

School Going Children's Knowledge on Disaster Preparedness: A Study from Selected Areas of Bangladesh

Md. Ekhtekharul Islam

Working Paper No: 11



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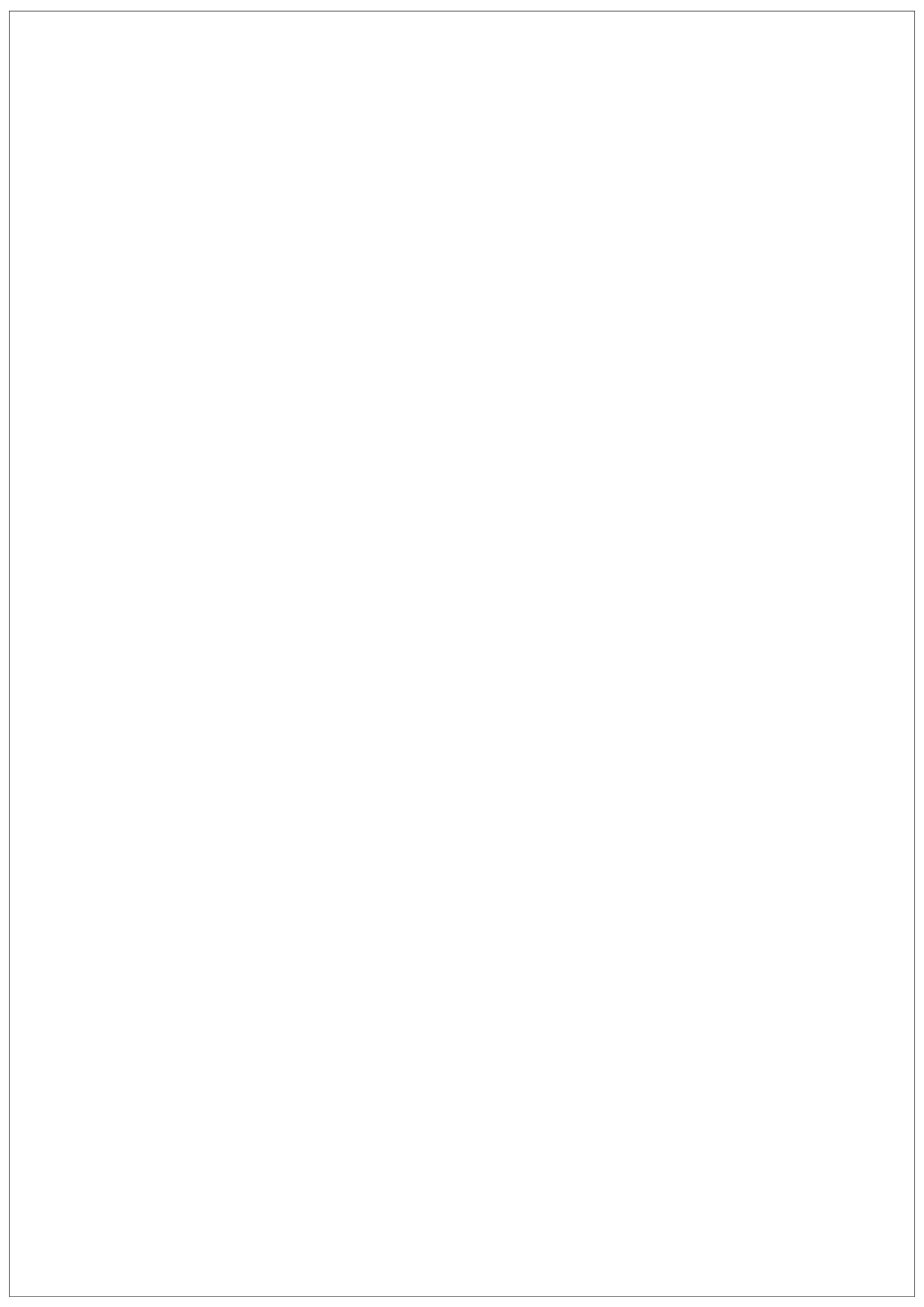
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Correct Citation: Islam, Md. Ekhtekharul. 2017. EWUCRT Working Paper no 11. East West University, Dhaka, Bangladesh.

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EWUCRT gratefully acknowledges the partial support of the University Grants Commission of Bangladesh through their Academic Innovation Fund under the sub-project “Knowledge Transfer and Capacity Development of Academic Staff” to publish this particular working paper.

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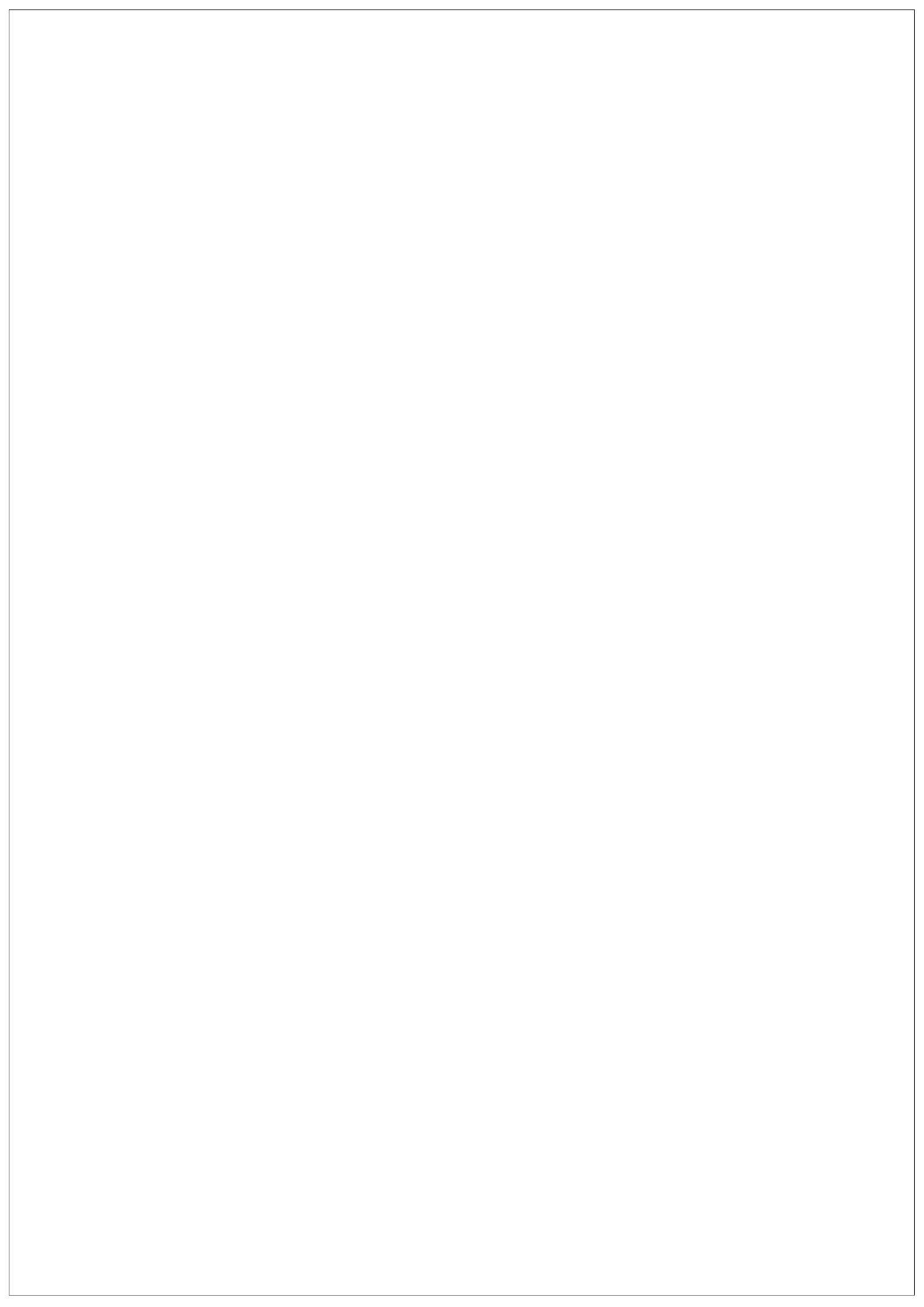


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ABSTRACT

Bangladesh is one of the most vulnerable countries to natural disasters in the world. Children, in particular, are confronted by multifaceted challenges of disaster as they are very sensitive and socially excluded in our country. Reducing vulnerability to disaster by increasing the level of preparedness among school going children is an essential development agenda. In this context, the study aims to explore different dimensions of knowledge on disaster preparedness among school going children in Bangladesh. A mixed method strategy (qualitative and quantitative) is employed to conduct the study. Interviews are conducted among children from primary and secondary schools from five different disaster prone areas of Bangladesh. In the beginning, the paper describes sample characteristics, children knowledge on disaster preparedness, sources of knowledge and related factors. Children gain knowledge on disaster and disaster preparedness from various formal and informal sources. The regular source includes textbook, and informal sources include TV, radio, internet, family, community, friends and experience. Different factors affecting disaster preparedness knowledge among children include family size, parent's education, parent's profession, gender and information sharing. Findings indicate that parent's job has significantly positive relationship with knowledge on disaster preparedness among children. However, basic knowledge on drought among children has significantly negative correlation with knowledge on disaster preparedness. In the end, the study presents particular policy recommendations to address children's emergency preparedness issues in local and international development discourse(s).

Key Words: Disaster Preparedness, Children, Knowledge.

ACKNOWLEDGEMENT

I would like to thank Dr. Rafiqul Huda Chaudhury, Chairperson, East West University Center for Research and Training for his continuous support and guidance. I would like to offer my sincere appreciation for the learning opportunities provided by him. I gratefully acknowledge the support from Dr. Lutfun Nahar, Associate Professor, Department of Social Relations, East West University and Dean, Faculty of Liberal Arts and Social Sciences, East West University, without which the study could not have been completed. Special thanks to Dr. Bijoy P. Barua, Professor, Department of Social Relations, East West University for his valuable input in this study. I would also like to express my sincere gratitude for Ms. Touhida Tasnima, Assistant Professor and Chairperson, Department of Social Relations, East West University, who has been very supportive throughout the time. I would like to thank my colleagues from the Department of Social Relations, East West University for their support and cooperation during the work. Finally, heartfelt thanks to all the staff of East West University Center for Research and Training for making this task possible. I would also like to thank Mr. Shafiqur Rahman, Assistant Professor, Department of English, East West University for English editing of this working paper.

Abbreviations

ADPC	Asian Disaster Preparedness Center
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BDT	Bangladeshi Taka
BTRC	Bangladesh Telecommunication Regulatory Commission
CMR	Cyber Media Research
DRR	Disaster Risk Reduction
FAO	Food and Agriculture Organization
GHS	Global Humanitarian Assistance
GoB	Government of Bangladesh
HSC	Higher Secondary Certificate
ICT	Information Communication and Technology
MDG	Millennium Development Goals
NCP	National Children Policy
NDMP	National Disaster Management Plan
NGO	Non Governmental Organization
SIM	Subscriber Identification Module
UNCRC	United Nations Convention on Rights of Children
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations Children's Fund
UNISDR	United Nations International Strategy for Disaster Reduction
USD	United States Dollar
USGS	United States Geological Survey
VO	Village Organization

1. Introduction

We live in a world that is increasingly affected by disaster events. In recent decades, a number of disasters have been rising, and people around the world are facing multifaceted impacts. Children are highly vulnerable to natural disasters because of their particular stage of physiological and social development (Seballos et al. 2011). Numerous challenges of disaster confront Bangladesh. Since 1980, the country has faced frequent disasters, causing more than 16 billion USD in total damage, according to UNDP (2012). Evidence from Bangladesh suggests that among many other communities in our society, children belong to most vulnerable segment and face exclusion (Rashid and Shafie 2013). Bangladesh ranks first in the world regarding children's vulnerability to natural disaster, and distribution of vulnerability tends to highly concentrated on them (Global Humanitarian Assistance 2013). A glaring example is half of the total population who were severely affected by Cyclone Aila that hit the coastal areas of Bangladesh in 2009 was children (GoB 2011a). Children face direct impacts of a disaster like deaths, injuries, and diseases as well as indirect impacts like psychological trauma and disruption in education (UNICEF 2011). The toll of disaster on children is projected to rise sharply in coming decades (Save the Children 2009). It is because, until recent times children are barely acknowledged regarding risks they possess. Moreover, some children exposed to threats of disaster will significantly increase in coming decades (ibid). Therefore, reducing children vulnerability and prepare them to overcome future challenges is an essential development agenda. As children throughout the world constitute 50% of those affected by disaster now (UNICEF 2011), it is critically important to address children's needs and challenges in the emergency management framework.

About disaster management, Bangladesh has made a paradigm shift from conventional management to a comprehensive disaster risk reduction strategy. It is important to note that disaster preparedness is a core component of disaster risk reduction strategy (FAO 2008). Disaster preparedness refers to *“the capacities and knowledge developed by governments, professional response organizations, communities and individuals to anticipate and respond effectively to the impact of likely, imminent or current hazard events or conditions”* (UNISDR 2009). Disaster preparedness program facilitates and supports the integration of children's

disaster needs in local and national level disaster management framework. The government of Bangladesh has produced some policies at home, and global communities highly applauded those. These policies have undoubtedly brought remarkable reductions in losses and damages due to disasters in the recent years (See the New York Times 2014)¹. The inclusion of disaster related contents in the school textbooks by the Government of Bangladesh is a notable advancement reflecting textbook driven disaster risk reduction approach (Selby and Kagawa 2012). Educating children empowers them with knowledge, and this supports Article 6 of UN Convention on the Rights of the Child. However, several other challenges require attention as the country still possesses serious threats of disaster especially in regards to children. Such problems are related to participation in decision making, enduring discrimination among different groups and power and access to resources (Rashid & Shafie 2013). If these problems are not addressed the process of achieving Millennium Development Goals will be delayed, and tougher challenges will threaten post-2015 Sustainable Development Goals to make on time. Thus this research aims at exploring dimensions of disaster preparedness among school going children in line with those earlier mentioned challenges.

Purpose and Objectives

There is a high degree of agreement that children are the most vulnerable group to disaster in Bangladesh. However, available information does not indicate to what extent and why are they vulnerable to disaster (Rashid & Shafie 2013). All these information indeed provide the foundation of disaster preparedness. Moreover, the importance of knowledge is often disregarded in disaster risk reduction strategy because of data unavailability, exclusively in developing countries (Cutter et al. 2012). Disaster preparedness actions broadly encompass contingency planning, communication, community drillings, exercises and public education. The purpose of this study is to contribute to the knowledge gap at least partially. Findings of the study will hopefully contribute to future disaster risk reduction policies and actions in Bangladesh. This study has following objectives:

- a) To examine different factors influencing level of disaster preparedness knowledge among school going children

¹ Borrowed time on Disappearing Land, Retrieved from http://www.nytimes.com/2014/03/29/world/asia/facing-rising-seas-bangladesh-confronts-the-consequences-of-climate-change.html?_r=0 Accessed on 24th September 2014

- b) To identify formal and informal sources of knowledge characterizing disaster preparedness among school going children
- c) To propose particular policy recommendations on disaster preparedness to strengthen further existing disaster management framework for school going children

Research Questions

Based on the given definition of disaster preparedness, the analysis in this study will focus on response spectrum of children, their experience about disaster and impacts of the disaster on them. The study will also include discussion about children's access to various resources and social processes those steer their knowledge formation. Ultimately, the study will identify social, cultural and geographic factors affecting knowledge acquisition among children. It is believed that social relations and structural features of a society define people's choices and their impact. Therefore, the study possesses following research question:

What factors hinder or facilitate knowledge on disaster preparedness among school going children in five geo-climatic regions of Bangladesh?

Other sub-questions are,

What are the formal and informal sources of knowledge on disaster preparedness among school going children in the selected areas?

What are the factors determining or influencing the process of knowledge acquisition on emergency preparedness among the chosen school going children?

What policy implications does this study have?

Structure of the Report

The report consists of six chapters. *Chapter 1* presents background information, research objectives, and research questions. In *Chapter 2*, the concept of disaster preparedness and theoretical framework of the study is described. *Chapter 3* entails methodology of the survey. *Chapter 4* addresses results of analyses. Sample population characteristics, findings from bivariate and multivariate analysis are presented in this section. *Chapter 5* presents a discussion on the results and provides some recommendations those have policy-level implications. And

Chapter 6 is about concluding remarks. References and Annexes are listed in the last part of the report.

2. Concept and Theory

Over the last few decades, the frequency and intensity of natural disaster have been increasing significantly. Bangladesh being one of the developing countries and also one of the least responsible countries to climate change is facing the growing impacts of the disaster. This chapter includes detail discussion on the concept of disaster preparedness for children and the theoretical framework of the study.

Concept of Disaster Preparedness for Children

Currently, 600 million children are living in 10 countries of the world including Bangladesh who is most vulnerable to natural disasters (UNICEF 2013). Children are more likely to get affected due to greater vulnerability to disaster and social exclusion. Social exclusion is a process through which vulnerable groups like children wholly or partially get excluded from full participation in the society (Haan & Maxwell 1998). Such exclusion in Bangladesh affects individuals' quality of life and the equity as well as the cohesion of society as a whole (Rashid and Shafie 2013). UNICEF's study (2011) about children from eight most vulnerable countries revealed that disaster causes drop out from schools, increase gender gap in schools, increase the incidence of water-borne diseases, lack of water and sanitation and decrease net enrollment ratio in schools. The Even more challenging fact is 88% of existing diseases among children around the world are due to global climate change and increase in the frequency of disaster (ibid). The Intergovernmental Panel on Climate Change has also predicted that frequent disaster will affect children not only from developing countries but also from developed countries in future (IPCC 2007). Disaster preparedness is about two broad objectives. First, increasing capacity to predict and be prepared to reduce risks and second, efficiently responding to an emergency situation (UN 2008). This study, however, has research questions only related to the first objective of disaster preparedness.

Disaster preparedness for children is an emerging concern. A plethora of research explores that lack of preparedness among children widens the sufferings and problems during and aftermath the disaster (Izadkhah 2005). Accompanying children into the disaster management process will

help them to survive using their capacities. Thus, disaster preparedness aims to disaster risk reduction and refers to the knowledge and ability of every individual to effectively anticipate, respond to and recover from the impacts of disaster (UNISDR 2015). Children as an independent agent usually take three distinctive strategies in response to disaster (Ojala 2012). First, keeping trust on various social agencies including family. Second, using own capacities motivated by knowledge and third, using own abilities to adapt. Children are subject to external assistance to prepare for disaster and thus, a wide range of factors affect the processes to develop. The level of preparedness largely depends on variations in sources of information used by different stakeholders (Tierney, Lindell and Perry 2001). Such sources may include textbooks, schools families, friends, relatives, communities, experience, public announcement and media. Turner, Nigg, and Heller-Paz (1981) studied the positive relationship between the level of preparedness among children and role of their families. The study has also found children have greater ability to understand information related to disaster when their parents are more educated when they share information regularly and have better income. Previous experience also leads to higher level of disaster preparedness among children. Mileti and Obrien (1992) found that families that previously experienced disaster tend to do more in response to the warning. Apart from family, general disaster education provided by schools has a profound impact on the level of disaster preparedness (Tierney, Lindell and Perry 2011). There are now globally available well-integrated disaster interventions that consider children. Many countries have already incorporated disaster education into school curricula with an aim to bridge school, home, and community (Asian Disaster Preparedness Center 2007). Approaches to include disaster related issues into school curriculum include infusion of topics into different subjects and an entirely dedicated subject.

Paradigm Shift in Bangladesh

It has been mentioned in the previous section that Bangladesh has made a paradigm shift from conventional disaster management to disaster risk reduction approach. Particular attention has been given to children. At the policy level, Bangladesh has developed some well-acclaimed policies. Figure 1 summarizes three such policies and related interventions for children to combat disaster and climate change. Concerning children, Bangladesh National Children Policy has been introduced in 2011 (NCP 2011) and has extended its emphasis on children's participation in decision-making for their protection (GoB 2011b). In another policy, Bangladesh Climate

Change Strategy and Action Plan (BCCSAP) 2009, comprehensive disaster management has been mentioned one of the six pillars to manage disaster (GoB 2009). BCCSAP has greater stress on adaptation strategy rather than on response mechanism. The inclusion of disaster management related topics in school curriculum is an initiative under comprehensive emergency management program.

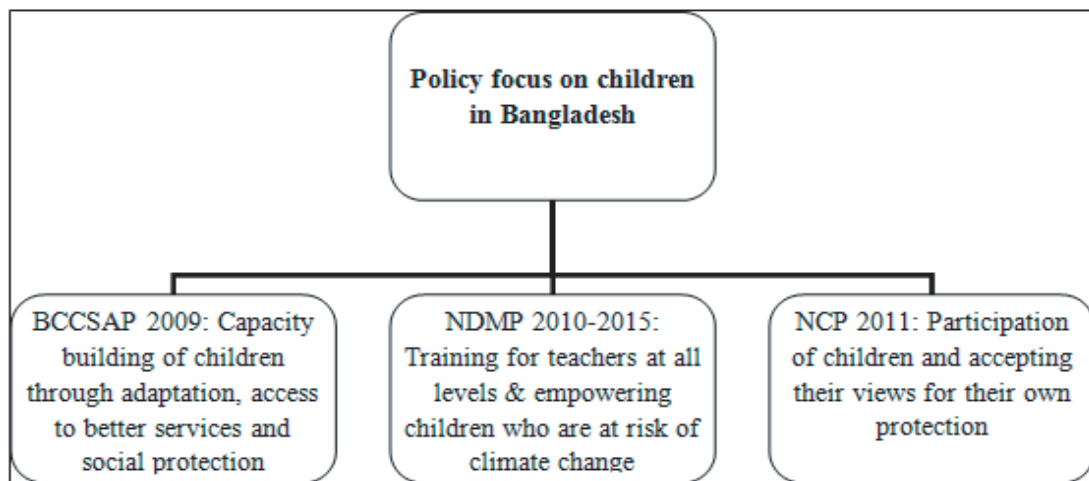


Figure 1: Policies addressing children’s rights in Bangladesh

Taking textbook driven approach, National Curriculum and Textbook Board (NCTB) has infused disaster and climate change related issues within chapters in different books (UNESCO and UNICEF 2013). Concepts of natural and human induced hazards, vulnerabilities, risks and disaster preparedness are incorporated (Table 1). However, there is a lack of agreement about the quality and effectiveness of these contents.

Table 1: Disaster-related contents in textbooks of NCTB (Selby & Kagawa 2012)

Class	Subject	Related Topics
5	Bangla Language	Poetry on cyclone
6	Social Science	Definition and types of disaster and mitigation plan for disaster
6	English Literature	Fire and drought: definition, causes, and effects
7	General Science	Flood, river erosion, and drought in Bangladesh: causes & effects
8	General Science	Cyclone and tidal surges: history, causes & effects

Knowledge and Disaster Preparedness: The Theoretical Framework

Disaster Risk Reduction centered policy take-up and implementation minimize challenges of human development in the face of disaster (Davis et al. 2003 cited in Izadkhah 2005).

Emergency preparedness is an integrated part of disaster risk reduction, and thus knowledge is required for informed decision making in this regard. The recently approved Sendai Framework for Disaster Risk Reduction 2015-2030 addresses the importance of knowledge and provides the scope to highlight critical roles of knowledge required for disaster preparedness among different groups in the society, including children. Hence, this study aims to identify different types of knowledge and knowledge sources for disaster preparedness among school going children. The *knowledge system and disaster preparedness* framework developed by Dekens (2007a) and cited in Mercer et al. (2010) gives the theoretical foundation of this study. Though the framework addresses issues in general, we pointed out our focus only for children in this study.

Knowledge is defined as “*a fluid mix of framed experience, contextual information, values, and expert insight that provides a framework for evaluating and incorporating new experiences and information*” (Davenport and Prusak 1998 cited in Weichselgartner and Pigeon 2015). *Knowledge* is dynamic, and for this study, it implies useful information and skill built through formal and informal education, social interaction and experience. According to Dekens (2007), knowledge can be classified into technical, historical and cultural knowledge. Technical expertise of disaster refers to the detailed understanding of disaster and vulnerability to disaster with a fundamental aim to reduce disaster risks among different stakeholders including children. Learning organizations like educational institutions where children are continually learning about various issues provide technical knowledge on disaster preparedness. For instance, duties and responsibilities before, during and after a natural disaster are such kinds of knowledge available in school curricula. Historical knowledge includes experiences and information from previous natural disaster or any other event and implication of prior knowledge in current context. This kind of knowledge allows the identification of localities with different level of exposure or vulnerability to disaster. Chronological explanation of past disaster and associated impacts on the society in textbooks is an example of historical knowledge. Cultural knowledge includes prevailing norms and practices in the family, as a whole in the society. A set of cultural factors may include socioeconomic and personal characteristics of families, the way of living (practices and norms), understanding of disaster and activities with families/societies (Wisner et al. 2008). Apart from what we discussed earlier, it is also important to highlight circumstances affect children in the community to acquire knowledge in their ways. To complement our analysis

based on the aforesaid framework of Deken's (2007), *the Access Model* provides additional avenues to analyze our social system in this study context (Wisner et al. 2003).

The Model defines *access* as “*always based on social and economic relations, including the social relations of production, gender, ethnicity, status, and age, meaning that rights and obligations are not distributed equally among all people*” (Wisner et al. 2003). Thus the model deals with series of inter-connected and iterative systems and processes defining access to resources that enables people to reduce their vulnerabilities. However, only two interconnected systems namely *social relations* and *structure of domination* were chosen to use in our analysis. The meaning of ‘*access*’ of children is more complicated. Children usually have access to fewer resources, which thereby makes them more vulnerable to disaster (Kofinas, Folke and Chapin 2009). According to the Access Model, *social relations* refer to how people, children in our case, acquire and exchange knowledge amongst each other. It is related to support and to network within and between households, social groups, and communities as a whole (Wisner et al. 2003). *The structure of domination*, on the other hand, is the pattern of relations within groups or households influenced by existing institutional arrangements. It can be mutual support within a community, support from government or local institutions and gender roles within families. Issues of *social relations* and *structure of domination* are very much interrelated and tough to differentiate. Thus, in our analysis, we include family size, family education, gender roles, income sources of families, social networking, access to technologies, roles of educational institutions and content of school textbooks.

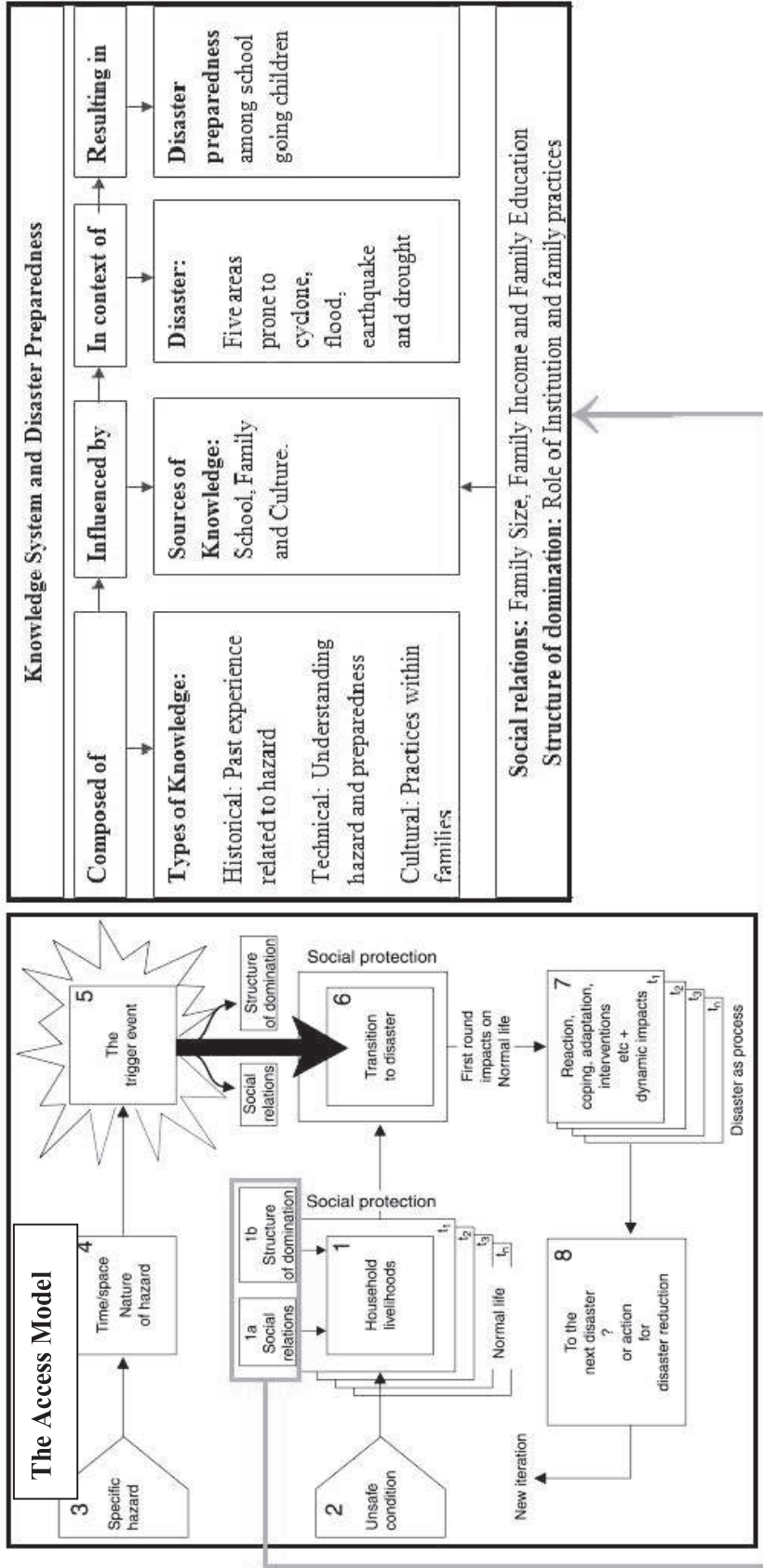


Figure 2: Theoretical framework of the study (adopted from Deken's Knowledge System and the Access Model)

3. Methodology

Research Context

The geographical context, land features, crisscrossed rivers and the monsoon climate render Bangladesh extremely vulnerable to natural hazards. However, the nature of occurrence, season and extent of loss and damage are not the same in all regions of Bangladesh. Depending on nature and extent of different hazards, Bangladesh can be divided into several regions, and these regions possess different disaster risks. Initially, purposive sampling technique was applied to select five areas located in five different hazard prone regions of Bangladesh. To do this, the Hazard Map of Bangladesh drafted in the Bangladesh National Disaster Management Plan 2010-2015 (Figure 3) was used. From this map, Daudkandi (Comilla District), Teknaf (Cox's Bazar District), Charghat (Rajshahi District) and Sreemangal (Moulavibazar District) were selected as these areas are prone to flood, cyclone, drought and earthquake respectively. Dhaka was chosen as it is the capital of Bangladesh and essential amenities are more available here than any other area. *Dhaka* is one of the most populous megacities of the world. It is estimated that Dhaka would be the fifth largest city in the world regarding population size by 2030². The Stanford-based earthquake disaster risk index declares Dhaka as one of the twenty most vulnerable cities in the world to earthquakes (The Guardian 2010). In addition to this, Dhaka is also at high risk of river flood and prolonged water logging. Historical data shows that since 1970, scale, intensity and severity of floods in Bangladesh have increased and created devastating impacts on infrastructure, agriculture and education (Dewan 2015). Regular river floods affect 20% of the country increasing up to 68% in extreme cases (GoB 2010). *Daudkandi* is such an area located in flood prone region. Due to its low-lying nature, the area has long been recognized for regular inundation (Nuruzzaman 2011). Daudkandi has severely affected by 1988, 1998, 2004 and 2008 floods. During the flood of 1998, the water level exceeded 50 cm above the danger level in this area and stayed approximately for 60 days. A more complex and different scenario prevails in the northwest of Bangladesh. Due to climate change and diversion of water in the upstream, this region has been increasingly facing consequences of drought (Mbugua 2011). *Charghat* is in the northwest of Bangladesh and is severely affected by drought.

² Rise of the Megacities, <http://www.theguardian.com/global-development/interactive/2012/oct/04/rise-of-megacities-interactive>

Sedimentation and drying up of rivers along with drowning ground water level have caused decreasing rainfall in the monsoon in this area.

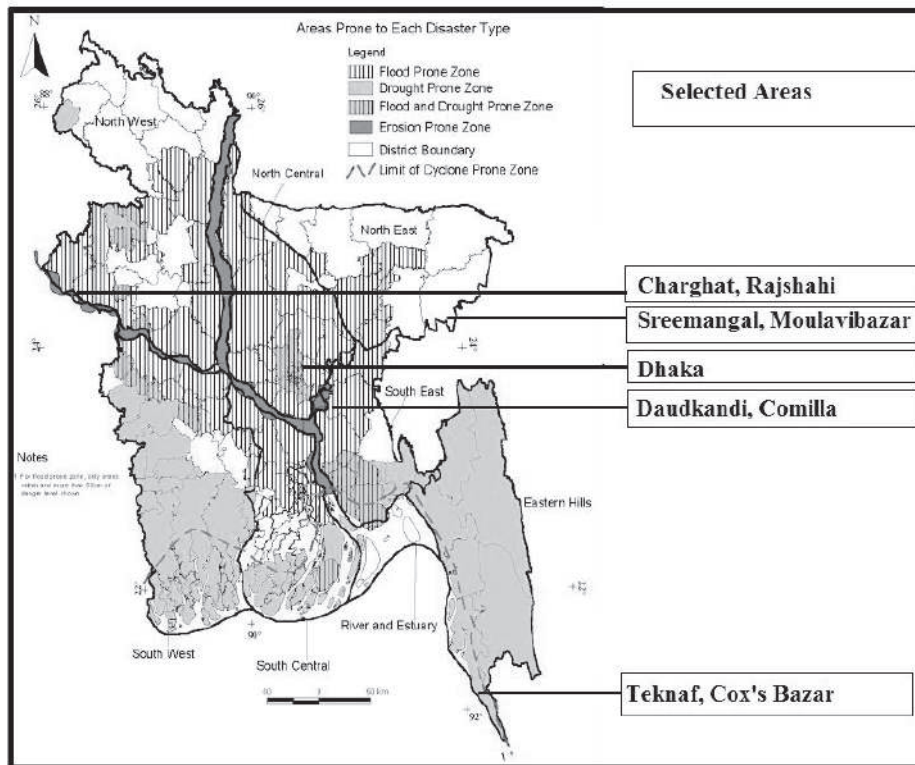


Figure 3: Hazard Map of Bangladesh (adopted from Bangladesh National Disaster Management Plan 2010-2015)

Another critical geographical feature of Bangladesh is the conical shape Bay of Bengal. Due to such feature, the phenomenon of re-curved tropical cyclones in the Bay of Bengal makes *Teknaf* a high-risk zone. The area is a narrow strip of land between the coastline and the hills on the east (BUET- BIDS 1993). This area faced one of the world's deadliest cyclones in 1991 killing around .15 million people. The settlement pattern is scattered in this region and forming alongside the roads, banks of rivers and foothills. Bangladesh has long been one of the seismically active regions of the world and thereby, earthquake hazard constitutes a persistent threat to human life (GoB 2010). Based on seismic zoning map of Bangladesh, greater Sylhet is situated in the highest seismic zone (Ansary and Sharfuddin 2000). *Sreemangal* is an area from greater Sylhet region and is at high risk of an earthquake.

Data Types and Sources

This study has an integrated approach that includes quantitative and qualitative techniques. Quantitative data was collected by conducting interviews with children in class eight and ten. Initially, from each purposively selected area one primary school and two higher secondary

schools (one boy's and one girls) have been chosen. In the case of absence of separate boy's and girl's school in any location, one coeducational school was selected. In Dhaka, Daudkandi, and Charghat separate boy's and girl's schools were found whereas, in Sreemangal and Teknaf, coeducational schools were found. In-class interviews were conducted in class five, eight and ten in each school by using semi-structured questionnaire (Table 2). Two major principles have provided the foundation for this study to select children for interviews. These are rights-based approach and perception of children. Children have a distinct set of rights to actively express their views and opinions according to the UN Convention on the Rights of the Child (CRC)³. Bangladesh has ratified this convention. From child rights perspective, a disaster not only affects child's fundamental right to live but also right to standard health and primary education (UNCRC). (The translated questionnaire is included in Annex 2).

A total 450 children, 250 from class eight and 200 from level ten, were interviewed and these interviews were used in both quantitative and qualitative analysis. Twenty-five interviews were conducted in class eight and twenty in class ten of each secondary school. Equal numbers of male and female children were interviewed with an aim to draw differences between them. From level five, a total 175 children were interviewed using semi-structured questionnaire. In this process, 35 children were selected from a selected primary school in each area. These interviews were not used in the quantitative analysis due to two reasons. Firstly, responses of children from class five were poor. Secondly, disaster related contents are included in primary level textbooks to a limited extent. However, their responses were used in qualitative analysis as many children were able to share their experiences and knowing. The study took an 'emic' approach to describe the opinion given by the children and key informants as well as took an 'etic' approach by applying theory to explain the findings.

Table 2: Selected schools and total number of interviews from each school

Area	Name of Schools	Class 8	Class 10	Total Children
Dhaka	Dhaka Ideal School Banasree	25	20	45
	Bashabo Kodomtoli Girls High School	25	20	45

³ Convention on Rights of the Child, retrieved from <http://www.unicef.org/crc/>

Daudkandi	Gouripur Govt. Boys High School	25	20	45
	Gouripur BM Girls High School	25	20	45
Charghat	Charghat Pilot High School	25	20	45
	Sardah Govt. High Schools	25	20	45
Sreemangal	BTRI High School (Co-ed)	50	40	90
Teknaf	Teknaf Pilot High School (Co-ed)	50	40	90
Grand total		250	200	450

Regarding qualitative data, multiple sources were used. For instance, six focus group discussion (FGDs) sessions were arranged in secondary schools from Teknaf, Sreemangal, Daudkandi, and Charghat. In Dhaka, it was hard to ensure minimum participants for focus group discussion as teachers had very compact class schedules. No one agreed to participate group discussion session after work hours. In addition to FGD, ten key informant interviews were conducted among teachers from both primary and secondary schools. In doing so, we have selected teachers who teach those subjects containing disaster related contents. All these interviews and focus group discussions were conducted in between March 2013 to September 2014.

Variables

The empirical analysis explored factors of disaster preparedness knowledge among children based on some selected characteristics. These selected characteristics include family size, parent's educational background, parent's professional background and gender. In particular, the investigation was conducted to find the relationship between independent variables and dependent variable. Quantitative data was coded into categorical variables to analyze data. Associated statistical graphs and figures were produced using Microsoft Excel. The dependent variable was chosen from the question which asks: *“What would you do to prepare for unforeseen challenges associated with disaster in your area?”* It was an open question, and correct answers were coded as “Yes” and wrong answers were coded as “No.” Thus, knowledge of disaster preparedness among school going children is the dependent variable (Yes or No) (A list of the correct answer is included in Annex 3). Family size, parent's profession, parent's education, sharing information between parents and children, year of schooling and gender were taken as independent variables. Following the belief that all these independent variables could enhance disaster preparedness knowledge among school going children, the relationship was measured at different levels.

The family remains the chief source of protection for children. Families with less than three or more than ten members were found very insignificant in number in this study. Hence, families were grouped into three levels: less than 4 or 4 members, 5- 6 members and 7 or more than seven members. Smaller families share more resources and thus get well prepared for disaster (Gladwin, Morrow and Peacock 2000). It is found that in bigger families, children are more likely to get involved in income generating activities especially in rural areas and thus become more vulnerable to disaster (Save the Children 2007). Moreover, fewer resources are distributed among each member of bigger families. Regarding family size in Bangladesh, parents may continue to give birth to achieve a favorable number of distribution of sons and daughters (Uddin et al. 2011). However, it mostly depends on parents' profession as well.

Households possess different human and personal resources such as education and skill. Going beyond school-based learning, children and family members can engage together in learning about and discussing disaster risk reduction. Children can learn to think and to develop new skills and more matured approaches to problem-solving if more experienced peers guide them, siblings and parents (Boyden and Mann 2005). This notion is the central aspect of the popular Vygotskyian theory. Children are almost entirely dependent on caregivers, mostly parents in the context of Bangladesh, for social and emotional nurturing and cognitive learning. Interaction with parents is the only channel for them to acquire knowledge and skill at their early ages (UNICEF 2011) and thus parents' education is crucial for disaster preparedness among children. Scholars recognize that less educated mothers are at greater risks of disasters and they face more difficulties about disaster preparedness (Donner & Rodriguez 2008). Parent's (fathers and mothers) educational qualifications, in this study, were grouped into levels of primary schooling, SSC/HSC, BA/B.Sc. and above BA/B/Sc.

The pattern of wealth and power in families is a major explanatory factor in the creation of disaster and distribution of impacts of disaster (Wisner et al. 2003). It is assumed that if people have better sources of livelihoods and higher incomes, they will invest more in disaster risk management (Boyden and Mann 2005). Such investment may include better learning opportunities for children to acquire knowledge and skill. In this study, father's professions were grouped into four levels: Job holder, businessman, farmer and migrant worker. And mother's occupations were grouped into three levels: Housewife, job owner and businesswoman. In short, knowledge on disaster preparedness is the dependent variable.

Independent variable includes family size, parent's profession, parent's education, sharing information and sources of knowledge.

Statistical Techniques

Quantitative analyses were undertaken using both bivariate and multivariate methods. Results of the bivariate analysis were presented by using cross-tabulation. Also, logistic regression analysis was carried out to assess factors associated with disaster preparedness knowledge. Such factors include family size, parent's education, parent's profession, information sharing and gender. The multivariate analysis was also supported by results from the bivariate analysis. For qualitative analysis, data was read and reread to frame categories and codes. Findings from interviews were then organized according to the categories and codes. Segregating data according to different categories helped to discuss relationships between disaster preparedness knowledge and its associated factors like family size, parent's profession, and parent's educational qualifications.

Ethical Issues

There are numbers of ethical and practical concerns those needed to consider in this study. Usually, there are four main areas of ethical consideration. First, to ensure no harm is done to participants; second, to make sure that members are fully informed about the objective of the study; third, to ensure participants' privacy is not breached and fourth, to make sure that deception is avoided (Bryman, 2008). In line with this, prior permission was taken from the respective school authority, and purposes of this study were clearly described to the authority and before each class. It was clearly stated that participation was voluntary in this study and, furthermore, said that respondent's anonymity would be maintained. Children were assured that there was neither right/wrong answer nor any marks allocation for the interview. Teachers were also requested not to present in the class during the interview so that children could respond to questions in the absence of any external assistance or hindrance.

4. Results of Analysis

Sample characteristics

Before the main analysis, it is important to explain sample characteristics of the study Population briefly. In the study sample, total 46.5% children were from families having 4 or less than four members, 43.6% children were from families with 5 to 6 members and 9.9% children were from families with 7 or more than seven members.

Table 3: Distribution of sample characteristics by family size

Family Size	Response (%)
Four or less than four Members	46.5
Five to six Members	43.6
Seven or More than seven Members	9.9
Total	100.0 (n=450)

Area wise sample distribution showed that majority of children's families in Dhaka (74.4%) have four or less than four members (Figure 4). In contrast to this, not a single family with more than seven members was found in this area.

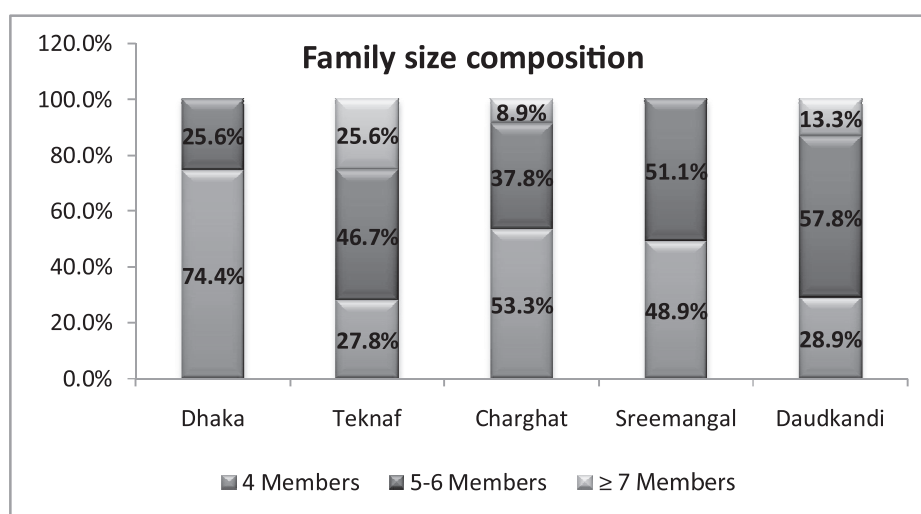


Figure 4: Distribution of sample by family size of children and area

Charghat and Sreemangal have around 50% families with four or less than four members. Families with seven or more than seven members were found in large number in Teknaf (25.6%) and Daudkandi (13.3%). Moreover, in Charghat, 8.9% families have seven or more than seven members.

Table 4: Distribution of sample by family size, area, and gender

Gender	Family Members	School locations (response in %)					Total (N=450)
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Male	≤ 4	75.6	33.3	62.2	51.1	33.3	51.1 (n=115)
	5-6	24.4	42.2	31.1	48.9	53.3	40.0 (n=90)
	≥ 7	.0	24.4	6.7	.0	13.3	8.9 (n=20)
	Total	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=225)
Female	≤ 4	73.3	22.2	44.4	46.7	24.4	42.2 (n=95)
	5-6	26.7	51.1	44.4	53.3	62.2	47.6 (n=107)
	≥ 7	.0	26.7	11.1	.0	13.3	10.2

							(n=23)
	Total	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=45)	100.0 (n=225)

Female and male children have some significant differences regarding their family size. Higher numbers of male children were from smaller families in comparison to female children in all areas (Table 4). It was significantly greater in Charghat, Teknaf, and Daudkandi. On the other hand, some female children from families with five to six members was higher than male children from similar households in all areas. But this was significantly greater in Daudkandi. In Dhaka and Sreemangal, families with seven or more than seven members were not found. Regarding parents education, fathers were found with significantly better educational accomplishments (B.A. or above) in Dhaka (91.1%) followed by Sreemangal (84.4%). Similarly, mothers from Dhaka (93.3%) and Sreemangal (65.6%) have better educational attainments (Table 5). 14.4% and 13.3% children's mothers from Charghat and Daudkandi have higher educational degrees (Above B.A). However, only 1.1% children's mothers have above BA/B.Sc. Degrees in Teknaf. Parents from both Dhaka and Sreemangal have minimum SSC or HSC level education. From Teknaf, Charghat, and Daudkandi 56.7%, 31.1% and 28.9% children's mothers have completed just primary school. In contrast, 37.8%, 18.9% and 16.7% children's fathers respectively from these areas have had their primary level of education.

Table 5: Distribution of sample by educational background of children's parents by area

Parents	Education	School locations (Responses in %)					Total (N=450)
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Father	Primary Schooling	.0	37.8	18.9	.0	16.7	14.7 (n=66)
	SSC/HSC	.0	27.8	13.3	3.3	18.9	12.7 (n=57)
	BA/B.Sc.	8.9	27.8	41.1	12.2	47.8	27.6 (n=124)
	Above BA/B.Sc.	91.1	6.7	26.7	84.4	16.7	45.1 (n=203)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Mother	Primary schooling	.0	56.7	31.1	.0	28.9	23.3 (n=105)
	SSC/HSC	.0	28.9	17.8	3.3	36.7	17.3

							(n=78)
	BA/B.Sc.	6.7	13.3	36.7	31.1	21.1	21.8 (n=98)
	Above BA/B.Sc.	93.3	1.1	14.4	65.6	13.3	37.6 (n=169)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

In addition to educational track record, diverse income sources of parents were also found. Jobs, in general, including government and private, remain the dominant profession of children's fathers (32.3%) (Table 6). Other professions of children's fathers include farming (21.9%), business (28.1%) and migrant worker (16.6%). In contrast, mothers were housewives mostly (81.4%) along with some jobholders (16.2%) and very few were businesswomen (2.4%).

Table 6: Distribution of sample by parent's profession

Father's Profession		Mother's Profession	
Category	Response	Category	Response
Job holder	32.3	Housewife	81.4
Farmer	21.9	Job holder	16.2
Businessman	28.1	Businessman	2.4
Migrant Worker	16.6	Total	100.0 (n=450)
Total	98.9(n=447*)		

*missing responses= 1.1%

From Dhaka, 52.2% children's fathers and 44.4% children's mothers were found doing government and private jobs (Table 7). In Dhaka, 47.8% children's mothers were housewives whereas most of the children's mothers were housewives in other areas. In Sreemangal 55.6% children's fathers were job holders while 47.7% and 32.2% children's fathers respectively from Teknaf and Dhaka were engaged in business.

Table 7: Distribution of sample by profession of children's parents by location

Parent s	Professio n	Areas (Responses in %)					Total
		Dhak a	Tekna f	Chargha t	Sreemanga l	Daudkand i	
Father	Job holder	52.2	13.6	30.0	55.6	11.2	32.7 (n=146)
	Farmer	1.1	33.0	42.2	4.4	30.3	22.1 (n=99)

Parents	Profession	Areas (Responses in %)					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
	Business	32.2	47.7	27.8	8.9	25.8	28.4 (n=127)
	Migrant worker	14.4	5.7	.0	31.1	32.6	16.8 (n=75)
Total		100.0 (n=90)	100.0 (n=88)	100.0 (n=90)	100.0 (n=90)	100.0 (n=89)	100.0 (n=447*)
Mother	Housewife	47.8	95.6	94.4	81.1	87.8	81.3 (n=366)
	Job	44.4	3.3	5.6	16.7	11.1	16.2 (n=73)
	Business	7.8	1.1	.0	2.2	1.1	2.4 (n=11)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

*missing responses

Also, 42.2%, 33%, and 30.3% children's fathers correspondingly from Charghat, Teknaf and Daudkandi were farmers. In Daudkandi and Charghat these farmers produce rice, vegetables, and seasonal fruits whereas in Teknaf there were involved in fishing and salt production.

Basic Knowledge of Disaster

This section presents the findings of types of disaster occurring, causes of disaster and impacts of the disaster on children as well as their families. The recently adopted Sendai Framework for Disaster Risk Reduction (hereinafter mentioned SFDRR) directly refers to knowledge in Paragraph 19: *“Disaster risk reduction requires a multi-hazard approach and inclusive risk-informed decision making based on the open exchange and dissemination of disaggregated data, including by sex, age, and disability, as well as on the readily available, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge”* (UNISDR 2015). Thus becoming an informed and resilient community is related to gaining the essential underpinnings of disaster and associated factors.

Children from Dhaka (77.8%) have the highest response in mentioning earthquake as a disaster as they have experienced three medium scale earthquakes⁴ in recent years (Table 8). It has been already mentioned that Dhaka is at moderate to high risk of earthquake hazard.

⁴ Recent Earthquake near Dhaka, Retrieved from <http://earthquaketrack.com/p/bangladesh/dhaka/recent> Accessed on 14th August 2014

Second most frequent responses about earthquake were found from Sreemangal (72.2%). Geographically Sreemangal is at highest risk of earthquake hazard. Among other most top responses, 80% children from Daudkandi talked about the flood, 82.2% children from Charghat talked about drought, 61.1% and 71.1% children from Teknaf talked about landslide children and cyclones respectively. All these responses are highly consistent with the hazard map presented in the earlier section. In this study, children brought up those scenarios they have experienced in their life and learned from formal and informal sources. In doing so, children have considered geographical and geo-commercial characteristics of their surrounding environment.

Table 8: Distribution of sample by children's basic knowledge of disaster by location

Knowledge of Disaster	Response	School locations					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Flood	Yes	31.1	28.9	31.1	37.8	80.0	41.8 (n=188)
	No	68.9	71.1	68.9	62.2	20.0	58.2 (n=262)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Drought	Yes	35.6	40.0	82.2	23.3	48.9	46.0 (n=207)
	No	64.4	60.0	17.8	76.7	51.1	54.0 (n=243)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Earthquake	Yes	77.8	50.0	33.3	72.2	41.1	54.9 (n=247)
	No	22.2	50.0	66.7	27.8	58.9	45.1 (n=203)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Landslide	Yes	16.7	61.1	37.8	32.2	18.9	33.3 (n=150)
	No	83.3	38.9	62.2	67.8	81.1	66.7 (n=300)
Total		100.0	100.0	100.0	100.0	100.0	100.0

Knowledge of Disaster	Response	School locations					Total
		Dhaka (n=90)	Teknaf (n=90)	Charghat (n=90)	Sreemanga I (n=90)	Daudkandi (n=90)	
							(n=450)
Cyclone	Yes	45.6	71.1	30.0	26.7	65.6	47.8 (n=215)
	No	54.4	28.9	70.0	73.3	34.4	52.2 (n=235)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

Measures of disaster preparedness

Numerous bodies of literature point out that poor level of preparation can exaggerate problems associated with the catastrophe. The best task is to prepare over half of the world's population below 18 years of age for disaster (Izadkhah & Hosseini 2005). After having a picture on a basic understanding of disaster in the preceding section, it is also important to define the measures and sources of disaster preparedness for children. From the different literature it has been found that effective disaster preparedness measures include family support for children, a collaboration of related agencies with schools, community engagement, sharing information between families and children and arranging practical exercises (Twig 2015). According to children from this study disaster preparedness measures were watching TV and listening to radio (89.3%), frequent family discussion (78.4%), active community engagement (62.4%), discussion with friends (63.1%), utilizing past experience (81.1%) and keeping up with higher level of mental strength (82.4%) at the time of or before disaster (Table 9).

Table 9: Distribution of sample by measures of disaster preparedness

Watching TV/ Listening to Radio	Frequent discussion with family members	Discussion with friends	Utilizing previous experience	Active community engagement	Having mental strength
88.9	78.1	63.1	81.1	62.4	82.4
11.1	21.5	36.9	18.9	37.6	17.6
100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)

Responses on disaster preparedness measures can be visualized as steps taken by individual, family and community. Such measures can significantly contribute to building up a culture of safety. Watching television and listening to the radio was found as one of the most frequently mentioned steps for disaster preparedness (Table 9 & 10). All (100%) children from

Sreemangal told that watching TV and listening to the radio can enhance disaster preparedness knowledge. In contrast, 76.7% children from Teknaf, lowest among all responses, mentioned about watching television and listening to radio. Discussion with friends and active community engagement were found a relatively less important measure to enhance knowledge among children especially in Dhaka, Teknaf, and Daudkandi. Around 80% children from Dhaka, Teknaf, Charghat and Daudkandi told about family to play a crucial role in enhancing disaster preparedness knowledge. 92.2% children from Charghat spoke about utilizing previous experience to overcome future challenges.

Table 10: Distribution of sample by measures of disaster preparedness by location

Preparedness measures	Response	School locations (Responses in %)					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Watching TV & listening to radio	Yes	91.1	76.7	85.6	100.0	93.3	89.3 (n=402)
	No	8.9	23.3	14.4	.0	6.7	10.7 (n=42)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Frequent discussion with family members	Yes	81.1	85.6	78.9	65.6	81.1	78.4 (n=353)
	No	18.9	14.4	21.1	34.4	18.9	21.6 (n=97)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Discussion with friends	Yes	55.6	55.6	67.8	75.6	61.1	63.1 (n=284)
	No	44.4	44.4	32.2	24.4	38.9	36.9 (n=166)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Utilizing previous experience	Yes	68.9	85.6	92.2	76.7	82.2	81.1 (n=365)
	No	31.1	14.4	7.8	23.3	17.8	18.9 (n=85)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Active community engagement	Yes	57.8	57.8	73.3	73.3	50.0	62.4 (n=281)
	No	42.2	42.2	26.7	26.7	50.0	37.6 (n=169)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Having mental strength	Yes	86.7	80.0	82.2	76.7	86.7	82.4 (n=371)
	No	13.3	20.0	17.8	23.3	13.3	17.6 (n=79)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

School from Sreemangal is located inside a government colony and school from Charghat is close to several state institutions. Children from these schools regularly participated in different programs including the celebration of important day and scouting. Hence it is not surprising to find 73.3% children mentioned about active community engagement as a disaster preparedness measure and this was considerable higher than responses from other areas. A considerably large proportion of children (around 80%) children from all areas except Sreemangal mentioned that mental strength is necessary to overcome risks and challenges of a disaster. It is also cited as one of the most important measures of disaster preparedness by 76.7% children of Sreemangal. The next section contains findings on sources from where children come to know about disaster preparedness measures.

Sources of Knowledge on Disaster Preparedness

Sources of knowledge on disaster preparedness among children are divided into two categories. First, the formal source of knowledge include textbooks provided by schools. And second, informal sources of knowledge include TV/radio, family, Internet, friends, and others. In this study, all children (100%) from Dhaka and Sreemangal have mentioned textbook as a source of knowledge for disaster preparedness (Table 11). It is perhaps because rules and regulations in the selected schools of Dhaka and Sreemangal were found more stringent. Moreover, competitiveness among students from Dhaka and Sreemangal were found relatively higher than other schools. It has been determined by students' performance in the public examinations as mentioned by school management committee members. More than 90% children from Teknaf and at least 80% children from Charghat and Daudkandi have mentioned textbook as a source of knowledge.

Table 11: Results of the bivariate analysis of sources of knowledge on disaster preparedness by location

Major Sources of Knowledge among Children (responses in %)							
Sources	Response	School locations					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Textbooks	Yes	100.0	92.2	83.3	100.0	85.6	92.2 (n=415)
	No	.0	7.8	16.7	.0	14.4	7.8 (n=35)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
TV/Radio	Yes	62.2	72.2	86.7	75.6	90.0	77.3 (n=348)
	No	37.8	27.8	13.3	24.4	10.0%	22.7 (n=102)

Major Sources of Knowledge among Children (responses in %)							
Sources	Response	School locations					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Outreach programs	Yes	53.3	18.9	22.2	.0	3.3	19.6 (n=88)
	No	46.7	81.1	77.8	100.0	96.7	80.4 (n=362)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Family	Yes	68.9	37.8	51.1	61.1	67.8	57.3 (n=258)
	No	31.1	62.2	48.9	38.9	32.2	42.7 (n=192)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
Internet	Yes	72.2	20.0	22.2	50.0	56.7	44.2 (n=199)
	No	27.8	80.0	77.8	50.0	43.3	55.8 (n=251)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
GO	Yes	57.8	22.2	12.2	12.2	33.3	27.6 (n=124)
	No	42.2	78.8	87.8	87.8	66.7	72.4 (n=326)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)
NGO	Yes	36.7	15.6	14.4	8.9	37.8	22.7 (n=102)
	No	63.3	84.4	85.6	91.1	62.2	77.3 (n=348)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

Informal sources of knowledge on disaster preparedness among children include TV/radio (77.3%), outreach programs (19.6%), family (57.3%), Non-governmental organization (22.7%), Governmental organizations (27.6%) and access to the internet (44.2%) (Table A in Annex 1). Children mentioned the name of several non-governmental organizations including BRAC, Grameen, Bureau Bangladesh, Proshika, Heed Bangladesh, World Vision and Caritas. Governmental organizations include Office of Fire Service and Civil Defense, Department of Agriculture and District Commissioner's Office. All these informal sources are part of active organizations to expand individual's capacity to learn to deal with a disaster (Senge 1990) continually. Children in Dhaka (68.9%), Daudkandi (67.8%) and Sreemangal (61.1%) have widely mentioned family as their sources of knowledge.

Factors affecting knowledge on disaster preparedness

In this section, a variety of factors affecting disaster preparedness knowledge among children is presented using bivariate analysis. Table 12 contains a list of different factors that influence or affecting disaster preparedness among school going children. The family is the core source of support for children. Family members, especially adults, are mediators between the negative/positive aspects of the community and the well-being of children (Barrett, Ausbrooks & Martinez-Cosio 2011).

Table 12: List of factors affecting disaster preparedness knowledge among children

Dimensions	Factors
Individual	Family, Parents education and profession
Social	Inequality, gender diversity and cultural practices
Economic	Unemployment and environmental burdens
Institutional	Access to IT, Lack of participation, role of institution

Table 13 summarizes how sources of knowledge vary with family size in the study. The textbook was a primary source of knowledge for children from all families (around 90%). In general, a higher proportion of children (83.2%) from medium size families watch TV and listen to the radio, and 73.8% children from small families do so. Outreach programs were mentioned by very few children from the medium (15.7%) and large families (7%). However, about 25% children from small families have said about outreach programs.

Table 13: Results of the analysis of sources of knowledge on disaster preparedness by family size

Major sources of knowledge	Response	Family size (total members)			Total
		≤4 (small)	5 to 6 (medium)	≥7 (large)	
Textbooks	Yes	94.8	89.8	90.7	92.2 (n=415)
	No	5.2	10.2	9.3	7.8 (n=35)
Total		100.0 (n=210)	100.0 (n=197)	100.0 (n=43)	100.0 (n=450)
TV/radio	Yes	73.8	83.2	67.4	77.3 (n=348)
	No	26.2	16.8	32.6	22.7 (n=102)
Total		100.0 (n=210)	100.0 (n=197)	100.0 (n=43)	100.0 (n=450)
Outreach programs	Yes	25.7	15.7	7.0	19.6 (n=88)
	No	74.3	84.3	93.0	80.4 (n=362)
Total		100.0 (n=210)	100.0 (n=197)	100.0 (n=43)	100.0 (n=450)
Family	Yes	63.3	53.8	44.2	57.3 (n=258)
	No	36.7	46.2	55.8	42.7 (n=192)
Total		100.0 (n=210)	100.0 (n=197)	100.0 (n=43)	100.0 (n=450)
Internet	Yes	48.1	44.2	25.6	44.2 (n=199)

Major sources of knowledge	Response	Family size (total members)			Total
		≤4 (small)	5 to 6 (medium)	≥7 (large)	
	No	51.9	55.8	74.4	55.8 (n=251)
Total		100.0 (n=210)	100.0 (n=197)	100.0 (n=43)	100.0 (n=450)

A higher proportion of children from smaller families (48.1%) and medium families (44.2%) got knowledge on disaster preparedness using the internet. It is evident from the discussion so far that children from smaller and medium families have a higher rate of response in related to sources of knowledge. It is because resources in these families are usually distributed evenly. These variations are described in the discussion section.

Table 14: Results of the analysis of sources of knowledge by gender

Sources of knowledge	Response	Gender		Total
		Male	Female	
Textbooks	Yes	90.7%	93.8%	92.2 (n=415)
	No	9.3%	6.2%	7.8 (n=35)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)
TV/radio	Yes	76.4%	78.2%	77.3 (n=348)
	No	23.6%	21.8%	22.7 (n=102)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)
Outreach programs	Yes	22.7%	16.4%	19.6 (n=88)
	No	77.3%	83.6%	80.4 (n=362)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)
Family	Yes	57.8%	56.9%	57.3 (n=258)
	No	42.2%	43.1%	42.7 (n=192)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)
Internet	Yes	56.0%	32.4%	44.2 (n=199)
	No	44.0%	67.6%	55.8 (n=251)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)

Table 14 shows differences in responses regarding sources of knowledge among male and female children. A significant difference exists between male and female relating to the use of the internet. 56% male children used the internet as a source of disaster preparedness knowledge whereas only 32.4% female children used so. In regards to participating in different cultural programs, male children stated more programs attended than female children. A little higher proportion of female children (93.8%) than male children (90.7%) mentioned textbook as a source of knowledge. Individuals (key informants) during an interview stated that books were always fully completed in the class and for children it is

essential to read textbooks. Similarly, TV/radio is a standard tool used for recreational purposes. Thus no difference was found among male and female regarding TV/radio. In line with this, no significant difference was found between male (51.6%) and female (54.2%) children regarding their level of disaster preparedness knowledge (Table B in Annex 1). In Dhaka female participation in scouting was well accepted in children’s families. However, an entirely different scenario came out from other four areas. But female children (26.7%) from Charghat had a higher response regarding outreach programs than male children (17.8%). In Charghat, the presence of government institutions guided children from schools to participate in different programs. Such state agencies include Sardah Police Academy and Water Development Board local office. Regarding internet use, female children were found lagging behind in this study. In total, 56% male children told about using the internet whereas only 32.4% female children said so (Table 14). It is because families usually impose restrictions on female children in regards to mobile phone use.

Table 15, and Table C in Annex 1 summarize sources of knowledge among children according to their parents’ professional groups. 25.3% and 23.6% children whose fathers are job holders and doing business mentioned about outreach programs. Very few children whose fathers are either farmer (14.1%) or migrant workers (9.3%) said outreach programs as a source of knowledge. A considerably higher number of children (72.6%) with their fathers doing jobs said that family is a source of knowledge. In contrast, 61.1% children whose mothers are job holders said so. Children (32.9%) from families where mothers were job holders and children (36.4%) whose mothers were businesswomen have a higher rate of participation in outreach programs.

Table 15: Results of the analysis of sources of knowledge by father's profession

Sources		Fathers Profession				Total
		Job	Farmer	Business	Migrant	
Textbooks	Yes	95.2	88.9	87.4	98.7	92.2 (n=412)
	No	4.8	11.1	12.6	1.3	7.8 (n=35)
Total		100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)
TV/radio	Yes	71.2	75.8	83.5	81.3	77.4 (n=346)
	No	28.8	24.2	16.5	18.7	22.6 (n=101)
Total		100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)
Outreach	Yes	25.3	14.1	23.6	9.3	19.7 (n=88)

program	No	74.7	85.9	76.4	90.7	80.3 (n=359)
Total		100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)
Family	Yes	72.6	51.5	45.7	54.7	57.3 (n=256)
	No	27.4	48.5	54.3	45.3	42.7 (n=191)
Total		100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)
Internet	Yes	49.3	21.2	38.6	76.0	44.5 (n=199)
	No	50.7	78.8	61.4	24.0	55.5 (n=248)
Total		100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)

Internet was found very prevalent among children from Dhaka (72.2%), Daudkandi (56.7%) and Sreemangal (50%) as presented earlier in Table 11. Particularly in Daudkandi and Sreemangal, use of the Internet by children is related to their father's profession. 32.6% children from Daudkandi and 31.1% children from Sreemangal who mentioned the internet as a source of knowledge and their fathers were a migrant worker. 76% children from families with fathers working abroad told about the internet as a source of knowledge whereas 49.3%, 21.2%, and 38.6% children whose fathers are respectively jobholders, farmers and businessmen said so. (Table 16). The selected school from Sreemangal had its own Facebook page and students regularly check different posts, mentioned by the students.

From the analysis, it has been found that children (63.3%) from Dhaka have highest level of disaster preparedness knowledge followed by Sreemangal (57.8%) and Daudkandi (52.2%) (Table 16). Children from Charghat (47.8%) have the lowest level of disaster preparedness knowledge followed by Teknaf (43.3%). It was done by scrutinizing children's response about disaster preparedness and identifying the correct answers. A list of correct answers is given in Annex 3. There are several reasons identified behind this. According to the key informant interviews, schools in Teknaf and Charghat didn't have required some teachers to teach relevant courses. Moreover, teachers were not trained enough in line with the updated course curriculum. Also, the school had severe infrastructural problems. Given the profession of children's parents, it can be said that relatively poorer children were found studying in the schools in Teknaf and Charghat. In Charghat 42.2% and Teknaf, 33% children's fathers were farmers whereas just 1.1% and 4.4% children's fathers are farmers in Dhaka and Sreemangal (Table 7). However, Daudkandi remained an exception in this regard.

Table 16: Results of the analysis of children’s knowledge of disaster preparedness by location

Variable	Response	School locations					Total
		Dhaka	Teknaf	Charghat	Sreemangal	Daudkandi	
Disaster preparedness knowledge	Yes	63.3	43.3	47.8	57.8	52.2	52.9 (n=238)
	No	36.7	56.7	52.2	42.2	47.8	47.19 (n=232)
Total		100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=90)	100.0 (n=450)

In addition to this, more children from class eight (56%) were able to explain disaster preparedness knowledge than children (49%) from class ten (Table D in Annex 1). It is because children from class eight study general textbooks that cover more issues of disaster. In contrast, students in class ten study selected books depending on they are in Science or Arts or Commerce group. Textbooks for Science group students contain more topics on disaster related issues than those for Arts and Commerce group. Children (84.4%) from migrant worker families told rightly about disaster preparedness and also children (80.8%) whose mothers were jobholders clearly explained disaster preparedness (Table 17). Migrant worker families have access to the internet through devices like smartphones and computers to maintain regular communications with their families abroad. Also, 52.7% children whose fathers were jobholders have explicit knowledge on disaster preparedness. Children whose mothers were housewives also have a lower level of disaster preparedness knowledge.

Table 17: Results of the analysis of knowledge of disaster preparedness by parent’s profession

Knowledge	Father’s profession				Total	Mother’s Profession			Total
	Job	Farmer	Business	Migrant Worker		Housewife	Job	Business	
Yes	52.7	43.4	41.7	84.0	52.8 (n=236)	47.5	80.8	45.5	52.9 (n=238)
No	47.3	56.6	58.3	16.0	47.2 (n=211)	52.5	19.2	54.5	47.1 (n=212)
Total	100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)	100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)

Findings from Multivariate Analysis

In the preceding section, results of bivariate analyses between different socio-economic factors of children's families and their level of disaster preparedness knowledge are presented. In this section, the discussion will focus on the results of multivariate analyses between these factors. Table 18 shows the summary of multivariate analyses showing the relationship between disaster preparedness knowledge and a set of factors including family size, parent's educational background, parent's profession, the source of information, sharing information, basic knowledge of the disaster, class attended and gender. Variables were entered in a step by step process in a group. At first, the variables gender, class attending, location of Schools, sharing information between children and parents, parent's education, parent's profession, family size, basic knowledge of disaster and sources of knowledge were entered. Doing so, several of these variables like father's education, mother's education, information sharing and family size were found not significant.

Table 18: Coefficient of the logistic regression models of factors associated with knowledge of disaster preparedness among school going children

Category	Variables	B	Exp(B)
Gender	Gender	-.236	.789
Location of School	Dhaka ®		
	Teknaf	-.115	.891
	Charghat	.230	1.259
	Sreemangal	-.215	.806
	Daudkandi	-.407	.665
Information sharing	Sharing with parents ®	.276	1.317
	Sharing with children	.068	1.071
Family Size	4 or less than four members ®		
	5-6 members	.043	1.044
	7 or more than seven members	.095	1.100
Father profession	Job Holder ®		
	Farmer	-.053	.948
	Business	-.325	.723
	Migrant Worker	1.971***	7.181
Mother's Profession	Housewife ®		

	Job Holder	1.626***	5.083
	Business	-.343	.710
Area wise disaster	Flood ®		
	Drought	-.455**	.635
Sources of knowledge	Textbook ®		
	Internet	-.064	.938
	Constant	.517	1.676
***P<.001, **P<.01, *P<.05			

Some models were run by adding and deleting all these variables. However, significant relationship with disaster preparedness knowledge was not found. Thus in the final model, gender, location of schools, sharing information between children and parents, father's education, mother's education, family size, father's profession, father's occupation, area wise disaster and sources of knowledge were retained. In the final model, after controlling for all other variables, data shows that disaster preparedness knowledge of the children is significantly high if their fathers were migrant workers. As mentioned earlier, children from migrant worker families have had access to the internet through devices like smartphones and computers. They use the internet to communicate with their families abroad. The β coefficient for the father as the migrant worker was 1.971 with RR 7.18 indicates that disaster preparedness knowledge of this group of children whose fathers were migrant workers has seven times higher than other children whose fathers were not migrant workers. In a similar trend, data shows that disaster preparedness knowledge of the children is significantly high if their mothers were job holder. Sharing information among children and their mothers get stronger especially when children's mothers are job holders. About 80% children whose mothers are jobholders shared information with their mothers and mothers did the same (Table E Annex 1). Sharing information between children and mothers who are housewives or businesswomen is done relatively less frequently. The β coefficient for job holder mothers was 1.626 with RR 5.08 indicates that disaster preparedness knowledge of this group of children having job holder mothers has five times higher than other children having mothers who were housewives and businesswomen. The only other variable that has significant but an inverse relationship with disaster preparedness knowledge of the children is the core knowledge of disaster among children. The β coefficient was -0.455 with RR 0.635 indicates that children who have basic knowledge on drought have a lower level (64 %) of disaster

preparedness knowledge. It is because the impacts of drought are mostly intangible and can only be understood clearly after a considerable period. As things are changing very slowly in drought prone areas, children and others get slowly adapted to it. Another reason behind such relationship is drought has not been discussed intensively in textbooks.

Finally, data shows an expected relationship between disaster preparedness knowledge of the children and parent's profession as well as basic knowledge of children on disaster. While the first two variables have a positive correlation, the following variable has a negative correlation. Disaster preparedness knowledge among children is associated with their parent's profession. It has been found that children whose fathers are job holder and migrant worker have strong knowledge on disaster preparedness than the children whose fathers were engaged in different professional activities (i.e. businessman and farmer). The analysis suggests that the relationship is highly significant. It has already been found that children whose fathers were job holders tend to share information regularly with their children (Table E in Annex 1). On the other hand, children whose mothers are housewives and job holder have a deeper understanding on disaster preparedness in comparison to those whose mothers were involved in another profession i.e. business in this case. It has also been found that the knowledge of disaster preparedness among school going children is strongly correlated with mothers' professional background. The regression analysis has found an insignificant relationship between children knowledge on disaster preparedness and mothers who were businesswomen. Only 2.4% children's mothers were businesswomen, and that's why no significant association was found. Moreover, it has been observed that the variation of disaster preparedness knowledge is not sex-differentiated. No significant association was discovered in the context of gender and also in the context of class attended. As it was assumed that knowledge mostly comes from textbooks and it largely depends on how the topics of disaster are included in the books. Children in schools overwhelmingly rely on books and thus, gender difference did not influence the relationship between gender of children and knowledge on disaster preparedness.

Discussion

From the bivariate analysis, it has been found that children responses about disaster are related to geographical characteristics of their areas. Children were able to present that local conditions connected to the vulnerability of disaster. As children from Charghat have deemed

a faulty irrigation structure responsible for worsening drought situation in that area. The structure named ‘*Charghat Regulator*’ was built in 1985 by Bangladesh Water Development Board on the Baral River with an aim to control flood and ensure irrigation for agriculture (Zaman et al. 2013). This regulator is located 400 meters north from the Charghat sub-district headquarter and 1 km south from Sardah Police Academy (ibid). It is how children were able to blend their local knowledge connected to human induced environmental changes in their areas. Further triangulation by interviewing the key informants revealed that local people considered this regulator a curse for them. Consequently, the incidence of drought has been on rising, and many people have migrated to neighboring Rajshahi city for better livelihood. Recurrent drought in Rajshahi region has reduced *Boro* yield dramatically, reported by a national daily⁵. Each year Charghat is affected by severe drought, and due to this, the ratio of cultivable land to population has decreased by 23.2% in Rajshahi region compare to a reduction rate of 17.2% in the whole country (Akhter 2010). Similarly, children in this study were asked an open-ended question: *how do you define a disaster?* Few children from Teknaf linked the answer to the issue of migration of Rohingya⁶ in Teknaf and nearby areas as a human induced cause of the disaster. These migrants have destroyed hill-slope forests, illegally occupied lands and destroyed hills in that area. All these have aggravated the sufferings resulting from natural disaster, stated by children. Similar findings were also demonstrated by Center for Hazard and Risk Research at Columbia University USA, and therein, Teknaf has been identified a landslide risk hotspot⁷. This disaster experience can increase disaster awareness and consequently preparedness actions (Muttarak & Pothirisi 2013). Children were well aware of multifaceted impacts of the disaster. Most frequently mentioned consequences were psychological (52.7%) and financial (50.9%) as presented in Table F in Annex 1. Usually, they couldn’t decide what would be their instant duties before, during and after a disaster. This situation was found worse among female children and also children from class five. They, however, consider this situation very usual for them.

⁵ Barind region at groundwater drought risk, Retrieved from <http://archive.thedailystar.net/newDesign/news-details.php?nid=228019> Accessed on 12th December 2014

⁶ The Rohingya people are an ethnic group who practice Islam and speak Rohingya mostly related to Chittagonian or more distantly to Bengali. Their origin is disputed; according to many Rohingya belong to the Rakhaine state of Myanmar and some believe they originated in Bengal (current Bangladesh) during the British Rule.

⁷ Country natural disaster profile, retrieved from <http://www.ldeo.columbia.edu/chrr/research/profiles/bangladesh.html>

Regarding impacts of disaster on children, male and female children have different patterns of responses, found in this study. According to female children, most of the time they have to take care of their younger family members and have to sacrifice certain things like lifestyle related costs e.g. not buying ornaments or clothes and reducing educational costs like buying fewer materials related to study. Consequently, they find it difficult to perform well in school as mentioned by them. The socio-cultural situation in Bangladesh contains severe gender discrimination and girls often receive less investment in their healthcare and education (UNICEF 2011). Such inequalities are not rooted in the biological difference between male and female but to social constructions of gender roles and relations (Bradshaw & Fordham 2013).

Children's knowledge of disaster related issues is always influenced by different factors and individual's way of constructing concepts. It is in the light of the fact that children are exposed to multiple sources of information in various social and cultural context (Lee 1999). Formal education could increase children's chance of knowledge accumulation and encourage the proper use of other human and social capitals (Dulal et al. 2010). Textbook as part of formal education is found a common source of knowledge on disaster related issues in this study (Table 11 at Page 30). The textbook is believed to provide a common and professional sense of responsibilities among children, and it's certainly an affordable tool (Shiwaku & Shaw 2008). In Bangladesh, textbook oriented education is standard and is always followed (Akanda, Hoq and Hasan 2013). That's why children were able to mention textbooks as sources of basic knowledge on disaster. However, the effectiveness of textbooks to provide knowledge on disaster preparedness among children is not strongly evident in this study. Disaster related contents in the textbooks are much generalized and not applicable for all locations. Moreover, the emphasis is given more to cause and effect of the disaster, not on practical preparedness measures.

Among informal sources, family and the internet are found very useful for children (Table 19). Family as an organization is a major source of knowledge among children. Much of the supports for children during emergencies come from their families (Asian Disaster Preparedness Center 2007). It is agreed upon that parent who is involved in different professions and networks are socially more adept (Barrett, Ausbrooks & Martinez-Cosio 2011). Their children have a better understanding of their surroundings (ibid). According to Sapir (1993), children's vulnerability to natural disaster increases if related information is not shared by parents. The Recent global trend shows, mothers who are involved in business and

other jobs get a little time to pass with their children (ibid). Family size was found an important dimension. Children from smaller families have a higher propensity to participate extracurricular activities as well as better family interactions. Different empirical pieces of evidence are available regarding the relationship between family size and children's knowledge of disaster. Some studies claim there is a positive correlation between family size and knowledge on disaster among children whereas some studies claim the opposite (Maralani 2008). In developing countries, big families usually face resource constraints, and this limits their ability to gain knowledge (ibid). In this study, two issues are identified from FGDs and key informant interviews regarding family size and children's knowledge of disaster. First, usually limited resources are shared among members of large families. Second, larger families usually have more elderly members, and they sometimes impose restrictions on children's choices. Such restrictions include restrictions on female children mobility, participating extracurricular activities and use of mobile phones. It is imperative to take part in extracurricular activities and outreach programs for children to be a more resilient community (Paton & Johnston 2011). Children participation or involvement in extracurricular activities or outreach programs was found unsatisfactory except in Dhaka (Table 11). Extracurricular activities and outreach programs in schools of Dhaka were arranged jointly by the school authority having logistic supports from other institutions or independently by the schools, mentioned by school officials. Dhaka as a metropolis enjoys higher access to different institutions to arrange programs. However, such support outside Dhaka was hard to find, informed by the teachers from other areas. It was admitted by the respondents from Daudkandi, Charghat, Sreemangal and Teknaf that they could not organize any extracurricular activities for children. In literature, it is widely acknowledged that "*rural-urban divide*" in the education sector of Bangladesh is predominant regarding the quality of teaching, access to resources, extracurricular activities and outreach programs (Mujeri 2010). Outreach programs are efficient and sustainable learning apparatus and are believed to develop the positive social relation between groups (Henderson & Map 2002). That, also, provides children with a rational mind to avert disaster risks efficiently (Darling, Caldwell & Smith 2005).

The quality of teaching has a profound impact on active learning by children (Shiwaku & Shaw 2008). Teacher crisis in Charghat, Sreemangal and Daudkandi was found very critical and few numbers of teachers were burdened with multiple tasks. The most common practice was Mathematics teachers were regularly teaching Social Science, General Studies, and

Religion. Thus it is very unlikely to give due importance to these subjects. But Social Science and General Studies contain the broad concept of disaster management issues. Eventually, children get reluctant to study these topics. Moreover, centrally adopted textbooks in Bangladesh failed to address critical of local knowledge for disaster risk reduction (Selby & Kagawa 2012). Famous author Ulrich Beck in his remarkable books “*Risk Society: Toward a New Modernity*” and “*Ecological Politics in the Age of Risk*” wrote that central elite authority sometimes do not address the root causes of environmental problems by taking a top-down approach (Wisner et al. 2003).

Access to information technology in today’s world is another essential tool for children to learn effectively. Children from Dhaka, Daudkandi, and Sreemangal have mentioned the internet as an important source of knowledge on disaster (Table 11). The higher rate in internet use is catalyzed by the widespread expansion of mobile phone network, at the same time by the rapid growth of mobile internet users. According to an estimate by Bangladesh Telecommunication Regulatory Commission (2015) there are 44 million mobile internet users in Bangladesh out of total 46 million internet users and still growing. Moreover, use of cell phones for entertainment purposes including the use of social media ranks first among all value added services provided by operators in Bangladesh (GSMA Intelligence 2014). At the same time, local operators offer cheaper handsets along with free internet packages with a particular focus on social networking sites. Furthermore, under the flagship initiative of Digital Bangladesh 2021, the government has been continuously promoting ICT for the digital empowerment of human resources. However, female children have much lower rate of internet use than male children. Restrictions on females’ mobility arising from social insecurity especially about mobile phone use were an important reason, stated by female children. At puberty, girls’ movement is often restricted in Bangladesh and thus limiting their choices regarding livelihood, lifestyle, recreation and other social activities (UNICEF 2013).

Multivariate analysis shows that father’s profession and mother’s occupation of children have a significant relationship with knowledge on disaster preparedness. It suggests children from migrant worker families have better knowledge on disaster preparedness. It is due to that fact that these families maintain communication with their members abroad by using smartphones and computers. This has provided them with access to internet facilities. The analysis shows that 76% children from migrant worker families mentioned the internet as a source of knowledge (Table 16). From various empirical studies, it has been confirmed that endowments increase remarkably due to the contributions of remittances sent by migrant

workers in rural families (IOM 2006). Subsequently, these families invest more money in education, better and safe infrastructure, health and community involvement (ibid). Moreover, any disaster event increases cash flows in migrant worker families in Bangladesh for quicker recovery from shocks (The World Bank 2009). This conclusion was drawn from a study conducted after the flood in 2008. Another significant relationship from the multivariate analysis indicates that children whose mothers were jobholders have better knowledge on disaster preparedness in comparison to children whose mothers were housewives. State of the World's Mothers 2014 Report says that woman employment in family improves health, nutrition and educational condition of children (Save the Children 2014). The other significant but inverse relationship indicates that children with basic knowledge on drought have a lower level of disaster preparedness knowledge. Because the condition of drought is difficult to define and such condition develops slowly over many years. The impacts of drought are intangible making it difficult for people especially children to prepare for such disaster (Wilhite, Svoboda & Hayes 2007). Similarly, children from this study rarely mentioned about impacts of drought in their area.

Based on the analysis and subsequent findings the study wants to make some recommendations. It is essential to consider children's participation and perception while making a decision related to disaster management. It can be about designing curriculum for children as well as involvement in disaster management committees. Children are believed to be resourceful while their thoughts are taken to manage impacts of disaster (Bartlett 2008). At the beginning of this report, it has been mentioned that Bangladesh has made a paradigm shift from conventional disaster management to effective disaster risk reduction strategies. However, such change is not reflected in the school curriculum. According to UNICEF and UNESCO (2014), effective disaster risk reduction for children has five dimensions, in which disaster preparedness is an essential component. Countries must work in line with these dimensions for vulnerable groups including children. The second aspect, learning and practicing safety measures and procedures, is not addressed adequately in our school textbooks. Thus this study recommends including topics on tools and techniques for disaster risk reduction in textbooks. Moreover, disaster poses risks differently to male and female children. In our book, information is not presented in a gender sensitive way.

This study is not without limitations. Some limitations of this study include quality of schools were not equal in five locations, no urban-rural classification of schools was made, and schools from more remote areas were not selected. However, this study has opened up

avenues for future research which is not possible to explore in the existing study framework. Fascinating areas to explore are gender perspective of disaster management among children, challenges of interactive learning at schools in remote locations, psychological issues of children about the disaster, children's participation in disaster management process and effectiveness of local disaster management. Further studies on these areas in different socio-environmental context will cast more light on factors influencing the level of disaster preparedness among children.

Conclusion

The study was conducted in five areas of Bangladesh which are prone to different hazards. In the beginning, socio-economic condition of children, sources of knowledge among children and measures for disaster preparedness taken by children are presented. From initial findings, sources of knowledge among children can be classified into both formal and informal sources. Official sources include textbooks whereas informal sources include family, access to the internet, extracurricular activities, participation in outreach programs and government-nongovernment organizations. Textbooks were found a common source of knowledge about disaster among children. About this, it is suggested to revise disaster related contents in textbooks as well as to make learning more interactive to harness targeted benefits. Among informal sources, the internet was found an attractive source of knowledge on disaster though there is a debate on providing children with unlimited access to the internet. Non-monetary social relations (family discussion, information sharing, and outreach programs) have developed insightful thought in children's mind. However, female children lag behind to utilize informal sources in comparison to male children. Female children face family restrictions while accessing the internet and participating outreach programs or extracurricular activities.

Further analysis indicates that parent's professions have significant and positive relationship with the kids' knowledge on disaster preparedness. And the internet plays a crucial role in this relationship. Most of the children from migrant worker families have better access to the internet and thus a higher level of knowledge on disaster preparedness. In addition to this, children whose mothers were jobholders also have better knowledge on disaster preparedness. Another finding suggests that children with the experience of drought have a lower level of knowledge on disaster preparedness. The level of knowledge on disaster preparedness is not found sex-differentiated and also does not vary with class attended by the

children. From all these discussions, findings can be summarized in the following manner: informal sources of learning are equally important for children to prepare for disaster and children are still excluded from disaster risk reduction framework. Thus, this study has opened up avenues for further research which were not possible to explore according to the study context. Further research will cast more light on factors affecting the level of knowledge on disaster preparedness among children.

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Annex 1: Related Tables

Table A: Distribution of sample by sources of knowledge on disaster preparedness

Response	TV/Radio	Outreach programs	Family	GO	NGO	Internet
Yes	77.3 (n=348)	19.6 (n=88)	57.3 (n=258)	22.7 (n=102)	27.6 (n=124)	44.2 (n=199)
No	22.7 (n=102)	80.4 (n=362)	42.7 (n=192)	77.3 (n=348)	72.4 (n=326)	55.8 (n=251)
Total	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)	100.0 (n=450)

Table B: Distribution of sample by knowledge on disaster preparedness and gender

Variable	Response	Gender		Total
		Male	Female	
Disaster preparedness knowledge	Yes	51.6 (n=116)	54.2 (n=122)	100.0 (n=238)
	No	48.4 (n=109)	45.8 (n=103)	100.0 (n=212)
Total		100.0 (n=225)	100.0 (n=225)	100.0 (n=450)

Table C: Distribution of sample by sources of knowledge and parent's profession

Sources of Knowledge		Profession of Mothers			Total
		Housewife	Job holder	Businessman	
Textbooks	Yes	90.7 (n=332)	98.6 (n=72)	100.0 (n=11)	92.2 (n=415)
	No	9.3 (n=34)	1.4 (n=1)	.0 (n=0)	7.8 (n=35)
Total		100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)
TV/Radio	Yes	79.0 (n=289)	74.0 (n=54)	45.5 (n=5)	77.3 (n=348)
	No	21.0 (n=77)	26.0 (n=19)	54.5 (n=6)	22.7 (n=102)
Total		100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)
Outreach programs	Yes	16.4 (n=60)	32.9 (n=24)	36.4 (n=4)	19.6 (n=88)
	No	13.3%	5.3%	.9%	19.6%
Total		83.6 (n=306)	67.1 (n=49)	63.6 (n=7)	80.4 (n=362)
Total		100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)
Family	yes	57.7 (n=211)	61.6 (n=45)	18.2 (n=2)	57.3 (n=258)
	No	42.3 (n=155)	38.4 (n=28)	81.8 (n=9)	42.7 (n=192)
Total		100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)
Internet	yes	40.7 (n=149)	57.5 (n=42)	72.7 (n=8)	44.2 (n=199)
	no	59.3 (n=217)	42.5 (n=31)	27.3 (n=3)	55.8 (n=251)
Total		100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)

Table D: Distribution of sample by disaster preparedness knowledge and class.

Disaster preparedness knowledge	Class 8 r 10		Total
	Class Eight	Class 10	
Yes	56.0 (n=140)	49.0 (n=98)	52.9 (n=238)
No	44.0 (n=110)	51.0 (n=102)	47.1 (n=212)
Total	100.0 (n=250)	100.0 (n=200)	100.0 (n=450)

Table E: Results of the bivariate analysis of sharing information and parent's profession

Children share information with parents (responses in %)									
Response	Fathers Profession				Total	Mothers Profession			Total
	Job	Farmer	Business	Migrant Worker		Housewife	Job	Business	
Yes	85.6	77.8	80.3	69.3	79.6 (n=356)	80.9	80.8	36.4	79.8 (n=359)
No	14.4	22.2	19.7	30.7	20.4 (n=91)	19.1	19.2	63.6	20.2 (n=91)
Total	100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)	100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)
Parents share information with children (responses in %)									
Yes	87.0	78.8	79.5	73.3	80.8 (n=361)	82.5	80.8	27.3	80.9 (n=364)
No	13.0	21.2	20.5	26.7	19.2 (n=86)	17.5	19.2	72.7	19.1 (n=86)
Total	100.0 (n=146)	100.0 (n=99)	100.0 (n=127)	100.0 (n=75)	100.0 (n=447)	100.0 (n=366)	100.0 (n=73)	100.0 (n=11)	100.0 (n=450)

Table F: Impacts of Disaster

Impacts	Economic (%)			Physical (%)			Psychological (%)		
	Yes	No	Total	Yes	No	Total	Yes	No	Total
Dhaka	32.2	67.8	100.0 (n=90)	26.7	73.3	100.0 (n=90)	56.7	43.3	100.0 (n=90)
Teknaf	58.9	41.1	100.0 (n=90)	54.4	45.6	100.0 (n=90)	72.2	27.8	100.0 (n=90)
Charghat	64.4	35.6	100.0 (n=90)	37.8	62.2	100.0 (n=90)	40.0	60.0	100.0 (n=90)
Sreemangal	40.0	60.0	100.0 (n=90)	44.4	55.6	100.0 (n=90)	51.1	48.9	100.0 (n=90)
Daudkandi	58.9	41.1	100.0 (n=90)	38.9	61.1	100.0 (n=90)	43.3	56.7	100.0 (n=90)
Total	50.9 (n=229)	49.1 (n=221)	100.0 (n=450)	40.4 (n=182)	59.6 (n=268)	100.0 (n=450)	52.7 (n=237)	47.3 (n=213)	100.0 (n=450)

Annex 2: Questionnaire

General Information

School Name:	Class:
School Type: <input type="checkbox"/> Boys School <input type="checkbox"/> Girls School <input type="checkbox"/> Co- Education	
Area:	

Name:	Total family members:
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Educational information of family members:

Member	Educational information (Tick the answer)
Father	① Class V pass ② Class VIII pass ③ S.S.C pass ④ H.S.C. pass ⑤ Degree pass
Mother	① Class V pass ② Class VIII pass ③ S.S.C pass ④ H.S.C. pass ⑤ Degree pass
Brother	① Class V pass ② Class VIII pass ③ S.S.C pass ④ H.S.C. pass ⑤ Degree pass
Sister	① Class V pass ② Class VIII pass ③ S.S.C pass ④ H.S.C. pass ⑤ Degree pass

Occupational information of family members:

Member	Occupational information (Tick the answer)
Father	① Government Service ② Private Service ③ Farmer ④ Worker/Labor ⑤ Businessman ⑥ If others write here
Mother	① Housewife ② Service ③ Farmer ④ Labor ⑤ Business ⑥ If others write here

Answer the following questions:

1. What do you mean by disaster?
You may choose one or more option > ① Changes in temperature, ② Storm/Cyclone, ③ Erratic rain, ④ Drought, ⑤ Flood, ⑥ Earthquake, ⑦ Tornado ⑧Tsunami ⑨Landslide ⑩All
2. What types of disaster occur in your area?
You may choose one or more option > ① Changes in temperature, ② Storm/Cyclone, ③ Erratic rain, ④ Drought, ⑤ Flood, ⑥ Earthquake, ⑦ Tornado ⑧Tsunami ⑨Landslide ⑩All
3. What are the impacts of various disasters on you and your family?

You may choose one or more option > ① Obstacle to come in school, ② Spreading of diseases, ③ get physically injured, ④ get panicked of, ⑤ No care by our family members, ⑥ Economic loss of family, ⑦ All

⑧ If you know any more impacts, write here:

4. What are your responsibilities and duties during a disaster?

You may choose one or more option > ① Regular viewing of TV news or listening to the radio, ② Helping parents, ③ discussing with friends, ④ Helping younger siblings, ⑤ not to be highly panicked of, ⑥ utilization of own experience, ⑦ All

5. What is meant by early warning about the disaster? Please explain:

6. For which of the following disasters, we get an early warning?

You may choose one or more option > ① Cyclone, ② Flood, ③ Earthquake, ④ Storm/ Tornado/ Thunder, ⑤ Drought, ⑥ Excess rainfall, ⑦ Tsunami, ⑧ All

7. Different types of early warning ____.

You may choose one or more option > ① Loudspeaker announcement, ② Red flag, ③ Radio/TV news, ④ Discussion with friends, ⑤ If you know any other early warning system write here:

8. What are the benefits of early warning according to you?

You may choose one or more option > ① the amount of loss Lessens for family, ② less spread of diseases, ③ Minimize hazards of being injured, ④ After disaster problems can be mitigated soon, ⑤ Can help neighbors and friends, ⑥ All

9. From which sources do you learn about disaster preparedness?

You may choose one or more option > ① Textbooks, ② Storytelling by school teacher, ③ TV/Radio, ④ Cultural Programs ⑤ School outreach programs, ⑥ Family, ⑦ Gov. Organization, ⑧ NGOs, ⑨ Internet, ⑩ Any other sources, If any:

10. Among all these sources which sources are most interesting or important to you? And why?

11. In your area, which NGOs work for disaster preparedness? According to you, how they can help you?

12. Do you share disaster related information with your family?

Tick the answer > ① Yes ② No

13. Do your family members discuss with you about the disaster preparedness?

Tick the answer > ① Yes ② No

14. Consider your area is highly at risk of cyclone/flood/drought. What would you do to prepare for unforeseen challenges associated with the disaster?

Annex 3: List of Questions for Focus Group Discussion and Key Informant Interview

1. Do you think Disaster related issues are properly included in the textbook?
2. How do you evaluate such inclusion?
3. Based on the information in the books, what and how you normally discuss about the disaster related issues? Do you discuss all the topics in the local context?
4. Before introducing these issues, have you ever used the disaster as a topical subject in your curriculum?
5. What type of informal or extra-curricular activities do you offer?
6. What kind of challenges are you facing about the topics included in the curriculum?
7. What concerns or limitations do the textbooks present, if there is any?
8. Did you ever face children's emotional reaction to any disaster? Describe.
9. Do you think, such emotional issues are properly addressed in the national curriculum?
10. If, yes, How?
11. What kind of materials do we need to incorporate to address children's emotion preparing for a disaster?
12. How do students response studying disaster related topics?
13. How will these topics help students interacting with their families and thereby benefiting? Any practical example?
14. How can we measure improvements in family preparedness as a result of including such topics?
15. Should these issues should be kept or needed to further elaborate? Why or why not? How?
16. Do you think, disaster education should be a national requirement and be more formal as well as informal for schools? Why and how?
17. Do you think the study materials are centralized? And this should be based on field level experience?

Annex 4: List of correct answers to define knowledge of disaster preparedness

1. Watching TV and Listening to Radio helps to prepare for disaster
2. Storing necessary equipment, food, water and medicines
3. Learning about disaster preparedness
4. Learning about nearby emergency facilities
5. Keeping emergency phone numbers
6. Taking care of elderly members and children from families
7. Sharing information with neighbors/parents
8. Participating extracurricular activities
9. Studying textbooks and story books

