with the private sector is an untapped potential for the school to explore or for the CDE and the National Secretariat to facilitate.

Furthermore, the government of Indonesia has been steadily increasing the budget for grant funding to support DRR implementation in schools. The MOEC and NDMA have been allocating funding and supporting schools since 2012, and then in 2015, both institutions began to implement this in a more coordinated manner (MOEC, 2017b). In 2016, the MOEC disbursed funding to support DRR programming in 59 schools and conducted awareness raising in a further 57 schools. They have also financed 7 NGOs to support the DRR programming in schools in their working areas. The total funding in 2016 was slightly over IDR 7 billion (about US$ 538,000). In 2017, the budget was approximately IDR 4.2 billion (US$ 316,000).

In 2015, the NDMA supported a pilot to develop DRR programming in ten schools in ten districts. The following year, this number increased to 20 schools, and in 2017, 12 schools. Overall, over IDR 32 billion has been spent by the government of Indonesia on safe schools programs, reaching 534 schools as documented by MOEC (2017b). The decrease in 2017 was due to budget cuts that occurred across all ministries due to an economic slowdown, including the MOEC who had to reduce their budget by more than IDR 2 trillion (about € 126 million) (Detik.com, 2017b). Unfortunately, data was not available for the 2018 budget.

Since 2009, the MOEC has adjusted the guideline on the use of school funds, where now they can be used for DRR activities, such as for school drills, capacity building purposes, as well as building retrofitting (MOEC, 2017b). Moreover, the draft Ministerial Regulation is also expected to allow more funds from the government budget for DRR measures.

Local governments can allocate funding for safe schools if there is a policy that allows them to do it. Due to the absence of national level policy, several local governments developed their own policy related to DRR education in school (Plan International, 2018). Only six areas in Indonesia (four districts and two provinces) have specific regulation related to DRR in the education sector (Pemerintah Provinsi DI Yogyakarta, 2010; Pemerintah Kabupaten Sikka, 2013; Pemerintah Kabupaten Rembang, 2014; Pemerintah Kabupaten Klaten, 2016; Pemerintah Provinsi DKI Jakarta, 2016a; Pemerintah Kabupaten Pidie Jaya, 2017). This is a small percentage of the more than 500 districts and municipalities and 34 provinces in Indonesia, where 136 districts and municipalities classified as high and medium risk areas to disasters (BNPB, 2016b).

5. 5. Platform for teachers

One of the key factors that hinders DRR program implementation in schools is the lack of motivation for teachers who are already very busy with routine school work (Amri, Bird, et al. (2017). To address this, it was proposed to have a live and online discussion platform (primarily for teachers) to enable teachers to raise their concerns and receive feedback and motivation from other teachers. Organising a national-level competition related to DRR in schools was also proposed.

The discussion in the focus group supported the need for an online discussion platform (between school personnel, practitioners, and policy makers). They highlighted the forest fire and haze event in 2015, where many schools were closed, and that having a platform such as this would ensure school personnel know what to do to reduce risks and respond in the event of an emergency. However, they also noted that if this platform is to be established, there needs to be human resources dedicated full time to moderate it, funded by the MOEC.

In relation to the national-level competition, the MOEC again responded positively and expressed a strong desire to organise it but felt that they would require a year of preparation before it could be run. As noted by the MOEC official:

> *"Awareness of policies can be done through continuous campaigns. This needs to be triggered, for example in having a competition of safe schools, so that teachers will be motivated to encourage their students"*

Progress to date: The NDMA, in collaboration with the MOEC and MORA, launched a national-level writing competition for students on Safe Schools in July 2017. The competition received some criticism as it was different to the original recommendation that suggested a competition similar to the healthy schools competition that has been implemented for decades, where the winners are schools, and not individual students (Amri, Bird, et al., 2017). Schools were therefore not as receptive to enter and promote the competition as was hoped. In 2018, the competition was run again, but this time at the school level, where schools are encouraged to submit photos and videos regarding their school preparedness measures.

There remains no progress to date on the issue of establishing a live and online discussion platform.

5. 6. Partnerships between schools and other key stakeholders

Collaboration between schools, disaster management authorities and other institutions remains limited and incidental. Recommendations were made to address this by promoting joint activities and for schools to be part of local DRR forums.

The Jakarta's education office echoed this observation,

"The school community cannot be separated, and they cannot be just an object, it is part of a Kelurahan (village), and therefore it needs to have one language in addressing the disaster risks… DRR program in schools should also transform teachers to become campaigner to others"

The teacher from the participating school of the Amri study (2017) also provided examples of good practice. This school was initially supported in DRR activities by Plan International and, once this project finished, by the Indonesian Red Cross, the fire services, the education office, and a local NGO. These agencies provide volunteers and experts who visited the school regularly to train the students and teachers on DRR and become a model school where other schools can visit and learn. So far this has been a positive change with benefits including increased awareness of the students and teachers, structural assessments of the school buildings, as well as construction of bio-pores to reduce the risk of flooding.

In addition, the DMA of Jakarta shared that for DRR programs in school to be sustainable, the schools cannot rely only on the DMA because of its limited resources and should partner up with other agencies. The DMA of Jakarta also noted that safe schools should not only prioritise safety inside the school but also safety in the surrounding neighbourhood and the road/journey between homes and schools.

The group discussion further highlighted that the role of the school committee is also important (in making sure schools are safe from disaster risks). This was not covered by Amri, Bird, et al. (2017). A school committee consists of representatives from parents, respective members in the community, local leaders, as well as from within schools, e.g. teachers or school board members.

In addition, the school contingency plan should be integrated between schools and Kelurahan (village council) according to Twigg (2009). However, in reality, these contingency plans are not in-sync. This is because the process in developing each plan rarely invites collaboration from the other institutions. For example, most school contingency plans were developed by school teachers and school principals and sometimes invite student views, however, they rarely invite village officials who are perceived to be very busy with other commitments. In addition, village contingency plan meetings are often scheduled in the evening or at the weekend when community representatives are not working and can more typically attend. However, this becomes an issue for school stakeholders, as school teachers or administrators are already back home or would rather spend time with their families at the weekend. Conducting joint simulations at the village level that include schools would be a good entry point to ensure contingency plans at all level are synchronised.

Progress to date: Partnerships should be fostered at every level (i.e. from national to the local level). However, it is outside the remit of this research to investigate partnerships at the sub-national and local level. At the national level, the MOEC decree that was described earlier related to the National

Secretariat of Safe Schools also formalised the partnership between MOEC with other ministries, consisting of: MORA and NDMA as well as with the Ministry of Public Works and Housing (oversee structural safety), Ministry of Social Affairs (oversee children protection during emergency), Ministry of Health, and the Ministry for Women's Empowerment and Child Protection (MWECP), and also several NGOs as partners of the secretariat (MOEC, 2017d).

Securing a formal partnership such as this is a significant step as with a formal decree, the national secretariat will be able to coordinate funds from the relevant ministries as well as access to other resources (personnel and facilities) to support the DRR implementation in schools. Regarding school teachers to join the local DRR forum, according to a recent study by Plan International (2018) at the local level, school principals and teachers are currently too busy with existing school activities to take part in activities with the local council or at the district level.

5. 7. Child participation

Awareness regarding the importance of children's participation in DRR was still low according to Amri, Bird, et al. (2017). Therefore, awareness raising (e.g. through campaigns) is needed. One researcher from the Indonesian Institute of Science highlighted:

> *"based on our assessment in schools, 80% of the community has a high*
> *level of knowledge, however in practice, people do not respond according*
> *to what they wrote in their test/questionnaire"*

The focus group participants all expressed that children's participation was very important yet agreed that it currently remained low. Continuous awareness raising on the importance of child participation as well as building the capacity of school personnel on techniques to facilitate children's participation were suggested by the participants.

Progress to date: In 2016, the Ministry for Women's Empowerment and Child Protection (MWECP) started revising the guideline for child friendly cities, including indicators for schools safe from disaster risks (based on personal communication with a high-ranking official from the Ministry). The original MWECP (2015) guideline did include a component of child participation and also safe facilities in schools, however it is not specific enough to encourage schools to include children in aspects of DRR. Moreover, the technical guideline has included children's participation in school-based risk assessment and the establishment of school disaster preparedness teams.

Child participation should continue to be promoted in DRR education, therefore more collaboration between the National Secretariat and the MWECP would be beneficial. In Jakarta, there have been events organised in the last two years where the governments invite children and youth to promote DRR and conduct awareness raising campaigns (merdeka.com, 2017). Unfortunately, this type of event

only occurred in the capital and more efforts should be undertaken to advocate for more awareness raising campaigns in other areas in Indonesia.

5. 8. Other issues

Aside from the issues that were identified in the Amri study (2017), the participants also raised several important points:

a) Every school is different, and it is important to understand the varied characteristics between public, private, and religious schools.
b) DRR in schools should be inserted as part of the Minimum Service Standard on education
c) DRR knowledge and skills should be part of teacher's performance criteria
d) DRR education should be part of students' test subject

Progress to date:

There was not much progress on these four issues, primarily because their perceived level of priority was low. Further discussion related to these issues are described in the subsequent section.

5. 9. Online Survey Results

Results from the online survey are presented in Table 4. Survey result showed that most respondents (79%) suggest the quality of research-based practice in this area requires improvement. Almost all respondents (>90%) also felt that research remains low in quantity and uptake. Most respondents (79%) described that the collaboration between researchers and practitioners is still low.

Table 4. Online survey participants' responses

Survey Parameters	1	2	3	4	5
What do you think about the quality of research related to DRR in education sector in Indonesia?[*]	3%	38%	38%	10%	1%
To what extent is the uptake on research outcomes on DRR in education sector in Indonesia?[+]	3%	52%	38%	7%	0%
How relevant is the research that have been done to address the issues in relation to DRR in education sector in Indonesia[#]	0%	24%	28%	34%	14%
To what extent is the influence of research outcomes to the practice of DRR in education sector in Indonesia?[$]	7%	31%	21%	24%	17%
How important is the research outcomes to be published in international journals?[$]	3%	14%	17%	38%	28%
What do you think about the number of researches related to DRR in education sector in Indonesia?[^]	24%	52%	21%	3%	0%
How often do you use research results in designing DRR programs in education sector?[@]	10%	28%	24%	24%	14%
To what extent is the level of cooperation between research and practitioners in Indonesia on DRR in education sector?[!]	17%	28%	34%	21%	0%

Remarks: [*](1 = Low Quality and 5 = High Quality); [+](1 = Low uptake and 5 = High uptake); [#](1 = Not relevant and 5 = Highly relevant); [$](1 = No influence and 5 = High influence); [^](1 = Very insufficient and 5 = Sufficient); [@](1 = Never and 5 = Always); [!](1 = Very Low and 5 = Very High)

More than half of the respondents (59%) thought that research has less influence and less than half (41%) used it for program design. However, two-third of respondents (66%) believe that the research will be more influential if it is published in reputable international journal.

Respondents provided suggestions for improving the quality of research, including: a) generating new, innovative, and applicable approaches; b) providing accessible research results in simple and easy to understand language, c) presenting the research results to policy makers and decision makers verbally to serve as basis for designing programs and policy changes, d) publication of the research results in a credible international journals, and e) more collaboration between practitioners and researchers in conducting joint activities on the ground, fostering cross-sectoral partnerships, as well as encouraging participation of all stakeholders in DRR education.

Respondents expressed that research should: cover all type of hazards, include formal and non-formal education, and be based on real issues on the ground. Research results should also offer solutions that are affordable, replicable, and applicable to the community. A routine workshop should be done at least once a year to share research findings and lastly, more longitudinal research and comprehensive evaluations of DRR education programs are required.

Research topics of interest included: a) the use of big data for DRR education program planning; b) the influence of local knowledge to DRR education; c) child-friendly DRR education materials to support teachers; d) capturing lessons learned and good practices on DRR education; e) the use of information and communication technologies (ICT) to support DRR integration into the education sector; f) role of parents/ guardians in DRR education; and g) safe schools facilities and infrastructures.

6. Discussion

Following the workshop, the results from research by Amri (2015) were adopted and served as a reference by the MOEC in their technical guideline for school facilitators (2016), the MOEC's publication (2017e), inputs for the national monitoring system for education (2017a), and their work plan to advance the DRR education implementation in Indonesia (please see Figure 2. Research Timeline).

Amri (2015) identified seven key issues and recommended 12 specific actions. All the key issues were responded to positively and participants agreed that these were the key issues facing DRR education in Indonesia. At the 2015 workshop, of the 12 specific recommendations, only the establishment of the online knowledge hub was not discussed as there are plans already to address it. The participants appreciate hearing the research particularly in a workshop format where people then can discuss on the next steps forward, as this practice is not common yet in most research in Indonesia.

Although all the 12 recommendations identified by Amri (2015) were considered important, eight recommendations have shown promising progress, even though hurdles and challenges still exist. Furthermore, progress to date on several key issues have not progressed well (Table 5 in page 34).

Table 5. Progress on the implementation of DRR education in Indonesia, corresponds to the key issues and recommendations identified by Amri, Bird, et al. (2017)

Key Issues	Proposed Recommendations	Progress (Yes/ No)	Status	Recommendations for future focus of DRR education policy
1. **Weak policy implementation on DRR education in Indonesia**	1. Raise awareness of policies related to DRR education	Yes	• Key directorates and relevant ministries are included in the National Secretariat • Draft Ministerial Regulation	• Stronger support from high-level position • Coordination meetings inviting key stakeholders should be regularly conducted • Partnership at sub-national and local level
	2. Include DRR aspects in the school monitoring process	Yes	• Twelve parameters submitted to be part of the EMIS	• Further advocacy with the Education and Culture Statistic Data Centre • Inclusion in the draft Ministerial Regulation
2. **Limited awareness of and access to DRR education materials**	3. An online knowledge hub as a repository of educational resources	Yes	• Dedicated website containing educational resources is operational	• N/A
	4. Development of standardised key messages for DRR	Yes	• Technical guideline published jointly by MOEC and NDMA	• A systematic evaluation is required
3. **Lack of teachers' capacity**	5. DRR education training should be integrated into higher education programs	**No**	• No progress	• Inclusion in the draft Ministerial Regulation
	6. The use of e-learning and computer-based training	Yes	• Discussion is underway with the Centre of Technology and Communication	• E-learning module on DRR education needs to be developed
4. **Absence of partnerships**	7. Joint activities to enhance preparedness should be fostered	Yes	• Included in the technical guideline	• A systematic evaluation is required

Key Issues	Proposed Recommendations	Progress (Yes/ No)	Status	Recommendations for future focus of DRR education policy
between schools and other stakeholders	8. Schools should also be part of the local DRR forum.	**No**	• No progress	• N/A
5. **No platform for teachers**	9. A live and online discussion platform	**No**	• No progress	• Allocation of resources for moderator
	10. A competition at the national level	Yes	• National-level writing competition on Safe Schools for students	• No recommendations required
6. **Limited dedicated personnel and budget**	11. Obtain additional funding from the village funds	**No**	• No progress	• Advocacy efforts need to start with the Ministry of Home Affairs
7. **Low children's participation in DRR**	12. Aware on the benefits of children's participation in DRR	Yes	• Included in the technical guideline • Child-friendly school included parameters related to children participation on DRR in schools	• More joint programs between the National Secretariat and the MWECP

6. 1. Key aspects with promising progress

Key directorates within the MOEC as well as other relevant ministries are now officially part of the National Secretariat and this will enhance coordination as well as the implementation of policies and regulations related to safe schools. However, based on the author's observations there is a lack of regular meetings for coordination across directorates and ministries, including encouraging MORA that oversees the religious schools and MWECP that oversees children's forums and child participation. Therefore, having regular attendance at meetings and participation from high-level positions will be useful (Start et al., 2004). In addition, based on existing pilots in several areas, greater work is still needed at the sub-national and local levels to establish local secretariats on safe schools. According to government officials, having local secretariats made them easier to allocate funds and divide the role between stakeholders (Plan International, 2018).

The website designed for teachers and safe school facilitators (http://spab.kemdikbud.go.id/) is up and running and contains news and resources related to DRR education. Although, its effectiveness is yet to be evaluated. And lacking in this space is a child-friendly website designed as a specific resource for school children to learn about DRR and safe schools.

Related to the standardised key messages, the technical guideline that has been published jointly by the MOEC and NDMA is considered by CDE as useful for consistency among DRR education practitioners. The guideline has also included joint activities (such as school drills) to be conducted between schools and Kelurahan (village council), as well as highlighting the importance of children's participation in risk reduction activities.

To date, there have been several collaborations across ministries to promote DRR education, as part of the Safe Schools program, as shown in the national competitions that have been organised in the last two years as well as development of modules, publications, and recently, the e-learning materials.

The effort to insert parameters related to DRR within the education management information system is still ongoing and needs further political support to secure (based on personal communication with the national secretariat official). This issue is expected to be addressed with the advocacy for Ministerial Regulation.

6. 2. Key aspects with challenging progress

Integration of DRR training into teacher's higher education programs or professional development has not been progressing as expected. However, the then-head of secretariat has been transferred to the directorate of teachers and other education personnel in September 2017. This may be a positive aspect as the official is a strong advocate of DRR in the education sector. The draft Ministerial Regulation is also expected to include policies related to teacher's competence on DRR, which was

raised as a new issue during the workshop. Furthermore, the head of the Centre of Technology and Communication is also supportive of the integration of an e-learning platform for teachers on DRR.

Encouraging schools to join local DRR forums is challenging for teachers already busy with existing responsibilities, as highlighted by Plan International (2018).

Discussion of the need for a live and online discussion platform for teachers to discuss and share experiences was very positive, however, participants noted the need for a dedicated moderator and thus requires another budget allocation from the MOEC. The suggestion to advocate for more funds for DRR activities in schools through village funds requires additional advocacy efforts to the Ministry of Home Affairs (that regulates the use of these funds), hence it is considered low priority. In addition, the Ministry of Home Affairs is not yet part of the national secretariat (MOEC, 2017d).

An additional four points were raised by the participants that were not covered by Amri, Bird, et al. (2017), these are: 1) the issues related to religious schools, 2) advocating DRR in the Minimum Service Standard of Education, 3) inserting DRR aspects as part of the teacher's performance criteria, and 4) the inclusion of DRR as part of test subject.

The religious schools are overseen by the MORA and the public and private schools by the MOEC. Even though MORA is a member of the National Secretariat, their engagement on safe school is low, the representatives from MORA who attends the meetings on safe schools kept changing, and it seems that DRR education is not considered as a priority by MORA, according to an official of the National Secretariat.

The Minimum Service Standard of Education contains 27 indicators that provides general standards such as distance between schools and settlements, maximum total number of students per classroom, and number of teachers per students, and not intended for specific issues such as DRR education. Therefore, it has been deemed inappropriate to advocate for DRR education to be included in the Minimum Service Standard.

On DRR knowledge and skills as part of the teacher's performance criteria, this requires further advocacy. However, this issue has been discussed on the teacher's capacity section earlier. On the issue of DRR to be part of student's tests, this is aligned with the global recommendation (UNESCO et al., 2012a). However, student assessment should not be restricted to tests of knowledge of hazards and what to do but rather also include students' understanding, behaviour and attitude towards disaster risks (see UNESCO et al., 2012a; Victoria A. Johnson, Ronan, et al., 2014 for information related to different types of students' assessment).

6. 3. Reflections on bridging the research and policy gaps

Reflecting on this experience, most of these recommendations have been progressing well partly due to a continuous relationship between the lead author and the MOEC. The workshop provided

evidence-based strategic advice and increased the credibility of the author as a qualified resource person for DRR education among practitioners and policy makers.

Moreover, the online survey results suggest that many stakeholders want to see an increase in the quantity, quality, and uptake of research on DRR education and improvements on collaboration between researcher, policymakers, and practitioners.

Several suggestions that were submitted from the survey indicates that research design should be consulted closely with practitioners (particularly at the field level), fostering joint activities so that research and programs can support one another, and ensuring the outcomes of the research are communicated to the relevant stakeholders in language that is easily understood, applicable, replicable, and affordable. Several research topics were also suggested by the respondents, including the need for longitudinal research and a comprehensive evaluation of the DRR education program in Indonesia.

Furthermore, UNICEF's role was mentioned several times. This is because since 2014, UNICEF assigned a staff member to be placed in the National Secretariat, dedicated full time to support the MOEC and NDMA in relation to DRR in the education sector. The staff member has been advocating the MOEC and NDMA to champion DRR education as well as gathering support from other NGOs to provide additional resources (either funding or expert's time), playing an essential role as policy entrepreneur (Young et al., 2009). Support from NGOs has been increasing for the National Secretariat, presumably because of the role of the UNICEF staff member, as the person also has a background in working with several child-focused NGOs in Indonesia and is well connected. The UNICEF program facilitates in bridging research and policy-practice by strengthening partnerships to support the National Secretariat, including inviting researchers to share technical advice and suggestions.

In addition, leadership and political support are crucial, as suggested by Young et al. (2009), particularly from the two key agencies, the MOEC and NDMA. Both directors in the two agencies have placed the Safe Schools program (including DRR education) as a priority program in both institutions (MOEC, 2015c; BNPB, 2016b). Partnerships with NGOs and academia have also been secured with the establishment of the National Secretariat (MOEC, 2017d).

Based on the process that have been undertaken from 2015 to 2018, we argue that the workshop with key stakeholders was useful to initiate the discussion on the importance of evidence-based research to inform program design and policy agendas. However, actual changes happened due to the regular interactions between researcher and practitioners-policymakers, through workshops, meetings, and informal communications throughout the years.

Finally, there is a great need for robust and systematic evaluations regarding the effectiveness and impact of DRR education in Indonesia, particularly undertaken by credible and trustworthy researchers. This is a common challenge in many countries, as highlighted by Amri et al. (2018).

Therefore, a systematic evaluation, supported by the National Secretariat is required to check the progress and identify measures to further improve the implementation of DRR education in schools in Indonesia.

7. Conclusion

Despite calls for greater evidence-based decision-making in DRR, collaboration between researchers, practitioners, and policy makers on DRR education remains limited, especially in developing countries such as Indonesia. The CDE, an Indonesian network of DRR education practitioners, government agencies, and research institutions, representing 47 departments / institutions, only encompasses three universities / research institutions.

A one-day workshop was organised in Jakarta to present findings from the latest research related to DRR education, inviting policy makers, NGOs, and research institutions to provide feedback and discuss how the research could be utilised to improve DRR education policies and practices in Indonesia. Seven key issues and 12 recommendations for improvement were discussed at the workshop. Following the workshop, regular interactions between the lead author and key DRR education stakeholders has enabled productive discussions and useful outcomes, including strategic documents such as a road map of DRR education and draft of Ministerial Regulation on Safe Schools.

Three years after the workshop, eight recommendations have progressed well and recommendations in four areas have shown no or little progress. Several additional suggestions have been identified to increase the effectiveness and progress of DRR education in schools. This includes the need for a robust and systematic evaluation to investigate the effectiveness of the methods (e.g. training), guidelines (including e-learning modules), and resources (e.g. websites, funding allocation). In addition to greater collaboration within the National Secretariat, further advocacy with other divisions in the MOEC and other ministries, and stronger advocacy efforts for a Ministerial Regulation are needed.

Other further research suggestions included: the improvement of learning material related to DRR, the development of innovative approaches to ensure the timely scaling up of effective DRR education, the documentation of lessons learnt and evaluation from post-disaster situation, and more localised research.

Overall, this research demonstrated that developing action plans and making decisions based on robust scientific research is helpful and effective. Sharing research findings as well as building continuous relationships and partnerships are needed for effective, sustainable and scalable DRR education.

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Chapter 3

Literature Review

1. Preface

This chapter outlines existing studies and practices related to children's participation in influencing changes, with a specific focus to identify factors that can facilitate or impede children becoming agents of change in the community. This review was informed based on previous studies that suggest that projects related to promoting children's participation in Disaster Risk Reduction (DRR), also known as the Child-Centred Disaster Risk Reduction (CCDRR) method, face significant challenges to be sustained and difficult to replicate in other areas (Amri, Bird, et al., 2017). Therefore, this review assesses practices of children's participation from other sectors, such as health, environment, and urban planning, to understand better the lessons learned and good practices that have been documented.

A scoping review was conducted in this literature review. This type of review is useful to assess existing literature in fields that are emergent, complex, and diverse as well as there was a lack of systematic reviews that have been conducted in this field (Peters et al., 2015). Scoping review is also useful to determine gaps in research and practice and informing future research, policies, and practices (Grant et al., 2009). This review starts with description on disaster trends and its impact on children and looks more closely at their vulnerabilities. The review then outlines children's active participation in their communities by depicting previous examples on children's participation in DRR and from other sectors. Subsequently, the factors that influence children's participation are explained. In the last section, two examples of children's activism in recent years are exposed and conclusions are drawn that influence the later stages of the research.

A search through various online databases (e.g. Google Search, Google Scholar, Springer, Science Direct, and Wiley Online Library) was undertaken using the keywords: "children and disasters" to understand the impact of disasters to children, and "children as agents of change" in January 2016 and August 2018. Articles related to children's participation in influencing change were assessed. References in these articles then generated access to additional sources. For the section related to children's activism in recent years, most of the literature was sourced from news articles and other media sources since most of the reported changes occurred less than one year ago. This review first describes disaster trends with a focus on impacts on children and their associated vulnerabilities.

2. Global Development Progress and Challenges

The world today has made significant achievements and breakthroughs in development goals (United Nations, 2015a). The global economy has been growing and the global poverty rate is at its lowest in recorded history (World Bank, 2019). The global life expectancy has increased from 66.5 (2000) to 72 (2016), with the highest leap in the Africa continent from 50.8 to 61.2 (WHO, 2019). The global enrolment rate in schools continues to increase, with nine out of every 10 children in school and 70% of children participating in early childhood education before entering primary schools (United Nations, 2015a; UNESCO, 2019).

However, these achievements come with new challenges. Even though the poverty rate is at an all-time low, the increase in the global population means that the absolute number of people living in poverty is still extremely high, about 736 million people in 2015 (World Bank, 2018b). Many cities are facing uncontrolled urbanisation, which create more demands for healthy and affordable housing, employment, basic services, as well as better infrastructure (Scott, 2015; UN Habitat, 2016; Oxford Economics, 2017; United Nations, 2018). Governments and private sectors also continues to further exploit natural resources, with a rapid rate of deforestation and conversion to agricultural lands (IUCN, 2017; Bradford, 2018; National Geographic, 2018).

These global issues are impacting local communities, particularly children as one of the most vulnerable groups. Children, defined by the United Nations (UN) as any person under 18 years old, make up one-third of the world's population, totalling almost 2.3 billion people in 2017 (UNICEF, 2017c). Children as well as adults have human rights. However, children should also be recognised as individuals with unique needs and sometime people misunderstood these needs, particularly if children did not have the space to express their views (for examples, see Spencer et al., 2000; Matthews, 2001; Burke et al., 2003; Gallagher, 2004). Therefore, children have the right to participate, protected through the UN Convention on the Rights of the Child (or commonly known as the UN CRC), providing the avenue to ensure that the specific needs of children are correctly identified and met (United Nations, 1989).

However, the fulfilment of children's rights is at risk because of global issues. Conflicts, extreme weather events, climate change, water crisis and natural hazards are five of the top risks identified in the latest global risks report published by WEF (2019). Some of the factors that exacerbate these are the changing climate, environmental degradation, rising urbanization and rising income and wealth disparity (WEF, 2019). Furthermore, the threat to

food securities and possible disease outbreaks have intensified in recent years, particularly with countries affected by conflicts and natural hazards (WHO, 2018; WEF, 2019). All of these are threats that may be beyond a community's capacity to cope and could lead to disasters (IFRC, 2016).

3. Disaster Trends

Over the last century, the number of disasters has increased significantly (Figure 3). There were 231 disasters across the globe in 1987, and in 2017, there were 366 disasters, a 58% increase (CRED, 2018). Uncontrolled urbanisation, population growth, poor land use management, environmental degradation, socio-economic inequities, and climate change have further exacerbated the severity of disaster impacts (UNISDR, 2004).

Source: EM-DAT: The Emergency Events Database – Universite catholique de Louvain (UCL) – CRED, D. Guha-Sapir- www.emdat.be, Brussels, Belgium
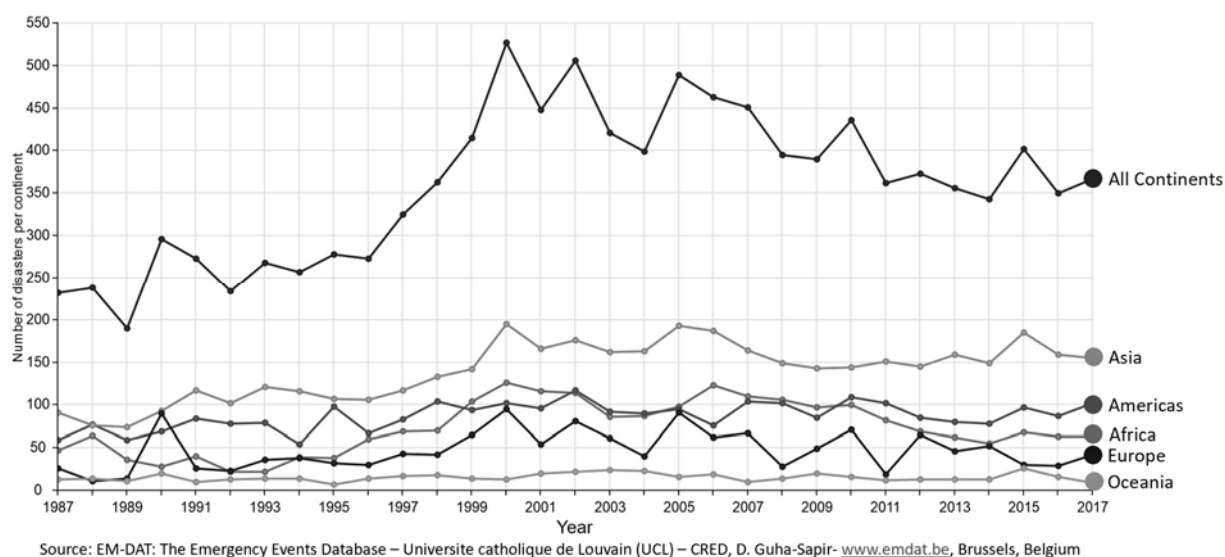
Figure 3. Total number of disasters per year per continents (adapted from CRED, 2018)

Over the last decade, the number of disasters, particularly extreme weather events have been breaking records year after year. The last four years (2015-2018) have been the warmest period of all time and triggering severe storms, floods, droughts, and wildfires in many countries, including three successive and destructive hurricanes in the North Atlantic (Hurricane Harvey, Irma, and Maria), floods in central Asia affecting 40 million people, and unprecedented droughts contributing to the acute food insecurity and malnutrition of more than 59 million people in 24 countries in Africa (FAO et al., 2018; WMO, 2018b, 2018a). As a comparison, in the US, there were 3.75 severe weather events per year on average in the 80s and 90s, and over the last five years, that figure rose to 11.6 events annually (Smith, 2018). The latest IPCC (2018) report suggests the records are expected to continue to be broken.

Fatalities from disasters have gradually declined, particularly in weather-related events, due to advances in early warnings and improved emergency services ensuring that the public are now better informed and more prepared (UNISDR, 2014a). However, the number of people affected by disasters continues to increase significantly. The United Nations Office for Coordination of Humanitarian Affairs or UN OCHA (2018) has estimated that more than 134 million people will need humanitarian aid in 2018, where conflict remains the main driver of humanitarian needs (nine out of ten of the largest humanitarian crises in 2018 are primarily driven by conflicts). Nevertheless, according to the Global Report on Internal Displacement published by IDMC (2018), 61% (18.8 million) of the 30.6 million newly internal displaced persons in 2017 were caused by natural hazards, and most of the displaced people were affected by weather-related hazards, e.g. storms, floods, and droughts (Figure 4).
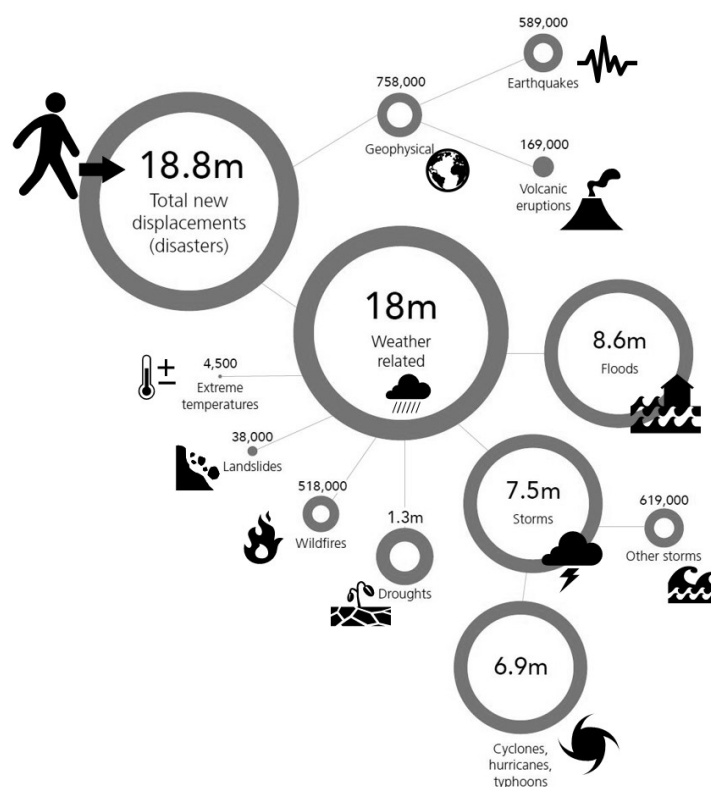
Figure 4. Total new displacements in 2017 because of natural hazards (adapted from IDMC, 2018)

In addition, disasters are increasingly characterised by a period of protracted crisis with people displaced for a longer period; in 2018, nineteen of the 21 humanitarian response appeals were from humanitarian crises that have lasted for five years or more (UN OCHA, 2018). Many areas are facing multiple humanitarian crises where there is combined presence of natural hazards, conflicts, food insecurity, lack of access to water and sanitation, and the threat of epidemics making it more challenging and complex for the community to recover (ibid).

In summary, disasters are becoming more frequent, they affect more people, are more complex lasting longer period and costing more. In the meantime, children face more difficulties as they are considered one of the most vulnerable groups from disasters (IDMC, 2018; IFRC, 2018). The following sections discuss the impacts of disasters on children.

4. Disaster Impacts to Children

4. 1. Physical impacts to Children

Children are more at-risk of being killed or injured, contracting life-threatening illnesses, and displaced in disaster situations because they are generally weaker, less mobile, have immature immune systems, and do not have direct control over the environment that they live in (Peek, 2008; Stanberry et al., 2018). According to the UN, about 30 to 50% of fatalities from natural hazard events were children (WHO, 2011b).

Impacts from floods, tsunamis, and earthquakes have led to the largest death tolls from disasters in the last twenty years (CRED, 2015, 2018). Between 1980 and 2009, there were over 500,000 estimated deaths from floods where a large proportion of fatalities were children (WHO, 2011c, 2014). Children are more at-risk in floods that are further exacerbated by various factors, including low socio-economic status, low education level, and with young children (Ahmed et al., 1999; Pradhan et al., 2007; Haynes et al., 2017; Rahman et al., 2017; Paul et al., 2018). Some of the factors contributing to these deaths also include inadequate supervision for infants and children, poor swimming skills, and lack of awareness regarding the water dangers (WHO, 2014). Gender is also a factor for flood deaths, although the result varies in different countries, where in Nepal, females have higher risks compared to males, however in the US and in Australia, it is the reverse (Pradhan et al., 2007; Ashley et al., 2008; Haynes et al., 2017). This is due the nature of the floods where in the developed countries, the leading cause of deaths were because men entered floodwater to continue their journey or to recreate. In developing countries, boys have more chance to survive from flash floods compared to girls because of gender discriminatory practices where parents prefer boys to be taught to swim and climb trees, compared to girls (Leone et al., 2003; Oxfam, 2005; Pradhan et al., 2007).

In the 2004 Indian Ocean Tsunami, most fatalities and people affected were women and children (and in some parts, one third of the victims were children), since they were likely to be indoors when the tsunami occurred (UN OCHA, 2005; Telford et al., 2006). In tsunami-affected regions in Sri Lanka, child mortality was three to four times that of young adults and

the mortality of young children (under-five) are twice that of adults over 50 years of age (Nishikiori et al., 2006; Zahran et al., 2008). Studies from major earthquakes also show that, due to structural failures of buildings, including in schools, children are more prone to be killed from earthquakes compared to adults (de Ville de Goyet et al., 1976; Parasuraman, 1995; Osaki et al., 2001).

In addition, children may have new disabilities in the aftermath of disaster, some because of the hazards and others because of inadequate care in post-treatment (Laverick et al., 2007; Mallick et al., 2010; Irshad et al., 2012). These new disabilities may hinder children's ability to access life-sustaining aid and pose an increased burden to parents (UNICEF, 2017b). Furthermore, children with new disabilities have higher challenge in mobility and access to information which makes them more vulnerable to violence, exploitation, and abuse, and more at-risk to future hazards (Peek et al., 2010; Ronoh et al., 2015).

Children are also prone to illness as disasters can affect families' ability to provide nutritious food, access to adequate clean water and sanitation facilities, as well as access to primary health care, all of which are essential for children's growth and well-being. After Hurricane Mitch in Nicaragua, children were four times more likely to be undernourished and 30% less likely to be taken for medical consultation (Baez et al., 2007). Post-Hurricane Katrina, children were not able to access medical care (Abramson et al., 2006; Barkemeyer, 2006). Increased prevalence of fever, Acute Respiratory Infections (ARIs), and diarrhoea also have been found in multiple disaster events in India (Datar et al., 2013), in wildfires in Indonesia (Sastry, 2002; Frankenberg et al., 2005), and drought-stricken areas in Africa and the Pacific (Asfaw et al., 2015; Emont et al., 2017), where diarrhoea and ARIs are the two major causes of death for children under-5 years, globally (WHO et al., 2018).

Undernutrition can also lead to stunting and other long term effects to children's growth and development (Hoddinott et al., 2001). Furthermore, inappropriate humanitarian response during the relief period may exacerbate illness (Goma Epidemiology, 1995; K. D. Gribble et al., 2011; K. Gribble, 2018). For example, in Indonesia, following the earthquake in Yogyakarta in 2006, there was a significant increase of diarrhoea cases among infants due to the uncontrolled distribution of infant formula and change of practices in breastfeeding (Hipgrave et al., 2012).

4. 2. Psychological Impact of Disasters to Children

There have been many studies assessing the impact of disasters to children's mental health, highlighting an increase in the incidence of stress reactions, sleep disorders, emotional anxiety, fears, somatic complaints, and behavioural problems (Norris et al., 2002; Pina et al., 2008; Schoenbaum et al., 2009). Children are more susceptible to psychosocial distress because they feel powerless, frustrated -including the fear of getting behind in their education, being displaced, limited space to play and food insecurity (Lauten et al., 2008; Akhter et al., 2015; Quinn et al., 2016). Furthermore, when adults experience issues affecting their mental health, they often cannot meet the needs of children, and thus children themselves may suffer from their parents symptoms (Fothergill, 2017). The severity of mental health issues in children in the post disaster situation may depend on the level of exposure, socioeconomic factors, age, gender, personality traits, cognitive skills, and the inter-relationships within the family (Burnham et al., 2008; Jia et al., 2010; Masten et al., 2012). Furthermore, children between the ages of 8-17 years identified disasters as one among eight most feared situations (Ollendick, 1983; T. H. Ollendick et al., 1985).

Violence against children also tends to increase in the aftermath of disasters, where the primary factor is due to the separation from family, friends, or other support systems that previously provided protection (WHO, 2005). Many of these cases occur when accessing essential aid or services, when children -especially girls- are separated from their parents or legal guardians, or during economic hardships (CASA Consulting, 2001; Women's Refugee Commission, 2009; Olan, 2014; Gyawali et al., 2017). OHCHR (2012, p. 1) recorded that according to a Najat Maalla M'jid, UN Special Rapporteur on the sale of children, child prostitution and child pornography:

After natural disasters, children are more vulnerable to sale, illegal adoption, forced labor or sexual exploitation, she says. Children may be removed from their communities by people illegally taking advantage of the chaotic situation, but also, by individuals with good intentions trying to ensure children's safety.

After the 2010 Haiti earthquake, about 1.5 million children were affected by the earthquake, including some 500,000 children that were extremely vulnerable to violence and abuse (UNICEF, 2010). In some cultures, adolescent girls may be forced or encouraged to enter into an early marriage or exploited sexually to get away from poverty (UNHCR et al., 2002; Enarson

et al., 2007; Csáky, 2008; Fothergill et al., 2018). Increased domestic violence, particularly to women and children, has also been evident in post-disaster situations (Bonnerjea, 1994; Enarson, 1999; Sety, 2012).

Disasters and conflicts could increase child labour as home and schools are often destroyed in times of crisis and children could be displaced and separated from their parents or guardians, making these children prone to be forced or willingly seek employment to support family's livelihood (ILO, 2017). Furthermore, after disasters, children are spending more working hours to gain more income, as investigated by Krutikova (2009) in Andhra Pradesh, India. Krutikova (2009) further highlighted that girls in rural areas are the most affected with longer working hours compared to boys and girls in urban areas. It is important to address child labour since children who must leave their education before the age of 15 are less likely to ever find secure employment with fair income and if they can gain employment, it takes them longer to do so (ILO, 2015).

4. 3. Impact of Disasters to Education

In many cases, disaster events have significant impacts on children's education. Natural hazards such as earthquakes, tsunamis, and destructive storms can destroy school buildings or render them non-operational (Table 6). Moreover, disaster situations can hinder children and school personnel to access schools, and impact family's income and force children to be out of school (ADPC, 2008; Mudavanhu, 2014).

Table 6. Impact of Disasters to the Education Sector based on PDNAs in several disaster events between 2014-2017

Country	Disaster Type	Year	Total schools affected	Total loss and damage (million US$)	Reference
Sri Lanka	Floods and Landslides	2017	336	9.28	(1)
Dominica	Hurricane Maria	2017	136	0.38	(2)
Nepal	Floods	2017	160	11.50	(3)
Fiji	Tropical Cyclone Winston	2016	178	35.67	(4)
Nepal	Earthquake	2015	8,242	397.00	(5)
Malawi	Floods	2015	462	22.90	(6)
Myanmar	Floods and Landslides	2015	4,116	39.20	(7)
Serbia	Floods	2014	35	2.65	(8)
Bosnia and Herzegovina	Floods	2014	121	19.38	(9)
Philippines	Typhoon Haiyan	2013	4,169	244.83	(10)
TOTAL			17,955	782.79	

List of References: [1]Ministry of National Policies and Economic Affairs et al. (2017), [2]The Government of the Commonwealth of Dominica (2017), [3]National Planning Commission of the Government of Nepal (2017), [4]Government of Fiji (2016), [5]National Planning Commission of the Government of Nepal (2015), [6]Malawi Government (2015), [7]Government of the Union of Myanmar (2015), [8]The Government of the Republic of Serbia (2014), [9]The Council of Ministers of Bosnia Herzegovina (2014), [10]The Government of the Philippines (2014)

In the last five years (2013-2017), the International Recovery Platform has collated post disaster needs assessments documenting impacts to nearly 18,000 education institutions with losses totalling over US$ 780 million (Table 6); noting that these are just a proportion of the total 1,813 disaster events that occurred between 2013-2017 (CRED, 2018). This is an indication that school buildings in many developing or less-developed countries have been associated with weak structures, as evident in earthquakes, tsunami, and storm events in China, Indonesia, Nepal, Pakistan, and the Philippines, and in some cases, these disaster events happened during school time. For example, the 2008 Sichuan earthquake and 2005 Pakistan Earthquake caused the destruction of school buildings leading to the deaths of tens of thousands of children and school personnel (Hewitt, 2007; Jia et al., 2010).

Furthermore, if school buildings are intact in the aftermath of a disaster event, the buildings are frequently used as temporary shelters for disaster survivors, often being used as shelters for an extended period resulting in a loss of school days (M. Sinclair, 2001). For example, children in flood prone areas in Cambodia have a 22% higher school drop-out rate compared to the national average as they cannot afford higher travel cost because of the floods (ADPC, 2008).

In times of relief, it has been demonstrated that in addition to the educational and academic continuity children should return to school as soon as possible to restore the sense of normalcy, overcome despair and build a sense of hope (M. Sinclair, 2002; Kumar et al., 2017). Education during emergencies can also provide life-saving information and prevent and mitigate children being exposed to secondary risks (M. Sinclair, 2001; INEE, 2010; Plan International, 2012; Ronan, 2014). For example, hygiene promotion education will be useful to prevent water-borne illness after flooding situation (WHO, 2013).

However, there is a lack of documentation and studies evaluating the long-term impacts of disaster on children's educational outcomes, as highlighted by Irwin E Redlener et al. (2010). Children affected by Hurricane Katrina experienced difficulties in family relationships, performance in schools, and interactions with their peers, particularly for children who were vulnerable and living with hardships before the hurricane (Fothergill et al., 2015).

5. Children as Agents of Change

Children are often characterised as a vulnerable group. However, research has demonstrated that they have a unique ability and perspectives regarding disaster risks (Mitchell et al., 2009; Haynes et al., 2010; Haynes et al., 2015). Children have the ability to identify various risks that adults often missed, overlooked, or considered as less important. Haynes et al. (2010) facilitated risk assessments in a village in Central Java, Indonesia and found that children were more concerned with hazards that have lower probability but higher consequences (such as landslides, flood and typhoons) compared to everyday risks such as road accidents and diseases, which were prioritised by adults.

Children have unique perspectives as well on future risks such as climate change. In Nepal, children are very much concerned with the impact of climate change and how it influences their future, including more frequent and more intense floods, landslides, and other extreme weather events (Gautam et al., 2008; Plush, 2009; Amri et al., 2018). This echoes the voices of children around the world as highlighted by Bild et al. (2013) from consultations with almost 1,300 children from 17 countries, across Asia, Africa, and Latin America, where children have expressed concerns their life, wellbeing and education are affected because of disasters.

Climate change offers a situation where the decisions being made today will affect more children in the future. Save the Children (2008) conducted an analysis showing that up to 175 million children are likely to be affected every year by climate-related disasters and tens of millions of people will be displaced, most of whom will be women and children. Which is why, children should play an important role in the decision making process today, at the local, sub-national, national, and global level (Plan International et al., 2015).

Children also have significant strengths as effective risk communicators, to their families, peers, and their community. Plan International (2010b) documented children in Sierra Leone were using radio broadcasts to spread awareness on a wide range of issues, from HIV awareness, farming techniques, to peacebuilding as well as DRR messaging including restoration of a bridge that children regularly use to cross to go to school. The same report highlighted children in a village in Rembang, Indonesia disseminate DRR messages through Qasidah, which is a form of Islamic poetry/ song commonly enjoyed by the local people. In Sikka, Indonesia, Eastern Samar, the Philippines, and slum area in Dhaka, Bangladesh, through theatres children are informing communities regarding the risks of floods, landslides, and

disease outbreaks in an effort to influence people to take action to prevent disaster risks (Plan International, 2010b).

In some instances, children can spread DRR messages more effectively compared to scientists and policymakers, by providing simpler and stronger messages (Mitchell et al., 2008; Mitchell et al., 2009; Tanner et al., 2009). Children can gather information from various media as they are more connected digitally, providing them advantage in accessing information from outside their area -from the neighbouring communities to other countries (UNICEF, 2017c). Children often challenge conventional models of risk communication and co-construct the knowledge needed to communicate risks by combining external information with their own style and language (Tanner, 2009).

Furthermore, children can become **agents of change** in their communities. There have been many examples where children with sufficient knowledge and support from adults were able to transform their communities into taking action to prevent or become better prepared for disaster. In Santa Paz, the Philippines, a group of school children was successful in advocating for their school to be relocated into a safer place because the original school is at-risk to landslides (Plan International, 2010b). Initially, the parents were reluctant to move the school as it will be further from their homes. However, with the help of the local politician, the children signed petitions and held rallies to influence the school stakeholders.

DRR programming in schools have been rapidly progressing in recent years where it is being implemented in more than 100 countries as part of the national education curriculum (Ronan, 2014). There have been several studies on the benefits of these programs at the school level, where children receiving DRR education in schools had better knowledge, calmer, and more stable risk perceptions (Finnis et al., 2010; Ronan et al., 2010; Victoria A. Johnson, Johnston, et al., 2014; Ronan et al., 2015; Towers, 2015a).

Moreover, the global framework on DRR in the education sector (Figure 5) has been developed by the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES et al., 2017).

The Comprehensive School Safety (CSS) Framework aims to provide a holistic focus for child-centred approach in establishing a safe school and promote evidence-based measures in advancing DRR in the education sector and to assure uninterrupted access of quality education even in the aftermath of a disaster. The framework itself comprise three main pillars: Safe

Learning Facilities; School Disaster Management; and Risk Reduction and Resilience Education.
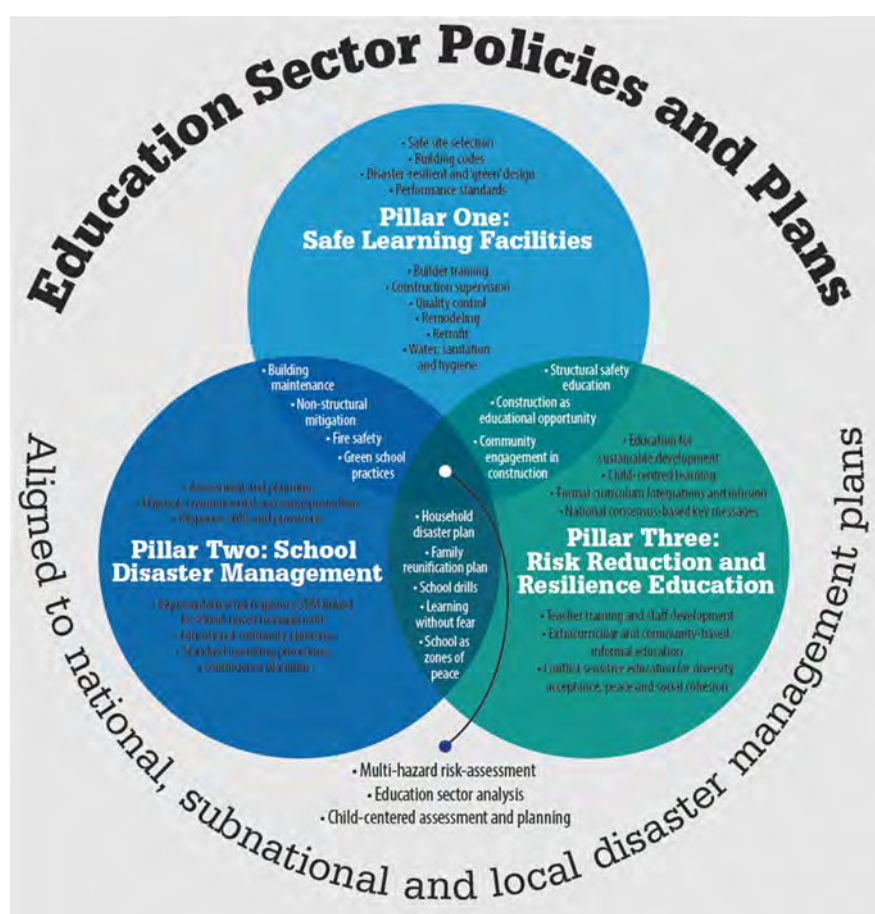
Figure 5. Comprehensive School Safety Framework (adapted from GADRRRES et al., 2017, p. 3)

The framework has been used as a reference document by child-focused organisations and adapted at regional and country level (see AADMER Partnership Group (2016) and MOEC (2017b) for examples) for their DRR programming in schools. Unfortunately, studies in investigating the effectiveness of DRR education programs in the education sector at a larger scale remains limited (Victoria A. Johnson, Ronan, et al., 2014; Amri et al., 2018).

In the Philippines, children were successful in campaigning for their school to be relocated to a safer location is an example of children's ability to influence policies and take part in the decision-making process (Plan International, 2010b). There are many other examples where children have taken action in their local communities, from mangrove planting to reduce tsunami risks, establishing local disaster response teams, advocating local regulation to prevent illegal mining, and planting trees to prevent landslides (Children in a Changing Climate, 2008; Plan International, 2010b; UNISDR et al., 2012).

At the national level, children have demonstrated their ability to mobilise and influence policy spaces. For example in Mozambique, a strategic plan has been developed to integrated DRR

into the education sector, inspired by national consultation with children and a special meeting of the Mozambique Children's Parliament in 2012 (Children in a Changing Climate, 2017).

At the global level, children are taking part in high-profile conferences to influence global declarations and agreements. Children's delegations have been participating in conferences related to DRR and Climate Change Adaptation (CCA) at the global level, expressing their views by delivering speeches on the global stage, talking to prominent leaders, and mobilising other children to influence the decision making process (Children in a Changing Climate, 2008; Plan International, 2010b; Children in a Changing Climate, 2011).

As discussed earlier, there have been many examples across continents on how children can take part in DRR and create change in their communities. However, recent research by Amri, Bird, et al. (2017) shows that these changes were primarily driven by Non-Government Organisations (NGOs) in developing countries, and once the NGO-led project finishes, so does the involvement of children in DRR. Therefore, further research needs to be undertaken to ensure sustainability and understand how to build children's capacities so that children can be part of the process and influence decisions that matter to them. The following section discusses children's active participation in sectors other than DRR and CCA to understand better the factors that influence children's participation.

6. Children's active participation in their communities

There have been many studies that highlight children's active participation in their communities. These studies documented children efforts in influencing their peers, their parents (or families) as well as advocating for policy change at the local to national level. This review captured relevant studies primarily from three sectors: health, environment, and governance (Table 7).

The following section outlines the factors influencing children becoming agents of change, highlighted in bold.

6. 1. Factors influencing children becoming agents of change

First, for children to become agents of change, they are **required to be motivated and passionate** about the issue, particularly on the **issues that matter to them**, issues that have direct impact to children's lives and wellbeing, such as hygiene education, HIV/AIDS, health, environment, and civic engagement (Uzzell et al., 1994; Onyango-Ouma et al., 2005; Mwanga

et al., 2008; Acharya, 2010; Bresee et al., 2014; Torres-Harding et al., 2018). In the US, a study on obesity prevention describes that one of the key factors of success is highly motivated children to have healthier food because they would like to look better or because they have a sick family member (Gadhoke et al., 2015).

Table 7. List of references related to children's participation

No.	Sector and Issues	References
1.	**Health Sector**	
	Hygiene promotion	Olayiwole et al. (2003); Mwanga et al. (2008); Susanto et al. (2016)
	Prevention of communicable diseases	Onyango-Ouma et al. (2005); Fernandez (2008); O'Reilly et al. (2008); Bresee et al. (2014); Pittenger (2017)
	Anti-smoking awareness raisings	Telch et al. (1990); Hansen et al. (1991)
	HIV/AIDS prevention and sexual health education	Ebreo et al. (2002)
	Campaigns against substance abuse	Klepp et al. (1986); Perry et al. (1989); Hansen et al. (1991)
	Healthy eating	Ensaff et al. (2015); Gadhoke et al. (2015)
	Sports programs	Hayhurst (2013); Gadhoke et al. (2015)
2.	**Environmental education**	
	Urban design/ planning	Burke et al. (2003); Natasha et al. (2003); Vaughan et al. (2003); Gallagher (2004); Malone (2013)
	Water protection	(Hiramatsu et al., 2014); Volonakis et al. (2017)
	Energy saving	Bartiaux (2009)
	Conservation issues	Uzzell et al. (1994); Adler et al. (2013); Damerell et al. (2013); Hiramatsu et al. (2014); Walker (2017)
3.	**Governance**	
	Advancing children rights to express their views	James et al. (2001); Acharya (2010); (James et al., 2001; Acharya, 2010); Torres-Harding et al. (2018)

Recognising this, it is essential that children have the capacity to understand the issue so that they can make an informed decision whether they are passionate enough about an issue to advocate for change. For example, issues related to climate change have been known to be complex, too technical, and difficult to understand (Susanne C. Moser, 2010; Spence et al., 2010). Nevertheless, many agencies have attempted to provide child-friendly education materials to help them understand the issue (see UNICEF et al., 2013 for examples; Plan International, 2015b).

Another facilitating factor is that the information children receive should come from **trusted and credible sources and backed by sound research**. This will help children when delivering the messages to the recipients, whether it is to their peers, their parents, or to prominent

people, such as local leaders. Bresee et al. (2014) highlighted that parents trust the information conveyed by children on water and sanitation as it comes from trusted teachers. It will also help if the recipients have existing awareness or familiarities regarding the issues (Bartiaux, 2009).

Another crucial factor is the **support from adults** in listening to children, respecting their views, facilitating conversations with other stakeholders, and engaging in meaningful discussions that lead to consensus. Almost all studies on children as agents of change highlighted the importance of the recipients in respecting the right of children to participate and influence the decision-making process, as chartered in the UN CRC. On this topic, adults have two roles, *as enablers* in assisting children and *as recipients* in hearing the views of children. Another side of the coin is that adults may be reluctant to listen to children if they do not see an immediate benefit from it or fear it will disrupt their position of power or authority (Onyango-Ouma et al., 2005; Cook-Sather, 2006; Mwanga et al., 2008; Lansdown et al., 2014; Ensaff et al., 2015). In this case, parents have a key role in helping their children to express their views, and then subsequently teachers have also a strategic role in enabling children to speak out and build their capacity to deliver the messages effectively (Uzzell et al., 1994; Ebreo et al., 2002; Mwanga et al., 2008; Bresee et al., 2014). However, some studies indicated that project sustainability may be difficult to achieve due to constraints on a teacher's time and capacity (Mwanga et al., 2008; Ensaff et al., 2015). Other support can be provided from extended family networks, local institutions (e.g. children clubs), and even corporations (Damerell et al., 2013; Hayhurst, 2013; Ensaff et al., 2015; Gadhoke et al., 2015).

As enablers, these adult champions have the responsibility to empower children and build their self-esteem (Hayhurst, 2013; Bresee et al., 2014; Gadhoke et al., 2015), and the absence of these enablers will hinder children's efforts influencing change, especially when children are expressing views that are not aligned with the normal cultural norms (Hayhurst, 2013). They also have the task to build self-efficacy and confidence, including turning words into action (Mwanga et al., 2008; Bresee et al., 2014; Gadhoke et al., 2015; Walker, 2017). Bresee et al. (2014) noted there are activities that children are able to do by themselves, such as handwashing by building simple handwashing facilities. However, for activities that are beyond their individual capacity to control, children will require access to resources (tools, financial, labours, or technical knowledge), such as building a latrine or printing campaign materials (Silva et al., 2011; Malone, 2013; Bresee et al., 2014). Similarly, when advocating for

changes in policies and regulations, children will need support from influential people that have access to resources to enable and promote change (Ebreo et al., 2002).

As recipients, adult's acceptance in listening and willingness to be educated by children will be influenced by **culture and socio-economic conditions** (Bartiaux, 2009; Gadhoke et al., 2015). Bresee et al. (2014) highlighted that recipients need to have a sense of value over the matters that are being discussed. Many studies have shown that the awareness of adults in listening to what the children are saying is crucial in children's participation (James et al., 2001; Save the Children, 2005; Mwanga et al., 2008; Graham et al., 2009; Percy-Smith et al., 2009; Acharya, 2010; Checkoway, 2012; O'Kane, 2013). Checkoway (2012) highlighted that in the process of enabling children participation, both children and adults should see themselves as allies in the process, where both sides value each other's opinions and recognise that working together will deliver a more effective process. Lansdown et al. (2014) and Mwanga et al. (2008) described realising children's rights to participate may challenge adults' position of power and to social norms, because of:

a) lack of understanding on what participation means,
b) weak policies in enforcing children's participation,
c) cultural barriers and adult resistance,
d) lack of adult capacities,
e) fear of negative outcomes -including redistribution of power that could lead to potential risk, and
f) lack of tools to encourage participation (see examples of tools in O'Kane, 2013)

Therefore, in order to enable children's participation, adults (including children's own parents/ guardians) are required to be sensitised to understand the value of children's participation (Save the Children, 2005; Graham et al., 2009).

Several case studies have shown that children's advocacy messages were more powerful because they can **mobilise large numbers of children** and **express their views using creative ways in their own language**. Children are now more connected digitally compared to their parents, and therefore gaining followers/ supporters and traction for an international social movement is easier by utilising the strength of social media channels, digital platforms, and the internet (O'Keeffe et al., 2011; UNICEF, 2017c). Furthermore, many creative ways have been utilised to send messages to be easily understood by their peers and adults, i.e. using marches, signing petitions, creating articles, staging walkouts, and the use of digital media (James et al., 2001; Natasha et al., 2003; Acharya, 2010; Walker, 2017).

Moreover, another factor that influences success in children's participation is the **presence of leadership qualities**, particularly among the children (Klepp et al., 1986; James et al., 2001; Cook-Sather, 2006). Ebreo et al. (2002) suggested that selecting leaders among the children's groups is crucial and it is better if the leader is selected by their peers. In relation to this, the age of children also comes into play where it is best that children are at a cognitive development state (such as 10 years and older) so that they are able to think abstractly and position themselves as agents of change (Piaget, 1964; John, 1999; Gadhoke et al., 2015). As children continue to develop more cognitive skills, their ability to think more conceptually grows (Ronan et al., 2014). There have been many studies and programs that involve children as young as 10 years old leading for change in their communities (Ronan et al., 2003; Children in a Changing Climate, 2008; Haynes et al., 2010; Ronan et al., 2010; UNISDR et al., 2012; Haynes et al., 2015). There are also studies that discussed the potential of young children (as young as kindergarten-age children), however there has been little empirical evidence on the abilities of young children as agents of change in their community (Barratt et al., 2007; David, 2007; Davis, 2009). Children may also need guidance and role models to advance their agenda, for example the health program in Zambia documented that the role of teachers was essential in facilitating the information exchange between students and their parents regarding good hygiene practices (Bresee et al., 2014).

Studies have also suggest that it does not matter whether the child participation is initially led by children, or by an adult, or a combination of the two, as long as it provides the right attributes to enable a meaningful participation from children (Checkoway, 2012). For example, an urban design project was initiated by a developer in the US that supports children to design their own neighbourhood, increasing the children's place attachment and stewardships in their surrounding environment (Malone, 2013).

6. 2. Children's activism in recent years

In recent years, there have been two major events where children are mobilising to influence policy changes. The first one was the March for Our Lives, which was a student-led demonstration for gun control in the US. It is estimated that over 2 million people took part in more than 800 locations, all over the US and even other cities around the world, including London, Sydney, Tokyo, and Mumbai, making it the largest protest in the American modern era (Figure 6) (Newsweek, 2018; The New York Times, 2018). The event was triggered from the Stoneman Douglas High School shooting in Parkland, Florida and a series of mass shooting

incidents that occurred between 2015-2018 (CBS Miami, 2018; Seelinger, 2018; Swartz, 2018). Survivors of the Parkland shooting announced the "Never Again" campaign that advocates for stricter gun control, using Facebook and Twitter to spread the messages and gain followers (Herald.net, 2018; Rhonda Douglas et al., 2018). Soon after, support came from celebrities and corporations, providing financial support, and amplifying the group message in their own social media channels (CNN, 2018b; TMZ, 2018).

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Figure 6. The crowd at the March for Our Lives rally, as seen from the roof of the Newseum in Washington, D.C., on March 24, 2018 (Source: Alex Edelman / AFP / Getty)

The movement did not create significant changes in terms of policies at the national level, even though many prominent people, including a former US President supported the cause (CNN, 2018a). This is because most of the legislative branch were receiving support and contributions from the National Rifle Association as well as pro-gun voters, who actively advocate against stricter regulations on gun control (CNBC, 2018; Salon, 2018). Nevertheless, since one year after the shooting, there have been 67 different gun control measures passed, such as raising the minimum age in purchasing a gun, enhanced background checks, confiscating weapons from at-risk individuals, and banned bumped stock to prevent modification of firearms into automatic weapons.(CBS News, 2019; CNN, 2019).

Another notable event was a one-day student strike for climate change protests in Australia, also known as School Strike 4 Climate. News reports showed that thousands of students from almost 30 cities and towns across Australia were demanding the Government of Australia take

action in addressing climate change (Science Alert, 2018; Sunshine Coast Daily, 2018; The Guardian, 2018). Some of the demands were for more use of renewable energy, saving the Great Barrier Reef, opposing Adani's coal mine, and reducing carbon emissions, which is a move that was supported by the majority of Australians (McDonald, 2018; SMH, 2018; The Guardian, 2019). Children also cited the latest climate report by IPCC (2018) that highlighted the negative impact of climate change (ABC News, 2018; EcoWatch, 2018; News.Com.au, 2018). This student movement was inspired by 15-year-old Greta Thunberg, a Swedish student who has also been staging protests in the Swedish parliament (The Guardian, 2018). The attractive protest signs (Figure 7) that the children made attracted attention from their peers and adults, providing them with more support from adults in social media (Science Alert, 2018).

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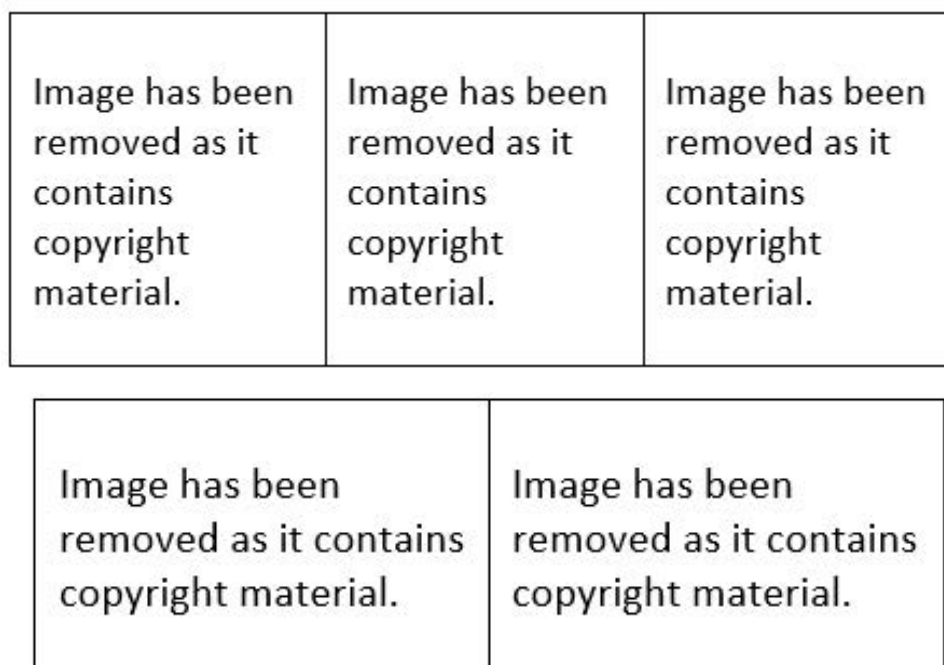
Figure 7. Signs that children made during the climate protests in Australia (Source: twitter @jelmerevers, @fadingfastash, @AssaadRazzouk, @EnviroVic, @incidentAlertMe, @Jordonsteele)

The two examples above demonstrate children who were motivated and passionate about an issue that mattered to them (gun control and climate change). Their campaigns and messages were backed with sound research and they mobilised support from a significant number of children as well as adults mainly through social media channels and digital platforms that showcased their child-led designs. They were also well facilitated and supported by influential people (celebrities, politicians, and corporations). Both events showed that the children were able to express their views, form alliances, and mobilise people. Interestingly, the climate strike in Australia was inspired by a Swedish girl, which highlighted that children are more

digitally connected now and able to discuss issues that cut geographical boundaries, class, race, and language. Furthermore, children amplified technical information about climate science using their own languages making it easier for other children and adults alike to understand.

Both events happened at the national level and received abundant support from adults, however it was not enough to deliver national policy change. This is because these children have not received support from policymakers who control the legislation process. In this aspect, children received adult support *as enablers* that facilitated them in expressing their views however this fell short on the support from policymakers *as recipients* of the advocacy process. Nevertheless, these children of today will be adults of tomorrow and by enabling participation such as this, it will create a generation of people with enhanced skills for critical thinking, communication, negotiation and decision making as well as empowering them to become active members in their community (R. Sinclair, 2004; Acharya, 2010; Checkoway, 2012).

7. Critical Research Gaps

Based on the literature review from the fields of health, environment, and governance, there are several factors that have been identified that can influence children as agents of change, and these are: (1) Children need to be motivated and passionate on the issue(s); (2) It needs to be issues that matters to them; (3) They have access to information from trusted and credible sources backed by sound research; (4) They receive support from adults (e.g. parents, teachers, or local leaders); (5) The culture and socio-economic conditions surrounding the children enables them to become agents of change; (6) Able to mobilise large number of children; (7) They are able to express their views using creative ways in their own language; and (8) There are presence of leadership qualities within the children's group.

Therefore, in the field of CCDRR, we have identified that the role of adults, including parents, is essential. This research will develop a tool that is initiated in school and will enable discussion about DRR and disaster preparedness between children and parents / care providers. Furthermore, previous study has shown that children are motivated about floods and the info is available as part of the school curriculum (Amri, 2015). The importance of developing the tool to be child-friendly is also recognised as children will need to be able to understand and able to express their views as well as have the space for the children to

influence the development of the tool. This research will also examine how culture and socio-economic conditions will influence the outcome of this tool.

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Link to Paper 2 (Chapter 4)

Amongst the studies of children as agents of change, there is little discussion on the sustainability and replicability of promoting children's participation. The literature from sectors outside DRR highlights that children will need tools and resources to support them in expressing their views to enable discussion with adults and key stakeholders, including in a family setting. However, there has been a lack of research in this area, including in the DRR field.

The review has shown the importance of the role of adults, as enablers and recipients, to have a meaningful engagement with children in order to have an informed decision-making process. According to disaster trends, the data clearly shows that this issue requires urgent attention, including at a household level. There have been many advances in DRR programming in schools and yet there remains little evidence of any influencing change in children's homes. This research therefore aimed to develop and test an innovative tool that can be initiated through schools but will lead to an increase in household preparedness. The next chapter in the form of a publication will outline the methods that have been undertaken to develop the tool using a participatory approach involving children and their parents as well as DRR education practitioners. For further information regarding the research timeframe, please refer to Figure 2. Research Timeline.

Paper 2 will be submitted to the journal *Area* it is a geographical publication that publishes articles that "shape key debates within and beyond the discipline of geography".

Chapter 4

Paper 2: Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan

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1. Abstract

Many development agencies have applied participatory processes to disaster risk reduction activities, including interventions for and with children. However, most interventions exist at the school or community level and there is a lack of participatory tools designed for households. This article documents the development of a participatory tool with children and their families to improve household preparedness in Indonesia. The process was multi-stage involving a workshop with key stakeholders, a consultation with development practitioners, group discussions with children, and focus group discussions with children and their parents. Based on these stages, a Household Disaster Preparedness Plan template was developed with an accompanying guideline.

This tool was then tested in three schools followed by family group interviews with thirteen families from the three schools. Based on the feedback from the family group interviews, all children and parents were able to complete the household disaster preparedness plan easily. By allowing participants, i.e. children and their parents, to develop their own preparedness plan, the tool -in the form of a poster- has achieved its objective to empower children and parents in defining their own preparedness actions. The poster is a low-cost material, it can be used offline (without the dependency of electricity and internet) and is child-friendly. The tool can therefore be initiated through schools and inserted into existing Disaster Risk Reduction (DRR) education programs, and possibly easily replicated for all types of hazards in any location.

Keywords: Child-Centred, Participatory, Disaster Risk Reduction, Preparedness Plan,

2. Introduction

Today, more than 2.2 billion people are children, making up almost one-third of the world's population (UNICEF, 2017c). However, in many disaster situations, children are still portrayed as passive victims with a limited role to play in reducing or responding to the risk (see Mitchell et al., 2008; US National Commission on Children and Disasters, 2010). Whilst previous studies have demonstrated the increased vulnerability of children, particularly in a developing world context (e.g. Telford et al., 2006; Pradhan et al., 2007; Fothergill et al., 2015; Fothergill et al., 2018; Krishna et al., 2018), there is now mounting evidence that children, with support from adults, can assist to protect their communities, and even save lives when disaster strikes (as shown in Gregg et al., 2006; Back et al., 2009; UNISDR et al., 2012; Suppasri et al., 2013; Haynes et al., 2015).

The first global framework on Disaster Risk Reduction or DRR (2005-2015) identified the importance of disaster resilience education for children and youth (UNISDR, 2005). The proceeding framework, the Sendai Framework for Disaster Risk Reduction 2015-2030, which has been adopted by 187 countries, reaffirmed the important role that children and youth can play by including them as one of the key stakeholder groups (UNISDR, 2015b). This is a significant step in recognizing children as key actors in disaster risk reduction, a core principle in Child-Centred Disaster Risk Reduction (CCDRR) approach (Children in a Changing Climate, 2017). CCDRR is an approach that combines child-focused and child-participation measures in DRR, this ensures their needs are considered and that they are involved in the process through meaningful engagement that captures their views, concerns and ideas.

A recent literature review by Amri et al. (2018) describes that CCDRR has been piloted in mostly developing countries, by child-focused organisations. These studies demonstrate how children can make a significant impact in building resilience, serving as risk identifier, risk communicator, and agents of change (Gautam et al., 2008; Back et al., 2009; Plush, 2009; Haynes et al., 2010; Seballos et al., 2011; Haynes et al., 2015; Amri et al., 2018). For example, children organizing campaigns to stop illegal mining in El Salvador, children's groups from migrant communities assisting the evacuation of older non-English speaking family members during Hurricane Katrina in New Orleans, US, and raising awareness of flood prevention by controlling deforestation in Eastern Samar, the Philippines (Mitchell et al., 2008; Haynes et al., 2015).

Many agencies that have applied the CCDRR approach have used participatory tools with children (Save the Children, 2007; Plan International, 2010a; World Vision, 2012; The Reality Check Approach+ Team and UNICEF, 2016). It is often assumed, particularly in practitioner reports and guiding documents, that working with children will provide knock-on benefits to families, households and the wider community (Save the Children, 2007; Plan International, 2010b; UNICEF, 2012; World Vision, 2012). It is widely accepted that research has demonstrated that the active involvement of parents is essential in order for any long-term tangible benefits at the household level (Haynes et al., 2010; Seballos et al., 2011; Towers et al., 2014). Despite this knowledge, to date there has been little engagement of parents, or guardians in CCDRR programming, or indeed household planning that actively includes parents and children.

Therefore, this article documents the development of a participatory tool to improve household preparedness from flooding in Indonesia.

3. Participatory Approach

The use of participatory approach gained popularity in the 1970s, particularly in development policies and practices where people are put at the center of development processes and initiatives (Michener, 1998). A decade later, the Declaration on the Right to Development was adopted to ensure people have the right "to participate in, to contribute to, and enjoy economic, social, culture, and political development" (United Nations, 1986). In relation to children's participation, the Convention on the Rights of the Child was adopted in 1989 following recognition that children have the right to influence the decisions that affect them (United Nations, 1989).

The purpose of a participatory approach is to build collaborative relationships within the community by involving groups that are marginalized (socially, economically, politically, and politically) in decision-making processes that affect their own lives (Guijt et al., 1998). It serves as a catalyst for the community to understand further on issues that matter to them, identifying possible ways to empower and strengthen different groups in the community, and foster independence and collaboration within the community (White et al., 1999). The participatory approach in its true form should shift the power balance between group(s) that have power with those that have less (Chambers, 1998).

Chambers (1999) also highlights that the use of participatory approach is effective and sustainable, and it involves a set of process and relationships that are inherently good.

Chambers (1999) also stresses that participants should be encouraged to take control of the initiative, accept responsibility and make decisions together on the measures to address the problems. However, others have argued that a participatory process requires a skilful facilitator, is time-consuming, prone to unequal power relationship between participants or between participants and facilitators, and requires constant monitoring and facilitation (Mercer et al., 2008). Furthermore, the importance of participants' involvement in decision-making throughout the process may also be regarded as an ineffective use of time and resources (ibid).

Participatory approaches have been mainly implemented in developing countries, originally developed in four main sectors, as described by Chambers (1994a): natural resource management (e.g. forestry, fisheries, water conservation), farming and agriculture (e.g. farming practices, livestock management, improving irrigation systems), poverty and social programs (e.g. identifying poor and marginalised people, empowerment of women, and adult literacy program), and health and food security (e.g. monitoring at-risk groups, nutrition assessment, and water and sanitation improvement projects).

4. The use of participatory methods in disaster risk reduction

Participatory approaches have been used within DRR context and adopted by many leading development agencies such as ActionAid International (2005), International Federation of Red Cross and Red Crescent Societies or IFRC (2008), and Oxfam (2012). The latest World Disasters Report highlights the participation of people at-risk in DRR will create a more inclusive, resilient communities (IFRC, 2018).

Initially, the use of participatory approaches in DRR was largely the adaptation of Participatory Rural Appraisal (PRA) tools to conduct community risk assessments (sometimes termed Participatory Hazard, Vulnerability, and Capacity Assessment or PHVCA) and plan community-based risk reduction activities (Twigg, 2015). The tool allowed the community to identify their own hazards, prioritise what needs to be addressed first, assess the capacities and vulnerabilities and identify the best way forward (ibid). This tool has also evolved beyond natural hazards, including conflict prevention, Climate Change Adaptation (CCA), and food security (Aalst et al., 2008; Gero et al., 2011; UNHCR, 2012).

However, there are several aspects that need to be considered when using PHVCA in communities. Firstly, people generally identify natural hazards as a lower priority compared to everyday risks (for example, food security, road accidents, school tuition, gang violence

etc), which often contradicts with the aims of DRR programs run by NGOs. Reviews of participatory risk assessments conducted by the Red Cross and many NGOs showed that women, men, boys and girls (when asked separately) have different lists and priorities, however rarely did these groups listed serious hazards such as earthquakes, floods, and tsunamis on the top of the lists (Haynes et al., 2010; IFRC, 2014). Secondly, most people consider natural hazards as an "acceptable risks", due to the limitation of choices or a willingness to live in a location to follow their livelihood or cultural attachment (B. B. Brown et al., 1992; Mishra et al., 2010).

Therefore, prior to taking participatory activities, participants need to be properly introduced to the concept of disaster risk reduction and have a good understanding of the risks surrounding their environment and how this can influence their lives and wellbeing, in the short and long term (Aalst et al., 2008; IFRC, 2014). However, and most importantly, NGO's and researchers, who utilise participatory approaches must ensure they understand the wider socio-political and cultural factors constraining interest and involvement in DRR activities. They must remain adaptive to the needs and wishes of communities and be willing to change their research focus and development program to suit (Haynes et al., 2015).

Participatory approaches have also been applied in developed countries, including in DRR projects, for example the Red Cross's Pillowcase Project and the Survive and Thrive program in Victoria, Australia. The Pillowcase Project encourages children to be active participants in preparing for disasters. This approach aims to help students understand and discuss the importance of being prepared, prepare themselves on what to do before, during, and after an emergency, and also identify themselves on what to pack in an emergency kit by using pillowcase (Tomazic, 2017).

The Survive and Thrive program is a school-based bushfire education in Victoria, Australia aimed at providing essential knowledge for children in Grade 5 and 6 and encouraging them to conduct student-led activities related to bushfire safety with their parents, students at other schools, and members of the broader community. According to recent evaluation by Towers et al. (2018), the program has been deemed successful in increasing knowledge of children as well as empowering children to communicate their knowledge with their families at home.

The use of participatory tools also benefits the monitoring and evaluation (M&E) process, as they involve the community in assessing the measures being undertaken and support them to

develop their own set of recommendations on how to move forward (World Bank, 1996). Participatory M&E processes change the paradigm where local people are not just the source of information and instead becoming active participants and stakeholders in the entire process (ibid). There have been a few publications discussing the use of participatory M&E in DRR activities. Villanueva (2011) suggests using the principles of ADAPT (Adaptive, Dynamic, Active, Participatory, and Thorough) and developed a list of indicators to assess effectiveness and efficiency in order to document the changing environment within a community that are implementing DRR and CCA activities. Twigg (2004) and Provention Consortium (2007) describes the steps to conduct an M&E, highlighting the challenges and factor of success in each step.

Unfortunately, there remains a lack of peer-reviewed studies on the use of participatory M&E tools in DRR-related activities (Aalst et al., 2008). There have been many evaluation reports from humanitarian organisations on DRR and climate change adaptation programs, however most of these evaluations involved communities as the source of information rather than active participants (for examples, see Chamberlain, 2014; Australian Red Cross, 2015; UNICEF, 2017a). In Uganda, an evaluation was conducted on a project related to climate variability, food, and health security, where the project stakeholders (i.e. project team, farmers, district officials and local NGOs) involved in developing their own monitoring framework (IIRR, 2012)

The use of technologies by using photography and video documentations has also been used in this process to assist with communication and dialogue, and capture evidence (Lunch, 2007; Plush, 2009; Haynes et al., 2015).

5. Participatory approach with children in building resilience

Many participatory tools described previously have been adopted to be undertaken with and for children, as part of the CCDRR approach and there has been evidence of positive results (Amri et al., 2018).

Involving children in the participatory process requires a specific skills set as well as ethical considerations, particularly for marginalised children or children in the aftermath of a disaster (Barker et al., 2003; Sime, 2008; O'Mathúna, 2010). The primary aspects in disaster research with children is to ensure the protection of children is a core principle (O'Mathúna, 2010). Furthermore, measures to protect child participants from the consequences of disaster and the research itself should be communicated clearly and consciously to the child as well as the child's guardian (Sime, 2008). As with any participatory processes researchers and facilitators

must have a deep understanding of the wider socio-cultural and environmental context surrounding the children, including the power relations between children and the people surrounding them (Barker et al., 2003).

The CCDRR toolkits that have been developed by child-focused organisations consist of a number of tools for conducting risk assessment with children, including the use of mind maps, seasonal calendars, disaster histories, hazard ranking, and developing action plans for the community. These tools were adapted by child-focused organisations from PHVCA tools to be used for and with children by using fun, child-friendly language and designs. The ethos of participatory practice remains central, however, and children must have an active role in designing, implementing, and evaluating the activities (Save the Children, 2007; Plan International, 2010a; World Vision, 2012; The Reality Check Approach+ Team and UNICEF, 2016). These methods should not only encourage children to share their views but are also empowering them to participate in a wider societal decision-making processes (Punch, 2002; Boyden et al., 2012; O'Kane, 2013). Moreover, the design and use of language must need to be easily understood by children as well as adults, in order to enable effective risk communication (Eisenman et al., 2007; Mitchell et al., 2008; Ronan et al., 2014).

The ladder of citizen participation was developed by Arnstein (1969), with eight rungs on the ladder indicating the level of citizen partnership and control and the top rung comprise of marginalised citizens obtain the power to influence in the decision-making process (Tritter et al., 2006). Hart (1992) adopted the ladder of participation and developed the eight levels of young people's participation, from non-participation (comprising of manipulation, decoration, and tokenism) to child-initiated and shared decision-making with adults.

Many studies have shown that meaningful participation is where children are working together with adults, provided a safe space for discussion and sharing views, respecting each other's perspectives, building consensus, and then making decision based on the informed account of each other's perspectives (see R. Sinclair, 2004; Alison et al., 2006; Frank, 2006; Oliver et al., 2006), which is aligned with the top rung of Hart's ladder.

In order to achieve the highest level of participation, there are several elements that need to be in place. First, children need to be well-versed on the topics that they want to be engaged in and they need to be motivated, passionate and backed by a sound research. Secondly, the support from adults is important, as the person that will support the children in expressing and channelling their views and as recipients that will listen and consider the children's voices

(Ebreo et al., 2002; R. Sinclair, 2004; Walker, 2017). Furthermore, critics have highlighted that the mantra of participation has become the new norm and thus the results of so-called "participatory initiatives" have been mixed. Much consultation termed participation is really just the delivery of already decided outcomes or programs and not meaningful participation in decision making processes (Cooke et al., 2001; Simpson, 2004). There will always be unbalanced power dynamics between facilitators and the community as well as within the community itself (e.g. between children and adults) and therefore facilitators should be flexible and able to use various methods that are respectful, address the power differential and reflect the diversity in the community (Cooke et al., 2001; Powell et al., 2009; Wickenden et al., 2014).

Children should be viewed as active participants who can influence the decision in research (Powell et al., 2009; Wickenden et al., 2014). Therefore, the research team should be able to identify at which stage the children can provide meaningful contribution and how the children can express their views in a safe and constructive environment (Veale, 2005; Greig et al., 2012). In addition, it is critical for the researcher to become good communicators and build rapport with the children so that the children are comfortable to participate in the research (Punch, 2002; Powell et al., 2009; Boyden et al., 2012).

In addition, facilitators of children's participation should understand how community spaces and spaces for children's lives are co-established by the actions of adult stakeholders, as the relations between children and adults and the enabling environment are key in deciding what topic children speak about, which children's voices get heard, and how it influence the decision making process (Mannion, 2007).

Lastly, children will require tools and resources to support them to engage with adults and help them in the process of discussion (Save the Children, 2005; O'Kane, 2013). For example, children in the Philippines uses video that they produced by themselves to trigger discussion with village heads and key leaders in their communities regarding illegal mining, flooding, and deforestation (Haynes et al., 2015). Another example in Moyamba township, Sierra Leone, children were using the local daily radio programme to campaign for road safety, issued a petition, and were successful in lobbying the local government to fix a bridge that was regularly used by children to go to school (Plan International, 2010b).

6. Participatory Process in Developing a Household Preparedness Tool

The idea in developing a participatory household preparedness tool is a continuation from an earlier study by Amri, Bird, et al. (2017) regarding challenges on the implementation of DRR education in Indonesia. Based on the Amri, Bird, et al. (2017) study, the current efforts in promoting children as agents of change in their homes is hampered as most interventions only include children in school and in communities, although the intention for many is to reduce household risks to disaster, they do not actively include parents or develop tools to be used by children with their parents.

Therefore, this research focused on developing a tool, disseminated through schools, to create a household preparedness plan for children and parents where they can interact together as a family. The tool engages children and their parents to actively plan and exchange views together. Enabling, all household members to understand and appreciate the roles and responsibilities of each other and to work together in building disaster preparedness.

Mercer et al. (2008) highlighted that some of the advantages in using participatory approaches are that it enables rediscovering knowledge of their own community and improved dialogues between stakeholders. These two areas fit well with the issues identified from earlier studies where children's participation in DRR is still limited in schools and in their communities, and not practiced at the household level even though children have their own unique perspectives and concerns as well as specific needs (Amri, Bird, et al., 2017; Amri et al., 2018).

A series of actives were undertaken to develop a tool in a and effective way (Figure 8, Please see page 7 for research timeline.). The tool was developed using a systematic and multi-stage approach. Phase 1 began with a workshop with key stakeholders for consultation, Phase 2, encompassed the tool development process, consisting of a desk review followed by a combination of participatory process, involving direct consultation with experts in the relevant field, group discussion with children, and then focus group discussion with children and their parents (Figure 8).

In the early stages of the research, the concept of the tool was defined. Firstly, the aim was to empower children to be able to influence their parents and positioned children as an important actor in building resilience (Mitchell et al., 2008; Mitchell et al., 2009; Seballos et al., 2011; UNISDR et al., 2012; Haynes et al., 2015; UNISDR, 2015b).

Figure 8. Tool Development Process

The tool also needed to consider the Indonesian context, as a rapidly growing, developing country, where:

a) more than 25.9 million Indonesians live below the poverty line (World Bank, 2018a);
b) there is significant and growing hazard exposure to a range of geological and metrological hazards,
c) a large proportion of the population is without internet and even electricity – with internet users in Indonesia at 54%, and 16% of total households do not have access to electricity (ADB, 2016; APJII, 2017).

Furthermore, in order to go beyond the isolated program approach of much child based DRR education work in Indonesia the tool also needed to be scalable and sustainable (Amri, Bird, et al., 2017; MOEC, 2017b). Therefore, the design of the tool took on board the following considerations:

1) Low cost
2) Can be used without an internet connection and electricity (offline)
3) Can be initiated through schools and inserted into existing DRR education programs
4) Easily replicated for all types of hazards in any locations
5) A child-friendly design and language
6) Enables children to engage with their parents

Based on the above criteria, it was decided to develop a household preparedness plan in the form of a poster that serves as a school assignment. This fits all the criteria listed above. The poster development underwent several steps: desk review, consultation with practitioners and children and then FGDs with children and their parents. Afterwards, the tool was tested in three schools and feedback were gathered on the use of the tool using a family group interview method.

6. 1. Identifying the research locations

Prior to the development of the tool, a consultative workshop with key stakeholders was undertaken in December 2015. Participants of the workshop were government agencies from the education and disaster management sector at provincial and central government level, NGOs, private sector, donors and schools. The workshop resulted in the development of

strong relationships with key agencies, particularly with the government agencies, as well as feedback and partnership to co-develop the research design.

After the workshop, separate discussions were made with the Provincial Disaster Management Agency, NGOs working in Jakarta, and several school principals. The initial, research design was to select three schools with different characteristics, including a school with a government-led DRR education program, an NGO-led DRR education program, and a school with no intervention from an outside agency related to DRR. Noting that schools in Jakarta have integrated flood and fire awareness and education in their local curriculum (Amri, Bird, et al., 2017).

Three schools were selected based on the recommendations from the Provincial Disaster Management Agency and NGOs working in Jakarta (Table 8). When approached, the school principals and personnel were very supportive and interested to take part in the research.

Table 8. Characteristics of target schools for pilot testing

	School A	School B	School C
School Name	SDN Sunter Agung 12 Pagi	SD Kembang	MI Ash Shiddiqin
School Type	Public	Private	Private – Islamic
DRR education program	Government-supported	No outside support	NGO-supported
Exposure to DRR education program	A one-day orientation with all the students and followed by a disaster simulation the following day	Limited education through curriculum	Ongoing for more than a year, consisted of trainings, orientation for students, and school drills
Average family class	Middle income	Mid to upper high income	Mid to low income
Exposure to floods	Moderately exposed, sometimes flooded every year (up to 1 meter)	Less exposed, rarely flooded, access to school disrupted	Highly exposed, always flooded every year (up to 1.5 meters)
School curriculum	National curriculum	Modified curriculum	National curriculum
School Budget Size	Moderate	High	Low

6. 2. Developing the concept of a participatory household preparedness tool

Before involving participants in the participatory process, careful preparation and understanding of the context is critical (Mercer et al., 2008). Therefore, a literature review and consultations with practitioners and a sample of children were the initial steps.

A review of scholarly articles and grey literature was undertaken in order to identify the key components that are commonly included in a household preparedness plan. The focus of the household preparedness plan was floods, as this is the most frequent hazard in Indonesia,

with more than 4,000 incidents causing almost 2,000 casualties between 2005-2015. This hazard will be further exacerbated due to the impact of climate change (BNPB et al., 2015; BNPB, 2016a).

A search through internet database were undertaken using the following keywords: "household preparedness plan" in September 2015. This search generated 11,6 million and 62,100 results through Google Search and Google Scholar databases. In addition, a search through the database of PreventionWeb's "document & publications" and "education materials" sections using the same keywords generated 1,379 and 142 results. Due to the large number of results, screening criteria were undertaken to ensure:

a) The reference comes from relevant and credible agencies (e.g. government agencies, UN agencies, or leading child-centred NGOs) or peer-reviewed journals
b) The reference focuses on the household level or child-centred preparedness
c) The reference focuses on preparedness measures for natural hazard or multi-hazards
d) English language[5]

The initial screening was conducted for the first 1,000 articles with only 20 articles deemed applicable according to the inclusion criteria, as listed in Table 9. As the relevancy of articles had diminished well before this point, it was considered safe to assume the remaining articles would also be deemed irrelevant.

Table 9. List of documents related to household preparedness plan

No.	Author(s) and Year of Publication	Country	Type of Hazard	Type of publication and topic
1	American Red Cross (2009)	USA	Multi-hazards	Preparedness plan template
2	American Red Cross (2009)	Australia	Multi-hazards	Preparedness plan template
3	Becker et al. (2012)	New Zealand	Earthquake	Journal article regarding earthquake preparedness plan
4	Becker et al. (2013)	New Zealand	Earthquake	Journal article regarding earthquake preparedness plan
5	Bethel et al. (2011)	USA	Multi-hazards	Journal article regarding preparedness plan for medically vulnerable populations
6	CDC (2012)	USA	Multi-hazards	Magazine Article regarding preparedness for public health emergencies

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[5] English language was chosen as the initial search on Bahasa showed no relevant publication available

No.	Author(s) and Year of Publication	Country	Type of Hazard	Type of publication and topic
7	CDE (2012)	Indonesia	Multi-hazards	Guideline for school preparedness
8	Department of Health and Environment of Kansas (n.d.)	USA	Multi-hazards	Preparedness plan template
9	FEMA (2015)	USA	Multi-hazards	Preparedness plan template
10	GADRRRES et al. (2015)	Global	Multi-hazards	Guideline on comprehensive school safety approach
11	Government of Canada (2012)	Canada	Multi-hazards	Preparedness plan template
12	Kapucu (2008)	USA	Hurricane	Journal Article regarding hurricane preparedness at household level
13	Kim et al. (2010)	USA	Hurricane	Journal Article regarding hurricane preparedness at household level
14	Levac et al. (2012)	Global	Multi-hazards	Journal Article regarding literature review on household preparedness
15	Ministry of Civil Defence and Emergency Management New Zealand (n.d)	New Zealand	Multi-hazards	Preparedness plan template
16	Ministry of Education Republic of Maldives (2009)	Maldives	Multi-hazards	Guideline on school emergency operations plan
17	Queensland Government (n.d.)	Australia	Multi-hazards	Preparedness plan template
18	Ready Marine Corps (n.d.)	USA	Multi-hazards	Preparedness plan template
19	UNISDR (2010)	Global	Multi-hazards	Guideline on school preparedness
20	Whittaker et al. (2013)	Australia	Bushfire	Journal Article regarding household preparedness and response towards bushfire

Results from the desk review highlight six recurring themes in all reviewed household preparedness plans (Table 10). One of the key findings from the review of existing household preparedness plan templates was that most templates contain pre-determined actions. Only two templates from American Red Cross (2009) and Department of Health and Environment of Kansas (n.d.) provides an open box where participants can tailor their actions and

responses. The absence of an open box restricts participants to identify actions that suit their circumstances.

Table 10. Components in Household Preparedness Plan

NO.	COMPONENTS	FINDINGS
1.	Assembling the emergency kits (e.g. 72-hour supplies of food, water, and medicines)	Referenced in most documents except in FEMA (2015) and Queensland Government (n.d.)
2	Identifying things to do when disaster strikes	Referenced in all documents
3	Identifying things to do to mitigate disaster risks and for recovery	Not referenced in all preparedness plan templates
4.	Creating evacuation map and routes	Referenced in most documents except in American Red Cross (2009), Becker et al. (2012), and Bethel et al. (2011)
5.	Important contacts (e.g. emergency phone numbers, out-of-town family, neighbours, physician)	Referenced in all documents
6.	Person responsible to collect children from schools	Only referenced in GADRRRES et al. (2015), Ministry of Civil Defence and Emergency Management New Zealand (n.d), Ministry of Education Republic of Maldives (2009), UNISDR (2010), and Government of Canada (2012)

Almost all documents highlight the importance in assembling an emergency preparedness kits, knowing where to go when disaster strikes (identifying safe haven and evacuation routes), and listing important phone numbers to contact during emergencies, including contacts for emergency services, out-of-town contacts, and neighbours, friends, or relatives.

Notably, all templates focus on things to do when disaster strikes, however, they have limited or no information regarding procedures on how to mitigate disaster risks (prevention) and after disaster strikes (recovery). This is a missed opportunity, as people can be more resilient if they take action to mitigate disaster risks as well as have the ability to recover quickly when disaster strikes (IFRC, 2013a; UNISDR, 2013; IFRC, 2016).

Only five documents referenced the importance of identifying additional people responsible to collect children if parents are unavailable. This is an important aspect to prevent children being separated from their parents. This is a significant issue in post disaster settings, such as in Aceh Tsunami 2004, Haiti Earthquake 2010 and Nepal Earthquake 2015 where significant

numbers of children were separated from their parents with no means of contact (ICRC, 2004; Doore, 2015).

6. 3. Designing the household preparedness tool

Once the key components were identified, the design process commenced. A design company that specialises in developing materials related to disaster disk reduction, and for children, was selected to assist (www.box-breaker.com). The first draft of the household preparedness plan template (Figure 9) was created using the five main components above in size A2 (594 x 420 mm). The A2 size was selected in order to fit all the components required for a household preparedness plan, the cost of printing a one-sided A2 poster remains affordable (less than US$ 2), it was still easy for children to carry from school and was still practical to be used at home (e.g. can be put on the wall). The poster was laminated to withstand accidental spills and water damage - as it is intended for households in flood prone area.

Figure 9. First draft of the household preparedness plan template

The first draft was made based on the interpretation from the designer. After reviewing it again, several inputs were made: 1) revising the icon in each section to describe further on the corresponding section; 2) adding the Bahasa Indonesia language in each section avoiding jargon or technical terms; 3) expanding the family setup to also include other vulnerable groups (elderly, people with disabilities, and pets). Based on these inputs, the second draft was produced (Figure 10).

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Figure 10. Second draft of the household preparedness plan template

In the second draft, the poster was divided into eight components: 1) Preparing your own household emergency kit; 2) What to do before the rainy season starts (disaster mitigation); 3) What to do when flooding is going to happen (disaster preparedness); 4) Do's and don'ts during and after flooding; 5) Evacuation routes and a safe haven; 6) Important phone numbers list; 7) Alternate person who can pick up from schools and point of contact; and 8) Signatures of all household members. In addition, websites and social media channels were included where children and parents can gather more information if needed. These are government-managed websites and social media channels that provide information regarding flood preparedness, sourced from the NDMA, the fire brigades, the weather office, and police station. The second draft was then presented and consulted with practitioners and school children.

6. 4. Consultations with practitioners and children

Five children from a public elementary school in Jakarta from previous research and four DRR practitioners from different institutions, with experiences in designing education materials for children, were invited to provide comments and feedback on the draft design of the poster (consulted separately).

The consultations covered several guiding questions:

a) What do you think about the design? Do you like it? Is it child-friendly?
b) What do you think about the wording of the questions? Is it easy to understand?
c) What do you think about the poster material and size?
d) What do you think about the components that are being asked? Does it cover the most essential information required in a household preparedness plan?

e) Is there anything else you would like to see included?

These questions were asked to the practitioners in one-on-one discussions and with the children in a group consultation setting. Each individual consultation ranged between 30 to 60 minutes and the group consultation with children took approximately an hour.

Feedback from the consultation process is outlined below:

i. Design of the poster

The design was favourable by the children. Practitioners commented that the pet animal should be removed as children may have a distinctive preference to variety of pet animal (e.g. cats, dogs, turtles) and some children may dislike certain type of pet animals. This view was also reinforced based on the views from the children.

Most of the practitioners noted that the design of the family was "too Islamic". Even though the majority of Indonesians are Islamic, it was felt that the poster needed to be inclusive to all to ensure everyone is comfortable looking at the design. Noting as well that most Muslims in Indonesia are moderate and that most women wear a hijab or veil because of convenience and fashion (Wanandi, 2002; Wagner et al., 2012).

Some practitioners also suggested using universal symbols, including the symbol for assembly points rather than an exit sign and the evacuation symbol.

ii. Wording of the poster

Both practitioners and children were happy with the choice of words and felt it was easy to understand by children and adults. For example, the poster used: "things to do before the rainy season starts" as a substitute for "mitigation", "things to do when there is going to be a flood", as an alternative for "early warning signs", and "things to do during and after floods", as opposed to "disaster recovery".

iii. Materials and size of the poster

The poster is laminated to be water-proof which meant that the children or parents could only use permanent marker and not regular pens or pencils. Both groups were happy with the size of the poster.

iv. Components of the poster

There was no suggestion to change the components of the poster. Both groups thought that the eight components were sufficient to represent measures that are essential for a household preparedness plan. However, consultation with the practitioners and school children revealed

that more information was required by participants in order to stimulate their knowledge and enable them to complete the poster effectively. Therefore, in order for the poster to be self-administered it was felt that it needed to be accompanied by a simple booklet. This was a very important improvement as the intention was for the poster is to be self-administered by any family and easily scaled up, and thus should not have to rely on the availability of teachers and/ or disaster management personnel to provide guidance. The booklet was then developed using information primarily gathered from a series of FGDs with students and their parents.

Based on the feedback from the consultations, the third design of the poster was published and used for pilot testing (Figure 11). Changes were made to include no pets, the mother was not wearing a hijab, and the exit icon was swapped with an assembly point icon.

Figure 11. Third draft of the household preparedness plan template

6. 5. Focus Group Discussion with students and their parents

Three Focus Group Discussions (FGD) in three schools were organised with students and their parents to understand their perspective towards risks, common practices to anticipate disaster risks, and participants' expectation for prevention, mitigation, and preparedness measures to reduce risks. The FGDs were facilitated by the researcher and took 3-4 hours.

Each FGD consisted of 15 children (Grade 4 and 5) and 15 of their parents/ carers. The researcher requested for the school teachers to select the participants (children and their parents/carers), with the criteria of trying to ensure groups were gender balanced and consists balanced number of grade 4 and 5 students. Two schools conducted the focus groups in a

classroom, and one school conducted the focus group in the Kelurahan (village) hall as the school classrooms were considered too small to contain all participants comfortably.

Since the start of the FGD, participants were divided per age groups and sex: boys, girls, and mothers. There were no male participants from the parents' side, due to two possible factors: two of the FGDs were conducted during weekdays and the topic related to children in school is generally falls into the responsibility of the mothers. In one FGD (that happened during weekend), there was one father who initially joined however then he requested to leave because he was not comfortable to be in the groups where almost all of them were women.

FGD participants were briefed on the nature of the research, including its purpose and ethical measures. Participants were also asked for their permission to record the discussion. Most participants were active in the FGD and shared their own perspectives and experiences.

A list of guiding questions was developed and structured in a systematic way. Questions regarding the type of disasters -whether they experienced it themselves or saw it from the news- was raised in the beginning of the FGD and participants then requested to briefly share their experiences in a relaxed situation. Each group was asked to list down the type of disasters that they know- and then each group listed down the top three disaster types that they consider were most likely and least likely to happen. Then the facilitator trigger discussion on the difference between hazards and disasters, including the meaning of risks, vulnerability, and capacity. This is to ensure that participants have the same understanding of risks and are comfortable in discussing disasters. At the end of the FGD, participants were asked regarding the things that they need to do to anticipate flood risks (before, during or after floods).

The audio recording was transcribed verbatim and the transcripts analysed using a Grounded Theory method. This method was selected since studies assessing perspectives toward disaster risks among different groups are still limited. Therefore, it is an appropriate approach to construct new theories and to understand new trends in research (Greig et al., 2012).

This theory provides a systematic yet flexible, rigorous, and comprehensive approach for collecting and analysing data in qualitative research (Bryant et al., 2007b). The theory allows the researchers to analyse the data with an open mind not limited by previous theories (Mardis et al., 2014).

The coding process was completed in three stages, as per recommendations from Bryant et al. (2007a):

(1) Initial coding was completed to define the list of actions that need to be undertaken if flood is approach, as stated by each group.

(2) Focussed coding involved a deeper analysis of the initial coding structure where each comment was classified in terms of whether it related to measures associated with: a) preparedness, b) prevention and mitigation, and/or c) specific related to children;

(3) Theoretical coding through sorting the group results to build a cohesive description of the actions that can be taken to prevent, mitigate, and prepared for disaster risks with the specific focus on children needs.

During FGD, participants shared their experiences when dealing with disasters, particularly on floods. Participants also shared their perspectives on list of actions to anticipate flood risks. Overall, 104 activities were recorded from 3 FGDs. Similar activities were then classified into a specific category. After screening, 17 unique categories were developed (Table 11)

Table 11. List of actions (per category) from each group (boys, girls, and mothers' groups)

No.	Categories	Frequency				Specific Activities
		Boys	Girls	Mothers	Total	
1	Protecting the children	6	7	8	21	*"Don't play too far away", "communicate clearly with children on what to do when there is flooding", "stay close with parents", "each child knows their personal data in case they gone missing", "doing swimming lessons", "not playing with the floodwater", "avoid power source", "knows contact details of parents (including address) as well as contact details for relatives who lives in a different area", "do not fight with friends", "choose friends who are nice and polite", "restrict children to play with other kids that behave poorly", "watch our kids closely", "educate children with religion and politeness", "place children with the people that you trust", "coordinate with the school authorities"*
2	Protecting valuable items	3	5	4	12	*"Items that are related with school and work should be placed in a safe place", "store school books in the cupboard", "place important stuffs in a high and safe place", "place important stuffs on the second floor", "save electronic appliances"*
3	Prepare evacuation plan	5	3	5	12	*"Prioritise safety before floods occur", "Everybody need to know where to go"*

No.	Categories	Frequency				Specific Activities
		Boys	Girls	Mothers	Total	
4	Stay healthy	3	3	4	10	*"Eat healthy food". "Check your health regularly", "take vitamins"*
5	Clean the surrounding environment	2	3	3	8	*"Clean the gutter regularly", "do not litter", "clean it together with other neighbourhood members"*
6	Assemble emergency kits	3	2	4	8	*"swimwear, mattresses, life vests, torch, spare batteries, radio, sat phone, bucket and scoop, medicines, first aid kit, power bank, blanket", "these kits should be stored where everyone knows where it is", "Prepare spare clothes and footwear"*
7	Protect important documents	2	2	2	6	
8	Stockpile resources	2	2	1	5	*"foods", "clean water"*
9	Road safety	1	1	2	4	*"always obey traffic rules", "park in a safe location", "routinely check your vehicles"*
10	Monitor the situation	1	2		3	*"check the news", "check outside"*
11	Prepare for cleaning the house		2	1	3	*"do it after the flood is over (make sure there will be no more flooding)", "buy cleaning products"*
12	Develop emergency contact list	1		1	2	*"list contacts of family members and relatives to get help and the list is stored in a place that everybody know"*
13	Turn off electricity	1	1		2	
14	Prepare rubber boats	1			1	
15	Create levees			1	1	
16	Do rainwater harvesting	1			1	
17	Prepare for mass feeding kitchen			1	1	
	Overall	32	33	37	104	

Following the analysis of the FGD data, the booklet was developed to provide further information and clarification on the measures that should be taken to reduce household risks from floods (Figure 12). Several references from Indonesian emergency service providers were used including: Dinas Pemadam Kebakaran & Penanggulangan Bencana (n.d.) –the Jakarta Fire Brigades-, Polda Metro Jaya (n.d.) –the Jakarta Police-, and Yakkum Emergency Unit or YEU (2015). A global document on key messages on disaster risk reduction for the public, published by IFRC (2013a) was also used as reference.

Figure 12. Guideline to complete the poster

Some of the additional actions that were sourced from the FGD discussion were: 1) coordinate with school authorities; 2) don't allow children to play too far from the home; and 3) store power bank for mobile phone in the emergency kits. These actions were rarely listed in the existing literature.

This booklet serves as a reference for children and parents to select which measures are appropriate to their situation. The booklet also outlines that children and parents can select other activities not listed in the booklet that may be appropriate to their situation and previous practices. The booklet was also designed with child-friendly language and instructions so that users are able to self-administer the poster.

6. 6. Reflections on the use of the tools

Family group interviews were undertaken with 13 families from the three schools between June to July 2016, one month after the posters were completed, with questions asking about their experiences in using the poster and the booklet. The family group interviews were audio recorded and transcribed. Data from the transcripts were analysed using a hybrid approach, that utilised a combination of Grounded Theory and Content Analysis methods (Kluge, 2000; R. B. Johnson et al., 2019). This meant that the data was coded for themes that the research team expected would be important such as: 1) things to do before, during, and after a disaster; 2) assembling preparedness kit; and 3) safe evacuations. However, the research team was also mindful to allow data to emerge and introduce new themes that were previously unknown. .

Based on the interview with the families, all children were comfortable in completing the assignment with the poster. The level of participation of parents varied, with some working only with their mother or father, and some had their siblings involved. However, the majority showed the completed poster to both parents, as highlighted by a child from SD Sunter Agung:

"My dad helped me in filling the poster, and then we showed it to everyone in our house"

Participants felt that the poster had generated a good level of interaction and discussion within families as highlighted by a conversation exchange with a girl from SD Kembang (D) and her mother (M):

"D: it was difficult when filling the actions on the things to do during and after floods... Oh, but it is not difficult, it is because my mom told me that I must fill the poster in order (filling it in a chronological order: before, during, and after floods), meanwhile I want to do the easy one first...

Researcher: And then, are there things that are difficult in the poster (asking to the mother)

M: Hmm, not really, there is one that when we discussed on what should we include in assembling the disaster preparedness kit, and then I said to include snacks but D then thought snacks are chocolate or other unhealthy foods but then we agree that it should be snacks that are healthy"

From the interviews, there were no accounts of children expressing difficulties in completing the Household Preparedness Plan. However, some children experienced difficulties in creating the map of evacuation and asked one of their parents to assist in drawing it.

"it is difficult to draw the map (when asked about which sections of the tool that was difficult for them to fill). My dad helps me draw the map for the evacuation route to the safe location"

Children also explored other ways of developing the evacuation plan, by consulting with the relevant authorities or using technologies, as highlighted by two children from SD Kembang:

"We did not know where the safe locations were, so we asked our security guards [in the housing complex] first" said a girl from SD Kembang

"It was easy to fill in the poster ... My brother helped me when drawing the evacuation routes, and we used google map first" said a boy from SD Kembang

Based on the interviews, all participants felt comfortable in using the poster as well as using the booklet that helped them to complete the household preparedness plan. Participants expressed that the booklet was easy to understood and useful for them as they can read the example actions that were listed in the booklet and then choose which ones that suitable for their home. Moreover, the booklet helps the children to discuss it with their parents, as mentioned by a girl (N) from SD Sunter Agung 12 Pagi with her father (F) and the researcher (Researcher):

"Researcher: Did you read this booklet?

N: Yes, I read it, my brother, and my father (read it too). I found it helpful. So, I read it first and then choose which one that is suitable, and then I asked to my mom and dad whether it is correct or not..

F: For things like this, usually the children end up to me and asked what I think. However, since the beginning, I do not want to intervene (much). All I want is to listen what she thinks and finding out if she understood the questions… We are quite used to be involved in helping our child on her homework, so this is nothing new for us.. because for this type of homework, children cannot finish it by their own and so we (the parents) need to be involved and then we became familiar as well with the homework.

7. Reflections on the use of participatory approach

Participatory approach is a technique to build collaborative relationships within a community by empowering all participants to be involved in the decision making process that affect their own lives (Chambers, 1994b; Guijt et al., 1998; Chambers, 1999; White et al., 1999). In this case, the development of a Household Preparedness Plan template is designed as a participatory tool where children and parents can develop their own disaster preparedness plan at the household level. The primary features of the template is that it fosters dialogue between children and parents and stimulates discussions among them to decide on the most appropriate ways to protect them from disaster risks, according to their perspectives, experiences, and capacities. Furthermore, the process in developing the template also used a

participatory approach where various stakeholders, i.e. practitioners, children, and parents, were involved throughout the design process.

In the end, a combination of top-down (i.e. workshop with key stakeholders and a literature review) and bottom up (consultation with children and their parents) were undertaken and arguably provided a more effective process. The workshop with key stakeholders resulted in a good rapport, particularly with key government agencies and NGOs, as well as assisting in identifying the research locations and partners. The initial workshop also assisted the researcher in understanding better the context and situation regarding DRR practices, particularly involving children. This is a key step to use in the initial stage of participatory approach process, especially when involving children (World Bank, 1996; Chambers, 1999; White et al., 1999; Save the Children, 2005; Hart, 2008; Molina et al., 2009; Percy-Smith et al., 2009). Reflecting on Hart's ladder of participation, this research uses the sixth rung of the ladder, where the intervention was adult-initiated, and the activities involved shared decisions with children. According to (Hart, 1992), this is considered as true participation and utilised in many community-led projects.

The desk review phase helped in assessing current practices in developing household preparedness plans and defining the most essential parameters that need to be included. Five main parameters were identified, consisting of: 1) Assembling the emergency kits (e.g. 72-hour supplies of food, water, and medicines); 2) Identifying things to do before, during, and after emergencies; 3) Creating evacuation map and routes; 4) List of important contacts (e.g. emergency phone numbers, out-of-town friends, family, neighbours, physician); 5) Person responsible to collect children from schools. These parameters also align with the global key messages on preparedness developed by the IFRC (2013a).

Results from the desk review also assisted in developing the first draft of the household preparedness plan template and made it easier to consult with practitioners and children to collect their feedback, regarding the design, use of words, material, and components of the template. Feedback from the practitioners and children were accommodated and changes in the design and it also highlighted the need for an accompanying guideline to help participants in completing the template.

The FGD in three schools involved 45 children and 45 parents where a range of topics were discussed including their current practices in before, during, and after floods. The booklet then

was developed by combining information from disaster management agencies' guidelines (from the fire services, police, and NGOs) and with the results from the FGD.

Both tools (the template and the booklet) allow participants to decide their own actions that are suitable with their situations and capacities. This fits well with the principle of participatory approach, as highlighted by White et al. (1999) where it acts as a catalyst for the community (in this case, a family) to decide on the most appropriate actions to anticipate and reduce disaster risks. By providing power for the community to discuss and decide, this approach provides a more effective, relevant, and sustainable approach, as suggested by Chambers (1999) and enabling children participation will resulted in empowering and enhance self-esteem, enhance children's skills, promote children's protection, improve services, and upholding children's rights (R. Sinclair, 2004).

Feedback from the family group interviews showed that participants are able to complete the poster with no significant difficulties. Some of the children interviewed mentioned that there were difficulties in drawing the evacuation map, however they received helped from their parents, which is aligned with what the tool intended to do, fostering collaboration between children and parents in making a disaster preparedness plans together.

8. Conclusions

Utilising participatory techniques in designing a tool for children and parents to come up with an agreed plan has been useful to foster dialogue between the two groups, stimulate discussions, as well as raising the awareness on the importance on the role of each individual at home, including children.

Reviews from previous practices has shown that most disaster preparedness plan templates were not participative and were designed to promote a top-down approach with pre-determined preparedness actions. This tool provides space for household members to learn and work together to decide on the most appropriate actions based on their situations and capacities.

Prior consultations with practitioners, children, and parents were also useful to decide and validate on the design, use of words, materials, and the components that needed inclusion and consideration for the tool. Based on the feedback from the family group interviews, all children and parents were able to complete the household disaster preparedness plan easily.

By allowing participants, i.e. children and their parents, to develop their own preparedness plan, the tool -in the form of a poster- is able to achieve its objective to empower children and parents in household disaster risk reduction. The tool is low cost and offline (without the dependency of electricity and internet), child-friendly, can be initiated through schools and inserted into existing DRR education programs, and easily replicated for all types of hazards in any locations.

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Link to Paper 3 (Chapter 5)

The previous chapter (Chapter 4/Paper 2) documented the development of a household disaster preparedness tool using a participatory approach consulting with children, their parents, and DRR education practitioners. The paper concluded that using participatory techniques was an effective way to determine the components of the household disaster preparedness plan template as well as ensuring the design, choice of words, and materials are effective. The booklet to accompanying the poster, contains a list of preparedness measures that were also designed based on the inputs from the children and their parents based on their knowledge and experiences.

The next chapter (Paper 3) outlines the results from the pilot-testing of the tool in three schools in Jakarta, Indonesia through quantitative data analysis. Data were collected using pre-test and post-test using questionnaires distributed to the children and their parents (please see Figure 2. Research Timeline). This paper reveals that there is a significant increase in awareness and attitude change across a number of important preparedness parameters suggesting that the poster has successfully enabled discussions and the exchange of views between children and their parents. More importantly, the paper documented evidence of perspective changes among parents and children regarding the importance of shared responsibilities among all household members on disaster preparedness.

Paper 3 will be submitted to the *International Journal of Disaster Risk Reduction*, an international journal that publishes applied research and case studies focusing on multidisciplinary research aiming to reduce the impact of disasters.

Chapter 5

Paper 3: Application of Participatory Child-Centred School-Based Planning Tool to Improve Household Disaster Preparedness

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1. Abstract

Previous research has demonstrated that children have unique perspectives and abilities regarding disaster risks, they can take part in identifying risks, serve as effective risk communicators to their peers, parents, and communities, and can also act as agents of change by mobilising resources and influencing policies. Many studies have also shown that children's participation in Disaster Risk Reduction (DRR) brings significant value to their communities. However, many child-centred DRR interventions rarely meets their target in delivering changes within the home.

This study examined the effectiveness of a household flood preparedness tool in three different schools in Jakarta, Indonesia, with varying school types, socio-economic conditions, exposure to flood hazard, and level of exposure on DRR education. Pre and post-test questionnaires were used with students and their parents from Grade 4 and 5. A control group was also established. This research revealed significant differences in a number of preparedness measures following the roll out of the preparedness tool and in attitudes towards the value of children's participation in DRR. The findings from this research strongly encourage agencies implementing child-centred disaster risk reduction (CCDRR) to actively involved parents and wider household members to increase the benefits of children's participation in DRR.

Keywords: School, Child-Centred, Children, Disaster Risk Reduction, Preparedness Plan, Household

2. Introduction

The latest Global Risk Report warned that extreme weather events, failure of climate change mitigation and adaptation, and disasters associated with natural hazards are the top three risks faced by the world's population (WEF, 2019). The report also indicated that

environmental degradation, uncontrolled urbanisation, and increasing economic inequalities could further exacerbated disaster risks (ibid). In 2018, the United Nations Office for the Coordination of Humanitarian Affairs or UN OCHA estimated that in 2018, there are more than 134 million people in need of humanitarian assistance (UN OCHA, 2018). Many of these affected people are women, children and the elderly, who are disproportionately prone to injury, sickness, and violence, as well as less access to urgent life-saving assistance (IDMC, 2018; IFRC, 2018).

Children, defined by the UN as any person under the age of 18, make up almost one-third of the world's population (UNICEF, 2017c). Disaster management practices generally treat children as passive recipients and provide limited support to enable them to express their views, opinions, or concerns (Mitchell et al., 2008; US National Commission on Children and Disasters, 2010). However, many studies have started to argue and demonstrate that children with sufficient knowledge and resources, and supported by adults, can improve their community's resilience toward disaster risks (Gautam et al., 2008; Mitchell et al., 2009; Haynes et al., 2010; Haynes et al., 2015). Research has demonstrated that children have unique perspectives and abilities regarding disaster risks, they can take part in identifying risks, serve as effective risk communicators to their peers, parents, and communities, and can also act as agents of change by mobilising resources and influencing policies (see also Children in a Changing Climate, 2008; Mitchell et al., 2009; Plush, 2009; Plan International, 2010b; Tanner, 2010; Bild et al., 2013; Children in a Changing Climate, 2017; Williams et al., 2017; Mort et al., 2018b, 2018a).

Several case studies undertaken by NGO agencies have captured the activities of children in seven countries in Asia, ranging from identifying the hazards in their surrounding area, disseminating early warning messages, delivering education and campaign messages, taking part in life-saving training (such as first aid and rescue), restoring river banks to reduce floods risks, and conducting disaster simulations in their communities (UNISDR et al., 2012).

On the policy advocacy side, children have also taken part in local councils in Bangladesh, the Philippines, and El Salvador as part of the disaster management committees; where space and support has been provided to enable child representatives to express views and represent the children in their communities (Plan International, 2010b). At the global stage, children's groups have demonstrated their abilities to express the views of children from around the world, including in the areas of Disaster Risk Reduction (DRR) and climate change adaptation

(CCA), and influencing global frameworks, agreements, and commitments (Children in a Changing Climate, 2008; Plan International, 2010b; Cabré, 2011; Nasiritousi et al., 2016).

This type of approach is often called Child-Centred Disaster Risk Reduction (CCDRR), which is defined as DRR measures *for* and *with* children, involving children, parents/ guardians, and local institutions (e.g. schools, children clubs, NGOs, local government, corporations). CCDRR is a joint effort to address the specific needs of children as well as enabling children to play an active role as part of the community in building disaster resilience (Plan International, 2010a; UNICEF, 2012; World Vision, 2012).

2. 1. Why should children participate?

Children have exclusive rights, protected by the UN Conventions on the Rights of Children (UN CRC), which is the most rapidly and widely ratified human rights treaty in history -signed by 196 countries and state parties as of January 2019 (United Nations, 1989; Human Rights Watch, 2014; United Nations, 2019). In the UN CRC, children have the rights to be protected, no matter their race, religion, abilities, location, and socio-economic condition. All measures should also be taken for the best interests of the child, including ensuring children can grow up in optimal conditions for their development and wellbeing. Lastly, children also have the rights to participate, meaning they should have the freedom to express their views, concerns, and their priorities, in matters that affect their lives.

Many studies have shown that children's participation brings significant value for children as well as to their communities (Acharya, 2010; Checkoway, 2012; Haynes et al., 2015; Amri et al., 2018; Mort et al., 2018b). Children who are supported to be active on issues in their community have improved critical thinking, an increased ability to communicate effectively, possess negotiation and decision-making skills, as well as empowering them to become leaders of today and in the future (Checkoway, 2012; Haynes et al., 2015; Amri et al., 2018).

Furthermore, another important reason why children should participate is that adults sometimes misunderstand the specific needs of children (Spencer et al., 2000; Matthews, 2001; Burke et al., 2003; Gallagher, 2004; Haynes et al., 2015; Mort et al., 2018a). Furthermore, interventions to address the needs of children may be beneficial to other age groups. For example, one of the significant challenges of climate change is that the language can sometimes become too technical, and difficult to understand. However, children can capture information more readily through school, are more connected to the internet and social media and can learn and adapt these messages into languages and vernacular that are

easier for older and less connected members of society to understand (James et al., 2001; Tanner, 2009; Susanne C. Moser, 2010; Spence et al., 2010; UNICEF, 2017c).

Moreover, the current global commitment on DRR, the Sendai Framework for Disaster Risk Reduction 2015 – 2030 (SFDRR), is one of the few global agreements that recognises explicitly the important role of children as agents of change (UNISDR, 2015b). This is important as the 168 governments that have adopted the SFDRR will be held accountable in advancing children's rights to participate in DRR measures.

2. 2. Challenges in children's participation

As described earlier, there have been many demonstrated examples of children influencing change in their communities, at the local level and all the way up to global forums. However, a recent study suggests that this type of approach is difficult to sustain and replicate in other areas (Amri, Bird, et al., 2017).

Reports in 2013 have also indicated that over 100 countries have included DRR education in the national curriculum (Ronan, 2014). This is a significant leap considering the first global commitment on DRR was started less than a decade before (UNISDR, 2005). Research has demonstrated that children exposed to DRR education in schools have better knowledge, reduced levels of hazard-related fears, more stable risk perceptions, and increased self-preparedness (Finnis et al., 2010; Ronan et al., 2010; Ronan et al., 2012). However, these studies have also highlighted that there is a lack of evidence of children who have been educated on DRR in schools being able to influence any changes at the household level (Towers et al., 2014). This is despite the fact that the majority of CCDRR approaches implemented in schools and in communities do aim to influence changes at the household level (Amri et al., 2018). However, they rarely put any specific focus on including other members of the family (Amri, Bird, et al., 2017; Amri et al., 2018). It is often that lack of understanding regarding the importance of children's participation and existing culture and norms that hinders children to participate in DRR (Haynes et al., 2010; IFRC, 2014).

This paper aims to investigate the influence of a child-centred disaster preparedness planning tool disseminated through school to increase household disaster preparedness. Specifically, the study aimed to assess changes in participant's perspectives and awareness regarding household disaster preparedness measures and children's roles in the household preparedness planning process. The following sections describe the methodology and process of the survey. Firstly, the rationale in selecting Jakarta as the study location and the design of

the study are outlined, followed by further description of the research locations and participants. The measurement materials and procedure to assess the effectiveness of the household planning tool are then presented and discussed. Finally, the implications of the results for child-centred risk reduction are considered.

3. Methods

3. 1. Case study location: Jakarta, Indonesia

Jakarta has been known as one of the most disaster-prone cities in the world, with seven identified disaster risks: floods, drought, coastal abrasion and king tides, earthquakes, technological disasters, drought and tsunami (Swiss Re, 2014; BPBD Prov. DKI Jakarta, 2015; BPS, 2017; BNPB, 2019). All risks expect for tsunami are considered medium-to-high risks (BPBD Prov. DKI Jakarta, 2015). However, the most frequent disaster that occurs in Jakarta is floods (BPBD Prov. DKI Jakarta, 2015).

Jakarta is home to more than 9.6 million people (at night) and up to 14.5 million people during the day, in a little over 660 square kilometres of land, making it one of the most densely populated area on earth (Demographia, 2015; BPS, 2017). High numbers of urban poor, growing unemployment, poor land use planning, environmental degradation and pollution are some of the major issues faced by the city (Baker, 2012; UN Habitat, 2016; WHO, 2016). Furthermore, Jakarta is the fastest sinking city in the world, not because of the surface geology but due to excessive groundwater extraction for industrial, agricultural, and housing use (Chaussard et al., 2013; Erkens et al., 2015; BBC, 2018; WEF, 2018).

Consequently, there are a number of programs focusing on disaster risk reduction and preparedness in Jakarta. Structural mitigation such as building dams, river dredging, and restoring river banks have been implemented (The Jakarta Post, 2012; ADB, 2014; World Bank, 2014a; The Jakarta Post, 2015b, 2015a). The local government has been actively working together with non-government institutions in promoting disaster preparedness, particularly through schools, awareness raising campaigns, and joint simulations (D. Brown et al., 2014). Schools in Jakarta have also included flood and fire awareness and education in their local curriculum (Amri, Bird, et al., 2017).

3. 2. Study Design

This study used a mixed methods approach, with the focus on children and their parents. Firstly, the household disaster preparedness tool was developed using a participatory

approach partnering with children, their parents, as well as DRR education practitioners in Indonesia (Amri et al., in prep). This involved focus groups and in-depth interviews in order to determine what risks to cover, what tool would be most appropriate, what local knowledge and practises should be included and what assistance was needed in terms of further education.

Based on the consultations, the tool that was produced was in the form of a household preparedness planning poster. The poster (Figure 17) is divided into eight sections consisting of boxes for the participants to fill in: 1) Assembling a preparedness kit; 2) Things to do before the rainy season arrives; 3) Things to do when there is going to be flood; 4) Things to do during and after floods; 5) Evacuation map and routes; 6) Important Phone Numbers; 7) Persons responsible for picking up the children during an emergency; and 8) Signatures of all household members. To assist in completing the poster, a small booklet was produced as a guideline. The booklet contains examples of actions that correlates with the tasks in the poster. For further information on the design and tool development process see Amri et al. (in prep).

Figure 13. The household preparedness tool (the poster on the left and the booklet on the right).

Once the design of the poster and booklet was finalised, the tool was tested in three primary schools in Jakarta. The children had two weeks to complete the poster with other household members (please see Figure 2. Research Timeline).

To assess the effectiveness of the poster, questionnaires were distributed before and after the tool was rolled out (pre-test in March 2016 and post-test in May 2016). This method is

selected as it is an effective way to measure change in a large group of participants (A. Bell, 2007; Weisberg, 2008; Bird, 2009). Previous studies on DRR education have also used questionnaires as the preferred way to measure risk perspectives, knowledge and views of research participants, including students (V. A. Johnson et al., 2014b). In addition, a questionnaire is often used in time-se1ries and replication studies on DRR education (Ronan & Johnston, 2001; Ronan et al., 2003; Ronan et al., 2010).

3. 3. Identifying the research locations

Primary schools in Indonesia are often categorised into two categories: 1) public and private schools; and 2) regular and Islamic school (or known as madrasah). There were 151.365 students in 3.112 primary schools in Jakarta, and most of these schools are public primary schools (57%) and private schools (28%), with Islamic primary schools comprising around 15% (MOEC (2016a). Based on this, one school from each type was selected for the research.

The three schools were selected based on consultations with the Provincial Disaster Management Agency of Jakarta Province (PDMA) and Save the Children (STC) who had both been doing some school based DRR education programs in Jakarta. Schools were then chosen based on the flood profile of the school and local community and the interest of the school principals and personnel at the schools. Table 12 describes the diverse characteristics of the three schools. Two schools, school A and C, had received some DRR education, however, school B had not.

Table 12. Characteristics of target schools for pilot testing

	School A	School B	School C
School Name	SDN Sunter Agung 12 Pagi	SD Kembang	MI Ash Shiddiqin
School Type	Public	Private	Private – Islamic
DRR education program	Government-supported	No outside support	NGO-supported
Exposure to DRR education program	A one-day orientation with all the students and followed by a disaster simulation the following day	Limited education through curriculum	Ongoing for more than a year, consisted of trainings, orientation for students, and school drills
Average family class	Middle income	Mid to upper high income	Mid to low income
Exposure to floods	Moderately exposed, sometimes flooded every year (up to 1 meter)	Less exposed, rarely flooded, access to school disrupted	Highly exposed, always flooded every year (up to 1.5 meters)
School curriculum	National curriculum	Modified curriculum	National curriculum
School Budget Size	Moderate	High	Low

When approached, the school principals and personnel of these three schools were very supportive and interested to take part in the research.

The public school (School A) had a history of serious flood inundation; in 2010, the school received funding from the government to increase the flooring above the average recurrence interval. However, the surrounding neighbourhood still floods, disrupting access for students and school personnel. Many students live near the school and experience regular flooding at their homes. About three months before the study, the school had a one-day disaster preparedness orientation with all the students comprise of earthquake and flood preparedness, facilitated by the local disaster management authority, and then the following day, a disaster simulation in school was conducted (school drills in Indonesia is not common and not yet mandatory).

The private school (School B) is located on higher ground and is not flood prone. However, the school is in a busy area of the city and whenever there is heavy rain the traffic becomes congested making access to school difficult with students often delayed on the way to or from school. According to personal communication with the principal of School B, most of their students' houses are not prone to floods. In School B, there was no specific DRR education, nevertheless schools in Jakarta taught some sort of flood preparedness as part of the local curriculum in the classroom (Amri, Bird, et al., 2017). Usually this subject only taught in 3-4 sessions by teachers to understand about floods, cause of floods, and how to prepare for floods.

The religious school (School C) is the most frequently impacted by floods. It is located north of Jakarta (which is near the bay) and near a small canal (Figure 14). The school floods annually with flood depths of up to 1.5 to 2 meters that could last for up to two weeks. Many of the students live nearby with their homes often affected by floods. School C has a comprehensive DRR education program that has been implemented since a year before, supported by Save the Children that comprise of: orientation on flood preparedness education for students, establishment of school disaster preparedness teams that includes students, training of evacuation, first aid skills, and DRR education campaign for the preparedness teams, provision of equipment and placement of evacuation signs in the school, and small-scale renovation for the school.

3. 4. Study Participants

The study participants in all three schools were from Grades 4 and 5 and aged 10-14 years old (M=10.96 and St.Dev=0.82). Students of this age were selected as previous studies have demonstrated that they have sufficient reading and communication abilities to respond to the type of items included (Ronan, Johnston, et al., 2001; Clerveaux et al., 2009; Soffer et al., 2010; Towers, 2015a). SDN Sunter Agung 12 Pagi has two parallel classes, so based on random selection, the students of Grade 4A and 5B become the regular research participants, while students of Grade 4B and 5A served as the control. All students and their parents took part in the questionnaire (pre and post-tool roll out).
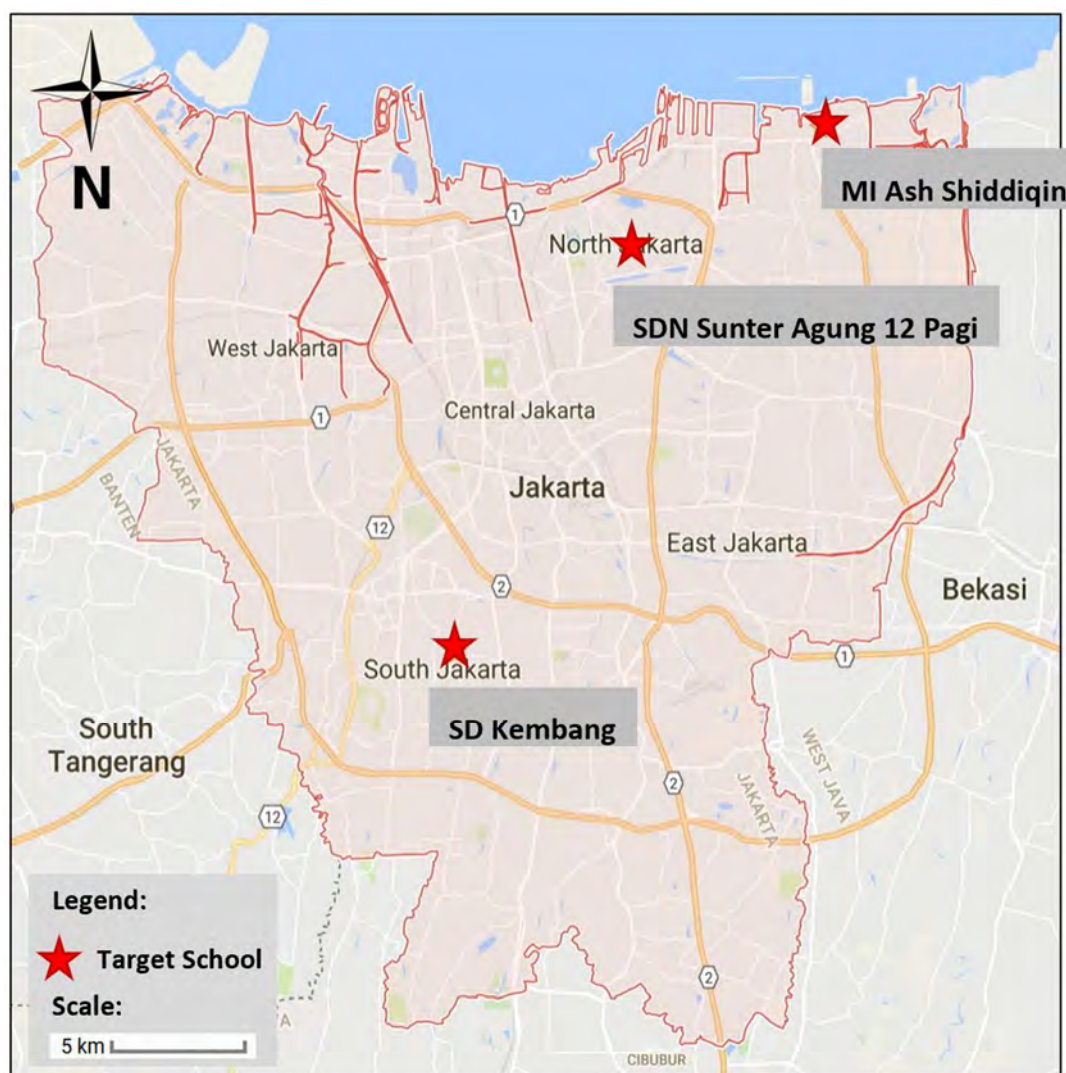
Figure 14. School locations (map data from Google ©2017)

3. 5. Questionnaire for students and their parents

The questionnaire for children and parents was adapted from Amri, Bird, et al. (2017). The original questionnaire contained questions in relation to respondent's awareness of disaster hazards that could affect their homes, their previous experience toward disasters, their state

of preparedness, and the role of children in the preparedness planning process. The questionnaire had been originally designed for children and was adapted for parents, as for the parents, there were additional questions inserted related to education level, employment status, household income, and type of dwelling. Questions related to household preparedness measures were added to the original questionnaire with open box qualitative replies in order to capture a range of responses. These questions are central to the study and consist of:

1. If there is an emergency and you need to get out from your house, where would you meet?
2. If there is an emergency and your parents can not collect you, who would be responsible for picking you from school? (please describe your relationship to the person)
3. If there is an emergency and your parents cannot be reached, who would you contact? (Please describe your relationship to the person)
4. If you are at home, list all the things that you need to prepare if flood is approaching?

For post-survey, the questionnaires for children and parents were similar, however several items were taken out as they were not relevant to the testing of the tool or did not need to be asked again (e.g. experience of past disasters, participant's awareness toward disaster risks, and personal information in the parent's survey).

The questionnaires were reviewed with several academics and colleagues who are experts in this field. Rigorous pretesting was not required as the survey had already been trialled in a previous study (Amri, Bird, et al., 2017). For the students, the questionnaire was administered during class time over a 2-day period in each school) and data collection took under 1h each day. The survey participants (students) sat in the class room while the facilitator read out loud the questionnaire in front of the class. Beforehand, the facilitator explained the purpose of the research project, how to mark the answers, the expected duration, and most importantly that their participation is voluntary. The participants were also informed that their responses would not affect their academic standing.

The whole process was supervised by a teacher. During the process, discussion about question clarification was encouraged. However, no discussion or deliberation between students about their answers occurred. Data were entered and analysed using Microsoft Excel ©.

Following student completion, a questionnaire for their parents was handed out to each student to give to their parents to be completed and returned to the teacher in one-week time. The same process also applied to the post-test (after the poster distributed).

Data collection was conducted in March 2016 (pre-test) and then in May 2016 (post-test). Overall, 161 students of Grade 4 and Grade 5 from the three schools took the pre and post-test (Table 13), ranging in age from 9 to 13 years old (M=9.97, St.Dev=0.82; 87 girls and 74 boys).

Table 13. Composition of students in each school

	School A	School B	School C	control
Male	18	23	15	18
Female	32	12	11	32

For the parents, 123 participants took part in the survey, ranging in age from 31 to 67 years old (M=42, St.Dev=6.10, 82 females, 39 males, and 2 not answering). Seven students and 25 parents were excluded because they did not participate in both tests.

4. Results

The following section describes the results from the pre and post-tests surveys for students (Grade 4 and 5) and their parents. Results are divided per theme. Firstly, results that were only asked in the pre-test survey are presented. These questions are related to participant's experience and risk perceptions of disaster risks as well as student's preference regarding various learning subjects and the preferred method of learning. Following this, the results from the pre and post-test survey will be presented together, with significance tests to highlight the impact of the poster intervention. This includes, questions related to the four household preparedness measures i.e. emergency assembly locations, designated persons to pick up their children, emergency contact person, and actions to do when floods are approaching), and questions related to the level of responsibility of household members towards disaster preparedness, including children.

4. 1. Descriptive test: Participants' perspectives in relation to disaster risks

i. Students

The results illustrate that in all target groups, most students identified floods as the likely hazard that could affect their home and almost all students have experienced impacts from floods (Other hazards (i.e. volcanic eruption, king tide, forest fire/ bush fire, landslides, tsunami, and strong winds/ typhoon) were selected by less than one-third of the participants.

Table **14**). In all schools, a high number of students also described disease outbreaks and building fires as top hazards. Additionally, students in School C also identified riots, conflict and violence as their top hazards. For School B, students also mentioned earthquakes and

droughts as hazards likely to affect their home. Other hazards (i.e. volcanic eruption, king tide, forest fire/ bush fire, landslides, tsunami, and strong winds/ typhoon) were selected by less than one-third of the participants.

Table 14. Perspectives of students toward: "Which of the following hazards do you think are likely to affect you at home?" and "Have you ever personally experienced any direct impacts from the following hazards?"Appendix A, Questions 1 and 3)

	Which of the following hazards do you think are likely to affect you at home?			Have you ever personally experienced any direct impacts from the following hazards? (select all that apply)		
	School A	School B	School C	School A	School B	School C
Floods	86%	54%	73%	98%	74%	96%
Epidemic*	56%	34%	42%	50%	29%	42%
House/ Building Fires	52%	26%	42%	24%	3%	46%
Riot, conflict, or violence	44%	17%	50%	16%	11%	69%
Droughts	26%	40%	38%	18%	26%	23%
Earthquakes	12%	34%	8%	30%	57%	8%

Health problems (affected them or other household members) and loss or damage to personal property/ possessions or sentimental possessions are the top impacts to children in School A, C, and control (**Table 15**). Distress (in school B) and death of loved ones (in School C) were selected by some students from the respective schools, much higher than compared to other schools. Prior to the survey, the school principals were notified, and school counsellors were on standby in case students became distressed.

Table 15. Students' response to "Did you experience any of the following impacts as a direct or indirect result of the hazard?" Appendix A, Questions 5)

	School A	School B	School C
Health problems	62%	6%	31%
Loss or damage to personal property or possessions	28%	26%	35%
Health problems for other household members	24%	3%	35%
Loss or damage to sentimental possessions	18%	11%	46%
Death of family/close friend (loved ones)	8%	9%	31%
Distress	4%	23%	0%

ii. Parents

The survey with parents also assessed the top hazards that are likely to affect their home (

Table 16). Parents from all groups (except School B) described that flood hazard is likely to affect their home and most had experienced it.

Table 16. Perspectives of parents toward: "Which of the following hazards do you think are likely to affect you at home?" and "Have you ever personally experienced any direct impacts from the following hazards?" (Appendix B, Questions 1 and 3)

	Which of the following hazards do you think are likely to affect you at home?			Have you ever personally experienced any direct impacts from the following hazards? (select all that apply)		
	School A	School B	School C	School A	School B	School C
Floods	59%	30%	46%	98%	61%	92%
Epidemic*	45%	48%	42%	18%	0%	38%
House/ Building Fires	41%	52%	8%	36%	48%	15%
Riot, conflict, or violence	36%	36%	42%	23%	21%	35%
Droughts	27%	33%	31%	14%	21%	12%
Earthquakes	20%	42%	27%	11%	18%	58%

There was less parents (30%) who identified flood as a risk from School B, since School B is rarely directly affected by floods. Building fires, disease outbreaks and earthquakes, are the top hazards identified by most parents from School C, ranging from 42% to 52%. Riot, conflict, or violence were identified as one of the top three hazards likely to affect the homes of parents from School C.

Similar to their children (students), other hazards (i.e. volcanic eruption, king tide, forest fire/ bush fire, landslides, tsunami, and strong winds/ typhoon) were selected by less than one-third of the participants.

Most parents from School A, C, and the control described loss or damage to personal property or possessions and health problems as the two top disaster impacts to them (Table 17). A smaller percentage of parents from School B selected the impact of disasters, which is an indication that they are less likely to be directly affected by disasters. In School C, a fairly high number of students also experienced death of family/ close friends because of disasters.

Table 17. Parents' response to "Did you experience any of the following impacts as a direct or indirect result of the hazard?" (Appendix B, Questions 5)

	School A	School B	School C
Loss or damage to personal property or possessions	68%	30%	38%
Health problems	55%	18%	54%
Loss or damage to sentimental possessions	32%	18%	27%
Death of family/close friend (loved ones)	5%	3%	35%
Health problems for other household members	30%	15%	27%

4. 2. Descriptive test: Disaster education and preparedness planning

The survey assessed whom participants would like to receive their DRR education from. The results showed that most students in School A preferred to be taught by their parents, teachers, and then emergency service personnel (Table 18).

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Table 18. Students' response to: "If you are interested to learn more, from where would you like to learn it from?" Appendix A, Questions 12)

	School A	School B	School C
From father	86%	60%	62%
From mother	84%	60%	85%
From schools – in the classroom	82%	66%	88%
From emergency management professionals/ institutions	74%	37%	50%
From community activities	60%	51%	31%
From schools – from extra curricula activities	56%	11%	77%
Other (please specify)	16%	11%	27%

In School B, most students preferred to be taught by teachers and their parents, and in School C, the majority wanted to be taught by teachers (in classroom), by their mother and through extra curricula activities. This aligns with their previous experiences on DRR education (see Table 12), where School A received DRR orientation from the local disaster management authority, and students from School C have an ongoing DRR education program. Interestingly, many students also expressed for their parents to teach them about DRR.

The survey also assessed student's interest on six topics, where most students from three schools (85%) are interested to learn about disaster preparedness and only less than half are interested to learn about climate change (49%). Other topics that were also assessed are: helping communities to be disaster prepared (78%), disaster prevention (76%), environmental education (73%), and problem-solving skills (60%).

4. 3. Comparative Pre and Post-test: Household preparedness planning

i. Students

Four parameters were used to assess the changes of awareness among students regarding their household disaster preparedness plan. The first parameter was their awareness on where to evacuate to. Respondents who responded: "I don't know" or without providing an actual location (e.g. "to safer place", "to shelter", or "to evacuation point") are considered not able to provide a specific answer. Respondents who were able to provide a specific answer generally answered that they would go to a public facility (e.g. mosque or government buildings) or go to their extended relatives or neighbours.

Figure 15 illustrates the results from the pre and post-test surveys from School A, B, C, and control (represented as D).
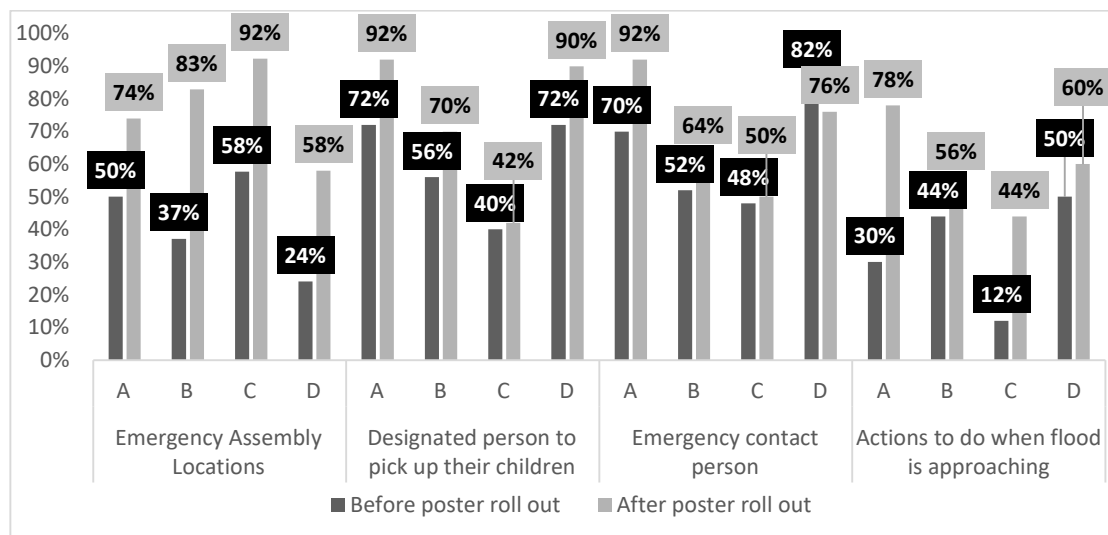
Figure 15. Perception of students towards disaster preparedness at home, before and after poster roll-out. Appendix A, Questions 28-30)

Almost all parameters show an increased percentage in the post-test survey, except emergency contact person in the control group. In the pre-test, a lower percentage of students who were able to describe what to do when a flood is approaching, compared to the other three parameters. Parameters related to the designated person to pick up children and naming an emergency contact person were answered with greater accuracy compared to the other two parameters. Results from the McNemar test (with α=0.05) showed that there were significant increases, in the following parameters:

a) Emergency assembly locations: All groups show a significant increase
b) Designated person to pick up their children: School A, B and the control have significant increases. The increment on School C was not considered significant.
c) Emergency contact person: School A and B have significant increase, School C and the control group do not show a significant increase
d) Actions to do when flood is approaching: School A and C show a significant increase, Schools B and the control show no significant increase

Detail analysis on the significant test is also provided in Table 25 (p. 140) using McNemar Test (Ciechalski et al., 2002) in the Appendices section.

ii. Parents

Most parents were able to identify preparedness measures for their household (Figure 16), including that they can:

a) Identify designated person to pick their children (> 85%%),
b) identify their emergency contact person (>85%), and
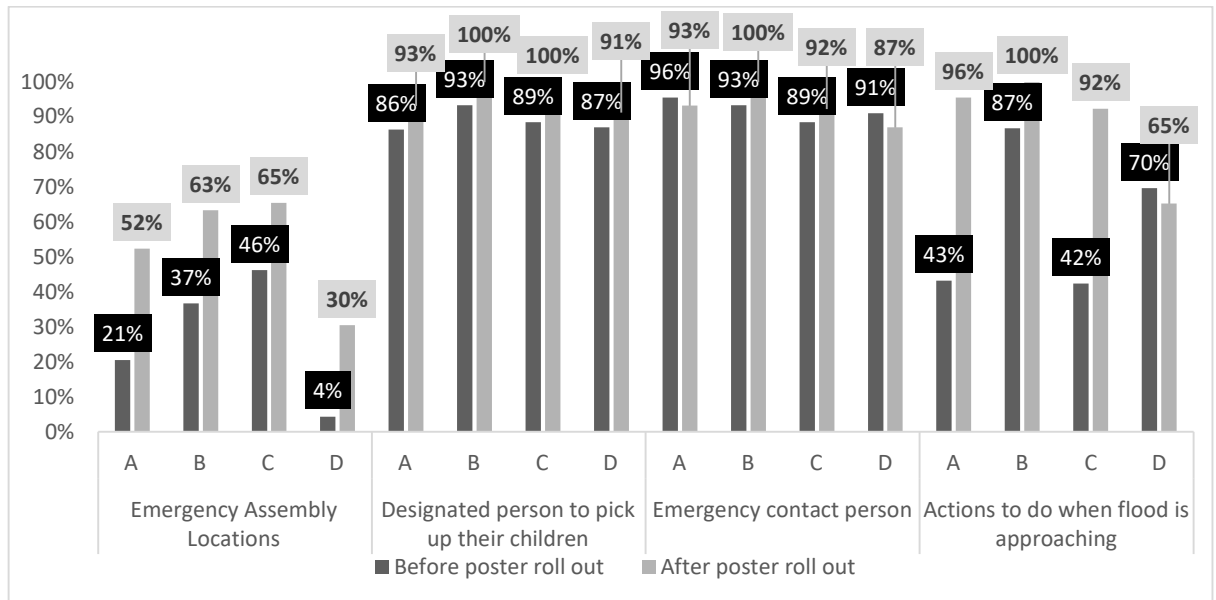
Figure 16. Perception of parents towards disaster preparedness at home, before and after poster roll-out (Appendix B, Questions 21-22)

Regarding actions to take when a flood is approaching, parents generally scored higher compared to their children in all schools. Lower percentages were received regarding the emergency assembly locations, ranging from 21% to 46% for School A, B, and C, and only 4% for the control group.

Analysis from McNemar test (with α=0.05) showed that there are significant increases in some of the parameters, as follow:

a) Emergency assembly locations: All groups have significant increase, except School C
b) Designated person to pick up their children: There were no significant increases in all groups
c) Emergency contact person: There were no significant increases in all groups
d) Actions to do when flood is approaching: School A and C have significant increase, School B and the control show no significant increase

Almost all students in all categories (except in School C) do not have a *written* household preparedness plan in their home (Table 19). In School C, the majority have some sort of preparedness plan, with one-third of the students having a written plan.

Table 19. Students' response to: "Do you and your family have preparedness plans?" Appendix A, Question 20)

	Students				**Parents**			
	School A	School B	School C	School D	School A	School B	School C	School D
Yes, written	4%	3%	38%	4%	0%	3%	31%	5%
Yes, not written	34%	34%	38%	30%	57%	33%	38%	57%
No	62%	63%	23%	66%	43%	64%	27%	38%

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The parents' results are similar to the students, with more than half the parents from School A and the control (57%) having a preparedness plan, though none are written. Only a third of parents from School B have a preparedness plan (36%), while two thirds of the parents from School C (69%) have a plan.

For parents, before the poster roll-out, only a small percentage of parents in school A and B think that their children are well prepared to face disaster risks, with 32% and 18%, respectively (Table 20). However, in School C, a much higher percentage of parents believe that their children are well prepared. After the poster roll out, there were significant increases in all target groups and the control group was constant.

Table 20. Parents' response to: "How prepared are the children in your household on what to do if there is a disaster?" (Appendix B, Question 18)

	School A	School B	School C	Control
Before poster roll out	32%	18%	65%	43%
After poster roll out	86%	43%	92%	43%

4. 4. Children's participation in household preparedness

i. Students

Students were asked about the responsibility for undertaking disaster preparedness in their homes, with six selections: "father", "mother", "grandparents", "children", "housemaid", and "other, please specify" Appendix A, question #15). They could tick all that apply. Before the poster roll-out, most students placed the responsibility of household preparedness primarily with their parents, especially their fathers (83 to 98%) followed by their mothers (71% to 84%) (Table 21).

Prior to the roll out of the poster, a low percentage of students in all groups thought grandparents, children, or other household members (e.g. housemaids) have an important responsibility for household preparedness activities. No students ticked the "other, please specify" option.

Table 21. Percentage of students who think these people have high or very high responsibility for disaster preparedness in their home (before and after poster roll-out). Participants were able to tick all that apply

	School A		School B		School C		Control	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Father	84%	92%	83%	97%	92%	100%	98%	96%
Mother	84%	94%	71%	94%	77%	88%	84%	96%
Grandparents	18%	**66%**	11%	**43%**	23%	50%	26%	34%
Children	34%	**60%**	31%	**63%**	23%	**65%**	26%	32%
Housemaid	24%	26%	31%	**63%**	15%	8%	12%	16%

The McNemar Test shows that following the poster roll out, a significant increase in the percentage of students who thought grandparents and children were responsible for preparedness activities is seen (highlighted in bold in Table 21). In School B, there was also a significant increase of students who considered that housemaids have responsibility for disaster preparedness in their home. This is aligned with their situation as students from School B come from higher income families more likely to have housemaids in their homes. The increment increase seen for the father and mother was not considered significant as the numbers were already high during the pre-test.,

The comparison before and after the poster roll-out also shows an increase in the percentage of students who think they should be involved in making their house and family better prepared in all target groups (Table 22).

Table 22. Percentage of students who thinks they must be involved in making their house better prepared, before and after poster roll-out Appendix A, Question 21 and 27)

	To what extent should you be involved in making your house better prepared?				To what extent would you like to be involved in making your home more prepared for disasters?			
	School A	School B	School C	Control	School A	School B	School C	Control
Before poster roll out	50%	60%	58%	62%	72%	83%	73%	92%
After poster roll out	70%	83%	89%	48%	82%	89%	92%	86%

ii. Parents

From the perspectives of parents, prior to the poster roll-out almost all parent respondents considered that they have a high responsibility in making sure their home and family are disaster prepared (Table 23). A much smaller number of parents believe that others have the same responsibility as them. For example, in School C only 27%, 23%, and 19%, thought that grandparents, children, and housemaids were responsible for household disaster preparedness respectively.

Table 23. Percentage of parents who think these people have high or very high responsibility for disaster preparedness in their home, before and after poster roll-out (Appendix B Question 16, using question: "In your opinion, how much responsibility should the following people have for preparing disasters in your home?")

	School A		School B		School C		Control	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Father	93%	96%	97%	97%	92%	89%	96%	96%
Mother	89%	98%	97%	97%	85%	96%	96%	91%
Grandparents	41%	**77%**	37%	**80%**	27%	**69%**	52%	48%
Children	55%	**84%**	53%	**93%**	23%	**69%**	48%	30%
Housemaid	50%	48%	53%	**87%**	19%	27%	48%	22%

However, after the poster roll-out, the numbers of parents who believe others are responsible increased significantly in all groups, except the control group. The post-test results show that between 69% to 80% of parents across the three schools believed grandparents were responsible compared to only 27% to 41% prior to the poster treatment (Table 23, pre and post-test results). The results for the role that children should play was even higher following the poster treatment, with 69% to 93% of parents across the three schools considering that children have responsibility for household preparedness, compared to only 23% to 55% in the pre-test. Similarly, with the students' result, parents in School B considered housemaids to have more responsibility following the poster treatment (from 53% in the pre-test to 87% in the post-test). All changes in School A, B, and C are considered significant based on McNemar test (Table 26, available in Appendices in p. 141).

5. Discussion

5. 1. Participants perspectives and experiences on disaster risks

According to the survey results, most participants (students and their parents) from all groups think that floods could affect their homes. However, students and parents from school B display a much lower percentage, indicating that their homes were less likely to be flooded. Other hazards that ranked highly, include building fires, disease outbreaks, droughts, and earthquakes. In addition, riot, conflict, and violence were also mentioned by students and parents in School C.

Floods and building fires were the top two hazards that have been identified by the Government of Jakarta (BPBD Prov. DKI Jakarta, 2015). It is likely that a high percentage of respondents mentioned earthquakes and droughts as in early 2016, there was a prolonged dry season caused by a strong El Nino and people in Jakarta reported difficulties in acquiring water from their wells (BBC Indonesia, 2015; Detik.com, 2015). Also, there was a significant earthquake in November 2015 off the coast of Java and the tremor was felt in Jakarta (Jakarta Globe, 2015).

The risk perception between children and their parents in School A and the control (both from the same school) are similar with the top three hazards of floods, epidemics, and house fires. However, there were more parents from School B (52%) that considered that house fires are more likely, compared with only 26% of children from School B. In School C, there were only 8% of parents who identified house fire as a possible risk in their homes, compared to their children (42%).

Differences in people's perspectives is common in children (boys and girls) as well as adults (men and women) (Gautam et al., 2008; Haynes et al., 2010; IFRC, 2014). Children have a unique perspective on how they see their world, including their perspectives towards risks (Seballos et al., 2011). Studies also show that fear of disasters rates highly in terms of the most feared situations for children and adolescence (Ollendick, 1983; Thomas H. Ollendick et al., 1985; Dadds et al., 2001; Burnham et al., 2008; Kalar et al., 2013).Therefore, it is important to acknowledge the different perspectives among groups and then to assess mitigating and preparedness actions to anticipate these risks.

5. 2. Students' perspectives on learning disaster preparedness

All three participating schools had received or had an ongoing DRR education program. School A organised a one-day orientation followed by a school drill the next day, in collaboration with the local disaster management authority. School B has been introducing DRR education through the classroom, led by teachers and School C has a more comprehensive DRR education program, supported by the NGO Save the Children. This is in line with the survey results where many students from School A preferred to be taught by disaster management professional and many students in School C preferred to be taught in extra curricula activities (same approach of Save the Children).

The survey results showed that many children expect DRR education to be taught in schools, whether it is in classrooms or through extra curricula activities, which is in line with the current DRR education programming. However, many children (>80% in School A and C, and 60% in School B) also expected to be taught by their parents, indicating a large interest from the children for DRR education to be introduced at home.

Moreover, many students are more interested to learn about disaster preparedness compare to learning about climate change. Therefore, it is important to recognise that climate change education can be integrated when learning about disaster prevention and preparedness and activities related to DRR and climate change should not be separate activities but one and it should be delivered using an integrated approach, as also highlighted by Mercer (2010)

5. 3. Effectiveness on the household disaster preparedness tool

The survey assessed four parameters of household preparedness. The results showed that most students in all target groups during the pre-test were not able to provide specific details in one parameter: actions to undertake if a flood is approaching.

Nevertheless, in the other three parameters, School A and C had a higher percentage of students who were able to provide specific details, ranging between 50 to 72% (for School A pre and post) and 40 to 58% (for School C pre and post). School B had a lower percentage with the range of 37 to 56% (pre and post). Higher percentages in School A and C are likely because School A and C were exposed with DRR education program, from the local government (School A) and from NGO (School C). Furthermore, Schools A and C were more flood prone and have more frequent experiences of floods, and thus they are more prepared compared to the students in School B.

Based on the pre and post survey results, there were increase percentages in all parameters. Therefore, it is well demonstrated the effectiveness of the poster and associated booklet in increasing the awareness of the children on household preparedness. After the poster roll-out, more students were able to identify specific evacuation areas, were able to identify a designated person to pick them if their parents could not come to school, were able to identify an emergency contact person and were able to identify preparedness actions to undertake if a flood is approaching.

Interestingly, through the school-based project, parents also experienced an increase in awareness on disaster preparedness by assisting their child to complete the poster. This is evident with the increase of awareness of parents from all groups in almost all parameters. After the poster roll-out, almost all parents in all target groups (>90%) were able to provide specific answer on alternate person to pick their child up from school, were able to identify their emergency contact person, and identify preparedness actions if a flood is approaching. This is consistent with the results from the students' questionnaire.

This shows that children can become agents of change, particularly with their parents, using a school-based disaster preparedness planning tool in the form of a simple poster and a booklet. The way that the school project was structured, providing a task for children and parents to discuss and complete together, created an opportunity, in otherwise busy lives for family-based disaster preparedness planning, that used to be a topic only for adults.

5. 4. Written household preparedness plan

The pre-test questionnaire captured that less than 10% of students in schools A and B have a written household preparedness plan, and only 34% of students have an unwritten one. The facilitator actually had to describe to the children during the pre-test what a preparedness plan was. The results for the parents were similar. However, during the pre-test, more parents

than children were able to provide specific details on their household preparedness plans, particularly in assigning a person to pick up their children, identifying an emergency contact person, and actions to undertake when a flood is approaching. This is an indication that parents have some sort of concept of preparedness, which was not the same situation with their children.

This also demonstrates that it was unlikely that parents had previously discussed their household disaster preparedness plans with their children, which also indicates there would have been a lack of input and participation from children in developing the plan. Even though Indonesia has ratified the UN CRC in 1990 (United Nations, 2019), promoting children's participation is still a challenge given that there is a lack of knowledge and culture to enable and support a child's right to participate (Haynes et al., 2010; IFRC, 2014).

Notably, School C has more students (76%) and parents (69%) that described they have a household preparedness plan, and more parents (65%) believed that their children are well prepared. This is likely to be because School C had a DRR education program led by an NGO that had been running for more than a year.

5. 5. Changes on the perspectives of children's right to participate

Children and their parents have also developed changes in their attitudes to who has the responsibility for disaster preparedness in the home. Before the poster roll-out, the responsibilities of household preparedness are seen to primarily rest with the father followed by the mother, with less than one-third of students in all target groups (<34%) answering that other household members have the responsibility on household preparedness.

After the poster roll-out, the views of children changed and there was a significant increase of students who believed that children and grandparents have responsibilities for household preparedness. In School B, a significant increase also occurred for housemaids. More importantly, there were more parents who believed that children and other household members have responsibilities for household preparedness.

This represents strong evidence that the household preparedness tool has influenced the attitudes of children and their parents regarding the role and importance of children (as well as other household members) in household preparedness planning.

The role of adults, particularly parents, is important in enabling children's participation in DRR, (Seballos et al., 2011) , particularly in terms of facilitating, empowering, and building their self-

esteem (Seballos et al., 2011; Hayhurst, 2013; Bresee et al., 2014; Gadhoke et al., 2015). As facilitators, parents can support children access resources, such as the required tools, finances, labours, or technical knowledge (Silva et al., 2011; Malone, 2013; Bresee et al., 2014).

5. 6. Comparison with the control group

The survey results showed an increase across many of the parameters in the target groups and also in the control group for some (

Table 24).

Table 24. Comparison of the significant tests between target and control groups

	School A	School B	School C	Control
Emergency Assembly Locations	Significant	Significant	Significant	Significant
Designated Person to Pick Up Children	Significant	Significant	Not significant	Significant
Emergency Contact Person	Significant	Significant	Not significant	Not significant
Actions to do When Flood is Approaching	Significant	Not significant	Significant	Not significant

The increase in awareness in the control group may have occurred because the control group is sourced from the same school as School A (SDN Sunter Agung 12 Pagi). There were several possible ways that respondents (students) from the control groups may have received indirect intervention from the process, for example:

a) The questions in the pre-test survey could have increased awareness and knowledge of respondents, and
b) Some of the students from the control group may have been exposed to the poster and the booklet and became inspired through learning from their friends in the target groups

In pre and post-test methodologies, it is common that participants in a control group remember some of the questions, they may have become more interested in the topic and look things up prior to being tested again. This is a well-known error termed repeat testing bias (B. A. Bell, 2010; Indrayan, 2012).

The children in the intervention groups were not told to keep the poster and their learning confidential and it is highly likely that they communicated with their peers and shared the posters. This is actually a positive result in that peer-to-peer communication and increased awareness occurs beyond those who received the intervention directly. Therefore, it is suggested that future surveys should use a control group that is in a different location (school) to ensure minimum interference.

Interestingly, the target groups experienced significant changes on the importance of children's participation in DRR. On the other hand, there were no significant increase in the control group. This strengthens the evidence that the act of getting households to sit down and plan together has delivered robust changes towards attitudes regarding children's participation.

6. Conclusion

Children, defined by the UN as any individuals under the age of 18, make up of one-third of the world's population. Their rights are protected by the Convention on the Rights of Children, including their rights to participate. The global commitment on DRR, the SFDRR, has also explicitly recognised children as agents of change as an important actor in building resilience.

Children can become agents of change if they have sufficient knowledge, are provided with the appropriate tools, and are supported by adults. In this study, a participatory household disaster preparedness planning tool was developed through consultations with children, their parents, and DRR education practitioners. The tool was disseminated through schools as a two-weeks school project, where students take the poster template home and develop their household disaster preparedness plan with their parents.

Pre and post-test questionnaires were utilised to measure the impact of the intervention for students and their parents. The results showed a significant increase in awareness and attitude change across a number of important preparedness parameters suggesting that the poster has successfully enabled discussions and the exchange of views between children and their parents. In particular, following the intervention significantly more students and parents felt that the responsibilities for household preparedness should be shared among all household members, including parents, children (boys and girls), their extended relatives (e.g. grandparents), and to some extent, their housemaids. The results also illustrated that many children expect DRR education to be introduced at home by their parents, whereas lessons related to DRR and climate change should be taught as one subject.

Providing and testing a simple and effective tool that enables family discussions on disaster preparedness is in line with one of the global commitments in the Sendai Framework for Disaster Risk Reduction 2015-2030 to build household resilience. This research also demonstrates the importance of actively involving parents and the wider household in child-centred risk reduction education and programs. It can no longer be expected that conducting an initiative with children alone will bring wider benefits to households and communities.

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8. Appendices for Paper 3

8. 1. The McNemar Test

The McNemar test (1947) is best described as a 2×2 cross classification of paired (or matched) responses to a dichotomous item. In simple terms, the McNemar test can be viewed as a type of chi-square test that uses dependent (i.e., correlated or paired) data rather than independent (unrelated) samples. The McNemar test is a non-parametric statistical test; i.e., it is distribution free and can be used with data sets and samples that are not normally distributed (Ciechalski et al., 2002).

We use data from pre-test and post-test that was administered to 4th and 5th grade participants to evaluate their disaster preparedness planning. Students' responses to each of 4 questions on the test were scored as correct (1) or incorrect (0). Table 1 describes response patterns to one of the questions in a typical 2×2 format.

Table 1

Example of 2×2 Classification Table for McNemar Analysis

		Post-test		
		Incorrect (0)	Correct (1)	
Pre-test	Incorrect (0)	A	B	
	Correct (1)	C	D	n_1
		n_2	n	

Where:

a = number students who gave incorrect responses in both the pre-test and post-test

b = number of students who gave incorrect responses in the pre-test but correct in the post-test

c = number of students who gave correct response in the pre-test but an incorrect response in the post-test

d = number of students who gave correct responses in the pre-tests and post-tests

n = total number of matched pairs

(i.e., a + b + c + d)

n_1 = total number of students who provided correct responses in the pre-test (i.e., $c + d$)

n_2 = total number of students who provided correct responses in the posttest (i.e., $b + d$)

p_1 = proportion of correct responses in the pretest, i.e., n_1/n or $(c + d)/n$

p_2 = proportion of correct responses in the posttest, i.e., n_2/n or $(b + d)/n$

Hypothesis Testing

Suppose we wish to examine pre-test and post-test changes in the proportion of students that reported correct responses before and after the treatment.

$$H_0: p_1 = p_2$$
$$H_1: p1 \neq p_2$$

McNemar Test uses data from the two discordant cells b & c (see Table 1) where change has occurred to test the equivalence of the two proportions (i.e., marginal homogeneity). The uncorrected[6] test statistic for the McNemar procedure is a chi-square test (with 1 degree of freedom) denoted as $(c - b)^2/(c + b)$ and the corrected test statistic is $(|c - b| - 1)2/(c + b)$.

Table 25. Result of McNemar Test for Students in School A, B, C and control with α=0.05

No.	Question	School	Pre	Post	Difference Percentage	p-value	Statistically Significance
1	Emergency Assembly Locations	A	50%	74%	24.0%	0.031	Yes
		B	37.10%	82.90%	45.8%	0.001	Yes
		C	57.70%	92.30%	34.6%	0.004	Yes
		control	24%	58%	34.0%	0.002	Yes
2	Designated Person to Pick Up Children	A	72%	92%	20.0%	0.021	Yes
		B	56%	70%	14.0%	0.016	Yes
		C	40%	42%	2.0%	1	No
		control	72%	90%	18.0%	0.004	Yes
3	Emergency Contact Person	A	70%	92%	22.0%	0.007	Yes
		B	52%	64%	12.0%	0.031	Yes
		C	48%	50%	2.0%	1	No
		control	82%	76%	-6.0%	0.581	No
4	Actions to do When Flood is Approaching	A	30%	78%	48.0%	0	Yes
		B	44%	56%	12.0%	0.146	No
		C	12%	44%	32.0%	0	Yes
		control	50%	60%	10.0%	0.458	No
5	In your opinion, how much responsibility should the following people have for preparing disasters in your home?						
a	Father	A	84%	92%	8.0%	0.388	No
		B	82.90%	97.10%	14.2%	0.125	No
		C	92.30%	100%	7.7%	0.5	No
		control	98%	96%	-2.0%	1	No

[6] A limitation of the McNemar test is that it was designed for use with large samples. For small sample sizes, a correction formula like the Yates correction formula should be used instead of the McNemar test (Ciechalski, Pinkney and Weaver, 2002). Also, the asymptotic 2×2 McNemar test assumes that the number of discordant pairs (i.e., b+c) is equal to or larger than 10. Hence, use of an exact binomial test is recommended if discordant pairs are less than 10 (Rufibach, 2011).

No.	Question	School	Pre	Post	Difference Percentage	p-value	Statistically Significance
b	Mother	A	84%	94%	10.0%	0.063	No
		B	71.40%	94.30%	22.9%	0.039	Yes
		C	76.90%	88.50%	11.6%	0.25	No
		control	84%	96%	12.0%	0.109	No
c	Grandparent	A	18%	66%	48.0%	0	Yes
		B	11.40%	42.90%	31.5%	0.013	Yes
		C	23.10%	50%	26.9%	0.065	No
		control	26%	34%	8.0%	0.541	No
d	Children	A	34%	60%	26.0%	0.001	Yes
		B	31.40%	62.90%	31.5%	0.001	Yes
		C	23.10%	65.40%	42.3%	0.003	Yes
		control	26%	32%	6.0%	0.69	No
e	Housemaid	A	24%	26%	2.0%	1	No
		B	31.40%	62.90%	31.5%	0.035	Yes
		C	15.40%	7.70%	-7.7%	0.625	No
		control	12%	16%	4.0%	0.791	No

Table 26. Result of McNemar Test for Parents from School A, B, C and D with α=0.05

No.	Question	School	Pre	Post	Difference Percentage	p-value	Statistically Significance
1	Emergency Assembly Locations	A	20.5%	52.3%	31.8%	0.004	Yes
		B	36.7%	63.3%	26.6%	0.008	Yes
		C	46.2%	65.4%	19.2%	0.18	No
		control	4.3%	30.4%	26.1%	0.031	Yes
2	Designated Person to Pick Up Children	A	86.4%	93.2%	6.8%	0.508	No
		B	93.3%	100.0%	6.7%	0.5	No
		C	88.5%	100.0%	11.5%	0.25	No
		control	87.0%	91.3%	4.3%	1	No
3	Emergency Contact Person	A	95.5%	93.2%	-2.3%	1	No
		B	93.3%	100.0%	6.7%	0.5	No
		C	88.5%	92.3%	3.8%	1	No
		Control	91.0%	87.0%	-4.0%	1	No
4	Actions to do When Flood is Approaching	A	43.2%	95.5%	52.3%	0	Yes
		B	86.7%	100.0%	13.3%	0.125	No
		C	42.3%	92.3%	50.0%	0.002	Yes
		D	69.6%	65.2%	-4.4%	1	No
5	In your opinion, how much responsibility should the following people have for preparing disasters in your home?						
a	Father	A	93.2%	95.5%	2.3%	1	No
		B	96.7%	96.7%	0.0%	1	No

No.	Question	School	Pre	Post	Difference Percentage	p-value	Statistically Significance
		C	92.3%	88.5%	-3.8%	1	No
		control	95.7%	95.7%	0.0%	1	No
b	Mother	A	88.6%	97.7%	9.1%	0.125	No
		B	96.7%	96.7%	0.0%	1	No
		C	84.6%	96.2%	11.6%	0.375	No
		control	95.7%	91.3%	-4.4%	1	No
c	Grandparent	A	40.9%	77.3%	36.4%	0	Yes
		B	36.7%	80.0%	43.3%	0.002	Yes
		C	26.9%	69.2%	42.3%	0.001	Yes
		control	52.2%	47.8%	-4.4%	1	No
d	Children	A	54.5%	84.1%	29.6%	0.015	Yes
		B	53.3%	93.3%	40.0%	0	Yes
		C	23.1%	69.2%	46.1%	0.008	Yes
		control	47.8%	30.4%	-17.4%	0.454	No
e	Housemaid	A	50.0%	47.7%	-2.3%	1	No
		B	53.3%	86.7%	33.4%	0.013	Yes
		C	19.2%	26.9%	7.7%	0.754	No
		control	47.8%	21.7%	-26.1%	0.109	No

Chapter 6

Content Analysis of Household Preparedness Plans in Jakarta

1. Introduction

This chapter outlines the analysis of the content in the household preparedness plans developed by families from the three target schools, as described in Chapter 5 and 6. The primary aim of this study is to assess how children can be agents of change and influence their parents using child-centred household disaster preparedness tool. Therefore, it was not the intention for the study to test participants' knowledge or examine in detail if they filled the poster correctly or not. However, the information gathered from the posters provide valuable description regarding participants' choices for preparedness measures.

1. 1. Household Preparedness Plans

Disaster prone countries have been promoting households to develop preparedness plans, although most of these efforts have been in developed countries, such as the United States, Australia, Canada, and New Zealand (Paton et al., 2010; Becker et al., 2012; Levac et al., 2012; Whittaker et al., 2013; Tomio et al., 2014). A desk review of eight household preparedness plan templates from four countries (i.e. Australia, Canada, New Zealand, and USA) shows that the templates provide pre-determined actions with little space for the participant to select actions that may be more fitting for their situation and context (see examples from Government of Canada, 2012; FEMA, 2015; Australian Red Cross, 2016; Ministry of Civil Defence and Emergency Management New Zealand, n.d; Queensland Government, n.d.; Ready Marine Corps, n.d.)[7]. This is a significant disadvantage because each individual, family or community is influenced by many factors, including their socio-economic conditions, culture, gender composition, habits, knowledge and skills, and many others (Wisner et al., 2004; Birkmann, 2006; IFRC, 2014). Therefore, in the process of developing a household preparedness plan, each household should have the space and also the support to discuss and decide which actions are appropriate and relevant for them.

However, there are limited guidelines available published by emergency services in Indonesia, particularly focusing on household preparedness. At the time this research began, September 2015, there were only three institutions -the fire brigade, police, and one local NGO- that

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[7] For further details on the desk review, please see Chapter 4/ Paper 2: Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan

produced publications with key messages on disaster preparedness at the household level (YEU, 2015; Dinas Pemadam Kebakaran & Penanggulangan Bencana, n.d.; Polda Metro Jaya, n.d.).

Therefore, as part of this research, the contents in the household preparedness plans were analysed to assess the preferred measures of households in Jakarta in preparing for a flood emergency. This chapter aims to create a list of measures related to flood preparedness. The preparedness plans were collected from households in Jakarta, and therefore it is likely that the disaster preparedness measures will apply to other urban areas in Indonesia.

2. Analysing the household preparedness plans

As detailed in Chapter 3 the preparedness plan were developed as the intervention to the students where they are required to develop their own household preparedness plan with their parents in the form of an A2 poster composed of eight sections (Figure 17): 1) Assembling preparedness kit; 2) Things to do before the rainy season arrives; 3) Things to do when there is going to be flood; 4) Things to do during and after floods; 5) Evacuation map and routes; 6) Important Phone Numbers; 7) Persons responsible for picking up the children during emergency; and 8) Signatures of all household members.

Figure 17. The household preparedness tool (the poster on the left and the booklet on the right).

The poster was also accompanied by booklet that served as a guide for the children and their parents when filling in the poster. The contents of the booklet include a) a list of items that can be part of the emergency preparedness kit; b) a list of suggested actions for prevention,

preparedness, response and recovery in relation to flood hazards; c) a guide to drawing evacuation maps and deciding on the best emergency assembly locations; and d) list of important phone numbers. The contents of the booklet were developed using a combination of desk review of guidelines that have been developed by emergency services in Jakarta and at the national level. Additional information for the booklet was gathered from Focus Group Discussions (FGD) involving children and their parents from the three target schools (please see Chapter 3/ Paper 2 for more details on the methods in developing the tool).

The suggested actions and items in the booklet ranged from 13 to 16 items, except the section on things to do during and after floods which had 22 suggested actions (the English version of the booklet is also provided in the Appendices of the thesis). The important phone number section provides a list of emergency service contacts including the police, fire brigade, the state-owned electrical company hotline, search-and-rescue, ambulance, and the telephone company.

A total of 94 household preparedness plans were collected from the three target schools in Jakarta between March and May 2016. Five parameters were then analysed consisting of: 1) assembling emergency preparedness kit, 2) preventative measures before the rainy season starts, 3) measures when receiving flood warning, 4) measures to do during and after floods, and 5) evacuation maps and identifying emergency assembly locations. It was not considered necessary to analyse the important phone numbers, signatures or persons responsible for picking up the children during an emergency. Due to limited space in the poster, participants were only able to select up to 12 items for the contents of the emergency preparedness kit, and only six main measures could be listed for things to do before, during, and after floods (see Figure 17). More than two-thirds of the participants filled in all the spaces in each section.

The contents of the poster were then entered into a matrix using Microsoft Excel © and coded based on the measures that were listed in the booklet/ poster. Additional measures that were not included in the booklet were also coded. Simple descriptive statistics were then undertaken.

3. Results

3. 1. Emergency preparedness kit

In terms of what participants stated they would put in their emergency preparedness kit, more than half of the households selected a change of clothes, raincoats, mattresses, tents, rope, life vests, emergency lights (torch) with backup batteries, communication tool (e.g. radio or

phone with mobile charger), first aid kit, bottled water and biscuits, hygiene equipment, and important documents (Table 27). The least preferred item was the whistle (for sending a signal to seek help) which was only selected by 27% of the households.

Table 27. Preferred items selected by participants for emergency preparedness kit

Items	Frequency
Spare clothes	74%
Raincoats, mattresses, folding tents, rope, buoys	73%
Lighting equipment (e.g. emergency lights or flashlights with backup batteries)	71%
Important documents	71%
Tool for communication and receiving news (e.g. radio or phone and mobile charger)	68%
First Aid Kit	68%
Bottled water and biscuits (for snacks)	64%
Hygiene equipment (soap, toothbrush, toothpaste, shampoo, towel, wet tissue, hand sanitizer)	62%

There were also 32 other items that were written in the household preparedness plans but were not listed in the booklet (Table 28), including personal protective items (e.g. mask, hat, and boots), other protective items (e.g. insect repellent, umbrella, map, compass, candle), cleaning tools (e.g. bucket and mop), hardware tools (e.g. shovel, spade, axe), flood protection equipment (e.g. water pumps, sand, water tank, plastic sheets), and also vehicles for evacuation (e.g. rubber boat and motorcycle). Each item was selected by less than 10% of the households and interestingly, most of the items that were not listed in the booklet were selected by respondents from School B (private school), and then followed by School A (public school).

Table 28. Additional items listed in the household preparedness plans that were not in the booklet

1. **Mask**	9. **Umbrella**	17. **Portable stove**	25. **Sand (for emergency levees)**
2. **Hat**	10. Insect repellent	18. Fire extinguisher	26. Water tank
3. **Boots**	11. Map	19. Wet sack	27. Bamboo
4. **Watch**	12. Compass	20. Waterproof bag	28. Ladder
5. **Slippers**	13. Candle	21. Shovel	29. Diesel water pumps
6. **Blanket**	14. Bucket	22. Spade	30. List of important contacts
7. **Prayer mats**	15. Mop	23. Axe	31. Rubber boat
8. **Walking stick**	16. Cleaning fluids	24. Plastic sheets	32. Motorcycle

3. 2. Things to do before the rainy season arrives

In the preparedness plan, the participants were required to identify a list of actions for prevention and mitigation, which are the measures that need to be undertaken before the rainy season arrives. There were six measures that were selected by more than half of the participants, these are: making sure garbage is disposed in the trash bin (62%), making sure the roof and wall are in good condition with no leakage (62%), dredge the river/ creek around their neighbourhood (56%), provide water storage tanks for clean water (54%), eradicate mosquito nests and breeding grounds (51%), and elevate the house or make water levees (50%).

The measures for prevention and mitigation that were least prioritised were monitoring the news to check when the rainy season is predicted to start (14%), preparing equipment to prevent flood water from entering the house, such as sand bags (11%), participate in the council's disaster preparedness team (7%), conduct disaster simulations in your home (3%), and subscribed to official emergency services social media accounts (1%). There were also seven additional measures that were identified by the participants for prevention and mitigation (Table 29).

Table 29. Additional measures to do before the rainy season arrives (that were not in the booklet)

No.	Actions
1.	Planting trees
2.	Taking care of the pets
3.	Take enough rest, vitamins and maintain health
4.	Empty the septic tank
5.	Check the electrical installation
6.	Repair damaged roads
7.	Mobilise the community to clean the environment.

Similar with emergency kit, the items in Table 29 were selected by less than 10% of households and mostly selected by households from School B.

3. 3. Things to do when there is going to be flood

There were three popular measures that were selected by more than half of the participants for measures to be undertaken when flood is approaching. These measures are: turning off the electrical equipment/ power source (80%), securing valuables and important documents in a safe place (71%), and making sure the water storage tanks are filled with clean water (55%).

The least popular measures were coordinate with the local council's disaster preparedness team (13%), make sure seepage wells are not blocked by leaves or other items (9%), monitor

children so they do not play far from home (7%), and coordinate with school authorities (4%). Eight additional measures were identified by the participants that were not included in the booklet, mainly related to evacuation and having enough supplies if evacuation occurred (Table 30).

Table 30. Additional measures to do when flood is approaching (that were not in the booklet)

No.	Actions
1.	Stockpile food and groceries
2.	Clean the gutter
3.	Contact all family members
4.	Call someone who you trust
5.	Place children with a person that you trust
6.	Make sure that your pets are in a safe place
7.	Help other people by taking part in distributing relief assistance or setting up evacuation posts
8.	Check the condition of nearby evacuation centres

The measure to stockpile foods and groceries was selected by most households among the eight additional measures, with about 10% of the households, from School A and B. The other seven measures were selected less than five households (>5%).

3. 4. Things to do during and after floods

More than half of participants selected two actions for during and after floods: stay calm and not panic (73%) and cleaning your home and surrounding environment with cleaning fluids (70%). Table 31 listed other measures that were also selected by the participants.

Table 31. Preferred measures to do during and after floods selected by participants

No.	Actions
1.	Evacuate household members when flood is still possible to cross
2.	Ensure that electrical appliances, power sources, and gas connections to the gas cylinders are turned off and not installed
3.	If the flood is too high, move to the upper floor, roof, or higher ground
4.	Avoid walking near the gutter to avoid falling and swept away by floodwaters
5.	Don't drink, play or swim in flood water, wash hands before eating and drinking
6.	Beware of wild animals that can be carried by flood runoff (such as snakes, monitor lizards, scorpions) especially around trees, bushes and narrow spaces
7.	Take vitamins and maintain healthy food intake to avoid disease
8.	If needed, place children with someone that you can trust
9.	Eradicate mosquito nests and breeding grounds
10.	Dry items that had been exposed to flood water

The least preferred measures (selected by less than 15% of participants) are avoid using the vehicle at night (14%), before reusing, check the electrical equipment, gas cylinders, gas lines

and make sure it is safe to use (11%), raise funds to help the flood affected survivors (10%), use bottled water or boil water before drinking (9%), if your car or motorcycle breaks down during a flood, leave it and move to higher ground or level (7%), if your car is submerged and the water is getting higher, use the window to exit (5%), if you are in a vehicle, avoid using an underpass because it can be submerged in water (4%), use chlorine if the dug well is contaminated by flood water (4%), and if the flood continues to rise, contact emergency services (1%).

Other measures were identified by the participants for things to do during and after floods (

Table 32). Most of the actions that were listed for during flooding were actions for personal safety, for example preventing electric shocks, wearing boots, and not to go out if it is not important. Measures to sustain wellbeing and defending the homes during flooding were also identified such as using the water efficiently, monitoring the news, and drawing out water from home and ensuring the drainage channel is still operating well (to clear the water out).

For actions after the floods, participants identified cleaning their houses (e.g. tidying up, throwing away food that is spoiled, use of air freshener, repair any damage, and opening windows and doorways to ensure airflow, anticipating future hazards (e.g. watch out for more floods and dispose flood garbage in a proper place), and check the health of all household members (e.g. see a doctor if sick and take a bath with antiseptic solution).

Table 32. Additional measures to do during and after floods (that were not in the booklet)

No.	During flooding	No.	After floods
1.	Drain water out from the home	1.	Watch out for more floods
2.	Make sure there are no cables or electronic devices that are submerged in water	2.	Return items to their place, tidy up the house again
3.	Do not go out if it is not important	3.	Dispose flood garbage in proper place
4.	Make sure you lock the doors when evacuating	4.	Throw away food that is spoiled
5.	Wear boots	5.	Check your health, go to the doctor if you have diarrhoea
6.	Monitor the news to find out when the floods will recede	6.	Clean yourself, take a bath using antiseptic solution
7.	Keep the drainage channel running smoothly	7.	Open the windows and doorways so that there is airflow
8.	Use clean water efficiently	8.	Use room freshener
9.		9.	Check the house and immediately repair if there are damages

The above measures were selected by less than 10% of households from School A and B.

3. 5. Emergency assembly locations

In terms of emergency assembly locations, most participants (56%) identified a local park or open field as the preferred evacuation point, followed by mosque/ place of worship (17%) and government offices (10%). Other locations that were also mentioned included school buildings, the supermarket or shopping malls, roads, health facilities (e.g. hospital or clinics), and a relative's or friend's house.

4. Developing a database to improve preparedness measures

The household preparedness tool -consisting of a blank template to generate discussion and to complete and a booklet to help in developing the plans- have served its purpose to help household members in selecting the most appropriate measures that are suitable for their homes, based on the participants' knowledge and experiences (please see Chapter 5 and 6 for the full qualitative and quantitative the analysis regarding the effectiveness of the tool). For example, in the booklet, there were little mention of specific actions for vulnerable groups such as older people and those with disabilities or those with pets. However, in the preparedness plans, participants have identified measures specifically for them, for example adding walking stick as part of the emergency preparedness kit and making sure their pets are evacuated when a flood is predicted to occur. This is an important aspect because community resilience is composed of a mixed contribution from government and NGO policies and practices as well as measures that suit communities, households, and individuals in addressing disaster risks (Diekman et al., 2007; Kapucu, 2008; Norris et al., 2008).

Most of the preferred items for the emergency preparedness kit are regular everyday items that are often already available at home, for example spare clothes, raincoats, emergency lights, and first aid kits. Nevertheless, there are also other items that are more complex and expensive such as diesel water pumps, rubber boats, and fire extinguisher.

Based on the contents in the prevention and mitigation section, half of the participants selected to raise their houses or create levees to prevent water entering the house. This is a common practice for flood prone areas in urban setting, as highlighted by Warsilah (2017). However, this is not a sustainable measure as roads are still flooded and are often damaged; when this occurs, the local government repairs the road by paving more layers making the elevation higher compared to the houses. Thus, when the next rainy season starts, the houses will be flooded again.

Looking at the measures during and after floods described by the participants, there are two options for households: evacuate to a safe place or stay and defend their homes. The option to stay and defend their homes involves the following measures: preparing to draw water out from their home by having a diesel water pump, ensuring the drainage channel is operating well, stockpiling water and food, using clean water efficiently, and moving to the second floor or to the roof if the floods continue to rise. The option to evacuate was also selected by participants who selected several measures to support this option such as leaving early, checking evacuation centres, and placing children with someone that you trust (if needed). Both options are considered feasible and are common, staying to defend the home is particularly popular given that regular floods in Jakarta often recede in 2-3 days and houses in flood prone areas in Jakarta usually have two stories or more (Sagala et al., 2013; Marfai et al., 2015; Warsilah, 2017). However, the stay and defend option has risks that should be thoroughly considered by families, local governments, and housing developers, such as lack of sleep in protecting their homes and valuables from being damaged by floods and uncertainties as to what extent the flood level is going to rise (Haynes et al., 2018). Another risk is that people who stay and defend their homes often at risk of secondary hazards, for example during flood situation, the electricity is often cut off and thus people use candles for lighting and this could lead to fire risks, as suspected in dozens of house fires that occurred during flooding in 2013, and posed more challenges to the fire brigade (Liputan6.com, 2013).

Flooding regularly occurs every year in Jakarta, particularly in the northern part of Jakarta. However, widespread flooding has occurred three times in the last five years and affected more than 35 sub-districts (out of 44 sub-districts) with flood height around two to four meters in some areas and could lasted up to three weeks (Detik.com, 2017a).

Previous studies have shown that the selection of where to evacuate to is influenced by proximity to hazards, access to health services and humanitarian aid, adequate space, and the resources available to support the affected people (Kar et al., 2008; Stepanov et al., 2009; Sayyady et al., 2010; Campos et al., 2012; Bish et al., 2013; Lim et al., 2013). Based on the content analysis, the choices for emergency assembly locations were dominated by the nearest available and safest place from the house, which is the park or open field, and then followed by public facilities such as mosques, and government offices. Emergency assembly locations are often categorised as the nearest destinations that serve as a temporary meeting points (e.g. park or open field) or ultimate destinations where people can stay for a longer period, e.g. relative's house or public buildings (Lim et al., 2013). Many urban areas in

Indonesia have public facilities that can contain many people such as schools, mosques, and government offices and these are common options to serve as shelters in many disaster-prone countries (Stepanov et al., 2009; Campos et al., 2012).

Interestingly, variations of measures and items that were not listed in the booklet were mostly selected by households from schools with families with medium-to-high income level. This may be because these children and their parents have more access to information and resources (e.g. network, financial, and equipment) to assist them in flooding situation. School with low-to-medium income families may have limited option to select measures that are more expensive or uncommon.

This exercise was not to test how well participants completed the poster, but to examine how they completed it, to see how they used the booklet and what other sorts of measures they included. The booklet was never intended as an exhaustive guide, but to trigger discussion and assist participants complete the poster. It was anticipated that participants would bring their own knowledge and experience, and this has overwhelmingly been the case. The number of households who selected actions or items outside the booklet were small. Nevertheless, these lists of additional action can now be used by agencies in improving their guidelines for household preparedness plans and to generate more discussion regarding the choice of preparedness measures.

5. Conclusion

By conducting a content analysis of the completed preparedness planning posters, a number of additional measures have been identified. This exercise has created a list of items and actions that are needed for emergency kits and to effectively prepare, respond and recover from a sample of population in Jakarta, and it may well be applicable in other flood-prone urban areas in Indonesia and beyond.

6. Areas for Future Research

Conducting the content analysis on the various household preparedness plans triggered new insights on the type of activities that households in Jakarta selected as their preferred preparedness actions. Future research will benefit by exploring further the reasoning and implications of households when selecting preparedness measures. Furthermore, a longitudinal study to assess the pedagogical benefits in the extended use of the poster tool

and family dialogue will provide better understanding on how families develop learning and build a culture of resilience.

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8. Appendices for Chapter 6

List of emergency items

No.	Items
1.	Personal protective equipment (e.g. spare clothes, mask, hat, boots, watch, raincoat, umbrella, insect repellent)
2.	Family shelter equipment (blankets, mattresses, folding tents, rope, life vests, portable stove)
3.	Lighting equipment (e.g. emergency lights or flashlights with backup batteries)
4.	Important documents
5.	Tool for communication and/ or receiving news (e.g. radio or phone and mobile charger)
6.	First Aid Kit
7.	Bottled water and biscuits (for snacks)
8.	Hygiene equipment (soap, toothbrush, toothpaste, shampoo, towel, wet tissue, hand sanitizer)
9.	Personal medicines (for example: cold, cough, runny nose, asthma, stomach ulcers, diabetes, heart disease, or other chronic diseases)
10.	Adequate cash (anticipation if the ATM or bank doesn't work)
11.	Swiss-army knife
12.	Lighters or matches (put in a waterproof box)
13.	Whistle for signal seeking help
14.	Hardware tools (e.g. shovel, spade, axe, ladder)
15.	Navigation kit (e.g. map and compass)
16.	Cleaning tools (e.g. bucket, mop, cleaning fluids)
17.	Emergency response kits (e.g. fire extinguisher, wet sack, waterproof bag, diesel water pumps)
18.	Materials for emergency levees (e.g. plastic bags, sands)
19.	Other items (e.g. prayer mats, walking stick, water tank, bamboo)
20.	Vehicles for evacuations (e.g. rubber boat, motorcycle)

List of things to do before the rainy season starts

No.	Items
1.	Make sure the roof and wall are in good condition and no leakage
2.	Make sure garbage are disposed in the trash bin
3.	Dredge the river/ creek around their neighbourhood
4.	Provide water storage tanks for clean water
5.	Eradicate mosquito nests and breeding grounds
6.	Elevate the house or make water levees
7.	Make sure all household members have a raincoat or umbrella
8.	Make seepage wells and bio pores so that flood runoff to homes can be reduced
9.	Arrange home furniture and electronic equipment so that it remains safe in the event of a flood
10.	Prepare cleaning equipment at home for cleaning after floods
11.	Look back at "My Household Preparedness Plan"
12.	Monitoring the news to check when is the rainy season starts
13.	Preparing equipment to prevent flood water from entering the house, such as sand bags
14.	Participate in the council's disaster preparedness team
15.	Conduct disaster simulations in your home
16.	Subscribed to official emergency services social media account
17.	Planting trees
18.	Taking care of the pets

No.	Items
19.	Take enough rest, vitamins and maintain health
20.	Empty the septic tank

List of things to do when there is going to be flood

No.	Items
1.	Turn off electrical equipment/power source to avoid electric shock
2.	Secure valuables and important documents to a safe place
3.	Make sure to fill the clean water storage tanks
4.	Move electronic equipment and other valuables to the top floor or safe place from flooding
5.	Prepare preparedness kit ready to use at any time
6.	Use clean water efficiently
7.	Check the entire house for leaks
8.	Monitor information from twitter, online news, or media regarding flood warnings
9.	Prepare emergency levees using sand bags or other material
10.	Make sure your vehicle (car / motorbike) is in good condition (check regularly) and fully loaded with fuel to anticipate if you must evacuate
11.	Secure the gas outlet/ gas cylinder
12.	Coordinate with the local council's disaster preparedness team
13.	Make sure seepage wells are not blocked by leaves or other items
14.	Monitor children not to play far from home
15.	Coordinate with school authorities
16.	Stockpile food and groceries
17.	Clean the gutter
18.	Contact all family members
19.	Call someone who you trust
20.	Place children to person that you trust
21.	Leave early and evacuate family members, children, elderly parents, and pets in a safe place
22.	Help other people by taking part in distributing relief assistance or setting up evacuation posts
23.	Check the readiness on the evacuation posts

List of things to do during and after floods

No.	Items
	During flooding
1.	Stay calm and don't panic
2.	Evacuate household members when flood is still possible to cross
3.	If the flood is too high, move to the upper floor, roof, or higher ground
4.	If the flood continues to rise, contact emergency services
5.	Ensure that electrical equipment, electricity sources, and gas connections to the gas cylinders are turned off and not installed
6.	Make sure you lock the doors when evacuating
7.	Avoid walking near the gutter to avoid falling and swept away by floodwaters
8.	Don't drink, play or swim in flood water
9.	Wash hands before eating and drinking

No.	Items
10.	Beware of wild animals that can be carried by flood runoff (such as snakes, monitor lizards, scorpions) especially around trees, bushes and narrow spaces
11.	Dry items exposed to flood water
12.	Use bottled water or boil water before drinking
13.	Take vitamins and maintain healthy food intake to avoid disease
14.	If needed, place children to trusted people
15.	Eradicate mosquito nests
16.	Draw water out from home
17.	Make sure there are no cables or electronic devices that are submerged in water
18.	Do not go out if it is not important
19.	Wear boots
20.	Keep monitoring the news and flood information and listen to emergency information, find out when the floods will recede
21.	Keep the drainage channel running smoothly
22.	Use clean water efficiently
23.	Stay away from cables or electrical appliances that got wet
24.	Avoid using the vehicle at night
25.	If your car or motorcycle breaks down during a flood, leave it and move to a higher place
26.	If your car is submerged and the water is getting higher, use the window to exit
27.	If you are in a vehicle, avoid using an underpass because it can be submerged in water
	After floods
28.	Clean your home and surrounding environment with cleaning fluids
29.	Check the electrical equipment, gas cylinders, gas lines before they are installed and reused. Make sure it is not wet and is safe to use
30.	Use chlorine if the dug well is contaminated by flood water
31.	Watch out for more floods
32.	Return items to their place, tidy up the house again
33.	Dispose flood garbage in proper place
34.	Throw away food that is spoiled
35.	Check your health, go to the doctor if you have diarrhoea
36.	Clean yourself, take a bath using antiseptic solution
37.	Open the windows and doorways so that there is airflow
38.	Use room freshener
39.	Check the house and immediately repair if there are damages
40.	Raise funds to provide food for flood affected survivors

Options for emergency assembly locations

No.	Items
1.	Nearby park or open field
2.	Mosque or place of worship
3.	Government offices
4.	School buildings
5.	Relative's/ Friend's house
6.	Supermarket or shopping malls
7.	Roads
8.	Health facilities (e.g. hospitals or local clinics)

Link to Paper 4 (Chapter 7)

Chapter five provided an analysis of the changes in awareness regarding household preparedness measures and attitudes towards the involvement of children's participation in DRR, in both children and their parents. Chapter six captured the content in the household preparedness plans and developed a database of disaster preparedness measures that were selected by families from the three target schools (please see Figure 2. Research Timeline).

The next chapter (Paper 4) provides a more in-depth investigation on the process of completing the household preparedness plans and understanding the family dynamics and interactions between children and their parents. Using family group interviews, the paper captures a more comprehensive and nuanced understanding of the influence of the household disaster preparedness tool on each members of the household and also their influence on the process.

Paper 4 will be submitted to *Children's Geographies*, an international peer-reviewed journal that publishes leading edge research and scholarship relating to children, young people and families.

Chapter 7

Paper 4: Building Disaster Resilience Together as a Family

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1. Abstract

The Sendai Framework on Disaster Risk Reduction (SFDRR) highlighted the global commitment in building community resilience and strengthening capacity to anticipate disaster risks. However, previous research suggests that many agencies implementing disaster risk reduction (DRR) with children mainly target schools or local areas (e.g. village level), with little evidence in increasing disaster preparedness at the household level. This is a significant gap recognising the role of parents in enabling children's agency in Disaster Risk Reduction (DRR).

This study examined the effect of a school-based household disaster preparedness tool in influencing awareness on disaster preparedness planning for children and their parents as well as perspectives regarding children's role in disaster preparedness. A family group interview methodology was used to assess the group dynamics of the family and to gain a deeper understanding of how family preparedness planning works and the interactions and roles between different family members. Overall, 11 families were interviewed from three schools in Jakarta, Indonesia with varying socio-economic conditions, exposure of flood hazards, and level of exposure to DRR education. This study found that the household preparedness planning process has provided families with a written and comprehensive plan, reduced hazard-related fears, built consensus in identifying preparedness measures, and facilitated children to have a meaningful discussion with their parents where they were able to positively influence household preparedness.

Keywords: School, Child-Centred, Disaster Risk Reduction, Preparedness Plan, Household, Family Group Interviews

2. Introduction

The world made a joint commitment to reduce disaster risk in 2005 through the ratification of the Hyogo Framework for Action 2005-2015 with the aim to significantly reduce disaster losses

(UNISDR, 2005). The latest global framework on Disaster Risk Reduction (DRR), the Sendai Framework for Disaster Risk Reduction (SFDRR), has recognized the growing risk of disasters that can threaten development, increase mortality, and displacement around the world (UNISDR, 2015b). In the coming years, these risks will be further exacerbated through anthropogenic climate change, uncontrolled urbanization, poor land use planning, environmental degradation, and the over-exploitation of natural resources (WEF, 2019).

The SFDRR has set a goal to substantially reduce "*disaster risks and losses in lives, livelihoods, and health and the economic, physical, social, cultural and environmental assets of person, businesses, communities, and countries*" (UNISDR, 2015b, p. 12). The framework has also identified four priorities for action, including strengthening disaster preparedness for response at the community level, increasing education and awareness raising, and training to build the capacity of community members to reduce disaster risks.

However, many development agencies have defined community in a conventional way purely by spatial terms: groups of people living in the same area or who have the same level of exposure toward risks (Twigg, 2009; IFRC, 2014). Consequently, a recent literature review on DRR programming with children suggest that many agencies focus their programs in schools as well as in local areas (e.g. village), and there is little evidence of DRR programs focusing in their homes (Amri et al., 2018).

Recognising this gap, we have developed a household preparedness tool that aimed to foster interactions and enable meaningful discussions between children and their parents regarding disaster preparedness in their home and thus expected that it will lead to improvement of disaster preparedness at home. The tool focuses on flood preparedness as a continuation of previous research by Amri, Bird, et al. (2017) with a case study in Jakarta which has extensive records as a flood-prone area (BPBD Prov. DKI Jakarta, 2015).

The tool comprises of a preparedness plan template in the form of an A2-size poster and a booklet that contains guidelines and example preparedness actions (Figure 18). The tool was developed using participatory approach in a series of steps, started with a review of studies and existing templates regarding household preparedness and then followed by consultations with participatory approach with DRR education practitioners, children, and their parents. A total of three FGDs with 50 children and their parents, consultations with four DRR education practitioners, and review of 20 literature were involved in the tool development process (for further details, see Amri et al., in prep).

Figure 18. The household preparedness tool (the poster on the left and the booklet on the right).

The poster is divided into eight sections consist of boxes for the participants to fill, and these boxes are: 1) Assembling preparedness kit; 2) Things to do before the rainy season arrives; 3) Things to do when there is going to be flood; 4) Things to do during and after floods; 5) Evacuation map and routes; 6) Important Phone Numbers; 7) Persons responsible for picking up the children during emergency; and 8) Signatures of all household members.

2. 1. Literature and practices related to household preparedness plans

For many years, household preparedness has been actively advocated in disaster-prone countries primarily in developed countries such as Canada, USA, New Zealand, UK, and Australia, by raising awareness on the importance of individual households in anticipating emergencies, such as earthquakes, floods, and bushfire (Page et al., 2008; Becker et al., 2012; Kohn et al., 2012; Levac et al., 2012; Ronan et al., 2015). Common preparedness actions that have been promoted by emergency services in these countries are assembling emergency kits, preparing evacuation routes, and understanding actions on what to do before and during emergencies (Kohn et al., 2012; Levac et al., 2012). However, in the context of resilience, capacity should be built throughout the whole phases of disaster management, consisting of reducing risk, responding adequately when disaster strikes, and recovering from the situation (Buckland et al., 1999; Finch et al., 2010). Therefore, developing a preparedness plan should encompass risk reduction measures, preparedness and response actions, and steps needed when recovering from a disaster.

Furthermore, many preparedness plan templates are provided with pre-determined actions with little room or support for each household to decide by themselves what actions are the most appropriate for their conditions (for examples, see American Red Cross, 2009; Government of Canada, 2012; FEMA, 2015; Australian Red Cross, 2016; Ministry of Civil Defence and Emergency Management New Zealand, n.d; Queensland Government, n.d.). This is a significant weakness as each household is unique and is comprised of household members with varying capacity and vulnerability toward risks, that are influenced by number of household members, age, gender, culture, class, economic levels, and many other elements (Peek, 2008; Haynes et al., 2010; Thomas et al., 2010; IFRC, 2014).

Moreover, Mitchell et al. (2008) highlight that disaster risk management remains dominated by adults with children seen to have a limited role to influence, including at the household level. This is contradictory to the UN Convention on the Rights of the Child (UN CRC) that outlines children have the right to express their views, concerns, and ideas as well as the right to be heard and taking part in processes that influence their lives (United Nations, 1989). Research has demonstrated that children have a unique perspectives on how they view risks and also have specific needs in building preparedness and resilience (Haynes et al., 2010; Seballos et al., 2011; Haynes et al., 2015; Amri, Bird, et al., 2017). Many studies have also provided evidence that enabling children to participate will increase important life skills such as their capacity to think critically, build leadership skills, and communicate effectively (R. Sinclair, 2004; Acharya, 2010; Checkoway, 2012).

In the area of DRR, many studies have generated evidences that children when equipped with sufficient knowledge and tools and supported by adults, have been able to deliver change and build resilient in their communities (Plan International, 2010b; UNISDR et al., 2012; Children in a Changing Climate, 2017). Based on these experiences, many child-focused agencies have been promoting child-centred DRR (CCDRR) approach where it is often defined as a combination of promoting child participation -by enabling children to take part during design and implementation- while also taking into account that children have specific needs and rights that are protected in the UN CRC (Amri et al., 2018).

With the advances on the integration of DRR education into the national curriculum in many countries, this provides a significant opportunity for children to become agents of change (UNESCO et al., 2012a; Ronan, 2014). However, studies related to DRR education also showed that these DRR education programs while they do increase knowledge and skills, provide more

stable risk-perceptions, and reduce hazard-related fears, it has not provide the children with the necessary tool for them to bring significant influences at home (Ronan, Johnston, et al., 2001; Ronan et al., 2003; Finnis et al., 2010; Ronan et al., 2010; Amri et al., 2018). Thus, this household preparedness tool was developed to provide children with resources to support them in playing a more active role on building preparedness at home.

Based on the above deliberations, this study aims to have an in-depth understanding on how the tool influenced the perspectives and practices of household preparedness in a family, including how it influences people's perspectives regarding children's role in disaster preparedness. A family group interview method was undertaken involving the children and parents who participated in the pilot testing. This is a method that has been rarely used, as highlighted by Eggenberger et al. (2007); MacLean et al. (2014), including in the area of child centred disaster risk reduction.

The following sections describe the methodology and process of the family group interviews. Starting with the rationale of selecting family group interview method.

3. Methods

3. 1. Rationale

In-depth interview is a method of data collection to explore issues more detailed and enable further clarification if needed and thus can enrich the qualitative aspects of the data (Kitzinger, 1995; Pamela Davies, 2006). This method is common to be used by researcher to gain deeper information, uncovering the views and reasoning that exist in a person (J. M. Johnson, 2001). Interviewing groups of people or the use of FGDs have been commonly used in qualitative studies since decades ago (Stewart et al., 2007; Krueger et al., 2014). However, family group interview has notable differences compared to group interview and FGD, as participants of group interview or FGD typically do not know one another nor they are relate to one another (Krueger et al., 2015). On the other hand, the extensive relationship among family members, the shared experiences as a family, and the intimate nature on the interactions on one another are aspects that need to be assessed to understand the group dynamics within a family (Eggenberger et al., 2007).

The use of family group interviews, where children are interviewed in the presence of parents/ carers, is still uncommon (MacLean et al., 2014). CCDRR research involving children as active participants commonly involved them as one homogenous group, with limited or no involvement of adults (e.g. Tanner et al., 2009; Haynes et al., 2010; Haynes et al., 2015).

The tool that is being tested is designed to enable discussion between children and their parents in developing a household preparedness plan, therefore assessing the family dynamic is becoming more important (Ronan et al., 2005). Hence, through family group interviews, researcher will be able to understand multiple perspectives of family members and how the interactions between family members (Åstedt-Kurki et al., 2001; Irwin et al., 2005; Curtis, 2007). Moreover, the method also provide the space for children to express their perspectives to their parents in a supportive and convenient environment (Backett-Milburn et al., 2004; MacLean et al., 2014).

3. 2. Participants

Eleven families participated, consisting of: five families from SDN Sunter Agung 12 Pagi (School A), two families from SD Kembang (School B), and four families from MI Ash Shiddiqin (School C), with the details are listed in Table 33. Only two families from SD Kembang accepted to participate as others were reluctant to participate for interviews. Families from the other two schools were more flexible and able to allocate their time for the interviews. The interview schedule and location were conducted based on participants' preferences. Most interviews (8) were conducted in the families' home, two were conducted in the school, and one in a restaurant due to their home were being renovated. The duration of the family interviews was around 2 hours.

Table 33. Description of family participants

No.	Family #	Interview location	School	Father	Mother	Student	Older sibling	Younger sibling	Total	Pseudonyms and ages
1.	Family 1	Home	School A	1	1	1	1	-	4	Krisna (41), Noni (40), Maria (16), Myra (11)
2.	Family 2	Home	School A	1	1	1	-	1	4	Afri (42), Ani (36), Ica (12), and Ira (10)
3.	Family 3	Home	School A	1	1	1	-	1	4	Bayu (41), Kiki (34), Nendra (11), and Noka (9)
4.	Family 4	Home	School A	-	1	1	-	-	2	Ovi (42) and Ratri (11)
5.	Family 5	Home	School A	1	1	1	1	1	5	Rino (39), Maulin (38), Desry (12), Mius (11), and Putri (6)
6.	Family 6	Restaurant	School B	-	1	1	-	1	3	Ratih (35), Pita (9), and Dewi (6)
7.	Family 7	Home	School B	1	1	1	1	-	4	Faiz (48), Lina (40), Reza (12), and Budi (10)
8.	Family 8	School	School C	-	1	1	1	-	3	Neny (35), Irsyad (12), and Fahri (10)
9.	Family 9	Home	School C	1	1	1	2	-	5	Purba (45), Sita (35), Ipul (14), Hendri (12), and Nanda (10)
10.	Family 10	Home	School C	1	1	1	1	1	5	Bambang (39), Diana (32), Mawar (16), Anggrek (12), Melati (6)
11.	Family 11	School	School C	1	1	1	1	-	4	Joko (34), Lely (32), Yusra (10), Wahyu (8)

In the interviews, we noted that there were no participants from extended relatives (e.g. grandparents, uncle, or aunt) or other household member such as housemaid. Based on our personal communication, this is because they were not interested or reluctant to participate as it will influence the family dynamics. However, even though they were not present, their roles were mentioned in some of the interviews.

3. 3. Procedures

The tool -the poster and the booklet- was tested with children in Grade 4 and 5 in three schools with different characteristics (Table 34). The children had two weeks to complete the poster with other household members and then the poster was later given to the teachers. The completed posters were then documented by the researcher team and then given back to the children via the teachers to be used in their homes as a household preparedness plan.

Table 34. Characteristics of target schools for pilot testing

	School A	School B	School C
School Name	SDN Sunter Agung 12 Pagi	SD Kembang	MI Ash Shiddiqin
School Type	Public	Private	Private – Islamic
DRR education program	Government-supported	No outside support	NGO-supported
Exposure to DRR education program	A one-day orientation with all the students and followed by a disaster simulation the following day	Limited education through curriculum	Ongoing for more than a year, consisted of trainings, orientation for students, and school drills
Average family class	Middle income	Mid to upper high income	Mid to low income
Exposure to floods	Moderately exposed	Less exposed	Highly exposed
School curriculum	National curriculum	Modified curriculum	National curriculum
School Budget Size	Moderate	High	Low

After the posters have been completed and documented, the researcher contacted the parents and requested for their willingness to participate in family group interviews.

The interviews were structured into several stages: the first step was introduction and building rapport. The research team consists of the lead researcher, one assistant to take notes, and another assistant helping for video recording. At the beginning, the team introduced themselves, explained the purpose of the interview and that the research was approved by the Macquarie University human ethics committee. To warm up participants the researcher introduced a game in the form of short quiz and each participant was given a pen, paper, and writing board. The first questions related to the interview participants, for example: what is mom's favourite food? What is the youngest child's hobby? What does the eldest child want to be when he/ she grows up? and what is Dad's favourite place a to go during the weekend/ holiday? These questions were carried out in relaxed and fun atmosphere. Following this the

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researcher asked participants to individually list the top five things that they were worried, concerned or fearful of and to rank them. The researcher then explored further what participants had ranked with open discussion, focusing on their experiences and possible consequences and impacts.

The next stage focused on the families' experience completing the poster. Inquiring who took part, their experiences in using the booklet, their views and attitudes towards the process and how they felt it had impacted their preparedness was a particular focus, with time taken to enquire about any new knowledge or actions the family had learnt about. Roles and responsibilities for disaster preparedness within the family were also discussed. The last stage explored family daily activities, to understand wider contextual issues of their daily lives and how this impacted on vulnerability and preparedness activities.

The researcher did not inquire specifically about the family household income, as it was felt that it may make participants feel uncomfortable. However, assessments were made by observing the location and style of home. From observation, it appears that the family socio-characteristics mirror the characteristics of the school where their children were enrolled (See Table 34). Therefore, families in SD Kembang were considered to be higher income households, the five families from SDN Sunter Agung were thought to be from middle income families, and the four families from MI Ash Shiddiqin were estimated to come from low income families.

The interviews were audio recorded and then transcribed verbatim in Bahasa Indonesia. Transcripts were analysed with NVivo 12©. Participants quotes then were translated into English. A thematic analysis was selected to code the data based on key parameters that have been set when designing the family interviews (Ignatow et al., 2017). The themes are related to participants' perspectives and experiences on disaster risks, the decision-making process within the family, participants' experiences in filling the poster and using the booklet, the overall design of the tool, as well as assessment on their preparedness plans. These themes work together to provide a more holistic picture of the participants' experience that are being assessed (Hawkins, 2017). Analytic induction was also undertaken as new themes and issues emerge as we establish patterns in order to draw conclusions (Pascale, 2011).

The family interviews were conducted between May and June 2016.

4. Results

The results of the focus groups and their discussion are presented below. Quotes are used to illustrate important points and to hear from the participants themselves. All names are pseudonyms.

4. 1. Perspectives and experiences toward hazards

Participants were asked to individually list the top five things that they were worried, concerned or fearful of and to rank them. Participants shared a wide range of issues that they were concerned of, based on direct experiences as well as things that they saw on the news or other sources. The most common issues discussed were floods, building fires, and earthquakes.

Some children expressed fear from hazards, such as tornadoes, landslides, and tsunamis, which are hazards that are unlikely to occur in Jakarta and are hazards they have seen on the news. Children also identified other fears such as sickness of a family member, getting bad grades, in a classroom with a teacher that angry easily, unexpected exam, and being scolded by mom or dad. Children from higher income family also expressed fear of losing their pets. Families from Northern Jakarta (School C) also mentioned criminal activities such as burglaries, gang violence, and even homicide, which had occurred recently in their area. Some parents also shared their fear of being sacked at work, worried if their children getting along with the wrong friends, and disease outbreak such as dengue. One mother recounted her fears and how she worried about how this would affect her children:

> *"it was scary at that time, people were out in the street waving machetes*
> *and throwing rocks to the windows to our houses from the streets… there*
> *are also a lot of burglaries here, if we were not careful, our motorbikes will*
> *be quickly disappeared and drugs also... which is why I am always worried*
> *if Mawar (her other daughter) when she hang around with friends from our*
> *neighbourhood. I am afraid it will affect her school" mother, interview*
> *participant, 33 years old*

The distinction between the fears and worries expressed within families between children and adults was noted by some participants. With adults realising that while they focused on the day to day risks, children also talked about hazards that they saw from the news or in the Internet.

"We were focused on our day-to-day risks [e.g. floods, fires, and riots].... on the other hand our children also think about other risks [e.g. earthquakes and tsunamis]" mother, interview participant, 38 years old

Many families shared their stories of being impacted by floods, including evacuating to their grandparents' house, having time off school, getting bitten by bugs, water entering the house from knee deep up to adult waist level, and moving valuables to the second floor.

Flood risks were also discussed by participants as one of the factors for moving or purchasing a new house, as described by several families, particularly for middle- and high-income families. However, the risks of floods in recent years has decreased in many parts of Jakarta due to dredging of the rivers, as mentioned by several families:

"Last year our house was flooded two times, and the previous year. However, when Ahok (the then-Governor) dredged the rivers, there were no more floods. I have to admit that his work and dredging the rivers, taking out the mud deposits, and then putting concrete slabs in the riverbank. Well, I think he cares with North Jakarta." Father, interview participant, 41 years old

Nevertheless, there were also one family who have lived for years expressed that flooding in his areas was getting worse:

"I think (in recent years) the floods have increased, maybe because all the constructions and then many roads are being elevated so the water is getting more difficult to recede. When I was little, flood water was quickly receded in less than an hour. These days, it can take hours until it recedes and worse in the other neighbourhoods (while pointing to his waist)." Father, interview participant, 39 years old,

Some of the households are comprised of two working parents, and in these cases their children are cared for at home by their grandparents, other relatives, housemaids, or just by themselves, as described in conversation below with a mother (42 years old) and her daughter Ratri (11 years old). Many children also go to school with a regular motorcycle driver who has driven them to and from school for many years.

Researcher (Re): When do you usually come back home from work?

Mother (M): Back home, it depends on traffic, sometimes can be 6.45, can

be seven, and can be 7.30, depends on the traffic

R: So Ratri come back home from school all alone?

Ratri: yes, no one at home

R: but is the house locked? Ratri has the house key?

Ratri: Yes, I carry the house key (mommy nods)

R: and how do you come back home from school?

Ratri: I have a regular motorcycle driver

M: "Her dad and I work from morning to evening, so Ratri is usually alone

at home and helps in taking care of the house"

DRR education has been practiced in schools in Jakarta. Some of the children mentioned that they had learnt about disaster preparedness, either in class with a teacher, by emergency service personnel, during a field trip, or from NGO staff. However, a one father mentioned that it is necessary for DRR education to be taught by a professional and also at home and that both provided unique skills:

Researcher (R): do you think things like this should be learned at school or

at home?

Father (F): I think both is important

R: why is that?

F: It is important so that children can be more prepared and not afraid. For

things like this, it needs to be taught by competent professionals, do some

practice. By practicing, it will be more effective. For instance, on how to put

fire out, this will be more effective if it can be practiced …Usually in schools

children learn on the theories, while at home they can practice it, so it will

be complementing

4. 2. Participants' perspectives toward other hazards

One of the benefits of the poster is that it can also be used for other hazards and not just for floods. For example, structural fire risk for some families was more concerning compared to other hazards, as described by a father (41 years old) and his wife (40 years old)

Researcher (R): this poster is focusing about floods. So, if we do a similar exercise and the information here is adjusted to other hazard, let's say fire, do you think it would be useful?

Father (F): I think that would be very useful

Mother (M): well, actually from my perspective, I ranked fire first compare to floods (regarding the hazards that she most concerned with). Because fire happened more frequent as nowadays, we are using gas stove. Regarding fire risk, we have kids in our home, and they can easily play with the stove. For example, Myra (his daughter), the positive side is that if I ask for a noodle, she will be the one who cook it. On the negative side, she can use the stove by herself, which is quite risky. Many families here, both parents are working full time, and then the children are alone at home and who can guarantee that the children are not playing with the stove. This thing we need to anticipate (by having preparedness plan in place)".

Some families also expressed that there is general information in the poster, for example the emergency preparedness kit, evacuation map, and list of important contacts, where it can also be used for other hazards such as fire and gang violence.

Another interesting benefit from the preparedness planning exercise is that children ask their parents questions who then have to find out more information in order to answer:

"After we fill the poster, the children now ask more information, what happens if there is fire,, what happens if an earthquake occurs .. so, it challenged me as a parent to find out and provide that information to our children." Mother, interview participant, 32 years old

In the interviews, many families are using regular motorcycle driver to pick and drop off their children to school, which is very common in urban areas in Indonesia. The exercise prompted parents to think about the emergency procedures at school when dealing with the safety of their children. Particularly on who the designated person is that can collect their children if

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the parents cannot, as captured in the following conversation with a father (39 years old) and his wife (38 years old):

> *Mother (M): if I cannot handle it, I asks someone (my nephew) to pick her up. The school already know this*
>
> *Father (F): children also know about this*
>
> *M: our regular motorbike driver can also pick her up*
>
> *Researcher (R): aren't you worried if some stranger may pick up your daughter during emergency?*
>
> *M: Well, the teachers are not concerned about this, so what can we do …*

One mother shared her experience of not being able to find her daughter when trying to collect her from school:

> *"At that time, she likes to play before coming home. And then when I checked, she has not come home and there was heavy rain and I received news that there were floods and when I went to school, she was not there, and she cannot be contacted. Apparently, she walked home with her friend and then picked up by the fire brigade and was brought to her friend's house." mother, interview participant, 35 years old*

Many schools do not have clear policy on children pickups, especially during emergencies, which pose significant child protection risks.

4. 3. Experiences with disaster preparedness planning using the tool

All the children in the focus groups stated that they were helped by their parents to complete the poster. Some were also assisted by older siblings. Many expressed that completing the poster was easy, although some mentioned it was difficult to draw the map for the evacuation plan and their parents had drawn it for them.

Most adult participants mentioned that they felt that they already knew what to do to anticipate and reduce the risks from disasters. Some discussed that they first sat back and observed their children filling in the poster and only engaged when their children asked them or if what they were doing was incorrect. Some parents also described that they are accustomed to helping their children with their homework which ensures they are informed

about what is being taught in school. They thought it was necessary to assist with homework in order to ensure it is completed well. The poster was therefore seen by the focus group participants as just another homework task that they wanted to assist their children with.

"If (Myra has) homework like this, usually it ends up to me... we (parents) are accustomed to helping with their homework. So, parents like it or not, must be involved.... So, when there is going to be a school holiday, they get homework to do things where parents need to be involved. Why? Because they cannot finish it by themselves, so parents need to be involved and then we know what they are working on." Father, interview participant, 41 years old

No suggestions for changes to the booklet were received and all children felt that the booklet was useful. Many of them also mentioned that they could easily understand the booklet, an indication that the language used was child-friendly, such as described by one young participant girl (11 years old):

Myra (M): I read the booklet and so did my mom and dad. I used the booklet to help me select which ones that are suitable to fill the poster. I discussed it with my mom and dad first before filling in the poster. The list of important phone number (in the booklet) was also useful.

Researcher (R): how do you see the language used? Are there things that are difficult to understand?

J: Nope

Similar responses were received in relation to the poster design, with all participants agreeing that they were happy with the design and no further change was needed. However, some parents mentioned that they did not read the booklet thoroughly or did not read it at all because they are already familiar with the risks that affect them and how to prepare for them, as described by a dad:

Researcher (R): If there is only the poster and no booklet, would you be able to fill it?

Father (F): Yes, I think so, because we all have experienced (floods). If we have not experienced it, maybe it will be difficult

Even though the booklet was available, some children did additional research, by asking other adults (e.g. housing complex security guards about safe locations) or finding it from the Internet.

"We did not know where the safe locations were, so we asked our security guards [in the housing complex] first" boy, interview participant, 12 years old

"It was easy to fill in the poster .. My (older) brother helped me when drawing the evacuation routes, and we used Google Map first" boy, interview participant, 11 years old

4. 4. The role and influence of each household member

For many parents, they stated that they already knew what to do when an emergency strikes, particularly for floods. Or at least they think that they know what to do. However, this information was often not transferred to other household members, and more often it is not written so it is not visible for others to know. The poster has helped families realise the importance of children knowing what actions to take before, during, and after floods, particularly in households where both parents are working full time and children are in the care of other or even home alone, as described below:

"before, I never realized the importance for my children knowing this (household disaster preparedness plan). Because when I am working, they are at home with their grandparents. So, they need to know what to do in an emergency" mother, interview participant, 40 years old

Another benefit of the poster is that because it is written down it can be shown to other household members,

"My dad helped me in filling the poster, and then we showed it to everyone in our house" girl, interview participant, 11 years old

It also assisted in showing the division of work that can be completed by each household member according to their capacity. For example, children can help in securing important documents, turning off the electricity, and making sure that their own important possessions are kept safely. There are other actions that needs to be undertaken by adults for example moving heavy items such as a sofa or heavy electronic appliances to the second floor. The

exercise also assisted participants in recognising children's potential to be risk creator (as discussed earlier) and this prompted additional preparedness actions to anticipate, for example securing electrical appliances.

Participants also discussed how children can also become risk creators as they play around the home. One family shared the story of when their previous house burnt down due to a fire at a neighbour's property caused by overloading of power boards, something simple that a child can prevent of or address to avoid fire. Another example, two mothers shared stories about their youngest children almost triggering house fires from assisting with cooking:

"Noka (age 9) likes to cook. There was one time when I came back home after working and ask him on what he was doing. And then he said: "I was making pancakes". And I saw the kitchen was a mess. I was very afraid if something happened because he was all alone at that time and he likes to cook by himself." Mother, interview participant, 35 years old

"Catherine has a personal experience with fire. Actually, I had warned her before, and then when she was cooking, a fire caught the curtain and then I went straight putting the fire down" father, interview participant, 41 years old

4. 5. The value of dialogue between children and their parents

The poster was beneficial to highlights key areas that need to be considered that otherwise may be left out or felt to be not important. The tool enables discussion between children and parents to agree on the right actions to take. For example, on evacuation routes:

"For me, we never thought to make a map or evacuation routes, because we always tell Yani (her daughter) if anything happens, she needs to call this and this and this, but we never teach her on where to evacuate. Because, she gets scared easily and panicked. In the past, she can be so scared, cried, and then cannot do anything. Now, she is calmer …. At least with this poster, it forces us to think on what to do in an emergency and if we are afraid, we know where the important documents are and where to run" mother, interview participant, 35 years old

For children itself, it helps them to think and confirm the actions required before, during, and after an emergency and validates what they think they know, as mentioned again by Pita (9 years old):

Researcher (R): So, Pita, when you filled in this poster, were there any information that you just found out?

P: Well this (while pointing to things to do during and after flooding) and also when I was little, I watched movies and it was mentioned that police emergency number is 911, now I know that it is not 911 (the Indonesian emergency phone number for police is 110)

Furthermore, the poster has helped families to assess their level of preparedness, as described by a mother (35 years old) below realising that they have not prepared an emergency preparedness kit. Other families have also highlighted that they realised they do not have fire extinguisher or wanting to buy a safe deposit box for storing their important documents.

Researcher: So Ms. Ratih, when filling the poster, were there new information that you learned? That you did not know before?

Mother: Not really, because after I finish with the poster, I realised that we have not really prepared for these (while pointing to the actions listed in the preparedness plan)... All of these were only in our minds (and never checked whether the preparedness measures are in place or not).. only realised that we stored important documents in some place. But we never prepared an emergency kit (for example torches, spare clothes, etc) ... So, we were never well prepared for an actual emergency.

5. Discussion

The interview results demonstrate several benefits from the exercise of children developing their household preparedness plan with their parents. Firstly. the different perspectives of each family member are discussed followed by the benefits of the exercise.

5. 1. Understanding fears, concerns, and views of each family member

It is noted that each person has a unique perception on disaster risk, including between father, mother, boys, and girls. Our records showed that parents are more focused with the day-to-

day risks. Children, on the other hand, tends to include also hazards that they saw from the news or in the internet.

This information reinforces the importance of understanding the different risks faced by individual families. Many studies in the past have highlighted the different views between children and adults where adults tend to highlight hazards that they have a direct experiences with (Haynes et al., 2010). By, facilitating dialogue between children and their parents, they started to recognise -and to some extent, appreciate- the fears and concerns of each individual and identifying measures to anticipate those risks.

The exercise also revealed other risks that they did not realised before. For example, child protection risk in relation to the lack of school procedures when picking up children during an emergency. This is an important aspect highlighted in the Comprehensive School Safety Framework, a global safe school framework that has been endorsed by many child-focused agencies (GADRRRES et al., 2017).

5. 2. Transfer what was once unwritten plan into a written plan

Many disaster preparedness measures are often abstract and unwritten. In the US, about 40-60% of Americans feel very prepared or prepared for a disaster, however less than half of Americans have a family preparedness plan (Irwin E. Redlener et al., 2007). Becker et al. (2012) interviewed residents in three urban areas in New Zealand and found that people are more likely to undertake simple preparedness actions. For example, preparing emergency kits, and only a minority would undertake more complex preparedness measures such as an emergency preparedness plan. The 2009 Victorian Bushfires killed 173 people with more than 2000 homes destroyed, an inquiry following the disaster showed that most people thought that they have average to high preparedness, however the report also suggests that the self-assessed levels of awareness and preparedness may be somewhat inflated (Whittaker et al., 2013).

During a disaster, people often find themselves in a panic, the situation can be stressful with high anxiety levels (Norris et al., 2002). In these emotional states it is difficult to anticipate the hazards surrounding them and respond appropriately without adequate planning and preparation (Kohn et al., 2012). The interviews showed that the presence of a written household plan can help people to assess their level of preparedness, to be calmer during emergency and take more appropriate actions and remind them to act accordingly.

During the interviews, several parents also realised that there are things that they have not done or prepared that were listed in the preparedness plan. For example, one family discussed during the focus group that they need to have a fire extinguisher ready at home and another family is planning to buy a safety deposit box to store their important documents. The poster has therefore been successful in helping families assess their level of preparedness and assisting them to become more prepared.

5. 3. Realisation of the importance of children's participation in household preparedness

The interviews indicated that parents rarely discussed this topic with their children. The poster itself provides a space for children and their parents to sit down and plan together. Some of the parents mentioned that after the exercise, they realised that there is important information that their children should know. For example, knowing where to go if they must evacuate the house, what to do if a flood is approaching, and emergency phone numbers.

The number of families where both parents are working continue to increase in many parts of the world (OECD, 2016). Working parents who were interviewed described that their children are spending significant periods of time at home in the care of guardians (e.g. grandparents, extended relatives, or housemaids) or even at home alone for older children. This causes a significant shift in responsibility from parents to their child's guardians or even to the children themselves. Initially, people thought the responsibilities on household preparedness lies only with fathers or mothers, and then the exercise helped them see that it should be a family exercise, as often parents are not at home, in addition to the extra skills and perspective that children or other household members can bring.

As captured during the interviews, children can reduce and create risks. For example, when cooking in the kitchen as highlighted by John's story where he often makes dishes by himself, even though the intention is good, it poses a significant fire risk at home. Other fire risks, such as appliances left on or overloading of power boards, are preventable risks that a child can avoid or reduce the risks by themselves. Children need to be aware of the risks surrounding them so that they can help to prevent and reduce the risks and be prepared if anything goes wrong. The exercise of filling household preparedness plan between children and their parents together has opened greater realisation for parents regarding the risks at home, and to plan with their children and take precautionary steps together to prevent, reduce or prepare for the risks.

Furthermore, the discussions captured during the interviews showed that there can be division of labours around preparedness at home, for example, identifying what actions children can do when flood is approaching and what actions needs to be undertaken by adults. For example, carrying heavy equipment or electronics should be done by adults, while children can save important documents or their valuable possessions and their pets. This division of work will help in times of emergency rather than relying on adults. Assigning children with tasks not only help to reduce losses but can also assist in keeping them occupied so that they do not become anxious during the event (Blanchi et al., 2014).

5. 4. Encourage children (and parents) to explore more information regarding disaster preparedness

An unexpected outcome that we observed from the exercise was that children were quite motivated to explore more information regarding disaster preparedness at home. For example, children tried to find more information on the internet, by contacting the list of emergency services or NGO contacts. Some children also asked the security guard in their housing complex where the emergency assembly points were.

In some cases, parents also joined and assisted the children in these research activities, for example by using Google Maps to draw their evacuation route. As described earlier, the exercise unlocks participants' understanding on what steps need to be undertaken to anticipate an emergency. It is important for people to have a plan that includes disaster prevention and mitigation, preparedness and response, as well as recovery (post disaster situation), as highlighted in Buckland et al. (1999) and Finch et al. (2010). It also includes other essential information such as evacuation routes and the alternate person to pick up their children. Preparing for a disaster can be an exhaustive exercise and it was not the intention of the poster to cover everything. However, as a minimum the poster covers all the phases in disaster management and is more comprehensive than other preparedness plan templates that generally only cover basic elements. For example, preparedness templates being used by FEMA, American Red Cross, Australian Red Cross, and New Zealand Government only list emergency kits, actions for preparedness and response, and emergency service numbers (American Red Cross, 2009; FEMA, 2015; Australian Red Cross, 2016; Ministry of Civil Defence and Emergency Management New Zealand, n.d).

5. 5. Enables family consensus building

Many children described that they worked on the preparedness plan together with their parents and in some cases with their older siblings. This moment of sitting down together as a family is important, particularly in selecting the appropriate preparedness measures in their home (e.g., assembling emergency preparedness kits, deciding before, during, and after actions, and selecting emergency assembly locations). The exercise enabled children and guardians to discuss disaster preparedness together. In some cases, children asked their parents for more information regarding floods and other risks such as earthquakes and fire hazards, which then enables transfer of knowledge between parents and children (and vice versa).

Although having a preparedness plan and an increase in knowledge is important, the authors argue that the discussion around it and the act of sitting down as a family is even more important. The research demonstrates that the act of family planning helps children realise the logic surrounding the choices that were made, supports the development of their critical thinking skills and promotes their participation in household decision-making. Parents not only learn greater knowledge through their children's enquiry but develop an understanding of their children's specific needs during a disaster and the benefits of shared family responsibility for disaster preparedness.

However, this needs to be treated with caution as enabling meaningful discussion between children and their parents goes beyond providing a tool. There are other elements that need to be considered, for example, the position of parents as enablers that can also moderate the discussion that respects the views and concerns of the child (Hayhurst, 2013; Bresee et al., 2014; Gadhoke et al., 2015) and as recipients that can process the discussion and make informed decisions (Acharya, 2010; Checkoway, 2012; Graham et al., 2009; James et al., 2001; Mwanga et al., 2008; O'Kane, 2013; Percy-Smith et al., 2009; Save the Children, 2005). The role of culture and norms also plays an important role here, as there are some cultures that have less appreciation in hearing what children have to say (Bartiaux, 2009; Gadhoke et al., 2015).

Nevertheless, families are becoming increasingly child-centred, with children having more influence in family decision-making processes (Sharma et al., 2014; Wingert et al., 2014; Allirot et al., 2018). Several marketing studies have highlighted that children's preferences have significantly influenced parents' choices when doing the groceries shopping or how a family

spends their earnings (Cairns et al., 2013; Lora et al., 2016). This is also similar to the interview results where some participants mentioned that the choice of where they live was partly influenced by the location of their children's school and some of the decision made as a family considered the views of the children, for example choosing where to go for the family holiday. Therefore, this indicates that the culture and norms are changing in a direction where children's voices are being heard and taken into account, compared in the 1990s where Indonesian families are not familiar with children's rights (Arifiani, 2015). Thus, we argue that the presence of this tool serves as a facilitating factor to help children engage with their parents on household preparedness.

5. 6. Expandable to anticipate other hazards

Many children and their parents expressed that even though the focus of the preparedness plan and associated information was focused on floods, it could also be useful for other hazards/ emergency situations. This is because some families living in the northern part of Jakarta are also worried about gang violence and criminal activities, building fires and their children getting sick. Parents stated that the list of important contacts, evacuation routes, and emergency kits will be useful for other hazards, especially fire risks.

During the design phase, there were discussions on whether the disaster preparedness plan should be multi-hazard or for specific hazard (Amri et al., in prep). However, studies suggest that although there are some common preparedness actions for all type of hazards, for example, actions of: don't panic and stay calm, monitor the situation and stay informed, preparing emergency kits for 72-hour, and listing key emergency contacts, and there are also key hazard specific messages (IFRC, 2013b). The existing disaster preparedness plan focused on flood preparedness however, there remain associated benefits for all hazards as children started to ask questions regarding other risks, such as fire and earthquakes and some of the actions and useful contacts will work for all hazards.

5. 7. Reflections on the use of family group interviews

Studies on CCDRR usually apply methods where adults are separated from children to ensure the voices of each group are captured (for example see Mitchell et al., 2009; Haynes et al., 2010; Haynes et al., 2015). However, based on the lead author's observation, the family group interviews provided a rewarding experience as the group dynamics of the family can be seen, as children and parents exchanging information, validate each other's opinions, and converse as a group (MacLean et al., 2014). This provides a more realistic view of how family works

within a community (Åstedt-Kurki et al., 2001; Irwin et al., 2005; Curtis, 2007). Therefore, using the family group interview method provides a much better understanding of how the family preparedness planning works and better enables an assessment of their roles and interactions.

Nevertheless, to use this method effectively, there are several aspects that need to be considered. Firstly, understanding the power relations at play. Within a family, differential power relations exist between children and their parents as well as between children and siblings, with children deferring to their parents or to older siblings and may not feel comfortable to speak out (Holland et al., 1996; Punch, 2005, 2007). There are also gender considerations, with mothers deferring to fathers and female children not comfortable to speak up or disagree with male or older family members (Arifiani, 2015; Permana et al., 2015).

Therefore, the facilitator conducting the family group interviews requires skills in making sure the interview environment is comfortable for all participants and where children and their parents can express their views in a safe space. The lead author used a game in the form of a quiz at the beginning of the session to break the ice, build rapport, and establish a relaxed and joyful atmosphere. This is essential to set the mood and ensure comfort. The facilitator should also moderate the discussion in a way where each participant is able to express their opinions and prevent certain participants dominating the conversation. However, various cultural norms do exist and, in some families, it must be understood that age and gender will remain a barrier to fully open discussion. This may be a limitation of the method, but the advantages of seeing the family interact and the insight this provides into household preparedness planning remains an advantage.

The facilitator should also be cautious with the duration of the interview. The family group interviews took approximately 2 hours. Based on our experience, if the interview take too long, participants may get bored and disengage with the conversation, particularly for the children. Thus, the facilitator needs to ensure the questions are succinct, well prepared, and targeted so that he/ she can make the best use of time. Based on our experiences, the family group interviews are effective if they take 2 hours or less.

6. Conclusion

The family preparedness planning exercise using the household preparedness tool has shown demonstrated evidence of a participatory tool can support children to influence and provide positive contribution to disaster preparedness at home. The exercise has provided families

with a written and comprehensive household preparedness plan and thus reduce hazard-related fears, identify appropriate preparedness measures together, encourage children and their parents to explore more information to be more prepared, helpful in assessing the level of preparedness at home and serve as a tool that enable children to have a meaningful discussion with their parents and influencing their perspectives and practices on household preparedness.

The tool has enabled families to realise the importance of shared responsibility on household preparedness, including the role of children and their guardians (e.g. grandparents, extended relatives, or housemaids), particularly when both parents are not at home. In addition, children can also create risks at home that could affect the safety of all household members. Furthermore, the tool also helped families to identify other risks such as child protection risks or other hazards such as building fire or gang violence.

Using family group interviews method was beneficial to understand better on the family dynamics and learning the role of each family member in a family. Using this method, we can assess how children and their parents exchanged information, validating each other's opinions, and enabling conversations as a group.

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Chapter 8

Scaling up and Replicability testing for Household Preparedness Planning tool

1. Introduction

This chapter presents the results from a replication test of the household preparedness-planning tool developed and tested in this thesis (poster and booklet). The aim was to assess the effectiveness of the tool in a different area outside Jakarta with limited input in the process by the researcher or other DRR professionals to judge its potential to be implemented at scale. The research participants had received no prior DRR education. Pre and post-implementation questionnaires were utilised with participant observations and informal interviews added to complement the analysis. This chapter also explores the barriers and opportunities for sustainability and replicability. Challenges to scaling up, including limited access to electricity, a good internet connection, as well as access to knowledge and information will also be discussed. A review of the experiences from other thematic areas outside disaster management such as (agriculture, microfinance, and public health) will be explored to contextualise the analysis and draw learnings. In the last section, updates are provided regarding a real-world application of the household preparedness tool in Indonesia.

1. 1. Understanding in scaling up

Many development initiatives and programs are often initiated by civil society organisations such as Non-Governmental Organisations (NGOs) and research institutions (Uvin, 1995; Jowett et al., 2012; UNDP, 2013; Save the Children, 2018). Many of these institutions are playing roles as innovators in introducing new intervention, strategies, or products in communities to improve their quality of life (UNDP, 2013; MSI, 2016). However, in many cases, scaling up a successful intervention to reach more people still poses a challenge for many agencies, including in the Disaster Risk Reduction (DRR) sector (Amri et al., 2018).

Scaling up has been defined as "ensuring the quality of development impact, reaching out to those 'left behind' and ensuring the sustainability and adaptability of results" (UNDP, 2013, p. 7). Based on this definition, scaling up entails increasing coverage to reach more people (in terms of more people from the same group or expansion to other groups), creating deeper impacts, able to sustain over a long period of time, adaptable in other areas with different contexts, and generating policy and institutional reforms that can provide enabling environments for the initiative to thrive (Hartmann et al., 2008; Yamey, 2011; Jowett et al.,

2012; Vaughan-Lee et al., 2018). Based on these criteria, it is also important that although the term scaling up and replication are often used interchangeably, replication is just one of the means to scale up (Jowett et al., 2012), which is an approach to reach a greater number of beneficiaries (Wazir et al., 1998; Hartmann et al., 2008).

Since the 1990s, many studies have been critical on the issue of scaling up and replicability (such as Uvin, 1995; Uvin et al., 2000; Hartmann et al., 2008; Paina et al., 2011; Jowett et al., 2012; Linn, 2012) and many development agencies have developed framework and theories for scaling up (World Bank, 2003; GTZ, 2011; IFAD, 2013; UNDP, 2013; MSI, 2016). Uvin (1995) highlighted the challenges faced by many NGOs that have successfully implemented pilot projects into an effective operation at-scale and describes four types of scaling up: quantitative scaling up (increasing the number of people involved), functional scaling up (expansion on the type and scope of the program activities), political scaling up (advocating for institutional changes), and organisational scaling up (improving the capacity of the internal organisation to be more efficient and effective). Uvin et al. (2000) also argues that scaling up is not to move towards standardisation, however, instead it should be a process that allows the development process to strengthen the social capital, enhance synergy, and influencing social actors for collaboration.

Research has shown that scaling up should not only focus on the application technologies or "products" but should understand the process and principles behind it in order to bring more quality programming, faster delivery, more equity, and more lasting impacts (CGIAR et al., 2000; World Bank, 2003; Hartmann et al., 2008). Therefore, it is essential to understand the contextual factors, relevant policies and regulations, and the people that we are targeting to ensure that the initiative is reaching the right people with the right methods (World Bank, 2003). Vaughan-Lee et al. (2018) synthesised these discussions in a recent literature review and suggested that "Successful", "Adaptable", and "Sustainable" as three (out of four) essential features and considered as "deal-breakers" for effective scaling up.

Vaughan-Lee et al. (2018) also argues that a monitoring and evaluation (M&E) system is the fourth "deal-breaker" for an effective scaling up process (as indicated in Linn, 2012; Barakat et al., 2014; Begovic et al., 2017; Richter et al., 2017). However, having an M&E system itself is not enough, since many organisations still face challenges in turning information and data captured from an M&E process into a meaningful learning process that drives improvement (Tuckermann, 2008). Learning processes are an iterative and interactive cycle to generate new

ideas and foster innovation (Linn, 2012). Therefore, it is important that organisations have policies that will enable "the learning culture" and to allocate time and resources, including having external facilitators, to enable dialogue, reflection, and action (Tuckermann, 2008; Oswald et al., 2010).

1. 2. Designing a scalable initiative

This action research was inspired by previous studies recognising that there has been rapid progress on the integration of DRR education in schools, which provides significant opportunities for children to become agents of change in building resilience (Plan International, 2010b; UNESCO et al., 2012a; UNISDR et al., 2012; Ronan, 2014; Amri et al., 2018). However, even though there has been evidence of increased knowledge and skills on DRR from child-centred initiatives current approaches have not created significant influences at home (see Ronan, Johnston, et al., 2001; Ronan et al., 2003; Finnis et al., 2010; Ronan et al., 2010). Moreover, many of these initiatives were also promoted by NGOs and other development agencies that often face challenges to sustain the initiative when the initial project has finished (Amri, Bird, et al., 2017).

In order to address this issue, a tool was developed with the aim to foster interactions and enable meaningful discussions between children and their parents regarding disaster preparedness in their home Chapter 4/ Amri et al. (in prep). The development of the tool has been conducted with considerations that it should be scalable and replicable (as suggested by Barakat et al., 2014; MSI, 2016; Begovic et al., 2017; Vaughan-Lee et al., 2018). Therefore, the design considered the following parameters:

a) Low cost
b) Can be used without an internet connection and electricity (offline)
c) Can be initiated through schools and inserted into existing DRR education programs
d) Easily replicated for all types of hazards in any locations
e) A child-friendly design and language
f) Enables children to engage with their parents

The tool was distributed through school, recognising that there have been many DRR education initiatives in Indonesia (MOEC, 2017b). The tool consists of a household preparedness plan template in the form of an A2 poster and accompanied with a booklet. The booklet serves as a guideline to assist participants fill in the template.

A pilot study was conducted in three schools in Jakarta that had received prior DRR education programming (see Chapter Five and Seven). Therefore, for this phase, the same tool and approach was implemented in a school in Bandung, Indonesia (Figure 19).
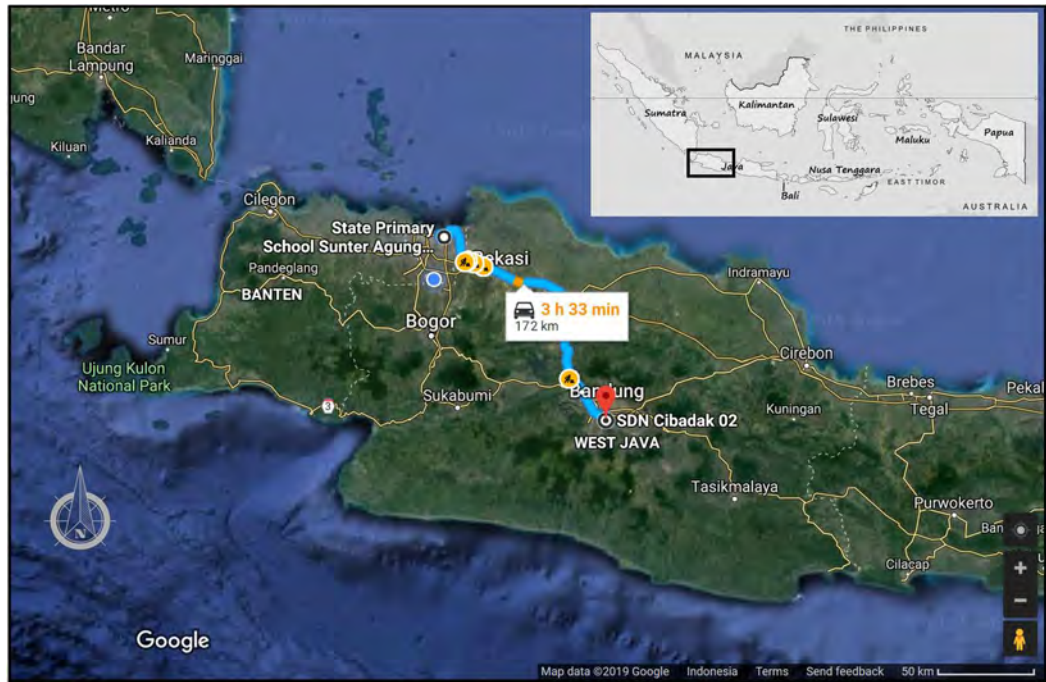
Figure 19. Map of Western Java island. Distance between Bandung and Jakarta is approx. 170 km

The main aim was to assess the efficacy of the tool with a separate sample that had received no prior DRR education although the area is flooded every year. If the tool could be proven to be effective without any DRR training and with limited facilitation from the researcher then it shows scalability potential, as it would reduce any dependencies on school teachers and emergency service professionals. To date reliance on teachers and other educators, who have limited capacity and time, has been identified as a key deterrent factors for the successful implementation of DRR education at scale (Amri, Bird, et al., 2017). In addition, the school in Bandung area is in peri-urban area, which is different compared with the three schools in Jakarta, which are in urban area.

2. Methods

2. 1. Overview of the design

The current study was designed to imitate the design of the previous study (see Chapter 5). Thus, this study was designed to assess the influence of a school-based household preparedness planning process on several aspects for children and their parents, including awareness of preparedness measures before, during, and after floods; attitudes towards household responsibilities for preparedness and children's participation in DRR; and the participants' self-assessment towards their preparedness.

2. 2. Participants

Participants were 58 primary school students from SDN Cibadak 01 in Baleendah, Bandung district, Indonesia from Grade 4 and 5 and with their parents (also 58 participants). Student participants consisted of 28 females and 30 male participants, and there were 28 female and male adult participants. Two parents did not respond, and nine students were excluded because they did not participate in both surveys. The student participants' ages ranged from 8 to 12 years old with a mean age of 10 years old (SD = 0.87). Based on the author's observation and personal communications with the school's principal, the children are from low income families living in peri-urban areas. The parents' ages ranged from 31 to 67, with 9 participants declining to state their age. The mean age of the parents was 42.69 years old (SD = 8.07)

2. 3. Intervention

This study followed the same methodology as that in the pilot testing (Chapter 4) and teachers gave students the poster as a homework task. After two-weeks, the students were required to hand in the completed preparedness plan to their teacher, which was photographed and then given back to the students. The intervention was undertaken in May 2017.

The household preparedness tool that was applied in this study consists of a household preparedness plan template in the form of an A2 poster and a booklet. No changes were made on the design of the poster and content of the booklet. A slight adjustment was made on the poster packaging, previously the poster was given to the students rolled up, in this study the poster was handed out to students folded twice into the size of an A4 poster and given in a zip-lock bag. This modification was conducted based on the researcher's observations during the pilot that the rolled-up poster was not convenient for children to carry and it often became damaged. The flat folding allowed it to more easily be put up on a wall and the zip-lock bag was provided to ensure that the poster was not damaged by rain or other spills.

2. 4. Measures

The measures undertaken in this study were adapted from previous studies (i.e. Whittaker et al., 2013; Webb et al., 2014; Amri, Bird, et al., 2017) and are embedded together within a single survey. Across these studies, these measures have tested to have reasonable reliability, convergent validity, and considerably effective. The same questionnaires and procedures were applied as in Chapter Five.

3. Results

The results are presented in two sections. The first outlines results from the survey that provides information regarding the background and context on the respondents, such as their perspectives toward disaster risks, their experiences and impacts from disasters, preferred learning subjects and the state of their household preparedness plans.

The second section compares the changes in the pre and post-test questionnaire data across four parameters regarding the respondents' perspectives towards: preparedness of their homes; knowledge on how to be safe from disasters; their knowledge on how to protect their home from disasters; and the roles and responsibilities of each household member on household preparedness (including children). Comparisons regarding household preparedness plans before and after the poster roll out are also outlined.

3. 1. Background and context of the respondents

i. Perspectives and experiences toward disaster risks

The survey demonstrates that in both groups, students and parents, most respondents selected floods and disease outbreaks as the top two hazards most likely to affect their homes (

Table 35). Earthquakes and droughts were also selected by many respondents in both groups and strong winds by the parents' group.

Table 35. Perspectives of respondents (students and their parents) toward disaster risks

No.	Hazards	Hazards that are likely to affect their home, according to		Hazards that had been experienced by	
		Students	Parents	Students	Parents
1	Floods	72%	60%	83%	81%
2	Disease outbreaks	64%	59%	55%	41%
3	Earthquakes	52%	47%	47%	34%
4	Droughts	40%	52%	47%	43%
5	House/ Building Fires	36%	33%	16%	21%
6	Riot, conflict, or violence	22%	17%	12%	9%
7	Strong winds	21%	41%	22%	33%
8	Tsunami	9%	2%	0%	0%

Consequently, many respondents in both groups described that they have experienced the top five hazards, particularly floods (80% of respondents).

The survey results captured that the biggest impacts of disaster to students were health problems (66%), loss or damage to personal property/ possessions (45%) and to sentimental possessions (43%). For parents, the situation is similar with health problems (43%), loss or damage to personal property or possessions (40%), and financial loss (34%) as three of the biggest impacts.

The survey results also showed that the majority of students (81%) expressed that they have some sort of knowledge on how to be safe from disasters. Of those who said yes, the majority described that they learned it from teachers (79%), printed media (78%), school books (78%), and electronic media (74%), and there were less students who learned it from their mother (57%) or father (52%).

ii. Learning about disaster and climate risk

The students also assessed on their interest on six learning subjects in relation to disaster and climate risks (Table 36). The survey results clearly suggested that the majority of the respondents were very interested or interested in environmental awareness and sustainability (90%) and disaster preparedness (81%). Lower results were received in three other topics, which are: how to be involved in your community to help for disasters (69%), problem-solving/ decision-making tools to help solve life problems (66%), and how to prevent disaster impacts (60%). A much lower result was on the topic of climate change where less than one-third of the respondents (31%) were interested/ very interested on it.

Table 36. Percentage of students who are very interested and interested on specific learning subjects

No.	Learning Subjects	Respondents
1	Environmental awareness and sustainability	90%
2	How to prepare for disasters and other life-saving measures	81%
3	How to be involved in your community to help prepare for disasters or solve other problems	69%
4	Problem-solving/decision-making tools to help solve life problems	66%
5	How to prevent disasters impact	60%
6	Climate change	31%

Almost all the student respondents preferred to learn these subjects from a teacher in a classroom setting (as part of the curriculum). Many respondents also selected their parents, where their mother received slightly higher votes compared to their father, with 74% and 71%. Noting that each respondent can select more than one option (Table 37).

Table 37. Percentage of respondents' selection regarding the preferred source of learning

No.	Source of learning	Respondents
1	From schools – in the classroom	91%
2	From mother	74%
3	From father	71%
4	From schools – from extra curricula activities	67%
5	From community activities	47%
6	From emergency management professionals/ institutions	33%

iii. Written household preparedness plan

The survey results illustrated the practice regarding preparedness plans. Only 10% of the students described that they had a written preparedness plan. The score is even lower from the parents' survey, where only 3% mentioned that they had a written preparedness plan. Most of the students (79%) did not know or did not have a preparedness plan, and a small number of students (9%) mentioned that they had some sort of preparedness plan although it was not written. On the parents' side, a much larger percentage of parents (33%) had some sort of preparedness plan although it was not written, and more than half did not have a preparedness plan (55%).

3. 2. Comparative assessments between before and after poster roll out

i. Perspectives of respondents toward disaster preparedness at home

Before the poster roll out, more than half of the students (52%) thought that their home is very prepared and prepared to face disaster risks (Figure 20). A higher percentage was received from the parents with 66% considering that their home is very prepared or prepared. After the poster roll out, these numbers increased: for the students, from 52% to 64% and for the parents, from 66% to 88%.

Both respondents were also asked whether they know how to be safe from disasters. Before the poster roll out, only 34% of students and two-third of the parents (66%) think that they knew well enough to be safe from disasters. After the poster roll-out, the same question was asked again, and the number of students almost doubled to 66% and almost all parents (91%) responded that they know how to be safe from disasters (Figure 20). The survey results also showed that before the poster roll-out, there were only 31% of the students and 59% of the parents who know how to protect their home from disasters. After the poster roll-out, these

numbers more than doubled from 31% to 74% for the students and a slight increase was seen for the parents, from 59% to 64%.
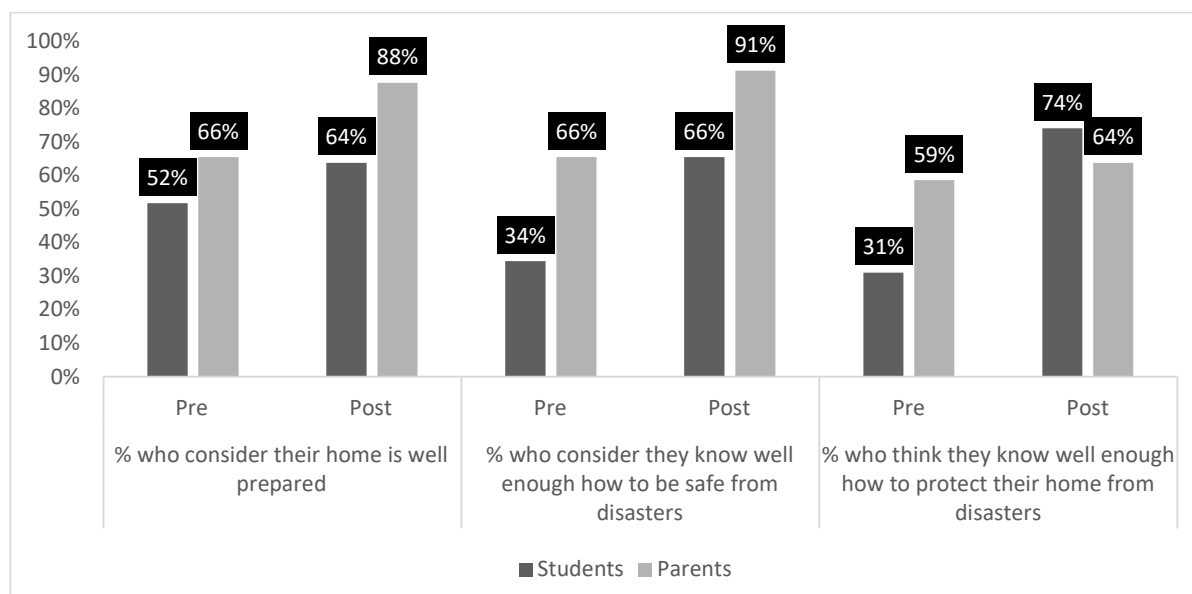
Figure 20. Perception of respondents towards disaster preparedness at home (pre and post poster roll-out)

Based on McNemar test (using α=0.05), significant increases were observed in students on their perception to be safe from disaster and in protecting their home from disasters and in parents on their perception for their homes to be well prepared and to be safe from disasters.

ii. Household preparedness planning

Four parameters were assessed regarding household preparedness plans, including: evacuation plans, alternate person for picking children from school, emergency contact person, and actions to take if flood is approaching. The pre-test results (

Table 38) described that a larger percentage of parents were able to provide specific details on these parameters compared to the students. There was only one parameter where the students' percentage was higher than the parents, regarding actions to take if flood is approaching.

Table 38. Changes on household preparedness plans

No.	Parameters	Students		Parents	
		Pre	Post	Pre	Post
1	% of respondents who were able to provide specific answer related to evacuation	57%	93%	67%	78%
2	% of respondents who were able to provide specific answer on who is picking up them from school	43%	93%	86%	95%
3	% of respondents who were able to identify their emergency contact person	60%	93%	86%	91%
4	% of respondents who were able to identify actions to take if flood is approaching	57%	81%	43%	81%

iii. Responsibilities of each household member on household preparedness

Both respondent groups were assessed on their perspectives on who is responsible for disaster preparedness planning at home. The results showed that most students and parents considered that high responsibility rested with the father and the mother (although the students' result show a slightly lower percentage for the mother, see Table 39). Results for other household members (i.e. grandparents, children, and housemaids) where much lower in the range of 17% to 24% for students and parents' results. After the poster roll-out, the % increased across all the parameters, particularly for grandparents and children.

Table 39. Percentage of students who think these people have high or very high responsibility for disaster preparedness in their home (before and after poster roll-out)

	Father	Mother	Grandparents	Children	Housemaid
Students					
Before Poster Roll Out	84%	69%	24%	22%	17%
After Poster Roll Out	84%	79%	43%	66%	24%
Parents					
Before Poster Roll Out	90%	86%	19%	22%	17%
After Poster Roll Out	91%	91%	81%	93%	28%

Based on McNemar test (using α=0.05), there were significant increases in: the students regarding the children's role in disaster preparedness and in parents regarding the role of grandparents and children in preparedness planning.

The survey also assessed specifically on the role of children in relation to disaster preparedness planning at home. Before the poster roll-out, only a small number of students (38%) thought that they have to be involved in making their house better prepared, however, 62% of them would like to be involved. These numbers increased after the poster roll-out, with 58% of students answering that they have to be involved (+20% increase) and 78% of them would like to be involved (+16% increase).

For the parents', in the pre-test results 40% agreed or strongly agreed that children should be involved when planning for household preparedness. Following the poster roll-out) this increased to 78%, an increase of 38%. There were significant increases in the number of students and parents who think that children should be involved in disaster preparedness planning process.

4. Discussion

4. 1. Respondents' perspectives, experiences, and level of preparedness

The purpose of this study is to assess the effectiveness of the household preparedness tool when implemented with a separate sample in a different area with similar hazard. As described in the previous section, the research location is in peri-urban area with no DRR education program, which is different compared with the three pilot schools that are in urban Jakarta areas and have received a DRR education program.

The survey results showed that most respondents have experienced floods and thought that their home was prone to the impacts of floods. Disease outbreaks were ranked second and health problems, damage to personal property and sentimental possessions, and financial losses had also been experienced by the majority of respondents. Previous articles and media reports also suggest that the flood impacts are getting worse with higher population numbers impacted, larger losses, and the threat of secondary hazards such as landslides and infectious diseases (Nuraeni et al., 2011; AntaraNews, 2016; Dompet Dhuafa, 2016).

The majority of the students expressed that they know how to be safe from disasters and that they learned it in school (from teachers and school books) and from media (printed and electronic media). Interestingly, there was a lower percentage of respondents who described they learned it from their parents, a good indication that disaster preparedness was not a common topic to discuss about at home.

Looking at the survey results regarding learning subjects, it was quite a strong difference between the students' interested on environment and disaster risks (over 80%) and learning about climate change (only 31%). This is similar with the results gathered from Chapter 5 and strengthened the evidences that topics such as climate change should be introduced to students by framing it in the issues that they are interested in, such as the impacts to the environment and disaster risk reduction where there is convergence (Mercer, 2010; Kelman, 2017). In Chapter 3, children in many parts of the world have high levels of interest on the topic of climate change, with significant student activism in many locations during 2019. It

can therefore be assumed that with the right support from adults (e.g. teachers) to motivate children, accessible child-friendly information, and having an enabling culture that promotes CCDRR will promote children to become agents of change.

Furthermore, the survey results also highlighted that almost all students preferred to learn this in school, and many (>70%) were also keen to learn it from their parents. This is an important point highlighting the role of parents in educating important life-skills (such as disaster preparedness) to their children (Ronan et al., 2005; Graham et al., 2009; Seballos et al., 2011; Cobham et al., 2016).

Many parents were quite convinced that they were well prepared against disaster risks based on the large percentage of parents who considered their home to be well prepared and knew well enough how to be safe from disasters. However, almost all households did not have a written household preparedness plan, which is similar with the results from pilot schools in Chapter 5. Studies have shown that introducing a preparedness plan contributes to the improvement of preparedness at the household level, based on case studies in the UK and Japan (Page et al., 2008; Mimaki et al., 2009).

4. 2. Influences of the household preparedness planning process

The analysis of the pre and post-test results generated a number of significant changes. All respondents - parents and students- had a higher confidence in their preparedness toward disaster risks. The number of children who thought that they knew well enough how to be safe from disasters doubled (from 34% to 66%), and an even higher increase was seen in the number of students who considered that they can protect their home from disasters (from 31% to 74%). This was similar to the parents with an increase on the percentage who thought that their home was well prepared to face disaster risks (from 66% to 88%) and who considered that they knew well enough how to be safe from disasters (from 66% to 91%). These results are similar with the results from the pilot schools in Jakarta.

However, it is important to recognise that previous studies have shown that many people often have inflated perception of preparedness compared to their actual level of preparedness when assessed using a written test or from actual emergency, both in the case of children and adults (Whittaker et al., 2013; Amri, Bird, et al., 2017).

4. 3. Household preparedness plans

Based on the parameters of the household preparedness planning, the results showed that there have been increase percentages in all four parameters, with the students' showing a larger increment compared to their parents. These four parameters have been advocated by many emergency management services as essential items in household preparedness planning (such as American Red Cross, 2009; FEMA, 2015; Australian Red Cross, 2016).

There were strong indications that the preparedness planning exercise has increased the level of awareness on both respondents, students and parents, regarding preparedness measures at home, including their awareness on evacuation routes, alternate person who will picking them up if their parents cannot pick them, emergency contact person, and actions to take when flood is approaching. This situation is similar with the results gathered from the pilot stage that tested students and their parents in three schools in Jakarta.

4. 4. Perspectives on the roles of children

Interestingly, the preparedness planning exercise has also influenced the perceptions of parents and children regarding the responsibilities of household members at home. Whilst the percentage of respondents who thinks the father and the mother have high responsibilities for disaster preparedness at home remains consistently high (before and after poster roll-out), a large and significant increase is seen in terms of grandparents and children also having responsibilities.

The perception on the roles of children also changed after the poster roll-out with more students and parents considering that children should be involved in disaster preparedness planning at home. Before the poster roll-out, the majority of the students also expressed that they want to be involved in the process. These are strong indications that the poster has changed participants' perspectives where each household members has specific roles and responsibilities toward disaster preparedness at home.

The above results are the same with the results from the pilot schools, which demonstrated the tool ability to change participants' perception on roles and responsibility of household members, including children.

4. 5. Scaling up and replicability factors

There were 69 completed household preparedness posters received and all posters were adequately completed. There were no reports of difficulties in filling out the posters from the

teachers or from the students (based on informal conversations with the teachers during the post-survey). The poster was able to be completed by the children with the help of their parents as well as with the provision of the booklet, even though the school had no DRR education program previously.

Vaughan-Lee et al. (2018) described that there are four essential factors for an effective scaling up on DRR intervention: successful in achieving its objectives, monitoring and evaluation is in place that enables continuous learning, adaptable to different contexts, and able to be sustained. This study suggested that the household preparedness planning process has all four factors, 1) the post-test results demonstrated an increased awareness of both students and their parents regarding preparedness plans as well as the important role of children in the process, 2) the monitoring and learning process and tools are in place in the form of the pre and post-test questionnaires, 3) the tool has proven to be adaptable for children in urban and peri-urban areas, responding to the different contexts of the participants, and 4) it is also able to be sustained, arguably since the intervention is initiated through schools, low cost (the cost of printing the poster and the booklet is less than US$ 4), can be applied with participants in remote areas with less access to electricity and internet connection, and even in areas where there were no DRR education intervention prior to the poster roll out, and no training or specialist DRR facilitators are required.

Another area for exploration is to advocate for this tool and method to be mainstreamed as part of the Indonesian school curriculum. There are more than 250,000 schools in Indonesia, and mainstreaming the tool would enable a large number of students to be reached over a short period of time. (World Bank, 2014b; BNPB, 2016b; MOEC, 2017e). However, in order to do this, there needs to be a systematic approach, adequate resources, and sufficient time to advocate the MoEC (UNESCO et al., 2012b).

Save the Children (2018) conducted a review of 14 DRR-related interventions with children, including this household preparedness poster initiative. The research team assessed the tool and provided a scalability score of 15 (with the highest possible total score being 16), with assessment criteria including measures on adaptability, sustainability, effectiveness, and learning as well as assessment on internal and external factors, which consist of: *planning from the beginning, relevance, comparative advantage, affordability and capacity, ownership, shared vision, partnerships, speed of scaling up, timing of the scale up, national authority support and engagement, champions, incentives and the balance between opportunities and*

constraints (Save the Children, 2018, p. 19). Overall the poster and booklet tool was ranked third out of the 14 initiatives that were assessed.

5. Conclusion

The household preparedness tool has delivered its objective in increasing the awareness on preparedness plans to household members, in this case the students and their parents. After the tool roll-out, both students and their parents have shown increased confidence on the level of preparedness in their home, with more students and parents considering that their home is well prepared, they know how to stay safe from disasters, and know how to protect their homes. However, this may be inflated, and further assessment should be undertaken to check on their actual level of preparedness (such as conducting family interviews as undertaken in Chapter Seven).

Accordingly, after the poster roll-out, more students and parents were able to describe specifically the details of evacuation routes, alternate people who will pick their children up from schools, emergency contact person if their parents were not reachable, and identify actions to take if a flood is approaching as highlighted in Chapter Five and Six). Furthermore, the process has led to an increased awareness of the role of children -and to some extent, the role of other household members such as their grandparents- regarding disaster preparedness at home.

The survey also captured that many children want to be involved in making their home better prepared and are keen to learn about disaster preparedness and the environment. Children preferred to learn this in schools or with their parents, recognising the important role of parents in introducing disaster preparedness to their children. All of these results are similar with the results from the three pilot schools in Jakarta, indicating that the tool is able to deliver its objectives, even in different location with different contexts.

This study presented evidence to demonstrate that the household preparedness tool can be easily scaled up and replicated in other areas without much intervention. Noting as well that the target schools in the pilot stage (in Jakarta) had received DRR education programs, and in this area (in Bandung) there had been no DRR education programs undertaken, although both areas are flood-prone areas. According to the key factors in effective scaling up, suggested by Vaughan-Lee et al. (2018), this intervention is considered likely to be scaled up and replicable to other areas.

6. The application of the household preparedness tool

This household preparedness tool has inspired the development of a more comprehensive toolkit and founded a social enterprise called PREDIKT (www.predikt.id). The PREDIKT toolkit has received two awards from the International Federation of Red Cross and Red Crescent Societies (IFRC) as the winner of Flood Resilience Innovation competition and from the US Mission to ASEAN as Young Southeast Asian Leaders Initiative (YSEALI) Seeds for the Future grant. Through these awards, the PREDIKT toolkit is now available in two languages: Bahasa Indonesia and English, and has been promoted in Indonesia, Australia, Malaysia, and Thailand.

As of January 2019, more than 20 agencies have been using the PREDIKT toolkit, comprise of government agencies, NGOs, schools, and universities for DRR education. This progress is also an indication that the uptake by government and NGOs have been well received and a positive indication for scaling up and replication in Indonesia and beyond.

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8. Appendices for Chapter 8

McNemar Test

The McNemar test (1947) is best described as a 2×2 cross classification of paired (or matched) responses to a dichotomous item. In simple terms, the McNemar test can be viewed as a type of chi-square test that uses dependent (i.e., correlated or paired) data rather than independent (unrelated) samples. The McNemar test is a non-parametric statistical test; i.e., it is distribution free and can be used with data sets and samples that are not normally distributed (Ciechalski, et al., 2002).

We use data from pre-test and post-test that was administered to 58 4th and 5th grade students to evaluate the mitigation of disaster. Students' responses to each of 4 questions on the test were scored as correct (1) or incorrect (0). Table 1 describes response patterns to one of the questions in a typical 2×2 format.

Table 1

Example of 2×2 Classification Table for McNemar Analysis

	Post-test		
	Incorrect (0)	Correct (1)	
Pre-test Incorrect (0)	A	b	
Correct (1)	C	d	n_1
	n_2	n	

Where:

a = number students who gave incorrect responses in both the pre-test and post-test

b = number of students who gave incorrect responses in the pre-test but correct in the post-test

c = number of students who gave correct response in the pre-test but an incorrect response in the post-test

d = number of students who gave correct responses in the pre-tests and post-tests

n = total number of matched pairs

(i.e., a + b + c + d)

n_1 = total number of students who provided correct responses in the pre-test (i.e., $c + d$)

n_2 = total number of students who provided correct responses in the post-test (i.e., $b + d$)

p_1 = proportion of correct responses in the pre-test, i.e., n_1/n or $(c + d)/n$

p_2 = proportion of correct responses in the post-test, i.e., $\frac{n_2}{n}$ or $\frac{b+d}{n}$

Hypothesis Testing

Suppose we wish to examine pre-test and post-test changes in the proportion of students that reported correct responses before and after the treatment.

$$H_0: p_1 = p_2$$
$$H_1: p1 \neq p_2$$

McNemar Test uses data from the two discordant cells b & c (see Table 1) where change has occurred to test the equivalence of the two proportions (i.e., marginal homogeneity).

The uncorrected[1] test statistic for the McNemar procedure is a chi-square test (with 1 degree of
freedom) denoted as $(c - b)^2/(c + b)$ and the corrected test statistic is $(|c - b| - 1)2/(c + b)$.

Question on Preparedness Plans (Student)

1. Emergency Assembly Locations

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 55.2\%$ students giving correct answer. By comparison, at post-test, $p_2 = 93.1\%$ students giving the right answer.

Q1PRE * Q1POST Crosstabulation

			Q1POST		
			Incorrect	Correct	Total
Q1PRE	Incorrect	Count	4	22	26
		% of Total	6.9%	37.9%	44.8%
	Correct	Count	0	32	32
		% of Total	0.0%	55.2%	55.2%
Total		Count	4	54	58
		% of Total	6.9%	93.1%	100.0%

Test Statistics[a]

	Q1PRE & Q1POST
N	58
Exact Sig. (2-tailed)	.000[b]

a. McNemar Test

b. Binomial distribution used.

For the first question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 37.9% difference between correct answers at pre-test and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

2. Designated person to pick up children

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 43.1\%$ students giving correct answer. By

Q2PRE * Q2POST Crosstabulation

			Q2POST		
			Incorrect	Correct	Total
Q2PRE	Incorrect	Count	3	30	33
		% of Total	5.2%	51.7%	56.9%
	Correct	Count	1	24	25
		% of Total	1.7%	41.4%	43.1%
Total		Count	4	54	58
		% of Total	6.9%	93.1%	100.0%

Test Statistics[a]

	Q2PRE & Q2POST
N	58
Chi-Square[b]	25.290
Asymp. Sig.	.000

a. McNemar Test

b. Continuity Corrected

comparison, at posttest, $p_2 = 93.1\%$ students giving the right answer.

For the second question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 50% difference between correct answers at pretest and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

3. Emergency Contact Person?

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 60.3\%$ students giving correct answer. By comparison, at posttest, $p_2 = 82.8\%$ students giving the right answer.

Q3PRE * Q3POST Crosstabulation

			Q3POST		
			Incorrect	Correct	Total
Q3PRE	Incorrect	Count	10	13	23
		% of Total	17.2%	22.4%	39.7%
	Correct	Count	0	35	35
		% of Total	0.0%	60.3%	60.3%
Total		Count	10	48	58
		% of Total	17.2%	82.8%	100.0%

Test Statistics[a]

	Q3PRE & Q3POST
N	58
Exact Sig. (2-tailed)	.000[b]

a. McNemar Test

b. Binomial distribution used.

For the third question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 22.5% difference between correct answers at pre-test and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

4. Actions to do when flood is approaching

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 56.9\%$ students giving correct answer. By comparison, at posttest, $p_2 = 94.8\%$ students giving the right answer.

Q4PRE * Q4POST Crosstabulation

			Q4POST		
			Incorrect	Correct	Total
Q4PRE	Incorrect	Count	3	22	25
		% of Total	5.2%	37.9%	43.1%
	Correct	Count	0	33	33

	% of Total	0.0%	56.9%	56.9%
Total	Count	3	55	
	% of Total	5.2%	94.8%	100

Test Statistics[a]

	Q4PRE & Q4POST
N	58
Exact Sig. (2-tailed)	.000[b]

a. McNemar Test

b. Binomial distribution used.

For the fourth question, we got $p-value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 37.9% difference between correct answers at pre-test and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

5. How prepared do you think your home is to face disaster risks? (BG-BH)

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 51.7\%$ students giving correct answer. By comparison, at post-test, $p_2 = 63.8\%$ students giving the right answer.

Test Statistics[b]

	BGPRE & BHPOST
N	58
Chi-Square[a]	1.241
Asymp. Sig.	.265

a. Continuity Corrected

b. McNemar Test

BGPRE * BHPOST Crosstabulation

			BHPOST Incorrect	BHPOST Correct	Total
BGPRE	Incorrect	Count	10	18	28
		% of Total	17.2%	31.0%	48.3%
	Correct	Count	11	19	30
		% of Total	19.0%	32.8%	51.7%
Total		Count	21	37	58
		% of Total	36.2%	63.8%	100.0%

For the fifth question, we got $p-value = 0.265 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 12.1% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

6. How well do you know how to be safe from disasters? (BI-BJ)

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 34.5\%$ students giving correct answer. By comparison, at post-test, $p_2 = 65.5\%$ students giving the right answer.

BIPRE * BJPOST Crosstabulation

			BJPOST Incorrect	BJPOST Correct	Total
BIPRE	Incorrect	Count	14	24	38
		% of Total	24.1%	41.4%	65.5%
	Correct	Count	6	14	20
		% of Total	10.3%	24.1%	34.5%
Total		Count	20	38	58
		% of Total	34.5%	65.5%	100.0%

Test Statistics[b]

	BIPRE & BJPOST
N	58
Chi-Square[a]	9.633
Asymp. Sig.	.002

a. Continuity Corrected

b. McNemar Test

For the sixth question, we got $p-value = 0.002 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 31% difference between correct answers at pretest and posttest is statistically significant using McNemar Test with $\alpha = 0.05$.

7. How well do you know how to make your home not being affected from disasters? (BK-BL)

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 31\%$ students giving correct answer. By comparison, at post-test, $p_2 = 74.1\%$ students giving the right answer.

BKPRE * BLPOST Crosstabulation

			BLPOST Incorrect	BLPOST Correct	Total
BKPRE	Incorrect	Count	7	33	40
		% of Total	12.1%	56.9%	69.0%
	Correct	Count	8	10	18
		% of Total	13.8%	17.2%	31.0%
Total		Count	15	43	58
		% of Total	25.9%	74.1%	100.0%

For the seventh question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 43.1% difference between correct answers at pre-test and post-test is statistically significant using McNemar Test with $\alpha = 0.05$.

Test Statistics[b]

	BKPRE & BLPOST
N	58
Chi-Square[a]	14.049
Asymp. Sig.	.000

a. Continuity Corrected

b. McNemar Test

8. In your opinion, how much responsibility should the following people have for? (CN-CW)

a. Father

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 84.5\%$ students giving correct answer. By comparison, at post-test, $p_2 = 84.5\%$ students giving the right answer.

FAPRE * FAPOST Crosstabulation

			FAPOST Incorrect	FAPOST Correct	Total
FAPRE	Incorrect	Count	3	6	9
		% of Total	5.2%	10.3%	15.5%
	Correct	Count	6	43	49
		% of Total	10.3%	74.1%	84.5%
Total		Count	9	49	58
		% of Total	15.5%	84.5%	100.0%

Test Statistics[b]

	FAPRE & FAPOST
N	58
Exact Sig. (2-tailed)	1.000[a]

a. Binomial distribution used.

b. McNemar Test

For the eighth (a) question, we got $p - value = 1 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that no difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

b. Mother

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 69\%$ students giving correct answer. By comparison, at post-test, $p_2 = 79.3\%$ students giving the right answer.

Test Statistics[b]

	MOPRE & MOPOST
N	58
Chi-Square[a]	.962
Asymp. Sig.	.327

a. Continuity Corrected

b. McNemar Test

MOPRE * MOPOST Crosstabulation

			MOPOST Incorrect	MOPOST Correct	Total
MOPRE	Incorrect	Count	2	16	18
		% of Total	3.4%	27.6%	31.0%
	Correct	Count	10	30	40
		% of Total	17.2%	51.7%	69.0%
Total		Count	12	46	58
		% of Total	20.7%	79.3%	100.0%

For the eighth (b) question, we got $p - value = 0.327 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 65.3% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

c. Grandparents

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 84.5\%$ students giving correct answer. By comparison, at post-test, $p_2 = 84.5\%$ students giving the right answer.

GRPRE * GRPOST Crosstabulation

			GRPOST		
			Incorrect	Correct	Total
GRPRE	Incorrect	Count	25	19	44
		% of Total	43.1%	32.8%	75.9%
	Correct	Count	8	6	14
		% of Total	13.8%	10.3%	24.1%
Total		Count	33	25	58
		% of Total	56.9%	43.1%	100.0%

Test Statistics[b]

	CHPRE & CHPOST	& T
N	58	58
Chi-Square[a]	18.581	04
Asymp. Sig.	.000	54

a. Continuity Corrected

b. McNemar Test

For the eighth(c) question, we got $p - value = 0.054 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 19% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

d. Children

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 22.4\%$ students giving correct answer. By comparison, at post-test, $p_2 = 65.5\%$ students giving the right answer.

CHPRE * CHPOST Crosstabulation

			CHPOST		
			Incorrect	Correct	Total
CHPRE	Incorrect	Count	17	28	45
		% of Total	29.3%	48.3%	77.6%
	Correct	Count	3	10	13
		% of Total	5.2%	17.2%	22.4%
Total		Count	20	38	58
		% of Total	34.5%	65.5%	100.0%

For the eighth (d) question, we got $p - value = 0.00 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 41.1% difference between correct answers at pretest and posttest is statistically significant using McNemar Test with $\alpha = 0.05$.

e. Housemaid

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 17.2\%$ students giving correct answer. By comparison, at post-test, $p_2 = 24.1\%$ students giving the right answer.

HOPRE * HOPOST Crosstabulation

			HOPOST		
			Incorrect	Correct	Total
HOPRE	Incorrect	Count	35	13	48
		% of Total	60.3%	22.4%	82.8%
	Correct	Count	9	1	10
		% of Total	15.5%	1.7%	17.2%
Total		Count	44	14	58
		% of Total	75.9%	24.1%	100.0%

Test Statistics[b]

	HOPRE & HOPOST
N	58
Exact Sig. (2-tailed)	.523[a]

a. Binomial distribution used.

b. McNemar Test

For the eighth (e) question, we got $p-value = 0.523 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 6.9% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

9. To what extent you have to be involved in making your house better prepared? (DD-DE)

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 37.9\%$ students giving correct answer. By comparison, at post-test, $p_2 = 58.6\%$ students giving the right answer.

DDPRE * DEPOST Crosstabulation

			DEPOST		
			Incorrect	Correct	Total
DDPRE	Incorrect	Count	19	17	36
		% of Total	32.8%	29.3%	62.1%
	Correct	Count	5	17	22
		% of Total	8.6%	29.3%	37.9%
Total		Count	24	34	58
		% of Total	41.4%	58.6%	100.0%

For the ninth question, we got $p - value = 0.017 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 20.7% difference between correct answers at pretest and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

Test Statistics[b]

	DDPRE & DEPOST
N	58
Exact Sig. (2-tailed)	.017[a]

a. Binomial distribution used.

b. McNemar Test

10. To what extent would you like to be involved in making your home to be more prepared for disasters? (DK-DL)

The hypothesis will test if the students giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 63.8\%$ students giving correct answer. By comparison, at post-test, $p_2 = 77.6\%$ students giving the right answer.

DKPRE * DLPOST Crosstabulation

			DLPOST Incorrect	DLPOST Correct	Total
DKPRE	Incorrect	Count	4	17	21
		% of Total	6.9%	29.3%	36.2%
	Correct	Count	9	28	37
		% of Total	15.5%	48.3%	63.8%
Total		Count	13	45	58
		% of Total	22.4%	77.6%	100.0%

Test Statistics[b]

	DKPRE & DLPOST
N	58
Chi-Square[a]	1.885
Asymp. Sig.	.170

a. Continuity Corrected

b. McNemar Test

For the tenth question, we got $p - value = 0.17 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 13.8% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

Table 40. Test Result for Pre-Post Intervention Data (Student) using α=0.05

No.	Question	Difference Percentage	p-value	Statistically Significance
1	Emergency Assembly Locations	37.90%	0	Yes
2	Designated person to pick up children	50%	0	Yes
3	Emergency Contact Person?	22.50%	0	Yes
4	Actions to do when flood is approaching	37.90%	0	Yes
5	How prepared do you think your home is to face disaster risks? (BG-BH)	12.10%	0.265	No
6	How well do you know how to be safe from disasters? (BI-BJ)	31%	0.002	Yes
7	How well do you know how to make your home not being affected from disasters? (BK-BL)	43.10%	0	Yes
8	In your opinion, how much responsibility should the following people have for? (CN-CW)			
	a. Father	0.00%	1	No
	b. Mother	65.30%	0.327	No
	c. Grandparents	19%	0.054	No
	d. Children	41.10%	0	Yes
	e. Housemaid	6.90%	0.523	No
9	To what extent you have to be involved in making your house better prepared? (DD-DE)	20.70%	0.017	Yes
10	To what extent would you like to be involved in making your home to be more prepared for disasters? (DK-DL)	13.80%	0.17	No

Preparedness Plans (Parent)

1. Emergency Assembly Locations

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 67.2\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 77.6\%$ parent giving the right answer.

Q1PRE * Q1POST Crosstabulation

			Q1POST		
			Incorrect	Correct	Total
Q1PRE	Incorrect	Count	12	7	19
		% of Total	20.7%	12.1%	32.8%
	Correct	Count	1	38	39
		% of Total	1.7%	65.5%	67.2%
Total		Count	13	45	58
		% of Total	22.4%	77.6%	100.0%

Test Statistics[a]

	Q1PRE & Q1POST
N	58
Exact Sig. (2-tailed)	.070[b]

a. McNemar Test

b. Binomial distribution used.

For the first question, we got $p - value = 0.07 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 10.4% difference between correct answers at pre-test and post-test are not statistically significant using McNemar Test with $\alpha = 0.05$.

2. Designated person to pick up children

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 86.2\%$ parent giving correct answer.

Q2PRE * Q2POST Crosstabulation

			Q2POST		
			Incorrect	Correct	Total
Q2PRE	Incorrect	Count	0	8	8
		% of Total	0.0%	13.8%	13.8%
	Correct	Count	3	47	50
		% of Total	5.2%	81.0%	86.2%
Total		Count	3	55	58
		% of Total	5.2%	94.8%	100.0%

Test Statistics[a]

	Q2PRE & Q2POST
N	58
Exact Sig. (2-tailed)	.227[b]

a. McNemar Test

b. Binomial distribution used.

By comparison, at post-test, $p_2 = 94.8\%$ parent giving the right answer.

For the second question, we got $p - value = 0.227 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot

reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 8.6% difference between correct answers at pre-test and post-test are not statistically significant using McNemar Test with $\alpha = 0.05$.

3. Emergency Contact Person?

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 86.2\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 91.4\%$ parent giving the right answer.

Test Statistics[a]

	Q3PRE & Q3POST
N	58
Exact Sig. (2-tailed)	.375[b]

a. McNemar Test

b. Binomial distribution used.

Q3PRE * Q3POST Crosstabulation

			Q3POST		
			Incorrect	Correct	Total
Q3PRE	Incorrect	Count	4	4	8
		% of Total	6.9%	6.9%	13.8%
	Correct	Count	1	49	50
		% of Total	1.7%	84.5%	86.2%
Total		Count	5	53	58
		% of Total	8.6%	91.4%	100.0%

For the third question, we got $p-value = 0.375 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 5.2% difference between correct answers at pre-test and post-test are not statistically significant using McNemar Test with $\alpha = 0.05$.

4. Actions to do when flood is approaching

Test Statistics[a]

	Q4PRE & Q4POST

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 43.1\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 81\%$ parent giving the right answer.

N	58
Chi-Square[b]	15.750
Asymp. Sig.	.000

a. McNemar Test

b. Continuity Corrected

Q4PRE * Q4POST Crosstabulation

			Q4POST		
			Incorrect	Correct	Total
Q4PRE	Incorrect	Count	8	25	33
		% of Total	13.8%	43.1%	56.9%
	Correct	Count	3	22	25
		% of Total	5.2%	37.9%	43.1%
Total		Count	11	47	58
		% of Total	19.0%	81.0%	100.0%

For the fourth question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 37.9% difference between correct answers at pretest and posttest are statistically significant using McNemar Test with $\alpha = 0.05$.

5. How prepared do you think your home is to face disaster risks? (BK-BL)

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 65.5\%$ parent giving correct answer. By comparison, at post-test, $p_2 = 86.2\%$ parent giving the right answer.

BKPRE * BLPOST Crosstabulation

			BLPOST		
			Incorrect	Correct	Total
BKPRE	Incorrect	Count	2	18	20
		% of Total	3.4%	31.0%	34.5%
	Correct	Count	6	32	38
		% of Total	10.3%	55.2%	65.5%
Total		Count	8	50	58
		% of Total	13.8%	86.2%	100.0%

For the fifth question, we got $p - value = 0.023 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 20.7% difference between correct answers at pre-test and post-test are statistically significant using McNemar Test with $\alpha = 0.05$.

Test Statistics[a]

	BKPRE & BLPOST
N	58
Exact Sig. (2-tailed)	.023[b]

a. McNemar Test

b. Binomial distribution used.

6. How well do you know how to be safe from disasters? (BN-BO)

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 65.5\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 91.4\%$ parent giving the right answer.

BNPRE * BOPOST Crosstabulation

			BOPOST		
			Incorrect	Correct	Total
BNPRE	Incorrect	Count	5	15	20
		% of Total	8.6%	25.9%	34.5%
	Correct	Count	0	38	38
		% of Total	0.0%	65.5%	65.5%
Total		Count	5	53	58
		% of Total	8.6%	91.4%	100.0%

Test Statistics[a]

	BNPRE & BOPOST
N	58
Exact Sig. (2-tailed)	.000[b]

a. McNemar Test

b. Binomial distribution used.

For the sixth question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 25.9% difference between correct answers at pretest and posttest are statistically significant using McNemar Test with $\alpha = 0.05$.

7. How well do you know how to make your home not being affected from disasters? (BP-BQ)

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 58.6\%$ parent giving correct answer. By comparison, at post-test, $p_2 = 63.8\%$ parent giving the right answer.

Test Statistics[a]

	BPPRE & BQPOST
N	58
Exact Sig. (2-tailed)	.678[b]

a. McNemar Test

b. Binomial distribution used.

BPPRE * BQPOST Crosstabulation

			BQPOST Incorrect	BQPOST Correct	Total
BPPRE	Incorrect	Count	11	13	24
		% of Total	19.0%	22.4%	41.4%
	Correct	Count	10	24	34
		% of Total	17.2%	41.4%	58.6%
Total		Count	21	37	58
		% of Total	36.2%	63.8%	100.0%

For the seventh question, we got $p-value = 0.678 > 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 5.2% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

8. In your opinion, how much responsibility should the following people have for? (CM-CV)
   a. Father

Test Statistics[a]

	CMPRE & CNPOST
N	58
Exact Sig. (2-tailed)	1.000[b]

a. McNemar Test

The hypothesis will test if the parent giving the b. Binomial distribution used.   correct

answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 89.7\%$ parent giving

correct answer. By comparison, at posttest, $p_2 = 91.4\%$ parent giving the right answer.

CMPRE * CNPOST Crosstabulation

			CNPOST		
			Incorrect	Correct	Total
CMPRE	Incorrect	Count	0	6	6
		% of Total	0.0%	10.3%	10.3%
	Correct	Count	5	47	52
		% of Total	8.6%	81.0%	89.7%
Total		Count	5	53	58
		% of Total	8.6%	91.4%	100.0%

For the eighth (a) question, we got $p-value = 1 > 0.05$, indicating that there are no

statistically significant differences between pre-test and post-test responses. Thus, we cannot

reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 1.7% difference between

correct answers at pretest and posttest are not statistically significant using McNemar Test

with $\alpha = 0.05$.

b. Mother
The hypothesis will test if the parent giving the correct answer more at post-test, in

comparison at pre-test. At pre-test, $p_1 = 86.2\%$ parent giving correct answer. By

comparison, at posttest, $p_2 = 91.4\%$ parent giving the right answer.

COPRE * CPPOST Crosstabulation

			CPPOST		
			Incorrect	Correct	Total
COPRE	Incorrect	Count	1	7	8
		% of Total	1.7%	12.1%	13.8%
	Correct	Count	4	46	50
		% of Total	6.9%	79.3%	86.2%
Total		Count	5	53	58
		% of Total	8.6%	91.4%	100.0%

For the eighth (b) question, we got $p - value = 0.549 >$ 0.05, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 5.2% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

Test Statistics[a]

	COPRE & CPPOST
N	58
Exact Sig. (2-tailed)	.549[b]

a. McNemar Test

b. Binomial distribution used.

c. Grandparents

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 19\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 81\%$ parent giving the right answer.

CQPRE * CRPOST Crosstabulation

			CRPOST Incorrect	CRPOST Correct	Total
CQPRE	Incorrect	Count	11	36	47
		% of Total	19.0%	62.1%	81.0%
	Correct	Count	0	11	11
		% of Total	0.0%	19.0%	19.0%
Total		Count	11	47	58
		% of Total	19.0%	81.0%	100.0%

Test Statistics[a]

	CQPRE & CRPOST
N	58
Chi-Square[b]	34.028
Asymp. Sig.	.000

a. McNemar Test

b. Continuity Corrected

For the eighth (c) question, we got $p - value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 62% difference between correct answers at pretest and posttest are statistically significant using McNemar Test with $\alpha = 0.05$.

d. Children

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 22.4\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 93.1\%$ parent giving the right answer.

CSPRE * CTPOST Crosstabulation

			CTPOST		Total
			Incorrect	Correct	
CSPRE	Incorrect	Count	4	41	45
		% of Total	6.9%	70.7%	77.6%
	Correct	Count	0	13	13
		% of Total	0.0%	22.4%	22.4%
Total		Count	4	54	58
		% of Total	6.9%	93.1%	100.0%

Test Statistics[a]

	CSPRE & CTPOST
N	58
Chi-Square[b]	39.024
Asymp. Sig.	.000

a. McNemar Test

b. Continuity Corrected

For the eighth (d) question, we got $p-value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 70.7% difference between correct answers at pretest and posttest are statistically significant using McNemar Test with $\alpha = 0.05$.

e. Housemaid

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 17.2\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 27.6\%$ parent giving the right answer.

Test Statistics[a]

	CUPRE & CVPOST
N	58
Exact Sig. (2-tailed)	.286[b]

a. McNemar Test

b. Binomial distribution used.

CUPRE * CVPOST Crosstabulation

			CVPOST Incorrect	CVPOST Correct	Total
CUPRE	Incorrect	Count	34	14	48
		% of Total	58.6%	24.1%	82.8%
	Correct	Count	8	2	10
		% of Total	13.8%	3.4%	17.2%
Total		Count	42	16	58
		% of Total	72.4%	27.6%	100.0%

For the eighth (e) question, we got $p-value = 0.286 < 0.05$, indicating that there are no statistically significant differences between pre-test and post-test responses. Thus, we cannot reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 10.4% difference between correct answers at pretest and posttest are not statistically significant using McNemar Test with $\alpha = 0.05$.

9. Children should be involved when developing preparedness planning at home

The hypothesis will test if the parent giving the correct answer more at post-test, in comparison at pre-test. At pre-test, $p_1 = 39.7\%$ parent giving correct answer. By comparison, at posttest, $p_2 = 77.6\%$ parent giving the right answer.

Test Statistics[a]

	DVPRE & DZPOST
N	58
Exact Sig. (2-tailed)	.000[b]

a. McNemar Test

b. Binomial distribution used.

DVPRE * DZPOST Crosstabulation

			DZPOST		Total
			Incorrect	Correct	
DVPRE	Incorrect	Count	13	22	35
		% of Total	22.4%	37.9%	60.3%
	Correct	Count	0	23	23
		% of Total	0.0%	39.7%	39.7%
Total		Count	13	45	58
		% of Total	22.4%	77.6%	100.0%

For the ninth question, we got $p-value = 0 < 0.05$, indicating that there are statistically significant differences between pre-test and post-test responses. Thus, we can reject the null hypothesis that $p_1 = p_2$. So, we can conclude that 37.9% difference between correct answers at pretest and posttest are statistically significant using McNemar Test with $\alpha = 0.05$.

Table 41. Test Result for Pre-Post Intervention Data (Parents) using α=0.05

No.	Question	Difference Percentage	p-value	Statistically Significance
1	Emergency Assembly Locations	10.40%	0.07	No
2	Designated person to pick up children	8.60%	0.227	No
3	Emergency Contact Person?	5.20%	0.375	No
4	Actions to do when flood is approaching	37.90%	0	Yes
5	How prepared do you think your home is to face disaster risks? (BG-BH)	20.70%	0.023	Yes
6	How well do you know how to be safe from disasters? (BI-BJ)	25.90%	0	Yes
7	How well do you know how to make your home not being affected from disasters? (BK-BL)	5.20%	0.678	No

8	In your opinion, how much responsibility should the following people have for? (CN-CW)			
	a. Father	1.70%	1	No
	b. Mother	5.20%	0.549	No
	c. Grandparents	62.00%	0	Yes
	d. Children	70.70%	0	Yes
	e. Housemaid	10.40%	0.286	No
9	Children should be involved when developing preparedness planning at home	37.90%	0	Yes

Chapter 9

Conclusion

1. Introduction

This chapter summarises the research undertaken by drawing together all the findings and implications from each stage. Recurring themes within the research are reviewed and the contribution to the field of Disaster Risk Reduction (DRR) education and Child Centred Disaster Risk Reduction (CCDRR) is discussed. My reflections are also added to include aspects that have not been discussed in previous chapters. The chapter concludes with a discussion of limitations and how these were reduced, and suggestions for future research.

1. 1. Summary of the Research Undertaken

The overall aims were to develop a tool that could be utilised in schools, would engage parents and support children to influence change at home. Specific considerations were included throughout the research so that the tool could be easily scaled-up and replicated in other locations.

The aims were developed based on the need to better support children and their parents in household preparedness (Olympia et al., 2010; Becker et al., 2012; Levac et al., 2012; Ronan et al., 2015). There have been many advances in integrating DRR into the education sector, as reported by Ronan (2014), with evidence of increased knowledge and skills of children and reduced hazard-related fears from these programs (Ronan, Johnston, et al., 2001; Ronan et al., 2003; Finnis et al., 2010; Ronan et al., 2010). Many initiatives assume that this knowledge will lead to better household preparedness (Ronan & Johnston, 2001; Ronan et al., 2010). However, it was found that the impacts of these programs to increase resilience at home,

through message transference inter-generational learning and the active engagement of families, has not been significant (Towers et al., 2014).

Specifically, the research questions were:

1. Is it possible for children to influence their parents in household disaster preparedness?
2. To what extent a household preparedness tool can be developed using participatory approach involving children and their parents?
3. How effective is the tool when implemented through a school-based intervention?
4. To what extent can the tool be scaled up and replicated in other locations?

The research used a multi-stage approach that documented the overall process of concept creation (Phase 1), tool development (Phase 2), pilot testing (Phase 3), and replicability testing (Phase 4), as illustrated in Figure 21.
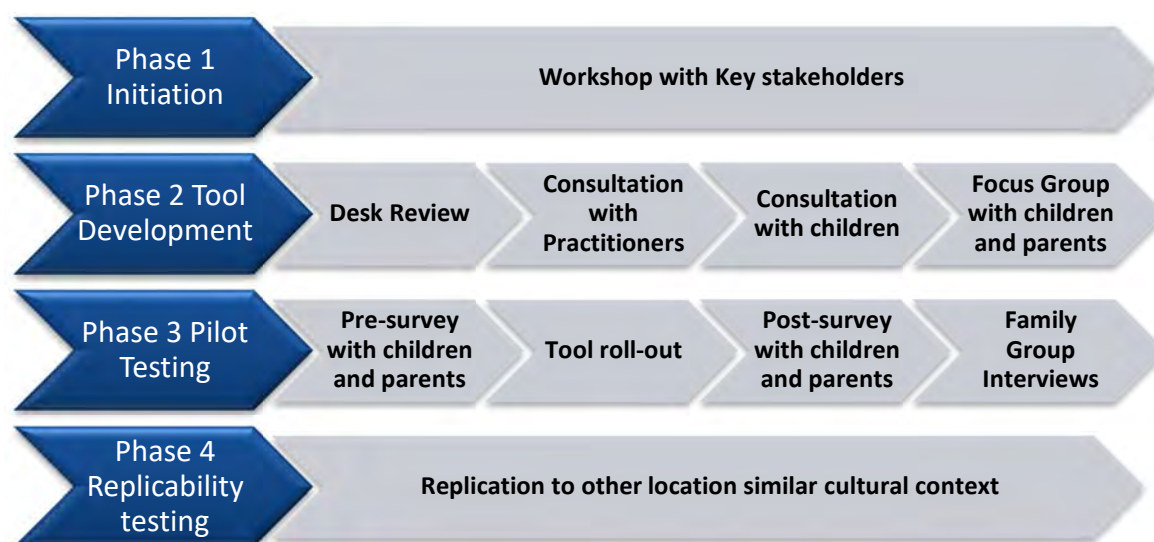
Figure 21. Activities undertaken to develop a scalable and replicable tool for school-based household preparedness

The research was undertaken in Indonesia as one of the most populous and disaster prone countries in the world, with more than 21,000 disasters recorded in the last 15 years, many of which were of a large scale, including recent disasters in 2018: Lombok earthquakes, Central Sulawesi earthquake/tsunami/liquefaction, and the Sunda Strait tsunami (BNPB, 2019). Moreover, Indonesia has an active network of DRR education practitioners comprised of government agencies, NGOs, and universities (MOEC et al., 2017b), and is one of the Safe School Leader Countries at the global level (UNISDR, 2014b).

1. 2. Phase 1: Initiation

This research concept was influenced by a previous study of DRR education in Indonesia by Amri, Bird, et al. (2017). Amri, Bird, et al. (2017) captured that, despite the existence of many

actors promoting DRR education in Indonesia, there were challenges and barriers that hindered its implementation, particularly in sustaining DRR education when external support had ended (ibid). Furthermore, there was a lack of collaboration between policy makers, academics, and practitioners in the DRR education field in Indonesia (ibid). Therefore, a workshop (Chapter 2) was held inviting key stakeholders from DRR education (e.g. government agencies, NGOs, and academia), the findings of the Amri, Bird, et al. (2017) study that explored the current state of play of DRR education in Indonesia were presented and discussed at this workshop. Results from the workshop as well as the progress of DRR education up until January 2019 (three years following the workshop) were documented in Chapter 2 / **Paper 1: Disaster risk reduction education policies and practices in Indonesia: Bridging the research-policy gaps.**

In the workshop, participants responded to the findings of the research from Amri, Bird, et al. (2017), shared their perspectives regarding the practice and policy environment, and discussed together the best way to move forward. This is an important factor in advancing research-driven policy advocacy and practice, as highlighted by S. Jones et al. (2014) and Rayner (2003).

Many studies suggest that in order to bridge the research-practice-policy nexus, researchers should produce timely, credible and trustworthy recommendations that will lead to actionable and reasonable actions (Young et al., 2009; Bennett et al., 2011). Amri, Bird, et al. (2017) highlighted seven key issues and 12 recommendations for DRR education in Indonesia. Three years after the workshop, eight recommendations have progressed well, and four have shown little or no progress. This is an indication of uptake of the Amri, Bird, et al. (2017) study by the policy makers and practitioners.

Moreover, studies have also highlighted the importance of fostering relationships between researchers, policy makers, and practitioners (Young et al., 2009; Bennett et al., 2011; Clark et al., 2012; S. Jones et al., 2014). The workshop resulted in building a strong relationship between the researchers, policy makers and practitioners. Based on this strategic collaboration, several initiatives were developed including, action plans, guidelines, and policies, making it a productive partnership. The presence of a facilitator that can bridge communication between researchers and policy makers was found to be an important factor in policy advocacy (as highlighted by Haynes, 2005; Young et al., 2009).

Generating evidence-based policy and practice based on robust research has proven to be helpful and effective, and is an important recommendation in the Sendai Framework for Disaster Risk Reduction (SFDRR) (UNISDR, 2015b). Paper 1 concluded with a greater call for researchers to share research findings and to build continuous relationships and partnerships for more effective, sustainable, and scalable DRR interventions.

The workshop also assisted in Phase 2 of the research (tool development) by building relationships with key agencies involved in DRR education in Jakarta. The support provided by these agencies was beneficial, including selecting pilot locations, building rapport with target schools, and in designing the household preparedness tool.

1. 3. Phase 2. Tool Development

Phase 2 consists of the steps undertaken in developing the household preparedness tool. At the beginning of Phase 2, a literature review (**Chapter 3**) was undertaken to investigate the factors that influence children as agents of change, which is a key aspect of CCDRR (Plan International, 2010b; UNICEF, 2012; Children in a Changing Climate, 2017).

The review began with descriptions regarding children's vulnerability toward disaster risk, recognising that children are generally more vulnerable compared to adults, since they are weaker, have immature immune systems, are prone to psychological stresses, susceptible to violence and abuse, less mobile, have less access to information, and are generally not involved in decisions that affect them (see Norris et al., 2002; WHO, 2005; Peek, 2008; WHO, 2011a; Mudavanhu, 2014; Stanberry et al., 2018). However, children do have the right to participate and influence decisions that matter to them, as decreed in the Convention on the Rights of Children (United Nations, 1989). Many studies have demonstrated that children are far less vulnerable when equipped with sufficient knowledge and skills, have access to the required tools and resources, and are supported by adults (Seballos et al., 2011; Haynes et al., 2015; Amri et al., 2018). Furthermore, they can also become agents of change and contribute to disaster resilience in their home and community (Plan International, 2010b; Tanner, 2010; UNISDR et al., 2012; Children in a Changing Climate, 2017).

In order to better understand the factors that influence children's participation, the review then explored studies that documented children's active participation in other sectors outside DRR and Climate Change Adaptation (CCA). Six key factors were captured that were found to be important in determining positive participatory experiences where outcomes were achieved:

1. Children need to be motivated and passionate about the issue, it must matter to them.
2. Children's voices and actions should be supported with information from trusted and credible sources and sound research.
3. Support from key adults is essential, as they act as enablers to empower the children and to facilitate the exchange between children and other stakeholders. Also, as recipients, recognising that children's views are important, respected, and taken into consideration.
4. A good understanding of the enabling environment by facilitators (adults and/ or children) is required. Including realising that there may be cultural, norms, and socio-economic conditions, that facilitate or deter children's abilities to influence change.
5. The mobilisation of large numbers of children who can express their views and reach more members of the community.
6. The presence of leadership qualities, particularly among the children.

Household disaster preparedness is considered an important issue for children, as studies have shown that disasters or natural hazards are among the most feared situations by children (Ollendick, 1983; Thomas H. Ollendick et al., 1985; Dadds et al., 2001; Burnham et al., 2008; Ronan et al., 2014). Moreover, the role of parents have been recognised as important in enabling children's agency in DRR (Graham et al., 2009; Seballos et al., 2011; Checkoway, 2012), and teachers are often seen as trusted and credible sources by parents (Uzzell et al., 1994; Mwanga et al., 2008; Bresee et al., 2014). Children should also be equipped with resources and tools to help them in expressing their views and to enable dialogue with their parents in order to foster meaningful discussions (Silva et al., 2011; Malone, 2013; Bresee et al., 2014). These factors were taken into consideration when developing the household preparedness tool.

At the end of the chapter, two recent children's movements were highlighted – the March for Our Lives, a student-led demonstration for gun control in the US, and the School Strike 4 Climate in Australia, which was a one-day student strike joined by thousands of children from almost 30 cities and towns across Australia. Both case studies highlighted many of the factors outlined in the literature are important in the successful participation of children as agents of change. The two case studies demonstrated that children were passionate about the cause, able to identify causes that have direct impacts to them (such as climate change and mass shootings in schools), able to mobilise large number of participants through social media, as well as the presence of leadership qualities among the children who organised it.

In Chapter 4 / **Paper 2. Reflections on The Use of a Participatory Process to develop a Child-Centred Household Preparedness Plan**, the steps undertaken to develop the household preparedness tool were outlined. A literature review of previous studies and templates

relating to household preparedness was undertaken first, followed by consultation with practitioners and children regarding the design, and lastly Focus Group Discussions (FGDs) to capture the views, experiences, and practices of children and their parents on flood preparedness, particularly in the Jakarta area.

Prior to the design, several parameters were set: the tool needed to be appropriate for the Indonesian context, could be easily scaled up, and would be sustainable. Therefore, the design of the tool needed to be:

1) Low cost
2) Used without an internet connection or electricity (offline)
3) Initiated through schools and inserted into existing DRR education programs
4) Easily replicated for all types of hazards in any location
5) A child-friendly design with appropriate language
6) Designed so that children would engage with their parents

The desk review examined 20 relevant documents relating to preparedness plans, consisting of nine journal articles, three guidelines, and eight preparedness plan templates. Almost all the literature was focused in developed countries, i.e. Australia, Canada, New Zealand, and USA. The following templates were assessed: American Red Cross (2009); Government of Canada (2012); FEMA (2015); Australian Red Cross (2016); Ministry of Civil Defence and Emergency Management New Zealand (n.d); Department of Health and Environment of Kansas (n.d.); Queensland Government (n.d.); Ready Marine Corps (n.d).

The majority of the templates focused on the importance of assembling emergency preparedness kits, evacuation, emergency contacts, and actions to take *during* an emergency. Many of these templates encouraged participants to know what actions to take *during* an emergency with little information to encourage participants to identify what actions to take *before* disaster strikes (this relates to disaster prevention and mitigation) or *after* disaster strikes (recovery). Furthermore, identifying an alternative designated person to pick up children from school if the planned person is unable to was only referenced in only one template: Government of Canada (2012). This is despite the risk of separation of children from their parents being a significant risk during emergencies (WHO, 2005; Olan, 2014; Doore, 2015; Gyawali et al., 2017).

Based on the desk review, the tool was designed in the form of an A2-size poster with eight open boxes where participants could fill in their own information relating to: 1) Preparing their own household emergency kit; 2) What to do before the rainy season starts (disaster mitigation); 3) What to do when flooding is going to happen (disaster preparedness); 4) Do's

and don'ts during and after flooding; 5) Evacuation routes and a safe havens; 6) Important phone number list; 7) Alternate person who can pick up children from school and act as an additional point of contact; and 8) Signatures of all household members. The design of the poster was consulted with DRR practitioners and children.

A booklet was also produced that served as a guideline for participants and contained a list of measures related to before, during, and after in relation to a flood emergency. Contents of the booklet was derived from existing guidelines in Jakarta and FGDs with school students and their parents in Jakarta.

The paper conclusion addressed the specific research question #2 that asked to what extent a household preparedness tool can be developed using a participatory approach involving children and their parents. The tool development process revealed that utilising participatory techniques by combining a literature review and consultation with DRR practitioners, children, and their parents was very useful. The literature review highlighted common elements that should be included in a household preparedness plan. However, the review also revealed a significant weakness where most preparedness plan templates provided pre-determined actions with little flexibility for the participants to identify actions that suited their circumstances.

Consultations with DRR education practitioners and children were useful to determine what was important; to validate the design, use of words, materials, and the components in the poster; and to ensure that the tool was easy to use by children and their parents. The booklet was also developed by including experiences and practices of children and their parents. This provided a meaningful participation from both sides (children and adults) in designing the tool – initiated by adults and with shared decisions with children (as recommended by Hart, 1992; Hart, 2008; O'Kane, 2013). Following this process, Phase 3. Pilot Testing of the tool commenced.

1. 4. Phase 3. Pilot Testing

This phase of the research investigated the effectiveness of the household preparedness tool. A mix of quantitative and qualitative methods were utilised, consisting of pre- and post-surveys and family group interviews. The findings were reported in two research papers: the quantitative findings in **Chapter 5/ Paper 3. Application of Participatory Child-Centred School-Based Planning Tool to Improve Household Disaster Preparedness**, and the qualitative findings in **Chapter 7/ Paper 4. Building Disaster Resilience Together as a Family.**

During Phase 3, an analysis of the material families entered into the posters during the household preparedness planning exercise was also undertaken (**Chapter 6**).

Three primary schools in Jakarta with different characteristics, including socio-economic conditions, school types, exposure to flood risk, and that had some form of DRR program were selected to be part of the pilot testing. The intervention was in the form of a household preparedness template distributed in the classroom by teachers where children were asked to complete the template with their parents as part of a school assignment. The students were given two weeks to complete the template. Before and after the poster roll-out, students (n=161) and their parents (n=123) participated in a questionnaire to explore the influence of the household preparedness poster on participant's perception and awareness of household preparedness as well as their understanding regarding children's participation. A control group (50 students and 23 parents) was also selected to compare the differences between the group that conducted household preparedness planning exercises using the poster and a group with no intervention. Approximately 3 weeks later, family group interviews were undertaken with 11 families.

The statistical analysis in Paper 3 demonstrated an increase in awareness regarding household preparedness plans in both students and their parents. The tool delivered positive change regarding children's participation, with both children and adults showing an increased awareness of the benefits of involving children in household preparedness planning. The recognition of a shared responsibility for preparedness among all family members also increased following the intervention, i.e. respondents saw all family members responsible, father, mother, children, and extended relatives (e.g. grandparents, uncle and aunts) rather than only the father or mother.

Respondents from school C had a higher increase in awareness on household preparedness as the school had DRR program implemented by an NGO with more active involvement of children and parents – including disaster simulations in school and trainings (i.e. risk assessments, flood and earthquake preparedness, first aid) for children and parents. The other two schools only had a one-day orientation on flood and earthquake preparedness for all students and followed by a school drill (School A) and DRR education regarding floods awareness and preparedness is taught in classrooms (School B). Respondents from the private school (with the assumption that it has a higher level of family income) also reported higher appreciation of other household members, such as housemaids, in household preparedness.

In Paper 4, the findings from family group interviews were captured. Eleven families from the three target schools participated in a relaxed and comfortable location. Findings from the interviews strengthened the evidence that the tool was able to increase students' and parents' awareness of household preparedness measures. In some cases, parents played a role in validating and correcting the preparedness measures proposed by children, and sometimes parents were also challenged by the children regarding the choices they selected. This process influenced parents to explain further so that children understood the rationale in selecting the measures. Students and their parents also expressed that the tool was easy to use.

Many studies described children as agents of change, recognising their role in raising awareness and reducing natural hazard risks, such as in planting trees to reduce landslide risks and restoring water points (Plan International, 2010b; UNISDR et al., 2012). However, interview results also showed that parents have increased awareness that children can become creators of risk, such as when using electrical appliances or the gas stove, two main factors that accounted for 75% of building fires in Jakarta between 2011 to 2015 (BPS, 2015). This has prompted parents to acknowledge the important role of children in household safety.

The tool also encouraged children (and their parents, to some extent) to explore additional information by asking other people or looking things up on the internet. Another important finding was that there was an increased level of preparedness toward other risks. Participants discussed how the exercise had made them think about other hazards and how many of the measures were transferable, such as assembling emergency preparedness kits, compiling a list of important contacts, evacuation planning, and the designation of a person to collect children in an emergency.

By using family group interviews, we were able to more fully understand family dynamics, the interactions between family members, and the role of each family member. Using this method, we could assess how children and their parents exchanged information, validating each other's opinions, and enabling conversations as a group. Based on the findings from the two studies, the household preparedness tool has delivered its purpose in raising awareness of household preparedness measures for children and their parents; it has fostered dialogue between children and their parents, and has changed the perception on the importance of children's participation for both children and their parents, which is an essential step in CCDRR (Seballos et al., 2011).

Based on the two studies that tested the efficacy of the tool, research question #1, that sought to determine if it is possible for children to influence their parents regarding household preparedness, was addressed. Results from the questionnaires and interviews demonstrated that children who were equipped with the tool (poster and booklet) were able to engage in meaningful discussions with their parents, increasing their awareness of household preparedness, and in some cases, influencing the selection of measures to make their home better prepared. Moreover, the tool also changed participant's perceptions on the importance of children's participation in DRR. This is an important finding as the role of parents in supporting children's participation is crucial (Uzzell et al., 1994; Ebreo et al., 2002; Mwanga et al., 2008; Tanner, 2010; Seballos et al., 2011; Bresee et al., 2014).

Testing the intervention in three schools in Jakarta generated evidence that the tool was successful in enabling families to develop a written disaster preparedness plan, identifying risks at home, and building consensus on appropriate measures before, during, and after disaster, all of which are important aspects in building disaster preparedness at home (Kapucu, 2008; Kohn et al., 2012; Levac et al., 2012; Whittaker et al., 2013; Tomio et al., 2014). This addressed research questions #3 that explored the effectiveness of the tool when implemented through a school-based intervention.

In addition to the two previously discussed studies, an analysis of the contents of the posters were conducted and the results were presented in **Chapter 7. Content Analysis of Household Preparedness Plans in Jakarta**. A total of 94 posters were collected from the three target schools in Jakarta. Analysis of the contents resulted in understanding the preferred measures that people in Jakarta commonly implement when preparing and responding to a flood emergency. There were eight sections in the preparedness plan, of which, the following five were analysed: 1) assembling an emergency preparedness kit, 2) preventative measures before the rainy season, 3) actions to undertake when receiving flood warnings, 4) measures to undertake during and after floods, and 5) identifying emergency assembly locations. The remaining three sections were related to the list of emergency contacts, designated person to pick up children from school, and signatures of household members, all of which have little relevance when compared.

Analysis of the poster content demonstrated that some participants selected easy measures such as assembling emergency kits with items that are already available at home, for example torch, raincoats, and spare clothes. However, there were others who also included more

complex and expensive equipment such as diesel water pumps, rubber boats, and fire extinguishers. Many participants selected preventative measures that may not be sustainable, such as raising their house or creating levees to prevent flood water entering their home. Furthermore, measures during and after floods were divided into two options: leave early and evacuate or stay and protect their homes. Both are feasible options considering floodwaters in Jakarta often recede in 2-3 days and people have adapted by having houses with two stories or more (Sagala et al., 2013; Marfai et al., 2015; Warsilah, 2017). However, the stay and protect option has risks that should be thoroughly considered by families, local governments, and housing developers, such as lack of sleep and uncertainties such as to what extent the flood level is going to rise (Haynes et al., 2018). Lastly, analysis of emergency assembly locations showed that many people preferred to evacuate to a park or open field followed by public facilities, such as mosques or government offices, where all of these are often nearby to their homes.

The booklet contains further information to help children and their parents fill in the preferred measures for their household preparedness. It was not intended to provide an exhaustive list, but only to serve as a reference. Preparedness guidelines produced by official institutions are very limited in Indonesia (for examples, see YEU, 2015; Dinas Pemadam Kebakaran & Penanggulangan Bencana, n.d.; Polda Metro Jaya, n.d.). Nevertheless, the information gathered from the content analysis has enriched the list for household preparedness, particularly for floods in urban setting such as Jakarta. After the pilot testing steps were completed, the next phase regarding replicability testing commenced.

1. 5. Phase 4. Replicability Testing

Chapter 8. Scaling up and Replicability testing for a Household Preparedness Planning tool, documented the process undertaken in Phase 4. This phase sought to answer research question #4: To what extent can the tool be scaled up and replicated in other locations? The household preparedness tool was tested with a separate sample, at a different time, in an area prone to similar hazards. The aim was to see if the household preparedness tool improved preparedness plans for: a) students, and b) their parents in a different context. A primary school in Bandung district, Indonesia was selected as this area is also prone to floods, is a peri-urban area, and has no DRR education program. The two latter conditions were different to the target schools in Jakarta, which were in an urban area and conduct some sort of DRR education program.

A total of 58 students and 58 parents participated, and pre- and post-questionnaires were distributed to measure the influence of the poster towards participants' awareness of household preparedness measures and their perceptions towards the role of children in the process. The survey showed similar results to the three pilot schools, with significant improvements in the awareness of household preparedness planning and increased motivation among students to be involved in the process. The survey results also suggested that there was a change of attitudes towards who is responsible in the family for preparedness. Before the poster roll out, most respondents (students and their parents) thought that this is the responsibility of the father or mother (or both) and after, more respondents thought children and extended relatives (e.g. grandparents) are also responsible.

Notably, the positive results were gathered from participants without prior intervention of DRR education or involvement of emergency services personnel or other practitioners. This is a good indication that the tool can be expanded at scale, even with minimal resources.

2. Overall Discussions and Conclusion

The research has shown that by using a participatory tool (household preparedness plan template) and a child-centred approach (through a school assignment where children and their parents / care providers work together to develop their own household preparedness plans), it is possible for children to influence their parents' perspectives and knowledge on household disaster preparedness. The pre-and post-test surveys have shown that after the poster roll-out, more participants were able to identify specific evacuation areas, were able to identify preparedness actions if a flood is approaching, and able to identify emergency contact person, for both students and their parents.

The tool itself was developed by using a combination of desk review and a series of consultations with children, their parents, and disaster education experts. The results were appreciated by the students and their parents who used the household preparedness plan template, based on the family group interviews. Furthermore, the tool even encouraged children (and parents) to explore more information regarding disaster preparedness, enabled family consensus building, and strengthened the importance of children's participation in household preparedness -an important feat of a CCDRR approach. Nevertheless, as described in the literature review, the support from adults (e.g. parents, care providers, or teachers) and appropriate enabling environments are required to support children to become agents of change in their communities.

The replicability test also suggests that the tool can be easily replicated in other locations. The use of the accompanying booklet has reinforced the ability for the poster to be self-administered by children and their parents even without prior training or other capacity building efforts. The tool itself is easily reproduced, cheap, offline (does not require electricity or internet), also bolstered the opportunity for the poster to be used at-scale across Indonesia.

Reflecting back to previous studies, many CCDRR initiatives face significant challenges in sustaining and replicating the approach in other areas (Amri, Bird, et al., 2017). A recent study assessed the scalability of 25 CCDRR initiatives that were implemented in over 30 countries, and this intervention (the household preparedness poster) received a score of 15 (out of a maximum 16), with assessment criteria including measures on adaptability, sustainability, effectiveness, and learning (Save the Children, 2018). Morinière et al (2018) concluded that the household preparedness poster is easy to be scaled up and is adaptable in different contexts. The tool enables children to engage in a discussion with their parents, exchange views, and build consensus, which are important elements in building necessary skills for critical thinking, effective communication, negotiation and decision making, all empowering them to become agents of change (R. Sinclair, 2004; Acharya, 2010; Checkoway, 2012; Hayhurst, 2013; Bresee et al., 2014; Gadhoke et al., 2015).

As noted in Chapter 8, this research project inspired the development of a comprehensive preparedness toolkit, called PREDIKT (www.predikt.id). The toolkit has been expanded to cover five hazards: earthquake, tsunami, volcanic eruption, structural fires, and floods. The pack contains a board game, household preparedness plan templates, worksheets, and preparedness guidelines for all five hazards. The toolkit is available in two languages: Bahasa Indonesia and English, and has received two awards, one from the International Federation of Red Cross and Red Crescent Societies (IFRC) and one from the US Mission to ASEAN.

In less than a year, more than 600 toolkits have been produced and used by more than 20 institutions, including the Ministry of Education and Culture, the National Disaster Management Agency, two government institutions leading the DRR education programming in Indonesia, as well as prominent child-focused organisations including UNICEF, Plan International, Save the Children, and World Vision. The toolkit has also been used in post disaster situations with the aim to equip children with necessary disaster preparedness knowledge as part of psychosocial support intervention for disaster-affected children.

There are two notes that are arguably important to highlight regarding this process. First, after reflecting on the process of family group interviews, it is believed that this method has influenced the family in evaluating the preparedness planning process and enabled children and their families to reflect again on the process and thus should be considered as an intervention. Based on this experience, having someone to conduct household visits, to spend time to discuss with family members, and to reflect on the preparedness planning process will increase the benefits and strengthen the learning process in the family. The person should act more as a facilitator (and not necessarily need to be an expert/ practitioner) and his/ her role would be to stimulate discussions and learning coming from the preparedness planning process, similar as to what was done during the family group interviews. It is considered that the presence of a facilitator will help the discovery process, where family members realise the strengths and weaknesses of their current preparedness level and identify actions to be more prepared. This also aligns with previous studies describing the role of other adults as facilitators in enabling children to discuss with their parents issues that affect them, especially when children's influencing decisions are not the cultural norm (Mwanga et al., 2008; Hayhurst, 2013; Bresee et al., 2014; Gadhoke et al., 2015; Walker, 2017).

A research project is being initiated by the University of Melbourne that is currently testing a similar approach, assessing the effectiveness of face-to-face engagement combined with the use of an online application (Cook, 2019). The approach attempts to influence public perception and practice towards disaster preparedness through direct engagement with emergency service practitioners. To date, the research findings have not been published.

Another aspect that needs to be highlighted is the school-based intervention approach. During the research period, I was invited to deliver a disaster preparedness orientation to a mother's group network that focuses on child safety. There were 15 participants in the orientation, all female estimated to be 30-45 years old. After the orientation, the participants were quite motivated, and the household preparedness tool (the template and the booklet) were distributed to them. About 13 participants also agreed to be contacted again and questioned regarding the tool. Interestingly, after two weeks, all participants expressed that they did not have the time to follow up or to complete the household preparedness plan; the same results were obtained after checking again one month after the tool was distributed. This is an interesting aspect, considering the return rate of the completed preparedness plans was more than 90% when distributed as a school assignment.

The results from the family group interviews also showed that parents are motivated in helping their children with their homework. A teacher from one of the target schools also mentioned:

"who wants their children's homework to look bad?".

Based on this observation, it is believed that distributing household preparedness tool as a school assignment delivers a more effective approach and it provides the missing link between DRR interventions in schools, at home, and the larger community, as highlighted in previous studies (Amri, Bird, et al., 2017; Amri et al., 2018). This finding could also apply in other contexts for example in health, environment, or governance, while promoting the child-led approach component.

3. Limitations and Areas for Future Research

The approach employed in this research project enabled several potential limitations associated with different research methods to be addressed. In each paper, limitations and areas for future studies were acknowledged. Four overarching limitations from the project were identified and are discussed below, with suggestions on how they may be addressed in future research.

The quantitative data collected in the survey (Paper 3) was suited to its intended purpose; however, as the control group was in the same location as the target group, it is likely that the target group influenced the control. The children were not told to keep the poster and their learning confidential and it is highly likely that they talked to their peers. This is actually a positive result in that peer-to-peer communication and increased awareness occurs beyond those who received the intervention directly. Therefore, it is suggested that future surveys should use a control group that is in a different location to ensure minimum interference. There is also likely to be a bias from the repeat testing, as the participants in the control group may have remembered some of the initial questions; they may have become more interested in the topic and looked things up or considered options prior to being tested again (B. A. Bell, 2010; Indrayan, 2012).

If there are larger number of participants, the data could be further examined on the influence of gender towards the process and the results. Several studies have highlighted that children are not gender neutral and that gender is an important factor that influences vulnerability,

risk perception, and decisions in selecting DRR measures (Enarson et al., 2007; Haynes et al., 2010; Cao et al., 2011; Irshad et al., 2012; Shrestha et al., 2014).

The survey with children and parents showed the lack of knowledge and interests regarding climate change. Future research can investigate further on the reasons for this as well as identifying effective ways to increase the interests and knowledge of children (and parents) on the topic of climate change.

To really test the impact of the tool, assessments should be undertaken after a major flood disaster and then for the researcher to go back to the research participants and check whether the poster had made an impact to the families. Future research will benefit by exploring further on the reasoning and implications of households when selecting the preparedness measures. Furthermore, a longitudinal study to assess the pedagogical benefits in the extended use of the poster tool and family dialogue will provide better understanding on how families develop learning and build a culture of resilience.

In addition, future research should explore whether and how this method can be mainstreamed as part of the curriculum. Investigations on the use of the tool using the same approach in other contexts would be useful to test scalability and replicability (for example, in developed countries with different education system). One important note on this is that the tool should be contextualised and adapted, for example the booklet that contains a list of preparedness measures should be adjusted with measures and actions that are commonly applied by people in the country or area.

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Appendix A

Student questionnaire

Participant information

Your answers are anonymous and your name will not be identified with your responses. Your name here is for tracking purposes only.

Questionnaire on School and Home Safety

For 4th and 5th Grade Students

Full Name:	Gender: Male/ Female*
Year of birth:	School Name:

*Strikethrough that is not relevant

1. Which of the following hazards do you think are likely to affect you at home?

(in alphabetical order)	1- Extremely Not Likely	2- Not likely	3- Neither	4- Likely	5- Extremely Likely
Earthquakes	☐	☐	☐	☐	☐
Epidemic*	☐	☐	☐	☐	☐
Droughts	☐	☐	☐	☐	☐
Floods	☐	☐	☐	☐	☐
House/ Building Fires	☐	☐	☐	☐	☐
Riot, conflict, or violence	☐	☐	☐	☐	☐
Strong winds	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐

* Epidemic: a widespread occurrence of an infectious disease in a community at a particular

time

2. Which of the following hazards do you think are likely to affect you at school?

(in alphabetical order)

	1- Extremely Not Likely	2- Not likely	3- Neither	4- Likely	5- Extremely Likely
Earthquakes	☐	☐	☐	☐	☐
Epidemic	☐	☐	☐	☐	☐
Droughts	☐	☐	☐	☐	☐
Floods	☐	☐	☐	☐	☐
House/ Building Fires	☐	☐	☐	☐	☐
Riot, conflict, or violence	☐	☐	☐	☐	☐
Strong winds	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐

3. Have you ever personally experienced any direct impacts from the following hazards?
   (select all that apply)

☐ Earthquake	☐ Tsunami	☐ Landslides
☐ Volcanic eruption	☐ Floods	☐ Strong winds/ typhoon
☐ Droughts	☐ Forest/ bush fire	☐ House fire
☐ King tide	☐ Diseases/ Epidemics	☐ Riot, conflict or violence
☐ Others. If you choose this, please describe below:		

4. How long ago did you experience this event? If there has been more than one experience, please refer to the event that impacted YOU the most SEVERELY

☐ Less than 6 months ago	☐ 6-12 months ago	☐ 1-2 years ago
☐ 3-5 years ago	☐ 6-10 years ago	☐ 11-15 years ago
Please describe the event:		

5. Did you experience any of the following impacts as a direct or indirect result of the hazard? **(please tick all that apply)**
- ☐ Loss or damage to personal property or possessions
- ☐ Loss or damage to sentimental possessions
- ☐ Financial loss (income decline or job loss)
- ☐ Physical injury from the event
- ☐ Physical injury from response activities after the event
- ☐ Increased relationship demands or problems
- ☐ Health problems
- ☐ Distress
- ☐ Physical injury for other household member
- ☐ Health problems for other household member
- ☐ Distress of other household member
- ☐ Injury to family/close friend (loved ones)
- ☐ Death of family/close friend (loved ones)
- ☐ Other (please specify)

| |
| |

6. How prepared do you think **your school** is to face disaster risks?

☐	☐	☐	☐	☐
1- Not at all prepared	2	3	4	5- Very prepared

7. How prepared do you think **your home** is to face disaster risks?

☐	☐	☐	☐	☐
1- Not at all prepared	2	3	4	5- Very prepared

8. How well do you know how to be safe from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

9. How well do you know how to make your home not being affected from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

10. If yes, where have you learned it from?

(in alphabetical order)	1- I have received no information	2	3	4	5- I have received a large amount of information

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Extra curricula (e.g. scouts)	☐	☐	☐	☐	☐
Father	☐	☐	☐	☐	☐
Internet	☐	☐	☐	☐	☐
Mother	☐	☐	☐	☐	☐
Newspaper, magazine, and other printed media	☐	☐	☐	☐	☐
School books	☐	☐	☐	☐	☐
Teachers	☐	☐	☐	☐	☐
TV, radio, and other electronic media	☐	☐	☐	☐	☐

11. Will you be interested to learn more on:

	1- Totally Interested	2- Interested	3- Neither	4- Not interested	5- Totally not interested
How to prevent disasters impact	☐	☐	☐	☐	☐
How to prepare for disasters and other life-saving measures	☐	☐	☐	☐	☐
Problem-solving/decision-making tools to help solve life problems	☐	☐	☐	☐	☐
How to be involved in your community to help prepare for disasters or solve other problems	☐	☐	☐	☐	☐
Environmental awareness and sustainability	☐	☐	☐	☐	☐
Climate change	☐	☐	☐	☐	☐

12. If you are interested to learn more, from where would you like to learn it from?

(in alphabetical order)	1- Strongly Agree	2- Agree	3- Neither	4- Disagree	5- Strongly Disagree
From schools – in the classroom	☐	☐	☐	☐	☐
From schools – from extra curricula activities	☐	☐	☐	☐	☐
From community activities	☐	☐	☐	☐	☐
From emergency management professionals/ institutions	☐	☐	☐	☐	☐
From father	☐	☐	☐	☐	☐
From mother	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐

13. How do you rate your efforts to reduce the impact of floods at your home?

☐　　　☐　　　☐　　　☐　　　☐

	1 – My family and I have done nothing	2	3	4	5 – My family and I have done everything possible

14. In your opinion, how much responsibility should the following people have for preparing disasters in your community?

	1- High Responsibility	2	3	4	5- No Responsibility
Individuals/ households	☐	☐	☐	☐	☐
The community	☐	☐	☐	☐	☐
Official response agencies (e.g. fire fighters, SAR, disaster management agency)	☐	☐	☐	☐	☐
Local Council	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐

15. In your opinion, how much responsibility should the following people have for preparing disasters in your home?

	1- High Responsibility	2	3	4	5- No Responsibility	Not Applicable*
Father	☐	☐	☐	☐	☐	☐
Mother	☐	☐	☐	☐	☐	☐
Grand parents	☐	☐	☐	☐	☐	☐
Children	☐	☐	☐	☐	☐	☐
Housemaid	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

(* for instance: female/ single headed households, grandparents are not living at home, etc)

16. In the last two years, how many times have you done drills at home?

☐	☐	☐	☐	☐
No	Yes, once	Yes, twice	Yes, more 2 times	I am not sure

17. If you have done drills at home, do you think it made you safer?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

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18. In the last two years, how many times you have done drills at your school?

☐   ☐   ☐   ☐   ☐

No   Yes, once   Yes, twice   Yes, more 2 times   I am not sure

19. If you have done drills at your school, do you think it made you safer?

☐   ☐   ☐   ☐   ☐

1- Not at all   2   3   4   5- To a great extent

20. Do you and your family have preparedness plans?

☐   ☐   ☐   ☐   ☐

No   No, but I would   Yes, it is written   Yes, it is unwritten   I am not sure

like to have one

* for example: a document explaining what to do before, during, and after disasters)

21. To what extent you have to be involved in making your house better prepared?

☐   ☐   ☐   ☐   ☐

1- Not at all   2   3   4   5- To a great extent

22. My teachers know what to do if there is an emergency

☐   ☐   ☐   ☐   ☐

1- Strongly agree   2   3   4   5- Strongly disagree

23. I can see the evacuation routes clearly in my school

☐   ☐   ☐   ☐   ☐

1- Strongly agree   2   3   4   5- Strongly disagree

24. If there is an emergency in my school, I know where to go

☐   ☐   ☐   ☐   ☐

1- Strongly agree   2   3   4   5- Strongly disagree

25. To what extent you have to be involved in making your school to be better prepared?

☐   ☐   ☐   ☐   ☐

1- Not at all   2   3   4   5- To a great extent

26. To what extent would you like to be involved in making your school to be more prepared for disasters?

☐	☐	☐	☐	☐
1- I am not interested	2	3	4	5- Yes, I am very interested

27. To what extent would you like to be involved in making your home to be more prepared for disasters?

☐	☐	☐	☐	☐
1- I am not interested	2	3	4	5- Yes, I am very interested

28. If there is an emergency and you need to get out from your house, where would you meet?

29. If there is an emergency and your parents can not collect you, who would be responsible for picking you from school? (please describe your relationship to the person)

30. If there is an emergency and your parents cannot be reached, who would you contact? (Please describe your relationship to the person)

31. If you are at home, list all the things that you need to prepare if flood is approaching?

32. Would you be interested to take part in a workshop on disaster risk reduction with your parents?   ☐ Yes   ☐ No

** FINISHED ** ☺
Thank you very much for your thoughts and taking the time to complete this survey

Appendix B

Parent questionnaire

Questionnaire on School and Home Safety

For Parents or Guardians

Full Name:	Gender (Male/ Female):
Child's name:	Relationship with the child:
Year of birth:	Postal code:

1. Thinking about the area in which you currently reside, which of the following hazards do you think are likely to affect you at home? **(please tick all that apply)**

(in alphabetical order)	1- Very Not Likely	2	3	4	5- Very Likely
Earthquakes	☐	☐	☐	☐	☐
Diseases	☐	☐	☐	☐	☐
Droughts	☐	☐	☐	☐	☐
Floods	☐	☐	☐	☐	☐
House/ Building Fires	☐	☐	☐	☐	☐
Riot, conflict, or violence	☐	☐	☐	☐	☐
Strong winds	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐

2. Thinking about your child's school, which of the following hazards are likely to affect the area?

(in alphabetical order)	1- Very Not Likely	2	3	4	5- Very Likely
Earthquakes	☐	☐	☐	☐	☐
Diseases	☐	☐	☐	☐	☐
Droughts	☐	☐	☐	☐	☐
Floods	☐	☐	☐	☐	☐
House/ Building Fires	☐	☐	☐	☐	☐
Riot, conflict, or violence	☐	☐	☐	☐	☐
Strong winds	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐

3. Have you ever PERSONALLY experienced any direct impacts from the following hazards? **(please tick all that apply)**

☐ Earthquake	☐ Tsunami	☐ Landslides
☐ Volcanic eruption	☐ Floods	☐ Strong winds/ typhoon
☐ Droughts	☐ Forest/ bush fire	☐ House fire
☐ King tide	☐ Diseases/ Epidemics	☐ Riot, conflict or violence
☐ Others. If you choose this, please describe below:		

4. How long ago did you experience this event? If there has been more than one experience, please refer to the event that impacted YOU the most SEVERELY

☐ Less than 6 months ago	☐ 6-12 months ago	☐ 1-2 years ago
☐ 3-5 years ago	☐ 6-10 years ago	☐ 11-15 years ago
☐ Longer than 15 years ago		
Please describe the event:		

5. Did you experience any of the following impacts as a direct or indirect result of the hazard? **(please tick all that apply)**
   - ☐ Loss or damage to personal property or possessions
   - ☐ Loss or damage to sentimental possessions
   - ☐ Financial loss (income decline or job loss)
   - ☐ Physical injury from the event
   - ☐ Physical injury from response activities after the event
   - ☐ Increased relationship demands or problems
   - ☐ Health problems
   - ☐ Distress
   - ☐ Physical injury for other household member
   - ☐ Health problems for other household member
   - ☐ Distress of other household member
   - ☐ Injury to family/close friend (loved ones)
   - ☐ Death of family/close friend (loved ones)
   - ☐ Other (please specify)

6. Overall, how well prepared do you feel you were for the hazard that you experienced?

   ☐   ☐   ☐   ☐   ☐

   1- Not at all   2   3   4   5- Very prepared
   prepared

7. Were any children (under the age of 18) with you at the time of the event?

   ☐ Yes   ☐ No   ☐ I am not sure

8. Do you think that preparing for natural hazards/disasters can help reduce risks?

   ☐   ☐   ☐   ☐   ☐

   1- Not at all   2   3   4   5- To a great

                                                          extent

9. How prepared do you think **your home** is to face disaster risks?

   ☐   ☐   ☐   ☐   ☐

   1- Not at all   2   3   4   5- Very prepared
   prepared

10. How well do you know how to be safe from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

11. How well do you know how to prevent your home being affected from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

12. How well do you know how to prevent your family's livelihood being affected from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

13. How do you rate your efforts to reduce the impact of floods at your home?

☐	☐	☐	☐	☐
1 – My family and I have done nothing	2	3	4	5 – My family and I have done everything possible

14. Would you like to know more about how to stay safe from disasters?

☐	☐	☐	☐	☐
1- Not at all	2	3	4	5- To a great extent

15. Does your house have preparedness plans?

☐	☐	☐	☐	☐
No	No, but I would like to have one	Yes, it is written*	Yes, it is unwritten	I am not sure

For example: there is a document that describes things to do before, during and after a disaster

16. In your opinion, how much responsibility should the following people have for preparing disasters in your home?

	1- High Responsibility	2	3	4	5- No Responsibility	Not Applicable*
Father	☐	☐	☐	☐	☐	☐
Mother	☐	☐	☐	☐	☐	☐
Grand parents	☐	☐	☐	☐	☐	☐
Children	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

(* for instance: female/ single headed households, grandparents are not living at home, etc)

17. Please indicate your level of agreement with each item below

	1- Strongly disagree	2	3	4	5 - Strongly Agree

Children have an important role in disaster preparedness	☐	☐	☐	☐	☐
Involving children in disaster preparedness will put them at greater risk	☐	☐	☐	☐	☐
Involving children in disaster preparedness will provide benefits for the children	☐	☐	☐	☐	☐
Involving children in disaster preparedness will strengthen preparedness planning	☐	☐	☐	☐	☐
Children should be involved in disaster simulations and response exercises	☐	☐	☐	☐	☐
Children should be involved when developing preparedness planning at home	☐	☐	☐	☐	☐
Children should be involved when developing preparedness planning at school	☐	☐	☐	☐	☐
Children should be involved when developing preparedness planning at council/ suburb level	☐	☐	☐	☐	☐

18. How prepared are the children in your household on what to do if there is a disaster?

☐ ☐ ☐ ☐ ☐

1- Not at all prepared   2   3   4   5- Very prepared

19. If there is an emergency and you need to get out from your house, where would you meet?

20. If there is an emergency and your parents can not collect you, who would be responsible for picking you from school? (please describe your relationship to the person)

21. If there is an emergency and you cannot be reached, to whom your child should contact? (Please describe your relationship to the person)

22. If you are at home, list all the things that you need to prepare if flood is approaching?

Personal Details

23. What is your current marital status?
   - ☐ Single (never married)
   - ☐ Widowed
   - ☐ Divorced/Separated
   - ☐ Married
   - ☐ Other (please specify)

24. In which country were you born?
   - ☐ Indonesia
   - ☐ Other (please specify)

25. Please enter the age and gender of each child (under the age of 18) residing in your household

26. What is the highest level of education that you have completed?

27. What is your main employment status?
   - ☐ Employed full-time
   - ☐ Employed part-time/casual
   - ☐ Unemployed
   - ☐ Retired
   - ☐ Student

☐ Looking after house/children/others
☐ Disabled
☐ Other (please specify)

28. What is your gross annual household income range, per month?
☐ Negative income
☐ Nil income
☐ Rp. 1 – Rp. 599.999
☐ Rp. 599.999– Rp. 999.999
☐ Rp. 1.000.000 – Rp. 3.999.999
☐ Rp. 4.000.000 – Rp. 6.999.999
☐ Rp. 7.000.000 – Rp. 9.999.999
☐ Rp. 10.000.000 – Rp. 12.999.999
☐ Rp. 13.000.000 or more
☐ I am not sure
☐ Rather not say

29. What type of dwelling do you currently reside in?
☐ Townhouse/ Housing complex – owned
☐ Townhouse/ Housing complex – leased
☐ House – owned
☐ House - leased
☐ Apartment – owned
☐ Apartment – leased
☐ Boarding room – leased
☐ Other (please specify)

30. How long have you been living in your current community (suburb, area)?

31. If less than 5 years, where have you lived previously?

32. Please indicate which of the following most accurately describes your plan for the future?
☐ I plan to live where I am for many years
☐ I plan to move elsewhere in this sub-district in the coming years

- ☐ I plan to move to another sub-districts in Jakarta in the coming years
- ☐ I plan to move to another area outside Jakarta in the coming years
- ☐ Undecided/ I don't know
- ☐ Others, please specify

33. Would you be interested to take part in a workshop on disaster risk reduction with your child?   ☐ Yes   ☐ No

34. Would you be interested to take part in a family interview related to disaster risk and climate change with your child/ ren?   ☐ Yes   ☐ No

** FINISHED ** ☺
Thank you very much for your thoughts and taking the time to complete this survey

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Appendix C

Guiding questions for Family Group Interviews

Aim:

- To explore how families' perspectives on (disaster) risks and their experiences in anticipating, during and the aftermath of a significant risks (i.e. disaster)
- To explore and understand the power relations that exists between children and parents within everyday family life
- To explore the impact of parents' presence on children voices, demonstrating how parents facilitated, modified, and policed children's accounts (and vice versa).

Duration: 2 hours (max)

Guiding questions:

1. Tell us about your family (name, age, school level/ occupation)
2. How long have you lived here? Where do you lived before? Do you have plans to move in the next 3 years?
3. What is your experiences in disaster? Have you ever had any? When was that? What was the impact? How frequent?
4. Each of you, write down on a piece of paper: What do you think are the top 5 risks in your community? (explore and analyse)
5. How was the experience in filling the poster? Did you enjoy it? Which ones that you like the most? Which ones that you don't like? Which ones do you think most useful? Less useful?
6. Who did you filled it with? Why? Did you showed it to other household members?
7. Do you think children <u>have</u> to be involved in developing the household preparedness plans? Why?
8. What efforts that you have done to prevent and prepare for emergency? Do you think there are other things that still needs to be done? Do you think others (e.g. the government) should do more?
9. What do you think the role of children in the house? Role of children for prevention, preparedness, response, and recovery? (what do the children think?)
10. Exploring about community cohesion. Does children plays with their neighbour friends? Do you know your neighbours? Are there regular events in the community? Are there activities related to prevention, mitigation and/ or preparedness to disaster risks in the community? If so, do you take part in the activities?

Appendix D

Documentation for human ethics requirement

1. Approval Letter

**MACQUARIE
UNIVERSITY**
FACULTY OF SCIENCE

Dear Dr Haynes

RE: Ethics project entitled: " Connecting communities: Integration of disaster preparedness measures at household, school, and community level, using a child-centered approach"

Ref number: 5201400846

The Faculty of Science Human Research Ethics Sub-Committee has reviewed your application and granted final approval, effective 21st October 2014. You may now commence your research.

This research meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). The National Statement is available at the following web site:

http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72.pdf.

The following personnel are authorised to conduct this research:

Dr Katharine Haynes
Mr Avianto Amri
Professor Kevin Ronan

NB. STUDENTS: IT IS YOUR RESPONSIBILITY TO KEEP A COPY OF THIS APPROVAL EMAIL TO SUBMIT WITH YOUR THESIS.

Please note the following standard requirements of approval:

1.   The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2.   Approval will be for a period of five (5) years subject to the provision of annual reports.

Progress Report 1 Due: 21st October 2015
Progress Report 2 Due: 21st October 2016
Progress Report 3 Due: 21st October 2017
Progress Report 4 Due: 21st October 2018
Final Report Due: 21st October 2019

NB. If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project.

Progress reports and Final Reports are available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3.   If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4.   All amendments to the project must be reviewed and approved by the Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5.   Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the continued ethical acceptability of the project.

6.   At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites:
http://www.mq.edu.au/policy/

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide the Macquarie University's Research Grants Management Assistant with a copy of this email as soon as possible. Internal and External funding agencies will not be informed that you have final approval for your project and funds will not be released until the Research Grants Management Assistant has received a copy of this email.

If you need to provide a hard copy letter of Final Approval to an external organisation as evidence that you have Final Approval, please do not hesitate to contact the Ethics Secretariat at the address below.

Please retain a copy of this email as this is your official notification of final ethics approval.

Yours sincerely,
Richie Howitt, Chair
Faculty of Science Human Research Ethics Sub-Committee
Macquarie University
NSW 2109

2. Information and Consent Form for Questionnaires

MACQUARIE
UNIVERSITY

Department of Environmental Sciences
Faculty of Science & Engineering
MACQUARIE UNIVERSITY NSW 2109

Contact: Avianto Amri
Phone: +61 (0)2 9850 9683
Fax: +61 (0)2 9850 9394

Supervisors:
Dr Katharine Haynes
Professor Kevin Ronan

Email: Avianto.amri@students.mq.edu.au

Information and Consent Form

Re: Your school participation in the project:
Connecting communities: Integration of disaster preparedness measures at household, school, and community level, using a child-centred approach

Your students are invited to participate in a study looking into policies and practices of disaster preparedness measures at the household, school, and community level in Jakarta. The purpose of the study is to improve measures of preparedness in a holistic and integrated way that aim to build resilient communities, with a child-centred approach as one of the centrepieces of those efforts.

These students have been selected because the school is located in a flood and/or fire prone area and the school has been recommended by the Jakarta Province Education Office.

By sharing the students' experiences and views, both in general and in relation to the preparedness, risk reduction, and adaptation measures in the school area, your child will be making an important contribution that may facilitate the enhancement of community resilience. The case study areas for this study are in SDN Sunter Agung 12 Pagi, SD Kembang, and MI Ash-Shiddiqin.

The study will be conducted by **Mr. Avianto Amri** (email: Avianto.amri@students.mq.edu.au), to fulfil the requirements of a Doctor of Philosophy degree at Macquarie University, Australia under the supervision of Dr Katharine Haynes (as the Principal Investigator, email: katharine.haynes@mq.edu.au) and Professor Kevin Ronan (as the Associate Supervisor, email: k.ronan@cqu.edu.au). The research is funded by the Department of Environment and Geography, Macquarie University and the Australian Bushfire and Natural Hazards Collective Research Centre (BNHCRC).

If your students would like to volunteer for the study and you consent to his/ her participation, the students will be involved in filling a questionnaire with his/ her peers facilitated by Mr. Avianto Amri. The session will be scheduled in consultation with the teachers at your child's school to ensure that it takes place at the most convenient and least disruptive time. The discussion is estimated to take approximately one hour.

The Education Office from Jakarta Province and your child's school have agreed to participate in this study. However, the students are under no obligation to participate.

There will be photo documentation during the session. All documents will only be available to the researchers listed above. By providing consent to participate in the study you will also be providing permission for the students to be taken pictures during the session.

The students' participation in the study is voluntary. The students are not obliged to participate and if you and the students do provide consent, the students are free to withdraw at any time without having to give a reason and without consequences.

The results of the research will be used to produce a Doctoral level research thesis, a publication in a peer-reviewed journal and a report for the BNHCRC. The non-identifiable information will also be used for future related research as required.

www.mq.edu.au

Please note that no report or document produced from this study will contain any single person's identifying information. Unless you state otherwise, no individual will be identified in any publication of results and your child's responses will remain anonymous. On request, you will be offered a copy of any resulting publications either electronically or by mail upon completion of this research.

I, ____ (school principal's name) ____ have read (or, where appropriate, have had read to me) and understand the information above and any questions I have asked have been answered to my satisfaction. I agree for my students to participate in this research, knowing that I can withdraw their participation in the research at any time without consequence. I have been given a copy of this form to keep.

School Name:_____
  (Block letters)

School Principal's Name:_____
  (Block letters)

School Principal's Signature: _____ Date:_____

Investigator's Name:_____
  (Block letters)

Investigator's Signature: _____ ____Date:_____

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone +61 (0) 2 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

(INVESTIGATOR'S [OR PARTICIPANT'S] COPY)

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3. Information and Consent Form for Focus Group Discussion and Family Group Interviews

MACQUARIE UNIVERSITY

Department of Environmental Sciences
Faculty of Science & Engineering
MACQUARIE UNIVERSITY   NSW   2109

Contact: Avianto Amri
Phone: +61 (0)2 9850 9683
Fax: +61 (0)2 9850 9394

Supervisors:
Dr Katharine Haynes
Professor Kevin Ronan

Email: Avianto.amri@students.mq.edu.au

Information and Consent Form

Re: Participation in the project:
Connecting communities: Integration of disaster preparedness measures at household, school, and community level, using a child-centred approach

You and your child are invited to participate in a study looking into policies and practices of disaster preparedness measures at the household, school, and community level in Jakarta. The purpose of the study is to improve measures of preparedness in a holistic and integrated way that aim to build resilient communities, with a child-centred approach as one of the centrepieces of those efforts.

You and your child have been selected because the school your child attends is located in a flood and/or fire prone area and you have expressed interest in participating in the study that involves a workshop and/ or family interviews.

By sharing you and your child's experiences and views, both in general and in relation to the preparedness, risk reduction and adaptation measures in your area, you and your child will be making an important contribution that may facilitate the enhancement of community resilience. The case study areas for this study are in SDN Sunter Agung 12 Pagi, SD Kembang, and MI Ash-Shiddiqin.

The study will be conducted by **Mr. Avianto Amri** (email: Avianto.amri@students.mq.edu.au), to fulfil the requirements of a Doctor of Philosophy degree at Macquarie University, Australia under the supervision of Dr Katharine Haynes (as the Principal Investigator, email: katharine.haynes@mq.edu.au) and Professor Kevin Ronan (as the Associate Supervisor, email: k.ronan@cqu.edu.au). The research is funded by the Department of Environmental Sciences, Macquarie University and the Australian Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC).

For participation in the workshop: If you and your child would like to volunteer for the study and you provide consent to participate, you and your child will be involved in a workshop with your child's peers and their parents, and also local government officials and school representatives. The workshop will be facilitated by Mr. Avianto Amri. The workshop will be located in consultation with the teachers to ensure that it takes place at the most convenient and least disruptive time. The workshop is estimated to take approximately two days and the duration can be adjusted to meet you and your child's needs.

For participation in the family interview: If you and your child would like to volunteer and provide consent to participate in the family interview, you and your family members will be involved in an interview. The interview will be facilitated by Mr. Avianto Amri and will be located at a place and time that are the most convenient for you and your family members. The interview is estimated to take approximately three to four hours and the duration can be adjusted to meet you and other family members' needs.

The Education Office from Jakarta Province and your child's school have agreed to participate in this study. However, your child is under no obligation to participate.

The discussion will be video-recorded digitally to maintain the accuracy of the information provided, and this recording will only be available to the researchers listed above. By providing consent to participate in the study you will also be providing permission for your child to be video-recorded during the focus group discussion.

The participation in the study is voluntary. You or your child are not obliged to participate and if you and your child do provide consent, you and your child are free to withdraw at any time without having to give a reason and without consequences.

The results of the research will be used to produce a Doctoral level research thesis, a publication in a peer-reviewed journal and a report for the BNHCRC. The non-identifiable information will also be used for future related research as required.

Please note that no report or document produced from this study will contain any single person's identifying information. Unless you state otherwise, no individual will be identified in any publication of results and your child's responses will remain anonymous. On request, you will be offered a copy of any resulting publications either electronically or by mail upon completion of this research.

I,_____ (parent's name) _____ have read (or, where appropriate, have had read to me) and understand the information above and any questions I have asked have been answered to my satisfaction. I agree for our participation in this research, knowing that I can withdraw participation in the research at any time without consequence. I have been given a copy of this form to keep.

Child's Name:_____
  (Block letters)

Parent's Name:_____
  (Block letters)

Parent's Signature: _____ Date:_____

Investigator's Name:_____
  (Block letters)

Investigator's Signature: _____ ___Date:_____

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone +61 (0) 2 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

(INVESTIGATOR'S [OR PARTICIPANT'S] COPY)

Appendix E

Paper: Amri, A., Bird, D. K., Ronan, K. R., Haynes, K., & Towers, B. (2017). Disaster risk reduction education in Indonesia: challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences*. doi:10.5194/nhess-2015-344

Appendix F

Paper: Amri, A., Haynes, K., Bird, D. K., & Ronan, K. (2018). Bridging the divide between studies on disaster risk reduction education and child-centred disaster risk reduction: a critical review. *Children's Geographies, 16*(3), 239-251. doi:10.1080/14733285.2017.1358448

Appendix G.

Accompanying Booklet – Guidelines for "My Disaster Prepared Home"

Natural Hazards
and Earth System
Sciences

Disaster risk reduction education in Indonesia: challenges and recommendations for scaling up

Avianto Amri[1,2]**, Deanne K. Bird**[1,2,3]**, Kevin Ronan**[2,4]**, Katharine Haynes**[1,2]**, and Briony Towers**[2,5]

[1]Risk Frontiers, Macquarie University, Sydney 2109, Australia
[2]Bushfire and Natural Hazard Cooperative Research Centre, East Melbourne 3002, Australia
[3]Institute of Life and Environmental Sciences, University of Iceland, 101 Reykjavik, Iceland
[4]School of Human, Health and Social Sciences, Central Queensland University, North Rockhampton 4702, Australia
[5]Geospatial and Mathematical Sciences, RMIT, Melbourne 3001, Australia

Correspondence to: Avianto Amri (avianto.amri@gmail.com)

Abstract. This article investigates the implementation of disaster risk reduction education for children in Indonesia. In the last decade, education programmes related to this subject have been promoted as capable of reducing disaster losses and increasing resilience, based on several studies that have identified positive outcomes. Therefore, it is critical to evaluate and address any potential challenges that might impede their success. The article uses a case study in Jakarta, a rapidly growing megacity that is highly prone to disasters and natural hazards, especially floods and fires, to explore the scaling up and sustainability of disaster risk reduction in Indonesian schools. Based on previous studies, a new approach was developed for evaluating the implementation of education programmes related to these subjects. This study captured the perspectives of children, school personnel, and non-governmental organisations on the challenges of scaling up the implementation of disaster risk reduction education in schools. The study revealed seven key issues and suggests several policy recommendations to move forward. These key issues may also be apparent in many other developing and developed countries, and the suggested recommendations may well be applicable beyond Indonesia.

1 Introduction

Children, defined by the United Nations (1989) as anyone below the age of 18 years, make up nearly one-third of the world's population (UNICEF, 2014). This represents a sig-

nificant increase: just 20 years ago, children made up less than a quarter of the world's population (UNICEF, 1996). Children are considered one of the most at-risk groups in a disaster. WHO (2011) estimates that 30–50 % of fatalities arising from natural hazard events are children. Children are more likely to be injured, have less access critical humanitarian assistance such as food and health care, and are exposed to other dangers, including separation from their families or caregivers (Peek, 2008). In the aftermath of a disaster, children can develop symptoms of post-traumatic stress disorder (PTSD), depression, anxiety, emotional distress, sleep disorders, somatic complaints, and behavioural problems (Masten et al., 2015; Newman et al., 2014; Norris et al., 2002).

Education is a key mechanism through which children can participate in disaster risk reduction (DRR) (Amri, 2015). There is growing anecdotal evidence that when children are supported by adults and are provided with sufficient knowledge and skills, they can protect themselves, save others from danger, and promote significant changes in their communities to adapt to climate change and reduce the risk of disasters (Back et al., 2009; Haynes and Tanner, 2015; Mitchell et al., 2008; Tanner, 2010; Webb and Ronan, 2014; Wisner, 2006). Recent empirical research has provided further support for children's agency in this realm (Haynes and Tanner, 2015; Towers, 2015).

Education has always been one of the priorities in the global commitment for DRR, as articulated in the Yokohama Strategy (United Nations, 1994), the Hyogo Framework for Action (HFA) 2005–2015 (UNISDR, 2005), and most re-

cently the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015b). Substantial efforts have also been made to integrate DRR in the education sector (Ronan, 2014). In the 2013 Global Assessment Report, 72 % of reporting countries specified that DRR had been integrated within their national education curriculum (Ronan, 2014).

Concurrently, there has been an increase in research examining DRR education in schools, including documenting positive outcomes. For example, children who have been exposed to a DRR education programme have better knowledge, reduced levels of hazard-related fears, and more accurate risk perceptions (Ronan et al., 2001, 2010; Ronan and Johnston, 2003).

Given the benefits that school-based DRR programmes can bring, it is critical to evaluate and address any potential challenges that might impede their success. It is therefore the aim of this study to identify challenges associated with implementing DRR education in schools, using Jakarta, Indonesia, as a case study example. The importance of this is twofold. Firstly, the government of Indonesia has made substantial gains in the integration of DRR into the education sector, including integrating DRR within school curricula and providing teachers with training on DRR education and school preparedness (BNPB, 2014; UNISDR, 2015a). However, international research has shown that there continues to be challenges with sustainability and scaling up of programmes (Johnson et al., 2014; Ronan, 2014). Alongside outcome effectiveness, sustainability and scaling up are the main issues related to DRR implementation within the school curricula internationally (Ronan, 2014). Despite this, there is a lack of published research assessing challenges associated with the implementation of DRR within schools in developing countries, particularly in the Indonesian context (Amri, 2015). It is therefore critical to identify the key challenges that Indonesia faces so that these can be considered when implementing DRR programmes within the school environment and thus ensure their success. Secondly, teachers, students, and households have low awareness and knowledge of DRR, particularly related to mitigation and preparedness strategies (BNPB, 2009; Desfandi, 2014; Sopaheluwakan et al., 2006). In these studies, access to DRR education materials, more preparedness planning at the household and community level, and support from relevant agencies were identified as key issues. In light of the above, this research focuses on the issues related to scaling up and sustainability components for DRR education.

The UNISDR (2009) defines DRR as a comprehensive and systematic approach to analysing and managing the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. This article captures the first phase of larger programmatic research and is focussed on several components of DRR (i.e. preparedness and response capacity). This approach was taken based on previous DRR

education studies (e.g. Johnson et al., 2014; Ronan et al., 2010; Webb and Ronan, 2014) that focussed on preparedness and response. In addition, the Indonesian government has been emphasising these components with respect to DRR education (BNPB, 2012).

1.1 Starting point of the study

In order to identify the key challenges on the implementation of DRR education in Indonesia, this research builds on an initial study undertaken by Johnson et al. (2014, hereafter referred to as the Johnson study). Based on focus group discussions (FGDs) with New Zealand teachers, the Johnson study identified eight facilitators and eight deterrents that influence the use of DRR education material in "What's the Plan, Stan?", a national education programme developed by the New Zealand Ministry of Civil Defence (Table 1).

In addition to a focus on the views of school personnel, as in the Johnson study, this study captured the perspectives of children and non-governmental organisations (NGOs). Based on a literature review by Amri (2015), the role and views of other stakeholders are considered important, particularly NGO-based DRR professionals, as they are the main drivers for advocating and facilitating DRR in many developing countries, including Indonesia.

Thus, this study was designed to gather data that can help improve the implementation of DRR education within the Indonesian education sector. The following section provides a description of the case study location.

1.2 Case study location: Jakarta, Indonesia

Jakarta was selected as the study location (Fig. 1) due to a combination of rapid economic growth and urbanisation (Statistics Indonesia or BPS, 2015), a high level of urban poor living in high-risk areas (Baker, 2012), and a high prevalence of both geological and climate-related hazards with high vulnerability (Swiss Re, 2014).

In addition, as in many other developing countries, Jakarta has many active DRR programmes implemented by various government agencies and NGOs, including the United Nations (UN), World Bank, Red Cross, Save the Children, Child Fund, World Vision, Plan International, and Mercy Corps (Brown and Dodman, 2014; UNISDR, 2012; World Bank, 2014a).

From 2002 to 2014, four major floods occurred in Jakarta displacing close to 1 million people (BNPB, 2016). Major floods occur if heavy rainfall coincides with an extreme high tide (Sagala et al., 2013). As a result, children and schools are often significantly affected. For example, a post-disaster assessment of the 2013 flood reported that more than 70 000 students from 251 primary schools in Jakarta could not access their school for 3 to 4 weeks due to flooding (Education Cluster, 2013).

Table 1. Classroom and school-wide facilitators and deterrents to use of "What's the Plan, Stan?" (Johnson et al., 2014).

| Facilitators	Deterrents
School-wide use of the resource	Voluntary nature
Promotion of the resource by teachers	Lack of awareness of the DRR education resource
Direct engagement with local Ministry of Civil Defence and Emergency Management staff	Perception that training is needed for its use
	Lack of school-wide use
Teacher's interest in the subject	Lack of relevancy when no disaster occurred
Student's interest in the subject	Incompatibility with teaching methods
Good-quality design	Competing extracurricular topics
Recent disaster	Lack of direct engagement with local Civil Defence and Emergency Management staff
Teachers' training	
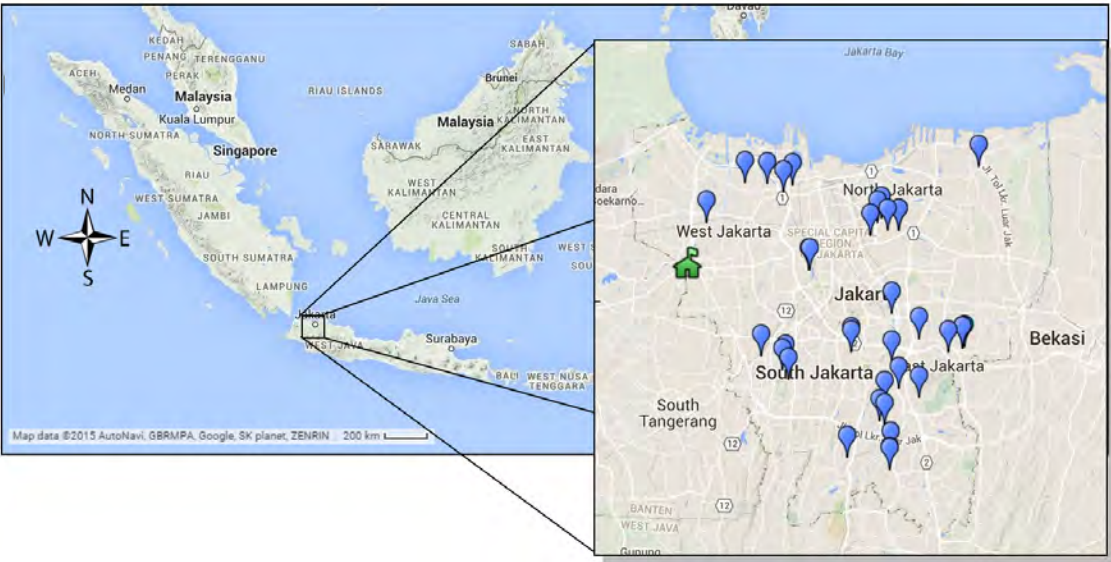
Figure 1. Map of Jakarta. Blue pins represent schools that participated in the school personnel survey. The green building symbol represents the school that participated in the student survey. (Image adapted from Scribble Maps ©2015; map data from AutoNAVI, GBRMPA, Google, SK planet, and ZENRIN.)

Jakarta is also prone to fire hazards. From 2009 to 2013, fire incidences in Jakarta led to 141 deaths. Fire fatalities were 3 times greater than those caused by floods in the same period, which totalled 43 (BNPB, 2016; BPS, 2015).

1.3 Basic education in Indonesia

The Indonesian education system is the fourth largest in the world (World Bank, 2014b). There are more than 50 million students and almost 4 million teachers in more than 269 000 schools spread over 17 000 islands (Chang et al., 2013; Ministry of Education and Culture, 2012; World Bank, 2014b). More than 80 % of schools are public (OECD/Asian Development Bank, 2015).

Since 2003, Indonesian schools have the authority to manage their operations independently with involvement from the local community as part of the school committee (Vernez et al., 2012). Schools also have the autonomy to develop the

syllabus and learning materials and operationalise the curriculum based on the guidelines provided by the Curriculum Centre, a unit under the Ministry of National Education. In 2005, the government of Indonesia enacted a new law that aims to improve the quality of teachers by providing mandatory certifications through courses and professional development (Chang et al., 2013).

Starting from 2009, the Indonesian government has piloted a DRR schools project originally named "disaster-prepared schools" (or Sekolah Siaga Bencana in Bahasa) but now called "disaster-safe schools" (or Sekolah/Madrasah Aman Bencana in Bahasa). According to a government report from 2013, there are more than 25 000 schools that have implemented the disaster-safe schools programme supported by government agencies and/or NGOs (Ministry of Education and Culture, 2015). This report also indicates that the main intervention is focussed on non-structural measures, i.e. DRR education and the development of school disaster manage-

ment plans. Schools participating in the programme are typically selected based on the recommendations of the local education offices and/or disaster management offices, based on their exposure and vulnerabilities to disaster hazards.

## 2	Methodology

This study used a multi-informant, mixed methods approach, focusing on three distinct groups: primary school personnel (i.e. teachers, school administrator, and school principals), DRR professionals within child-focussed NGOs working in Jakarta, and children. Firstly, a questionnaire was distributed to school personnel to assess the issues of implementing DRR education in schools based on their perspectives. Secondly, focus group discussions were conducted with DRR professionals to investigate the issues of scaling up and implementation, since these agencies have been advocating DRR education to be implemented nation-wide. Thirdly, children took part in the research through responding to a questionnaire that aimed to assess their knowledge and perspectives related to DRR. This third component of the methodology was undertaken to establish whether or not children should be included in DRR programmes, based on their current knowledge and desire to be involved.

Individual tools were developed for each stage of the research. These are available from the lead author on request. This study was approved by the Human Research Ethics Committee of Macquarie University (reference number 5201400846).

Using a critical realist approach, the overall analysis applied a thematic focus, stressing the pursuit of a better understanding of the underlying problems (Sayer, 1992). The authors were advancing and testing tools thought to be appropriate for Indonesia but also informed by previous international research, e.g. Johnson et al. (2014). The research was completed between late November 2014 and mid-January 2015. Each stage of the research is discussed in the following sections.

### 2.1	School personnel questionnaire

A questionnaire was developed for school personnel based on previous studies related to child-centred disaster risk reduction (CCDRR), including findings from previous studies that were adjusted for the Indonesian context (BNPB, 2013; GADRRRES and UNISDR, 2014; Haynes et al., 2009; Johnson et al., 2014; Save the Children, 2007a; Tanner, 2010; UNESCO and UNICEF, 2012). The questionnaire is available in the Supplement. The questions were framed and based around globally recognised frameworks such as the United Nations (1989), UNISDR (2005, 2014), and GADR-RRES (2014). A similar approach was used in designing the children's questionnaire.

Five parameters that dealt specifically with the issue of DRR education were selected for analysis in this study: (1) child participation in DRR, (2) DRR-related activities in schools, (3) involvement of external stakeholders, (4) DRR education facilitators and deterrents, and (5) teachers' training in DRR.

Two questions related to facilitating and deterring factors of DRR education are central to this study. These factors included the eight deterrents and eight facilitators identified from the Johnson et al. (2014) study. Three deterrents and four facilitators were added in consideration of the Indonesian context (Table 2) to assess

- teachers' capacity for infusing DRR into the existing curriculum,

- the role of the community in influencing DRR education in schools,

- issues relating to the availability of resources (e.g. funding and dedicated personnel), and

- whether or not school personnel are aware of current policy.

The questionnaire was reviewed with several academic colleagues expert in this field.

The self-completed questionnaire was distributed at the end of a training session organised by the Jakarta Provincial Disaster Management Agency (BPBD) and the Consortium for Disaster Education (CDE). The training was a focussed session for personnel working in flood-prone primary schools in the Jakarta area to learn more about appropriate emergency response measures for their schools. While the training did not cover DRR education per se, the session was considered a good opportunity to target a large group of school personnel who not only worked at high-risk schools but would also have an increased awareness of the risks they faced and disaster-related terminologies and approaches, including DRR education.

All participants at the training session agreed to take part in the survey. An explanation of the nature of the research, including its purpose and ethics approval was provided. Participants completed the questionnaire in the same setting. However, they did not discuss their responses with each other.

A total of 44 members of staff from 39 flood-prone Jakarta primary schools completed the questionnaire (Fig. 1). They were from schools ranging in size from 107 to 500 students with an average of 273 students per school and included 7 school principals, 34 teachers, and 1 administrator. Two people did not state their positions. Participants included 22 females and 22 males, whose ages ranged from 22 to 59 years ($M = 43.71$, SD $= 11.23$). Descriptive statistics in Microsoft Excel were used to analyse the data.

Table 2. Modified facilitators and deterrent for teachers to implement DRR education

No.	Facilitators	Deterrents
	Taken from the Johnson study (eight facilitators and eight deterrents)	
1.	Availability of useful "ready-to-go" and "child-friendly" teaching resources	Lack of "ready-to-go" and "child-friendly" teaching resources
2.	Promotion on the teaching resources by other teachers or education personnel	Lack of training in developing and/or delivering programmes of this sort
3.	Training available on how to develop and/or deliver such programmes for children	The topic is not relevant for the students
4.	The topic becomes a priority by the school management	The topic is not a priority by the school management
5.	Topic is timely in relation to upcoming risk for local natural hazards (e.g. bushfire, fire, cyclone, flooding seasons)	Not compatible with my beliefs about what children should learn in school
6.	Personal interest in the topic	Not enough space in the curriculum
7.	Student interest in the topic	Weak coordination between schools, disaster management agency, and local councils
8.	Good partnerships between schools, disaster management agency, and local councils	No clear mandate and/or policies to implement disaster risk reduction education for children
	Additional factors considering the Indonesian context (five facilitators and four deterrents)	
9.	Innovative methods for curriculum inclusion (e.g. combining learning with school drills)	Lack of knowledge in developing curriculum for disaster education
10.	Clear policies for school to deliver disaster risk reduction education for children	Lack of interest from the community
11.	Dedicated personnel and budget made available	Not enough budget and personnel
12.	High demand from the local community/students on disaster risk reduction education for children	Other, please specify
13.	Other, please specify	

2.2 Focus group discussion with NGOs

The FGD was organised with five child-focussed development agencies that promote the implementation of DRR education in Indonesia: UN Office for Coordination of Humanitarian Affairs (UN OCHA) representing CDE, Plan International (Plan), UNICEF, Save the Children (STC), and World Vision Indonesia (WVI).

Two other organisations (Indonesia Red Cross and Child Fund International) were also invited to participate. However, one agency did not respond to the invitation and the other was unable to attend due to unforeseen circumstances.

Five people (three males and two females), one from each organisation, participated, which is considered an ideal number for FGD on non-commercial topics (Krueger and Casey, 2015). The small size allowed time for in-depth discussions and clarifications. The participants were middle to senior level staff with more than 7 years of experience implementing DRR projects in Indonesia.

The aim of the FGD was to strengthen and triangulate data on the barriers and challenges in implementing DRR education as identified through the school personnel questionnaire. A series of discussion topics was developed based on the findings of the primary school personnel questionnaire and also the lead author's experience of working as an NGO

and CCDRR practitioner. However, as is best practice with in-depth qualitative research, it was also the intention for participants to discuss other topics they felt were important to ensure coverage of a wide range of issues related to CCDRR (Kitzinger, 1995). Topics explored in the FGD included participants' views of their agencies experiences and understanding of CCDRR; the successes, barriers and challenges to implementation, sustainability and scaling up; strategies used to overcome barriers and challenges; and other issues linked to sustainability and scaling up.

FGD participants were briefed on the nature of the research, including its purpose and ethic measures approval. Participants were also asked for their permission to be audio-recorded.

The lead author's background in working for a child-focussed NGO in Indonesia enabled an informal and relaxed environment that was intended to facilitate an honest and critical discussion. However, it was also recognised that the lead author's involvement as moderator of the FGD could create bias due to his knowledge of CCDRR programmes and past employment with NGOs. To avoid this, and to promote increased data collection rigour following FGD methodological recommendations, the lead author had a very limited role in the discussions. That is, this involvement included only prompting and providing probing questions when needed,

thereby avoiding the temptation to contribute his own per-spectives (as shown in Barbour, 2010; Morgan, 2012).

The FGD was held in a UN meeting room that is a "neu-tral" and familiar space for the participants. All participants were active in the FGD and shared their own perspectives and experiences. The discussion lasted for 1 h and 40 min.

The audio recording was transcribed verbatim and the transcripts analysed with the use of the qualitative data analy-sis software, QSR NVivo 10®, using a thematic and inductive approach.

2.3 Student questionnaire

The questionnaire for students was designed to assess children's interest and knowledge on DRR. It comprised 40 items drawn from previous research and theory and included questions to ascertain demographic information, DRR-related awareness, risk perceptions, emotions, and attitudes about DRR, participation in school- and home-based preparedness for hazards, and a knowledge test (see Supplement). It is beyond the scope of this paper to present all of the results from the children's questionnaire. However, 24 questions have been chosen to establish whether or not children should be included in DRR programmes, based on their current knowledge and desire to be involved. This information will be used to contrast against the school personnel's perceptions in order to identify any issues that may result in challenges of implementing DRR programmes. The results presented here are garnered from the questions related to the knowledge test (questions 21–40) and children's interest in DRR (questions 6, 16, 19, and 20).

The knowledge test questions related to fire prevention and safety, flood preparedness and response, and hygiene behaviour. These topics were selected based on the hazards that often occur in the study location (i.e. fire risks and floods). Hygiene behaviour questions were added as the children are often at risk from secondary hazards (i.e. water-borne diseases) after floods (WHO, 2013).

The student questionnaire was administered to 140 students in grades 4 and 5 in Kembangan Selatan 2 Pagi Public Primary School. The age of students ranged between 9 and 12 years, with the exception of one student who was 14 years of age ($M = 10.48$, SD $= 0.76$; comprised of 73 girls and 67 boys). Children of these age groups were selected because they have sufficient communication abilities to respond to simple inquiries (Bell, 2007; Borgers et al., 2000).

This school was selected because the school principal had taken part in the school personnel questionnaire. Thus, initial rapport was built and permission granted for this research to be conducted with the students. Furthermore, the school for this study is part of the government-endorsed safe school programme supported by a local NGO and is an at-risk school for annual flooding. In early 2014, there were two occasions where the floodwater reached 1 m in depth, forcing the school to be closed for a week on both occasions.

At the time of the study, there were 408 students (204 girls and 204 boys), ranging from 6 to 15 years old, enroled at the school with 1 school principal (female), 22 teachers (11 female and 11 male), and 2 school guards (both male).

Options of "I'm not sure", "I don't know", and "Other, please specify" were provided to reduce pressure and avoid participants answering randomly, as with the primary school personnel questionnaire.

The student questionnaire was reviewed by several academic experts who have experience in developing and validating questionnaires. It was also pilot-tested with 182 children in five schools in North Jakarta as part of a baseline study conducted by Save the Children (2014).

The pilot survey showed that some children were having difficulties writing responses in open-ended questions and also that their concentration was reduced if the process took over an hour. Therefore, the number of open-ended questions was minimised and the total questions restricted to shorten the process. The final questionnaire had 40 items. In this research, only relevant results are presented that are related to children's knowledge and their interest on DRR. Considering the changes made to the questionnaire, the results of the pilot survey are not included in the analysis presented here.

The questionnaire was administered during class time over a 2-day period in early January 2015, prior to the peak of the monsoon season (usually expected in early February). The data collection took under 1 h each day.

The survey participants sat in the class room while the facilitator read out loud the questionnaire in front of the class. Beforehand, the facilitator explained the purpose of the research project, how to mark their answers, the expected duration, and most importantly that their involvement was entirely voluntary. The participants were also informed that their responses would not affect their academic standing.

The whole process was supervised by a teacher. During the process, discussion about question clarification was encouraged. However, no discussion or deliberation between students about their answers occurred. Data were entered and analysed using Microsoft Excel.

Scoring criteria were developed to classify participants according to the level of knowledge into the following groups: high, medium, and low (Table 3). For example, participants who selected three correct answers (out of five questions) in relation to hygiene were rated as having a medium level of knowledge. This classification was used to differentiate children with a high level of knowledge in DRR and others who require more learning.

3 Results

The following section describes the results from the three stages: survey questionnaires with school personnel and children, respectively, and FGD with child-focussed NGOs. Re-

Table 3. Criteria for classifying children's knowledge and skills.

No.	Type	Number of correct answers			Total
		Low	Medium	High	questions
1.	Fire prevention and safety	0–2	3–4	5	5
2.	Flood preparedness and response	0–5	6–8	9–10	10
3.	Hygiene behaviour	0–2	3–4	5	5
4.	Overall	0–9	10–18	19–20	20

sults are divided per theme and the FGD results include participants' quotes.

3.1 Questionnaire: school personnel

3.1.1 Children's involvement in DRR

The results illustrate that the majority of teachers are confident in their abilities to involve children in the disaster preparedness process (86 %), believe that children should learn DRR education in schools (68 %), and consider children to have an important role in disaster preparedness (89 %). The majority of teachers also think that children should be involved in developing preparedness plans for their homes (61 %) and school (57 %).

However, when it comes to children's involvement in DRR, the views of teachers are divided, with 45 % considering that this might increase the risks faced by children and 39 % believing that children should not be actively involved.

3.1.2 Factors in implementing DRR education

Eight facilitators and five deterrents (shown in italics in Table 4) were selected by more than one-third of participants. Hence, these are considered as key factors. Moreover, two-thirds of participants (69 %) selected more than one option. While inspection of Table 4 underscores this point, a few factors stand out as more important, with the highest response being teachers training availability.

3.1.3 Preferences on type of teachers' training

When asked whether they were interested in training if it were offered and did not impinge unduly on their time, all participants answered yes (100 %). A blended or combination approach involving a mixture of classroom (theoretical approach) and experiential training received the highest endorsements (50 % of 44 responses), with "experiential or hands-on" training receiving the highest score for a single method (38 %).

3.1.4 Partnerships with other stakeholders

More than one-third of the participants (37 %) think that the level of coordination between their schools, the local council, and the disaster management agency is non-existent to low, 36 % believe there is a medium level of coordination, and 25 % stated that the coordination level is high. However, 75 % of participants indicated that they desired future changes to the level of coordination between these stakeholders whereas 18 % did not. The remaining participants did not answer the question. Of those who answered yes, two-thirds provided reasons of which, 45 % were related to improvement in disaster response, and 32 % in relation to disaster preparedness.

3.2 Questionnaire: children

3.2.1 Perspectives of children of their knowledge – what they think they know as opposed to what they actually know

Most children correctly identified the hazards that may impact their homes (79 %, $n = 140$) and their school (62 %), i.e. earthquake, floods, strong wind, structural fires, high tide, disease outbreak, riot, conflict, or violence (as per Dickson et al., 2012; Tadjoeddin, 2002; WHO, 2005). The remaining proportion of children identified hazards that are not likely to impact their homes or school, i.e. tsunami, landslides, volcanic eruption, drought, or forest fire.

The majority (71 %) of children indicated that they think they know how to be safe, 14 % do not think they know how to be safe, 14 % were not sure, and 1 % did not answer the question. Nearly all children think that they can or maybe can make themselves (94 %) and others (91 %) comfortable or calm in an emergency. However, the majority of children (61 %) also stated that they are sometimes worried, scared, or upset when thinking or talking about disasters.

The results of the knowledge test (see methodology for scoring criteria) illustrate that 89 % children have a medium level of overall knowledge, scoring best on flood preparedness and safety, where 26 % received a high score. However, the children scored poorly on knowledge in other areas, where only 2 and 15 % of children received a high score on hygiene behaviour and fire prevention and safety respectively.

When comparing the knowledge test results of the 71 % of children who indicated that they know how to be safe from disasters, nearly all of them (96 %) scored in the low-

Table 4. Teachers' responses to facilitators and deterrents in implementing DRR education in their classroom (participants were able to select more than one factor). Text shown in italics are factors that were selected by more than one third of participants.

No.	Facilitators	% of respondents (n = 44)	Deterrents	% of respondents (n = 44)
1.	*Training available on how to develop and/or deliver such programmes for children*	*84 %*	*No clear mandate and/or policies to implement disaster risk reduction education for children*	*52 %*
2.	*Good partnerships between schools, disaster management agency, and local councils*	*57 %*	*Lack of training in developing and/or delivering programmes of this sort*	*52 %*
3.	*Innovative methods for curriculum inclusion (e.g. combining learning with school drills)*	*52 %*	*Lack of "ready-to-go" and "child-friendly" teaching resources*	*48 %*
4.	*Availability of useful "ready-to-go" and "child-friendly" teaching resources*	*50 %*	*Lack of knowledge in developing curriculum for disaster education*	*41 %*
5.	*Clear policies for school to deliver disaster risk reduction education for children*	*48 %*	*Weak coordination between schools, disaster management agency, and local councils*	*36 %*
6.	*Personal interest in the topic*	*41 %*	Not enough space in the curriculum	30 %
7.	*Promotion on the teaching resources by other teachers or education personnel*	*39 %*	Not enough budget and personnel	30 %
8.	*Dedicated personnel and budget made available*	*36 %*	The topic is not a priority by the school management	25 %
9.	Topic is timely in relation to upcoming risk for local natural hazards (e.g. bushfire, fire, cyclone, flooding seasons)	23 %	Not compatible with my beliefs about what children should learn in school	7 %
10.	The topic becomes a priority by the school management	14 %	Lack of interest from the community	5 %
11.	High demand from the local community/students on disaster risk reduction education for children	11 %	Other	5 %
12.	Student interest in the topic	5 %	The topic is not relevant for the students	2 %
13.	Other	5 %		

to-medium range of knowledge, with only 4 % having knowledge of DRR in the high range.

Even though this research did not investigate in-depth on the issues of DRR education in this specific school, based on observation and discussion with the school personnel, this low score may be due to the fact that teaching material related to DRR is inconsistent with the key messages provided by the government, a lack of capacity among the teachers to search for DRR material, and the DRR education programme is limited to awareness raising and disaster simulation exercise.

3.2.2 Participants' interest in DRR education and involvement in preparedness

Nearly all child participants (94 %) would like to know more about how to stay safe. The reasons given for wanting more knowledge were grouped into three themes: to know how to be safe for themselves (e.g. "Because I want to know how to be safe from disasters"), to overcome their fears in relation to natural hazard impacts (e.g. "Because I fear drowning and many diseases"), and to protect oneself, other people, and the surrounding areas (e.g. "Because if it [a disaster] happens, I want to save my family and neighbours"). Only one participant gave a coherent reason for not answering "yes" and that was that the child did not want the disaster to happen in the first place.

A large majority of participants (more than 80 %) would like to be involved in making their school and home more prepared for disasters. From the participants who answered "no", only a few provided clear reasons, which were "I have never experienced disasters", "I do not want to be affected by disaster", "because mom and dad would not allow me [to be involved in preparedness activity]", and "because it [being involved in preparedness activity] makes things difficult".

3.3 FGD with child-focussed NGOs

During FGDs, participants shared their CCDRR project experiences, including efforts in promoting DRR education.

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They also described successes and progress coupled with the challenges they have faced. Based on the discussions, the findings were categorised into four main issues. The following section described each of the main issues.

3.3.1 Programme delivery approach

During the discussion on the NGOs' experiences in implementing CCDRR, several main obstacles were identified. The first is that NGOs face a significant challenge to sustain DRR projects when funding ceases. Participants labelled this a "project mentality" problem.

> Sustainability. Well, it is easy to say it but to realise it is very hard... our weakness is in monitoring after the project is finished, especially project areas where we do not have regular office presence.

The participants mentioned that most international NGOs do not have a long-term office presence at the local (or district) level and, according to participants, lack a strategy or vision to ensure sustainability in the Indonesian context. When the programme ends, the office is closed and staff relocated. Participant discussion also confirmed that the current government's monitoring system does not assess implementation or evaluate progress and effectiveness of DRR programmes in schools.

3.3.2 Funding limitation for comprehensive package of safe schools programme

Participants stated that NGOs usually have limited funding. Hence, efforts are often limited to delivering singular activities versus more comprehensive packages of education and teachers' training. Training and/or emergency drills were highlighted as the common activities facilitated and conducted. These were echoed several times, with the activities being reported to be one-off events, without exception. There were also challenges in implementing a comprehensive approach for school safety:

> In a safe school package there are a range of activities from A to Z, maybe we can only implement from A to D, not the whole package.... the simplest activity is to conduct a disaster simulation... to expect implementing one full package like we want, we still have not been able to do it.

When NGOs do succeed in advocating with local government to allocate funding for DRR implementation, the funding is often small, with reports of competing development priorities as one source of this problem:

> The reality is that certain districts have limited funding. So, we face tough choices. Which one that needs to be included in their development priorities, and when we talk about DRR, this goes to the back [and not as a priority].

This inevitably restricts the ability to implement a comprehensive package for a school-based DRR programme.

However, some participants disagreed in relation to funding issues. One participant mentioned that funding is available, particularly at the national level. As another participant stressed, the issue is not about budget but more a lack of understanding and capacity of government officials associated with engaging and promoting children's participation. However, one participant pointed out that there are opportunities for funding at the local level by tapping to the village funds.

3.3.3 Political will from the government

Participants discussed their frustration with the current and past government administrations, including DRR and education agencies, which still view children as passive participants:

> ...even in [disaster] preparedness activities [such as disaster simulations]... most of the time they are being treated as objects...

The Disaster Management Agency and the Ministry of Education have not made the issue of children and DRR a focus. This, combined with a lack of policy or political will, was considered a hindrance to the implementation of DRR education in schools:

> The government does not have a specific focus on children, especially in the disaster sector. Until now, even in emergency response, vulnerable groups have not been the focus.

> Up to this day, we still have problems with the Ministry of Education and the Curriculum Centre. They still do not have the solid "political will" for our [DRR] education system. So, we could not expect the schools to sustain it.

Nevertheless, moving beyond a project mentality is an issue that all participants want to focus on. Participants emphasised the importance of involving and working alongside government officials. A crucial step for NGOs, to ensure the sustainability of a programme and create a sense of ownership, was considered to be establishing relationships with government from early in the development of a project. However, participants noted the challenge in maintaining relationships. This included engaging and building the capacity of selected individuals in an agency as they are commonly transferred (every 2 to 3 years) to other agencies in different sectors, thus taking the knowledge and institutional memory of that collaboration with them. To anticipate this, participants recognised the importance of long-term implementation planning to secure commitments and anticipate government turnover.

3.3.4 Targeting the right partners

According to participants, identifying with whom you are working with in government is also essential. Participants described an example when they advocated for DRR to be integrated in the national curriculum:

> Let's take for an example, SCDRR [Safer Community through Disaster Risk Reduction]. They [SCDRR project team] spend lots of money to develop the modules but that still does not guarantee success. They start through the Curriculum Centre, but other directorates who oversee the schools won't buy it.

The participants described that in 2010, the United Nations Development Programme in collaboration with CDE-supported advocacy efforts through the project SCDRR. They worked closely with the Curriculum Centre, a unit within the Ministry of Education who hold the authority in designing the national curriculum.

However, a different set of units, the primary education and secondary education directorates, oversee the implementation of policies in primary and secondary education. These directorates were not involved in the previous stage described; there was thought to be a lack of awareness and low sense of ownership from these directorates to enforce DRR-related policies in the schools, as perceived by FGD participants:

> ... at the national level, there have been plenty of guidelines. Now, it is more on how we can implement it and enforce the policies.

Participants also acknowledged that there are a lot of actors that should be involved in DRR education, including different units within the Ministry of Education and other agencies (e.g. the National Disaster Management Agency, Ministry of Religious Affairs, and NGOs) who have relevant experiences and interests. Therefore, building inter-agency collaboration and having support from the top level was considered essential. This is a similar approach being undertaken in the water and sanitation sectors in Indonesia, as described by a participant. In addition, some participants mentioned the value of building a coalition at the national level in order to strengthen the efforts to ensure children's views reach the government:

> The Children in a Changing Climate Coalition has already existed for a long time and this is not donor driven, but because we believe that children can be agents of change... Maybe, that is an interesting idea [establishing coalition at the national level] because there are a lot of players [who have similar interests].

4   Discussion

Overall, the results from the children's survey on the low score received on knowledge and skills test have shown the importance of DRR education as well as their high interest to learn more; meanwhile, results from the survey with school personnel and FGD with the NGOs highlight the challenges in implementing DRR in schools.

The children's survey results suggest that the majority of children (1) have an awareness of the hazards surrounding them, (2) believe they know how to stay safe from those hazards, and (3) want to be involved. However, nearly all children attained scores within the low-to-medium range on the knowledge test, scoring poorly on hygiene and fire-related topics. Additionally, more importantly, most of these children think that they know enough on how to stay safe from disaster. This is an important finding that suggests children have a lack of knowledge in DRR even though they might have a sense of hazard awareness and believe that they know how to stay safe in a disaster.

Having a level of hazard awareness is an important and an initial step to become better prepared (Bird et al., 2009; King, 2000; Paton et al., 2008). However, previous studies have demonstrated that a high level of awareness does not mean that the public have the correct knowledge, are able to practise it when needed, or are necessarily better prepared (e.g. Haynes and Tanner, 2015; Whittaker et al., 2013). This is because there are many other factors at play, not least underlying vulnerabilities. This can be as important as knowledge in influencing behaviour and outcomes in relation to risk reduction (Bird et al., 2011; Haynes et al., 2008; Whittaker et al., 2013).

As evidenced by the results presented here, there are various factors that need to be considered when implementing DRR education in Indonesia. The five deterrents and eight facilitators have been synthesised into six key issues related to the implementation of DRR education in Indonesia (Table 5). Interestingly, children's interest is not considered as a factor of influence. However, the children's survey shows that they have a strong interest to learn about DRR. This is an important issue to keep in mind for schools considering the value of these programmes. This has therefore been presented in Table 6 as the seventh factor. Each of these seven key issues is discussed in the following sections.

4.1   Policy on DRR education in Indonesia

More than half of the school personnel participants think there are no clear mandates and/or policies on DRR education. This indicates the lack of awareness or clarity on DRR education policies, as Indonesia already has policies supporting DRR education. The law on disaster management (act no. 24 of 2007) has provided the legal framework that all citizens have the right to receive DRR education in Indonesia. In 2010, an endorsement letter by the Ministry of Edu-

Table 5. Key issues identified from the facilitators and deterrents, combined with relevant perspectives from teachers, NGOs, and recommendations from the Johnson study.

Key issues	School personnel		Additional views from school personnel	NGOs perspectives	The Johnson study
	Key deterrents	Key facilitators			
Policy on DRR education in Indonesia	No clear mandate and/or policies to implement disaster risk reduction education for children	Clear policies for school to deliver disaster risk reduction education for children	68 % teachers selected DRR education as a useful subject for children to learn	Enforcing the policies is an issue. No monitoring Involve the right government units from the beginning	Require disaster preparedness education in schools
Awareness of and access to DRR education materials	Lack of "ready-to-go" and "child-friendly" teaching resources	Availability of useful "ready-to-go" and "child-friendly" teaching resources		Lack of support from the Ministry of Education on the use of the guidelines	Establish and maintain ongoing evaluation of the resource
Teachers' capacity	Lack of training in developing and/or delivering programmes of this sort Lack of knowledge in developing curriculum for disaster education	Training available on how to develop and/or deliver such programmes for children Innovative methods for curriculum inclusion (e.g. combining learning with school drills)	86 % of teachers are confident to involve children in the disaster preparedness process Experiential approach or combining with classroom learning is preferred (89 %)	Training for school stakeholders have been done by NGOs in the past but more as one-off events	Provide more teachers training
Partnerships between schools and other stakeholders	Weak coordination between schools, disaster management agency, and local councils	Good partnerships between schools, disaster management agency, and local councils	75 % of teachers expect to have future changes on the level of coordination		Increase Ministry of Civil Defence and Emergency Management interaction through web-based technology
Platform for teachers		Personal interest in the topic Promotion on the teaching resources by other teachers			No clear recommendations
Dedicated personnel and budget		Dedicated personnel and budget made available		Lack of technical capacity Lack of funding for a comprehensive package	Not identified as an issue

Table 6. Perspectives on children's participation in DRR.

Key issues	Teachers' perspectives	Children's perspectives	NGOs' perspectives	The Johnson study
Children's participation in DRR	45 % of teachers think that involving children will put children at greater risk	94 % of children would like to learn more on DRR	Children are still seen as passive participants	Not discussed in the study
	39 % of teachers think children should not be actively involved	> 80 % of children want to be actively involved in preparedness at home and in schools		
	89 % of teachers believe that children have an important role in disaster preparedness and will benefit children			

cation of Indonesia (2010) (the circular letter of the Minister of National Education no. 70a/SE/MPN/2010) was sent to all education offices in Indonesia encouraging schools to mainstream DRR education using three options (through existing subjects, local content, and/or extracurricular activities). In 2012, BNPB also produced guidelines on safe schools. In addition, DRR has been incorporated in the national curriculum from primary to secondary schools, starting from grade 4 (the Curriculum Centre or Pusat Kurikulum, 2009). The nature of these policies is not imposing but more encouraging. This is because Indonesia has a decentralised system where the central government has less authority compared to the district government over education content, financial matters, and school practice.

This situation is similar to that identified on the national implementation of a CCDRR programme in New Zealand, where a programme kit was sent to every primary school in the country. However, as the programme is entirely voluntary, uptake has been quite low (Johnson et al., 2014). Similarly, child-focussed NGOs appeared to appreciate the development of a national policy but equally lamented that it is not being implemented in a systematic manner. This reflects a more pervasive problem in this area across the HFA with numerous countries developing DRR, or CCDRR, policy that is more "aspirational" than realised (Ronan, 2014).

This highlights a failing of the current monitoring system to capture the progress on the implementation of the policies related to DRR education. It is also worth noting that a systematic review of the 35 CCDRR education programme evaluations found that none of these were evaluated locally by DRR professionals, schools, or local community stakeholders (Johnson and Ronan, 2014). All were done by professional evaluators, with over 90 % being those in higher academic settings. This is a problem seen in many countries, especially on NGO-led projects, where the HFA has spurred the progress of the implementation of CCDRR education programmes and other areas (Ronan, 2014). This state of affairs represents a significant barrier for scaling up and ensuring sustainability.

4.2 Awareness of and access to DRR education materials

Half the participants from the school personnel survey stated that the availability of "ready-to-go" and "child-friendly" DRR education materials will aid the implementation of DRR education. This suggests that there is a lack of access to and awareness of already available DRR materials. For example, Pusat Kurikulum (2009) has produced guidelines for teaching on five main hazards (earthquake, floods, landslide, fire, and tsunami) in Indonesia. There are also a variety of guidelines and teaching resources produced by agencies such as the Indonesian Red Cross (2009) and Save the Children (2007b).

A further issue is that there are no standards for approved "key DRR messages" in educational resources for the Indonesian context. That is, there is no system in place to control and assure the quality of resources related to child-centred education frameworks, content, and delivery mechanisms in Indonesia, even though it is vital to have standard and/or consistent key messages (Ronan et al., 2001, 2010; Ronan and Johnston, 2003; Shimura and Yamagata, 2015; UNESCO, 2014). For examples of key DRR messages see IFRC (2013).

The current results also demonstrate that school personnel favour the inclusion of innovative methods for delivering DRR education. Practitioners of CCDRR have developed several participatory tools for children (e.g. risk mapping, transect walks, participatory video, mind mapping) to identify, assess, and communicate risks and generate action to bring about changes in communities (see Haynes and Tanner, 2015; Molina et al., 2009; Plan International, 2010). These tools should be considered for inclusion in the resource materials for DRR education in schools.

As a result of current findings, combined with previous research and expert opinion (IFRC, 2013; UNESCO and UNICEF, 2012, 2014) it is important that these standard key messages and innovative methods are included in the new curriculum when it is rolled out in 2016.

4.3 Teachers' capacity

A significant percentage of teachers (84 %) described a belief that training will help them facilitate the implementation of DRR education in their classroom or school. This percentage is much higher than for other facilitating factors. Some teachers are confident in their abilities to involve children in the disaster preparedness process. However, almost half believe that involving children will put children at greater risk. This is in line with the findings on teacher's perspectives in the aftermath of the 2011 Christchurch earthquake (Johnson and Ronan, 2014) as well as previous studies in Indonesia (Desfandi, 2014; Sopaheluwakan et al., 2006).

Furthermore, training teachers in DRR poses a significant challenge for Indonesia with more than 17 000 islands and 269 000 schools (Ministry of Education and Culture, 2012), spread over 34 provinces comprised of 413 districts and 98 cities. A cascading method has been used in Indonesia to roll out training for teachers, where training of trainers (ToT) is organised and the trainers that have been produced from this ToT continue to train other teachers (UNESCO and UNICEF, 2012). However, this option requires a significant number of master trainers and trainers for teachers. If the target were to train at least one teacher of each Indonesian school, almost 9000 training sessions would be needed, with a maximum of 30 participants per training. This number excludes training for trainers and associated monitoring components.

A systematic way to improve teacher's capacity is by integrating DRR education in higher-education programmes for teachers. UNISDR (2008) considers this the most effective, least expensive, long-term, and sustainable approach. This way, every teacher will have basic knowledge and skills to teach DRR. Another way is through online or computer-based training, though noting that this was not a preferred option from the school personnel survey, it has been found effective in reaching a large number of teachers over a short period of time in Turkey (Petal and Sanduvac, 2012).

4.4 Platform for teachers

As it stands currently, the quality of DRR education in schools depends on teacher's willingness and creativity. This is reflected in the survey where personal motivation and promotion of education resources by other teachers are seen to be facilitating factors. Encouragingly, the survey results show that the majority of teachers believe children have an important role in disaster preparedness and that it will bring

benefits to children (although noting as well that some teachers think that it may put the children at risk).

Johnson and Ronan (2014) revealed that peer-to-peer support among teachers could be an effective mechanism to help teachers implement DRR education. Having teachers that are more knowledgeable and regarded as "champions" on DRR education could inspire other teachers to follow in their footsteps.

The Disaster Resilient Australia New Zealand School Education Network (DRANZSEN) is made up of teachers, researchers, emergency service managers, and policy makers and is intended to strengthen the relationship and feedback between these spheres and also promote developments in DRR education (Attorney General's Department, 2015). This sort of network serves as an ideal platform with regular face-to-face meetings that could be broadened via an online presence to include Indonesian users. Alternatively, the platform could be replicated to connect teachers involved in DRR education across Indonesia. Creative tools that have been produced such as the ones documented by Back et al. (2009) and Dicky et al. (2015) could also be shared in such a platform.

The Indonesian government builds national identity among young people in schools through various approaches. Every Monday morning, all school children have to perform flag raising ceremonies and sing the national anthem, and every Friday all school children undertake morning aerobics with specific choreography that enhances citizenry (Moser, 2015). These approaches, which are repetitive in nature, can also be replicated to instil preparedness and risk reduction knowledge. For example, school principals can disseminate preparedness messages to warn students on the upcoming rainy season during the flag ceremony. Another way to reinforce this linkage is by organising a competition at the national level for the most disaster-prepared schools. Studies indicate that friendly competition between schools can improve the quality of teaching and school performance (Hanushek and Rivkin, 2003; Wößmann, 2007). Similar competitions have been successfully implemented by the health sector, with a government-run "healthy school" competition held annually at the national level (Direktorat Jendral Pendidikan Dasar, 2015).

4.5 Partnerships between schools and other stakeholders

According to the teachers' survey, more than half of the participants think that a good partnership between the school and the council/disaster management agency is a facilitating factor in the implementation of DRR education in schools. However, a higher number of teachers still think the roles of the local council and disaster management agency are mainly for improved emergency response, when in fact they also have a role in building preparedness.

Joint activities can be in the form of developing preparedness planning together, conducting joint simulations, and for

school children to raise awareness in the surrounding community. Framed as "being prepared to respond" to appeal to teachers' views could be useful to increase the effectiveness of preparedness measures in schools and the surrounding community (Towers et al., 2014).

Another way to strengthen partnerships is through the local DRR forum, a multi-stakeholder platform serving as a coordination mechanism to enhance collaboration. Schools that have DRR education programmes should be part of any local DRR forum to enable dialogue and partnerships with other forum members (e.g. the fire department, search and rescue, Red Cross) who have specific skills and expertise related to DRR. These agencies can be invited to share their experiences and also provide trusted and credible information for the students regarding DRR.

4.6 Dedicated personnel and budget

One of the facilitating factors identified is having dedicated personnel and a budget to implement DRR education. However, since DRR is already integrated in the curriculum, there should be no reason for teachers not to implement DRR education, even when there is a lack of dedicated DRR funding.

However, lack of funding may influence DRR activities beyond simply teaching DRR to students, as suggested by the result from the child-focussed NGOs. A comprehensive package of safe schools, as illustrated by GADRRRES and UNISDR (2014), would require additional funding. This includes other interventions such as retrofitting of school buildings, disaster simulations, teacher training, inviting experts to schools, and developing school disaster management plans.

4.7 Child participation

Students and/or community interest were factors that had little influence on teachers' views on the facilitators and deterrents in DRR education. This indicates that teachers seem to be indifferent to the interest (or lack of interest) from the students and/or the community on DRR education. This could be because there is more pressure to make sure that students can perform on exams or other reasons. However, this requires further investigation. This perhaps illustrates a style of teaching which may be dominated by a "top-down" approach, resulting in reduced interest or understanding of the benefits in hearing the views from the community, including children.

Some teachers (39 %) also disagree with children being actively involved in preparedness planning. This result may come from the participants' understanding of the meaning of "active participation", which can be ambiguous and worthy for future investigation (i.e. what does "active participation of children" mean to different stakeholders?). Nevertheless, this presumption was strengthened by the child-focussed NGOs where children are still seen as passive participants, and it is potentially a significant obstacle to chil-

dren's participation in DRR through schools or classrooms where this perception is prevalent.

This is contradictory to the result from the children's survey which demonstrated that the vast majority of children were interested in learning more about DRR and assisting to ensure their schools (and homes) are safer from disasters. The right for children to participate is protected in the Child Protection Law of the Government of Indonesia (2002) and the UN Convention on the Rights of the Child (1989). There are also many documented case studies and preliminary research findings which demonstrate that children's active involvement brings added value, including to the resilience of the community (Amri, 2015).

Many of the children living in Jakarta are prone to natural hazards. This is a risk to their safety and wellbeing as well as access to essential services such as health and education. Therefore, taking into account the views from the children, it is clear that DRR education in schools will enhance their rights to both safety and to participate. Greater awareness is also needed among teachers on the benefits of children actively participating in efforts to reduce risk in their schools and homes, perhaps through teachers' training.

This study focuses specifically on Indonesia, particularly the urban setting of Jakarta. However, these key issues may well be apparent in many other developing and developed countries, as highlighted by Ronan et al. (2010) and Johnson et al. (2014). These issues include the need for structured DRR training for teachers, a lack of awareness and access to materials, and issues associated with partnerships with other stakeholders. Hence, the recommendations suggested in this paper may well be applicable beyond Indonesia.

5 Limitation of study and future research

This study involves a relatively small sample size of school personnel and NGO staff and focuses only on Jakarta. Nevertheless, the school personnel that took part in the survey were from schools classified as at risk to floods and selected by the Jakarta Province Disaster Management Agency. The NGO staff were senior managers with more than 8 years of experience in implementing CCDRR in many areas in Indonesia and also from reputable child-focussed agencies. Thus, the responses from NGO staff have strengthened the discussion and the recommendations. This combination has provided a more comprehensive overview of the issues related to DRR education in Indonesia, compared to previous studies by Desfandi (2014) and Sopaheluwakan et al. (2006).

Plans for further research using a longitudinal approach are underway, including (1) expanding the sample size (more schools in Jakarta with diverse characteristics, including type of schools – i.e. public, private, and religious schools – status of DRR education programme – i.e. have ongoing DRR education programme versus those with no DRR education programme – support from outside the school (NGO-supported,

local-government supported, and no support), and types of exposure – i.e. school is frequently flooded, school is safe but the surrounding area is flooded, access to school disrupted due to floods), (2) additional stakeholders (parents and government officials), (3) assessing wider topics of DRR (including disaster prevention, mitigation, and climate change adaptation), and also (4) replicating the study in other areas in Indonesia.

6   Conclusions and recommendations

This study developed and tested tools to assess children and teachers' perspectives and knowledge on DRR and advances from previous studies implemented in the context of a developed country. The tools developed were applicable to the Indonesian context and the results have generated a number of actionable recommendations (see below). The results highlight the strong desire for children to learn more on how to stay safe from disasters and reduce disaster risks in their communities. It also demonstrates that children are extremely interested in assisting their households and schools to become better prepared for disasters. However, there is still a gap in children's knowledge on DRR. Seven key issues on implementing DRR education in Indonesian schools were identified based on the perspectives of children, school personnel, and child-focussed NGOs. These issues relate to policies on DRR education in Indonesia, teachers' awareness of and access to DRR educational materials; teachers' capacity for implementation of DRR education in schools; partnerships between schools and other stakeholders; the lack of a platform for teachers to share experiences, successes, and challenges; dedicated personnel and budget; and children's participation in DRR education and measures.

Thus, the following recommendations, which consider aspects of sustainability and scaling up, are made based on each of the seven key issues.

1. As the authorising body, the primary and secondary education directorates should lead efforts to raise awareness of policies related to DRR education to all school personnel and other education bodies across Indonesia. The directorates should also include DRR aspects in the school monitoring process so progress of DRR implementation is evaluated and reported.

2. Teachers should have access to an online knowledge hub as a repository of educational resources, including various guidelines and teaching manuals produced by various institutions. In addition, the Ministry of Education should take the lead in conducting a critical review of DRR education, including the development of standardised key messages for DRR in schools. Infusion of relevant key messages through the weekly flag ceremony and/or weekly aerobics could be effective.

3. A live and online discussion platform should be established to connect teachers across Indonesia who have an interest in DRR education. A competition at the national level could also motivate "champions" in DRR education.

4. DRR education training should be integrated into higher-education programmes as part of teachers' professional development. Given Indonesia is a highly disaster-prone country, basic knowledge of DRR should be part of teachers' minimum competencies. Although not a popular choice, the use of e-learning and computer-based training is an option for participants who have access to the technologies.

5. Joint activities to enhance preparedness should be fostered particularly between schools and local councils and disaster management agencies. Schools should also be part of the local DRR forum.

6. Budgets should not be an issue since DRR is already part of the national curriculum. However, for comprehensive DRR activities (e.g. school retrofitting, training for teachers, school drills), schools could obtain additional funding from the village funds where the government is disbursing development funding to be managed at the village level.

7. School personnel and other education staff (including those in the emergency management sector) should be aware on the benefits of children's participation in DRR.

These findings suggest that a change of strategy and introduction of new measures are essential to improve the implementation, and effectiveness, of DRR education in Indonesia. As previously described, work is underway to expand the research – i.e. more schools, adding more stakeholders (parents and government officials), and expanding to broader topics (disaster prevention, mitigation, and climate change adaptation) and conditions (e.g. flood prone versus non-flood prone).

Results and recommendations in this research are based on an Indonesian case study. Nevertheless, challenges that were identified are in line with previous studies and, therefore, the recommendations may be applicable in other countries facing the same challenges.

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Appendix F of this thesis has been removed as it contains published material. Please refer to the following citation for details of the article contained in these pages:

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Guidelines for "My Disaster Prepared Home"

By

Avianto Amri

2016

Hi and be prepared!

Do you know, almost one million people in Jakarta were affected by floods in the last decade? As people living in Jakarta, we have to get involved to prevent, reduce the risks, and be prepared for foods.

One of the ways to be prepared is by developing a disaster preparedness plan. Through this postgraduate research (PhD), conducted by Macquarie University, Bushfire and Natural Hazards CRC, and Risk Frontiers, Australia, and in collaboration with the Provincial Disaster Management Agency and Provincial Education Office of Jakarta, we are developing a poster of "My Disaster Prepared Home" and accompanying guidelines.

The "My Disaster Prepared Home" poster serves as a worksheet for students engaged in the topic of disaster education, and to increase knowledge and awareness regarding flood preparedness at home. This guideline can be used as a reference for filling out the poster.

"My Disaster Prepared Home" poster is designed to be administered together between children and their parents (mum and dad), and it is recommended to do it together with *all* household members, i.e. grandfather, grandmother, housemaid, babysitter, driver, and others (if applicable).

The author would like to convey utmost appreciation for the children and their parents who were representatives from three schools: SDN Sunter Agung 12 Pagi, MI Ash-Shiddiqin (Cilincing), and SDS Kembang (Kemang) who participated in one day workshop on disaster preparedness that provided valuable contributions for the development of this poster.

The author would also like to express his gratitude to the children and parents who are involved in administering this "My Disaster Prepared Home" poster. Please forward and

suggestions, comments, or recommendations to the author, using the contact details below.

Jakarta, May 2016

Author,

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Emergency Preparedness Kit

One of the ways to be prepared is to assemble an emergency preparedness kit to anticipate emergency situations and post-disaster situations. This emergency kit can be in the form of an individual kit (commonly known as go bag), for homes or families (such as using water proof box), or a communal kit (e.g. emergency kits for councils).

There are various items that need to be prepared for an emergency kit. This list should be **treated only as a reference**. An important thing to be remember is that the contents and quantities of each item varies according to the type of disaster risk, location, as well as the characteristic of each people who will be using them. More importantly, make sure people know where this emergency kit is stored and understand how to use it.

Types of items that can be part of emergency preparedness kit include:

1. Tools for communication and receiving news (e.g. radio or phone and mobile charger)
2. Lighting equipment (e.g. emergency lights or flashlights with backup batteries)
3. Raincoats, mattresses, folding tents, rope, life vests
4. First Aid Kit
5. Hygiene equipment (soap, toothbrush, toothpaste, shampoo, towel, wet tissues, hand sanitizer)
6. Lighters or matches (put in a waterproof box)
7. Spare clothes
8. Swiss-army knife
9. Important documents
   a. Family card
   b. Birth certificates
   c. ID Cards (Citizen card, Driver license, Passport, etc.)

d. Academic certificates
e. Marriage license
f. Bank account book
g. Medical records
h. Insurance certificates
i. Loan agreements
j. Vehicle registration certificate
k. House, Land, and Property ownership certificates

10. Personal medicines (for example: cold, cough, runny nose, asthma, stomach ulcers, diabetes, heart disease, or other chronic diseases)
11. Whistle for signal seeking help
12. Sufficient cash (anticipating if ATM or banks are not available/ in use)
13. Bottled water and biscuits (for snacks)

Please discuss with your parents to select the necessary items for your emergency preparedness kit

Things to do before the rainy season start

Flood events occur regularly. However, every few years (3-5 years), the rainwater volume can be higher than usual and can lead to major floods. With an increase in population and housing, and a decrease of green space, along with impacts of climate change, flood situations can increase in frequency, intensity and become more difficult to predict.

There are many things that we can do to prevent or reduce the impact of flood disaster (or usually known as flood mitigation) long before the rainy season starts. Flood disaster can also bring diseases, such as diarrhea, flu/ cough/ runny nose/ fever, and skin diseases. Following are a few measures or actions that can be done to mitigate the impact of floods:

1. Elevate the house or make water levees to avoid flooding
2. Make sure the roof and walls are in good condition and do not leak
3. Carry out 3M activities (Drain, Close, and Pile) objects that can become a nest for mosquitoes
4. Provide clean water storage tanks
5. Ensure all household members have a raincoat or umbrella
6. Prepare cleaning equipment at home for cleaning after floods
7. Ensure garbage around the house is disposed of in the trash bin
8. Make seepage wells and biopores so that flood runoff to homes can be reduced

9. Dredge the river / creek around your home area
10. Arrange home furniture and electronic equipment so that it remains safe in the event of a flood
11. Participate in the council's disaster response team
12. Prepare equipment to prevent flood water from entering the house, such as sand bags
13. Source info, from newspapers, TV, online news, or websites, about when the rainy season peak will occur
    a. Meteorology, Climatology, and Geophysics Office (BMKG) at www.bmkg.go.id
    b. Provincial Disaster Management Agency (BPBD) of Jakarta at *bpbd.jakarta.go.id*
14. Subscribe on official twitter and other social media accounts
    a. Jakarta Police at @TMCPoldaMetro
    b. BPBD of Jakarta at @BPBDJakarta
    c. BMKG at @infoBMKG
    d. Jakarta flood map at @petajkt
    e. Jakarta flood info at @infobanjir_jkt
15. Conduct disaster simulations in your home
16. Looking back over the plan for "My Disaster Prepared Home"
    a. Ensure the emergency preparedness kit is ready
    b. All household members understand things to do during and after floods
    c. All household members know where to go and how to reach safe place
    d. Doublecheck important phone numbers in case of emergency

You should discuss with your parents about which actions need to be taken before the rainy season starts!

# Identifying Evacuation Route and Map

Location of safe haven and evacuation routes are very important to be prepared, before disaster strikes. In certain

situations, the local authorities can instruct people to evacuate when flood risk is becoming more serious and dangerous. In other situations, evacuation can be an option to save yourself.

To draw evacuation route and map:

- **Identify a minimum of two locations** where your family will meet if something happens and you need to evacuate from home.
- Learn which evacuation routes are safe and easy to access
- Consult with your local council to select locations and routes of evacuation that are considered safe.

An example of an evacuation route and map:
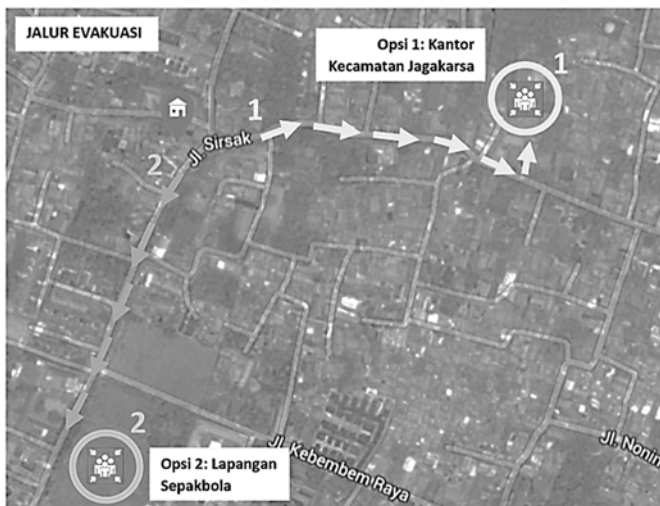
Things to do when flood is approaching

Usually floods in urban areas happened gradually and we are made aware a few hours in advance. Therefore, there is a golden time for you and other household members to anticipate floods. Consult with your local council on those responsible for informing early flood warnings in your neighborhood.

Once news if received that a flood is imminent in your area, there are a few things that can be done to reduce their impact, including:

1. Turn off electrical equipment / power sources, shut off the electricity to avoid electric shock
2. Move electronic equipment and other valuables to the top floor or a place that is safe from flooding
3. Collect and store clean water
4. Use clean water efficiently
5. Secure valuables and important documents in a safe place
6. Ensure preparedness kit is prepped and ready to use at any time
7. Prepare emergency levees using sand bags or other material
8. Make sure seepage wells are not blocked by leaves or other items
9. Check the entire house for leaks
10. If there are thunderstorms, disconnect the electricity immediately
11. Monitor information from twitter, online news, or media regarding flood warnings
12. Coordinate with the disaster task force in the area around your house for info on flood warnings and safe evacuation sites
13. Coordinate with school authorities to anticipate if the school is closed
14. Ensure that children do not play far from home
15. Remove the gas / LPG valve from the gas cylinder

16. Make sure your vehicle (car / motorbike) is in good condition (check regularly) and fully fueled in anticipation of evacuation

You should discuss with your parents what actions you should take when flood is approaching!

If there are other actions that you think are important, please include it in the "My Disaster Prepared Home" poster.

Things to do during and after floods

When flood happens, there are a few things that are recommended so that we are safe, our belongings are protected, and to reduce flood impacts. You also need to remember that floods can trigger illnesses that pose a threat to our health.

Recommended actions for during and after floods, include:

1. Stay calm and don't panic
2. Evacuate household members when floodwater is still at a safe level cross
3. If the floodwater is too high, move to the upper floor, roof, or higher ground
4. If needed, leave children with trusted people
5. Ensure that electrical equipment, electricity sources, and gas connections to the gas cylinders are turned off and disconnected
6. Avoid walking near the gutter to avoid falling in and becoming swept away by floodwaters
7. If you are in a vehicle, avoid using an underpass because it can be submerged in water
8. If your car or motorcycle breaks down during a flood, leave it and move to a higher place
9. If your car is submerged and the water level is rising, use the window to exit
10. Avoid using vehicles at night
11. Don't drink, play or swim in flood water
12. Beware of wild animals that can be carried by flood runoff (such as snakes, monitor lizards, scorpions) especially around trees, bushes and narrow spaces
13. If the flood continues to rise, contact emergency services
14. Clean your home and surrounding environment with cleaning products
15. Eradicate mosquito nests

16. Use chlorine if dug wells are contaminated by floodwater
17. Dry items exposed to flood water
18. Wash hands before eating and drinking
19. Take vitamins and maintain healthy food intake to avoid disease
20. Use bottled water or boil water before drinking
21. Check electrical equipment, gas cylinders, gas lines before they are installed and reused. Make sure they are not wet and that they are safe to use
22. Raise funds to provide food for flood affected survivors

You should discuss with your parents regarding the most appropriate actions to take during and after floods in your home and surrounding areas.

Important phone numbers

There are several important phone numbers that can be used as **reference**:

- Police: 110
- Fire brigade: 113
- Electric company: 123
- SAR : 115
- Ambulance: 118
- Telecom company: 117

You can also add other important phone numbers such as:

- Nearby hospitals or clinics with emergency room (ER) facilities
- Local Police station
- Local council members
- Village or sub-district officials
- Relatives that can support you, if you need help

This list can also be adjusted based on the needs of the household members, such as:

- Car repair shop or tow truck services
- Septic tank pumping
- TV Cable company
- Handyman services
- Electronic repair shop

For further information:

In Bahasa Indonesia:

- www.bnpb.go.id
- bpbd.jakarta.go.id
- www.bmkg.go.id
- www.jakartafire.net

In English:

- Disney Disaster Preparedness Book: http://bit.ly/1nLZBee
- www.ready.gov/kids
- www.whatstheplanstan.govt.nz
- www.redcross.org.au/prepare.aspx

Remember, when you have finished filling the "My Disaster Prepared Home" poster, **ensure all household members signed in the space provided**.

Thank you very much for your involvement.

** ☺ **