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**Combating Urban Hazard:
A Qualitative Study of Disaster Preparedness in Dhaka, Bangladesh**

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... আম্মা, তোমারেই করিয়াছি জীবনের ধুবতারা

Thank you for introducing me to Lund University by stepping here yourself back in September 1995 and for passing all your wisdoms in the subtlest manner. Whatever I am and ever will be is because of and only for you.

See you on the other side.

ABSTRACT

The research presents the disaster risk reduction landscape and identifies the urban hazard faced by residents in Dhaka. The aim is to analyze the concept of preparedness for vulnerability related to urban hazard by describing possible contemporary complications in both policies and practice. It examines the role played by the Government and Non-Government Organizations to implement the policies. The assessment highlights on not only identifying the policies and DRR methods currently being implemented, but, more critically the existing situation.

The research has been conducted by using a qualitative approach of semi-structured interviews and analysis of the policies. The chosen empirics has been limited to three evident urban hazards, thus all chosen interviewees have some relation to either planning or disaster risk reduction of urban areas.

The results show that success of functionality of the policies and strategies depends on proper monitoring and implementation. If proper mechanism is developed and initiated on both individual and organization levels, to ensure the implementation, it can restrict and prevent the process of vulnerability.

Keywords:

Dhaka, Urban Hazard, Earthquake, Fire Hazard, Waterlogging, Disaster Risk Reduction Policy, Pressure Model, Release Model

ABBREVIATIONS AND ACRONYMS

ADPC	Asian Disaster Preparedness Center
BBS	Bangladesh Bureau of Statistics
BFSCD	Bangladesh Fire Service and Civil Defense
BNBC	Bangladesh National Building Code
BRTC	Bangladesh Road Transport Corporation
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CDMP	Comprehensive Disaster Management Programme
CIESIN	Center for International Earth Science Information Network
CNG	Compressed Natural Gas
DCC	Dhaka City Corporation
DDM	Department of Disaster Management
DINB	Dhaka Imarat Nirman Bidhimala (Dhaka Metropolitan Building Rules)
DIPECHO	Disaster Preparedness European Commission Humanitarian aid and civil protection programm
DMA	Disaster Management Act
DMB	Disaster Management Bureau
DMDP	Dhaka Metropolitan Development Plan
DMRD	Disaster Management and Relief Division
DNCC	Dhaka North City Corporation
DNCC	Dhaka North City Corporation
DRR	Disaster Risk Reduction
DSCC	Dhaka South City Corporation

DSCC	Dhaka South City Corporation
ECP	Earthquake Contingency Planning
EPI	Environmental Performance Index
FAR	Floor Area Ratio
GoB	Government of Bangladesh
HBRI	Housing and Building Research Institute
HFA	Hyogo Framework for Action
IAB	Institute of Architects Bangladesh
INGO	International Non-Government Organization
IPCC	Intergovernmental Panel on Climate Change
LGED	Local Government Engineering Department
MoDMR	Ministry of Disaster Management and Relief
MoEF	Ministry of Environment and Forests
MoFDM	Ministry of Food and Disaster Management
MoHPW	Ministry of Housing and Public Works
NDMC	National Disaster Management Council
NGO	Non-Government Organization
NHA	National Housing Authority
NPDM	National Plan for Disaster Management
NSMDCIID	National Strategy on the Management of Disaster and Climate Induced Internal Displacement
NWBPPA	Natural Water Body Protection and Preservation Act
PWD	Public Works Department

RAJUK	Rajdhani Unnayan Kartripakkha (Capital Development Authority of the Government of Bangladesh)
SDG	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SOD	Standing Orders on Disaster
Titas	Bangladesh Gas Transmission and Distribution Company Limited
UN	United Nations
UNCRC	United Nations Convention on the Rights of the Child
UNISDR	United Nations International Strategy for Disaster Reduction
WASA	Water and Sewerage Authority
YCELP	Yale Center for Environmental Law & Policy

TABLE OF CONTENTS

Chapter 1: Introduction	1
1.1 Purpose of the Study.....	2
1.2 Research Question and overview	2
1.3 Structure of the Research Paper	3
Chapter 2: Literature Review and Background	5
2.1 Urban Hazard and Risk Reduction.....	5
2.2 Impact of Urban Hazard on the residents of Dhaka City.....	7
2.2.1 Earthquake.....	9
2.2.2 Fire Hazards	10
2.2.3 Water Logging.....	11
2.3 Risk Reduction Policies and Practices in Bangladesh.....	13
2.3.1 Organizational structure for Disaster Risk Management in Bangladesh	13
2.4 National Policies for Prevention of Urban Hazards	14
2.4.1 National Plan for Disaster Management 2010- 2015	14
2.4.2 National Plan for Disaster Management, 2016- 2020	15
2.4.3 Disaster Management Act 2012	15
2.4.4 Standing Orders on Disaster, 2010	15
2.4.5 Dhaka Structure Plan, 1995-2015.....	16
2.4.6 Dhaka Metropolitan Building Construction Act 2007.....	16
2.4.7 Earthquake Contingency Planning	16
2.4.8 Fire Protection Act 2003	17
2.5 International Policies adapted in Bangladesh	17
2.5.1 Hyogo Framework for Action 2005-2015	17
2.5.2 Sendai Framework for Disaster Risk Reduction 2015-2030.....	18
2.5.3 Sustainable Development Goals.....	18
Chapter 3: Theories of Urban Hazards.....	20

3.1 The Pressure Model.....	20
3.2 The Release Model.....	21
Chapter 4: Research Methodology.....	23
4.1 Research Philosophy	23
4.2 Research Approach.....	23
4.3 Research Design.....	24
4.4 Research Method.....	24
4.4.1 Literature and Data Source.....	25
4.4.2 Institutional Level Research.....	25
4.5 Research Validity	26
4.6 Research Ethics and Societal Issues.....	26
Chapter 5: Research Findings.....	27
5.1 Response of Interviewees	27
Chapter 6: Analysis.....	35
6.1 Reasons for vulnerability:.....	35
6.1.1 Unsafe Conditions	35
6.1.2 Dynamic Pressures.....	36
6.1.3 Root Causes.....	37
6.2 Progress to safety.....	38
6.2.1 Achieve safer conditions	38
6.2.2 Reduce pressures	38
6.2.3 Address root causes	39
Chapter 7: Conclusion.....	40
7.1 Response to Research Question	40
7. 2 Concluding note	42
7.3 Recommendation for further research	42

LIST OF FIGURES AND TABLES

List of Figures

Figure 1	Population growth in Dhaka.....	7
Figure 2	Seismic Zones of Bangladesh.....	9
Figure 3	Bangladesh Risk Management System.....	14
Figure 4	The Crunch Model.....	20
Figure 5	The Pressure Model.....	21
Figure 6	The Release Model.....	22

List of Tables

Table 1	Fire Incident Data for 10 years in Dhaka.....	10
Table 2	Major causes of water logging in Dhaka City.....	12

CHAPTER 1: INTRODUCTION

The present world is at the verge of an era of urbanization and the pace is more than ever thus resulting to the extensive growth towards globalization. According to the Annual Report of Financial and Socials Relations Department of United Nation, compared to the inhabitants in urban area of total population, since the beginning of 21st century population have increased to 50% now; it is projected that by 2050, the population in cities will be 6.3 billion in cities (UN, 2014: 15). Due to climate change, the tendency of mass migration is taking place all over the world (Stott & Nadiruzzaman, 2014: 20); and among many other countries Bangladesh, an ecologically fragile country, derives thousands of people from their villages to city areas, who lose their land and the ability to continue with cultivation caused by cyclones, floods, drought and river erosion. Although the economy is largely dependent on agriculture, in the last few years the apprise of readymade garments has played a significant role in being the biggest earner of the foreign currency. Additionally, Bangladesh has recently been upgraded from low income country (LIC) to lower-middle income country (LMIC) as per the World Bank's classification (Raihan, 2016). This advancement has created a sense of essentiality for establishment of clothing industries surrounding Dhaka, the capital of the country, and has attracted a huge number of population from the rural areas to relocate, find employment and thereby adding up the city population (Raihan, 2016). The World Bank says Dhaka, which has a population of 15 million people, is one of the fastest-growing megacities in the world. Between 1990 and 2005, the city population doubled in size, from 6 to 12 million respectively. By 2025, the U.N. predicts Dhaka will be home to more than 20 million people, making it larger than megacities like Beijing or Shanghai. Although ideally, according to the experts and the geographic location and area of Dhaka, the population at most should have been 3 million!

With millions than the capability being city based inhabitants, makes it extremely crucial to give emphasis on the disaster risk reduction of the urban areas. As an impact of climate change and enormous population together, the vulnerabilities generate a disaster risk due to hazards. It is quite difficult to have an empirical evidence on the severity of impacts on urban areas compared to rural in case of a natural disaster; as it depends on a country's specific urbanization rate, type of natural disaster and mechanism used for damage measurement. As every disaster has its own severity; thus a natural hazard in the less densely populated coastal or rural area can have less or equal damage on the severity of on people's livelihood in case of a disaster in an urban area (Somik & Deichmann, 2009: 5). The intensity of calamities that are likely to be taken place in the mega cities and cities are increasing as the choice of "settlement" for most

of the people are urban areas, with an opportunity to have a better lifestyle (Shaw, 2014: 10). In such context, the natural disasters occurring have a prospect to create a series of events of injuries and fatalities leading towards an intensive enduring physical, social and economic vulnerability.

1.1 PURPOSE OF THE STUDY

Dhaka is enlarging in an unplanned manner and unfortunately the authorities have very limited control over the development trend. When a city of a lower (middle) income country witnesses a high rate of urbanization it becomes difficult to provide proper livelihood to the citizens. Possessing a huge population in a limited geographical area, it is in parallel difficult and important to provide security and safety (Bangladesh Disaster Report: 2012, 12). In a condition like that, the Government should work hard to provide the citizens with decent living condition, have policies that would protect their basic human rights and ensure the implementation. The main purpose of this study is to find out where the Government and Non-Government Organizations stands in ensuring a safe city for the millions of inhabitants from several life threatening urban hazards. Along with concentrating on the rural and coastal areas, keeping in mind the rapid growth in population and urbanization, the city areas are also indicating the need to focus on urban based disaster risk reduction. As an impact of climate change and exposure to vulnerability, Dhaka is currently in need of attention for concerns regarding urban hazards like earthquakes, fire hazards and water logging. The inclusion of international standard policies will be analyzed and determine the breach among the national policies and provide possible recommendations which can bring about a positive change.

1.2 RESEARCH QUESTION AND OVERVIEW

This research is conducted as an attempt by the researcher to discover the existing gaps by conceptualizing the notion of urban hazard risk reduction by investigating how implementation of policies can be applied for recovery and preparedness from future vulnerabilities. A better understanding of the importance of identifying such breach of policies will provide practitioners with the possibility to establish specific indicators for disaster preparedness; and can give information about the effectiveness of disaster recovery activities and will therefore be useful to inform future disaster recovery programs.

Based on the objective of the study, the following research questions will be answered in this paper:

“To what extent the Government and NGOs play an active role in limiting the risks of civilians from Urban Hazards in Dhaka?”

In order to answer the research question, the following sub questions will guide the research:

1. How is the concept of urban hazard included in risk reduction planning and implementation?
2. What are the prominent policies for reducing urban hazard?
3. How do current policies accord with international standards for urban hazards?

As the research question suggests the main focus of the paper will be to analyze the role that is played by the Government of Bangladesh and NGOs in minimizing the risks created due to urban hazards. Thus in order to measure the extent of the effectiveness of the policies, this research paper will not only analyze the existence of the policies on paper but also investigate the practice of implementation and the sectors of improvement.

1.3 STRUCTURE OF THE RESEARCH PAPER

The first chapter have provided the introduction to the thesis research. The purpose of the research topic has been introduced, along with an overview of the research question. The main research question as well as the three sub-questions that will guide the research has been introduced.

In the second chapter, the literature review will be presented. The description of urban hazard will be outlined and will be linked to the terminologies often required. It will provide some interesting inputs for understanding the urban hazards with a support of the disaster cycle. Furthermore, the chapter will describe the impact of urban hazards in detail and the core three hazards focused for this research will be introduced in reference to the previous studies conducted on Urban Hazards in Dhaka. The prominent policies and practices in Bangladesh for risk reduction will be discussed as well as will shed lights on the international policies that are being followed.

The third chapter will elaborately discuss the theory and model associated with the urban hazard risk reduction in Dhaka. The model will later be discussed further for analyzing the findings.

Followed by that in chapter four the methodology used in the research as well as the philosophy, approach and design for better understanding of the subsequent chapters will be discussed.

Chapter five presents the findings from the expert interviews. The key statements from the interviews will be analyzed based on each interview question.

In chapter six, the analysis of the expert interviews as well as the literature review will be integrated and discussed based on the findings. Each of the three sub-questions will be discussed based on the theory formulated in earlier chapter.

In the last chapter, conclusion will be drawn based on the findings of the literature review as well as the research interviews. All three sub questions and the main research question will be answered separately and concluding note about the roles of the Government and NGOs for risk reduction in urban settings will be formulated. Recommendations based on the findings for further studies will be provided in the end.

CHAPTER 2: LITERATURE REVIEW AND BACKGROUND

This chapter depicts the theories, concepts and studies that defines urban hazard and the terminology of disaster risk reduction required for this study as well as sheds light on the prominent urban hazards in Dhaka. In addition to that, the chapter will also bring up the previous discussions on similar issue.

2.1 URBAN HAZARD AND RISK REDUCTION

A city or urban area can be defined as creation of an environment in order to serve the population within a confined geographical area in a set of infrastructure with support provided through interrelated Government services. In the article Urban Disaster and Globalization, Albala-Bertrand have defined urban hazard as any risk that has the ability to threaten the population and socio economic activities of a city (2004: 75). Within the last decade the effect of disaster on the city dwellers have had increasingly harmful consequence in perspective of infrastructure, livelihood and fiscal plan. Urban Hazards can occur from any natural disaster or due to failure of the organizations and their planning. In several circumstances, it results into a disaster within a small area, with an extreme consequence for the population around. The effect is similar to natural disasters, but the response requires to be incorporated with the institutional Government policies and strategies (Albala-Bertrand, 2004: 75).

Prior to an in-depth look on the issues of urban hazard, it is important to have a distinctive understanding on the terms related to disaster risk reduction, which includes hazard, vulnerability, risk and disaster. The practitioners from the different parts of the world and discipline have been using various terms for the concepts which have led towards usage of alternative definition and methods for measuring the complexity of the calamities.

According to the UNISDR Terminology on disaster risk reduction, **hazard** is defined as “a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage” (2009: 17). Similar to that, Himayatullah Khan have categorized cyclones, tsunamis and earthquake as natural hazards (Khan H. et al, 2008: 45); whereas hazards which occur due to the negligence of human, are manmade hazards.

Through the term **vulnerability** a link has been created between poverty, risk and the efforts that is required to manage risks of all kinds. It is “the extent to which a community, structure,

services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area” (Khan H. et al, 2008). As mentioned by Alwang the core principle of vulnerability includes the concepts to be prepared for any loss that might take place in the future at any given time based on the past experience (2001: 5), and the momentousness depends on the characteristics of the ability to respond to the risk of the particular household. With the effect of such situation in mind, Khan have shown how hazard and vulnerability can lead towards a disaster after a collaboration; and **risk** can be defined as the harmful consequence which results in from interactions occurred between hazards and vulnerable condition. It is “the combination of the probability of an event and its negative consequences” (UNISDR 2009: 25). Often in the field of disaster research, risk is identified as a combination of hazard, vulnerability and exposure. UNISDR defines **disaster** as a sudden event that causes great damage; it is “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources”.

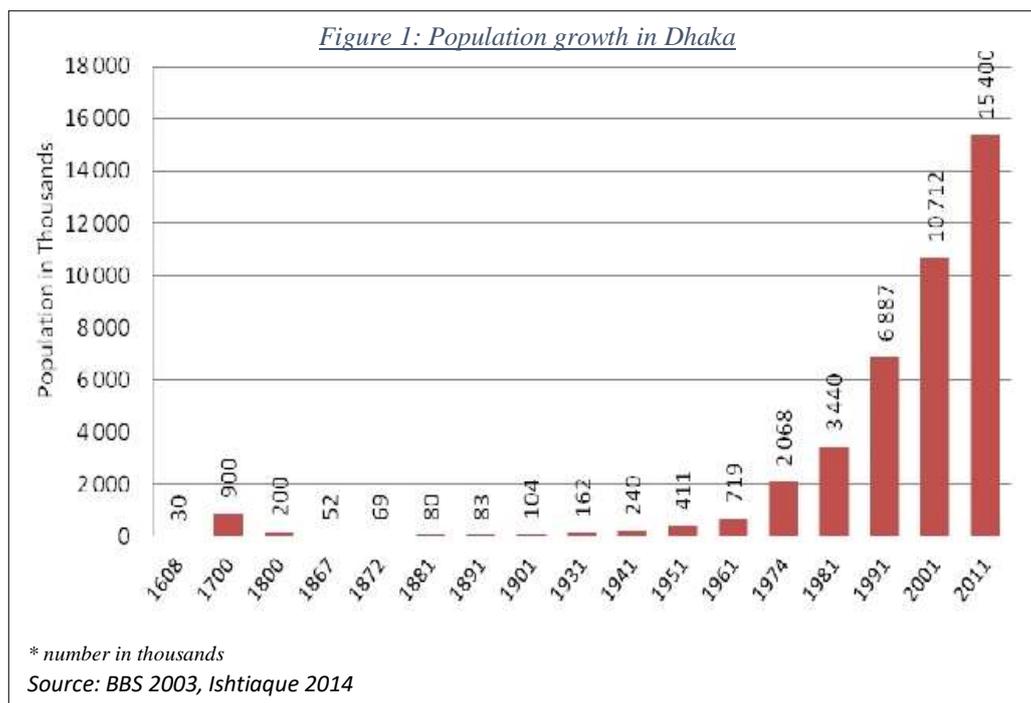
The result of a hazard’s impact on a vulnerable community causes damage to life, assets or livelihoods in a way which exceeds the community’s capacity to cope. It is interesting to look into how Khan explains in the paper Disaster Management Cycle, regarding the several incidents where both hazard and vulnerability are responsible and eventually lead towards a disaster. The author focuses on a vigorous issue of water logging, which often leads to a long time flooding due to heavy rains and landslides along with the blockage of drainage passage towards rivers and seas, which are created due to unplanned infrastructures in cities. He mentions that a disaster can only occur when it is a triggering event which would lead towards loss of life and property of the inhabitants in the particular area. For instance, no matter how strong the intensities of an earthquake are in an abandoned area, with no population or property, it will not become a disaster (Khan H. et al, 2008: 43) until and unless it affects people, their properties and activities.

To understand the sequence of natural or man-made disasters, the Disaster Cycle is a widely used model. The Disaster cycle illustrates the ongoing process with which Government plans for reducing the impact of disasters, react during and take steps to recover (Hansford, 2011: 16) after a disaster has occurred. Hansford also mentions that it recognizes that disasters tend to recur in the same place, with a ‘return period’ of perhaps a few weeks, or maybe 50 to 100 years, depending on the nature of the hazard. With the advance of climate change, certain types

of weather-related disaster are likely to occur more frequently and more intensely than in the past. And often, as a result of compactness of population in the urban based areas, the probability of severe series of disaster lies in the cities. According to UNISDR Report (2004: 59) over three-fourths of the one hundred largest cities are exposed to at least one natural hazard. This cycle will be later discussed for further understanding of the preparedness level in Dhaka.

2.2 IMPACT OF URBAN HAZARD ON THE RESIDENTS OF DHAKA CITY

Dhaka is considered to be the melting pot of Bangladesh in aspect of cultural, economic and political life. According to the World Population Review, as of 2016 Dhaka has an estimated population of about 14.54 million making it one of the most densely populated areas in the world, with a density of 23,234 people per square kilometer within a total area of 300 square kilometers. Dhaka was included in the category of “megacity” in 2001, with a population of 10.7 million (BBS, 2003) and Figure 2 shows after 1991 within only 20 years, the population increased to 15.4 million from 6 million (Ishtiaque, 2014: 48). With an annual growth rate of 4.4%, Dhaka is one of the fastest growing cities and have been identified as one of the most



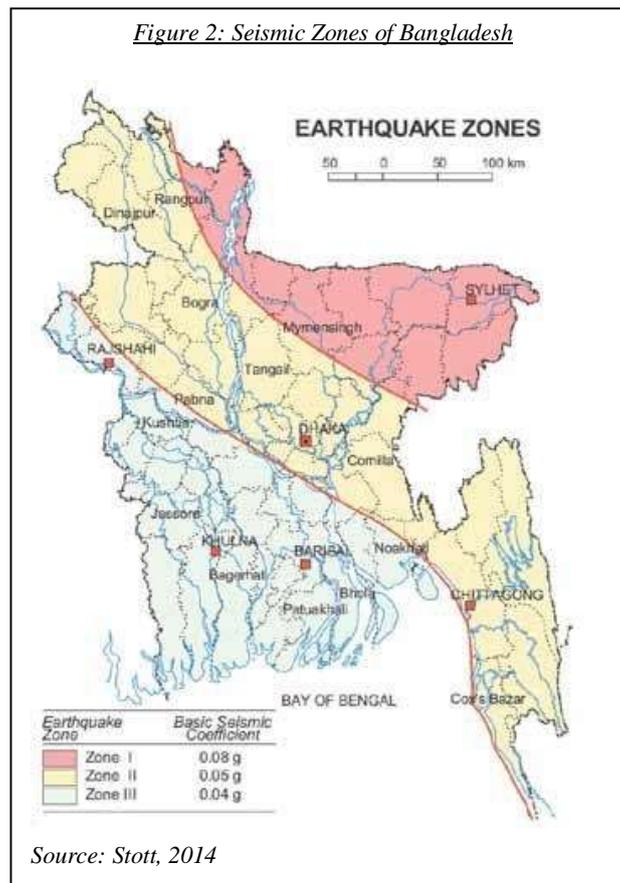
disaster prone megacities.

With dense population and disaster prone geographical location as a major factor, where industrialization is taking over and making the environment pay for it grievously, Dhaka faces several natural and man-made hazards which are often magnified. The hazards effect the citizen’s functionality, increases grievous injuries and mortalities of the slum dwellers and

floating population in the city, creating a way towards future vulnerabilities (Stott & Nadiruzzaman, 2014: 1). The main hazard occurs due to factors based on geological to meteorological, the mega city is exposed to ranges from earthquake, ground shaking mass movements to water logging, floods, storms to wild fire and fire accidents occurring due to extreme heat.

In recent times an impressive economic growth has originated base on Dhaka since industrialization took over (Somik & Deichmann, 2009: 7) and the increasing practice of rural-urban migration. As a result, the rapid and unplanned establishment of the factories and industries are not only polluting the cities, additionally are creating more hazard (BFSCDA, 2007: 23) for the inhabitants of Dhaka. These practices are magnifying the hazards and the rapid buildup of poor infrastructure and deficiency in providing public services are increasing the risks. Due to the geographical location, Bangladesh is predicted to be directly affected by earthquakes (ADPC, 2005: 3) and is likely to suffer in the near future. In fact, according to Earthquake Disaster Risk Index of Stanford University, in a global perspective Dhaka is one of the most vulnerable cities to earthquake. The major risk of earthquake risk is connected with the high vulnerability of buildings to collapse. With unplanned compact building construction, constant tendency of narrowing roads, usage of flammable building materials and unauthorized electrical system as well as lack of resources to raise awareness and response skills have resulted in to growing risk in large scale. Incident associated with fire is unfortunately now a common phenomenon in Bangladesh, especially at densely urban area such as Dhaka city (Bangladesh Disaster Report, 2012: 122). The low lying terrain, extensive rainfall during the monsoon season, increase in water levels of rivers leading towards flood, improper and lack of maintenance of drainage system: all these lead towards a waterlogged city for several days making the living conditions difficult for most parts of Dhaka. For further in depth discussion on the issue, Earthquake, Fire Hazards and Water logging, three prominent urban hazards will be in focus.

2.2.1 EARTHQUAKE



Currently Earthquake is a big concern for Bangladesh as in last few years several light to wild tremors have shook the capital of the country. In the paper *Urban Earthquake Hazard: Perceived Seismic Risk and Preparedness in Dhaka City, Bangladesh*, Paul and Bhuiyan mentions the existence and junction of two major subduction zones created by two active tectonic plates: The Indian plate and the Eurasian plate and makes Bangladesh exposed to sever seismic events (2010: 337) and two fault lines run through the geographical border of Bangladesh, which are 144 km and 370 km away from Dhaka respectively; and have resulted in several mild earthquakes in the last two decades and two major earthquakes within a century.

Additionally, according to the study of National Building Code of Bangladesh three seismic zones have been identified and are categorized according to the level of earthquake risk; zone III to zone I being the riskiest to least at risk respectively as shown Figure 3. As per the seismic zoning, it indicates that Dhaka is under the Zone II; being at a quite higher risk in case of an earthquake with significant magnitude. In the last few decades the scenario of Dhaka drastically changed and has thousands of multistoried now in the picture, which are mostly unplanned misusing the deficiency in supervision, ending up narrowing the roads and keeping barely much open space surround. Although, zone II indicates to be under medium risk (Stott &

Nadiruzzaman, 2014 :15), Dhaka is most likely to face some drastic calamities in case of occurrence of earthquake.

2.2.2 FIRE HAZARDS

Fire in urban areas has shown devastating impacts on people who are living in a congested and densely populated city like Dhaka. At present fire hazard is causing a humungous economic loss, along with a tragic form of human loss in a frequent manner. According to the report of BFSCDA, as shown in Table 1, incidents occurred due to fire in the last 10 years, in Dhaka city were nearly ten thousand per year, and the rate is increasing.

Table 1: Fire Incident Data for 10 years in Dhaka

Year	Total fire incident	Approximate property damage (million USD)	Death tolls
2006	9542	298.45	91
2007	9196	386.55	160
2008	9310	288.6625	229
2009	12182	382.375	118
2010	14682	407.0625	63
2011	15815	366.8625	365
2012	17504	602.9875	210
2013	17912	974.6375	161
2014	17830	449.15	70
2015	17488	1071.1875	68
2016	16858	300.5375	52

Source: Bangladesh Fire Service and Civil Defence Authority website

According to the BFSCDA Authority, in 2016 due to fire accidents the total monetary loss was near to \$ 300 million. As expected, Dhaka being a hub for most commercial and economic activities, the annual monetary loss that takes place due to fire hazards is significantly high compared to the other urban areas in Bangladesh.

In reference to the paper *Fire Hazard in Dhaka City: History, Spatial Distribution, Causes and Consequence*, Shimul Sarker (2014) have discussed the main causes behind the occurrence of fire. While few causes are due to natural disaster such as thunder and flash of lightning, most occurs for negligence while fixing the electrical wiring of households, careless usage of gas cylinder, cooking stoves, numerous welding and repairing shops with no precaution of

accidents (Sarker, 2014:3) and many more. Among all the fire accidents that took place in the last few years, the most dangerous ones have occurred in various garments' industries and slums in Dhaka.

Although it is quite optimistic to notice that the monetary loss due to property damage and death tolls have significantly declined in 2016 compared to the previous year; thus it can be expected that the number of fire incidents will come down drastically if people become ware, take precautionary measures to avert such incidents and show respect to law in constructing building and factories. The paper will go through the available codes and laws to find weather the codes are sufficient of not.

2.2.3 WATER LOGGING

Geographically Bangladesh is a low-lying land, thus the water flows all the way to the Bay of Bengal from the upstream through the rivers; however, with most river beds being silted badly, the fast decline of canals or river channels and the consistent formation of *char* (river bar, a tract of land surrounded by the waterbody), around 20-30% of the waters are logged in the low lying lands and remains up to 1-6 months. In a circumstance, the sufferings in both rural and urban areas are quite prominent, if not equal.

The beginning of urbanization in Dhaka was developed concentrating *River Buriganga* as it was considered to be the main source of water supply, transportation connection to the other parts of the country, industrial and agricultural purpose. Not only that, the river played a big role in terms of establishing city's sewerage and drainage system (Rahman, 2015: 28). Unfortunately, the scenario has now changed drastically due to the establishment of numerous factories, commercial buildings, industries and is making the water more toxic day by day as a result of becoming a hub of industrial and residential wastage; and by misusing the political influence people are filling up the rivers and thus constricting the flow of the river. This has resulted in creating blockage of water flow of the densely populated Dhaka. Being a country with a mean annual rainfall of about 2320 mm, in the last few years the residents from various part of Dhaka are facing the trouble of water logging, not just during the period of monsoon with heavy rainfall, but also with comparatively lesser rainfall.

In the study *Causes and Effects of Water Logging in Dhaka City*, conducted by Tawhid K. G. (2004) describes the causes and determined the contribution percentage of major causes of water logging in Dhaka and as Table 2 indicates, unplanned urbanization is identified as one of the leading causes of water congestion in Dhaka.

Table 2: Major causes of water logging in Dhaka City

Excessive Rainfall	74
Population growth and unplanned development	95
Waste management system	82
Encroachment	76
Topography	46
Scarcity and gravity of drainage system	67
Drainage management system	83
Development works during rainy season	40
Storage of construction materials	37
Lack of public awareness	60
Lack of regulations and its implementation	45

** number in percentage*
Source: Tawhid (2004: 40): Field survey (Interview and Open Discussion)

In the paper *Water Logging and Losses in Ecosystem: A Case Analysis on DND Embankment, Bangladesh*, K. M. A Rahman mentions that with 28.4% in 2011 it is implicit that the level of urbanization in Bangladesh is quite high. Unfortunately, the drainage network and management mechanism are not in standard compared to the density of population. Neither the sewage drains are cleaned properly and sufficiently, nor the city dwellers maintain proper solid waste disposal management resulting in blocking the drainage network. The main effects that the city dwellers are facing due to water logging in Dhaka are immense communal disruptions, damage of building, roads and other infrastructure (Tawhid, 2004: 3); also damaging underground metalloid pipes of various utility services losing their longevity, and increasing the diseases extensively.

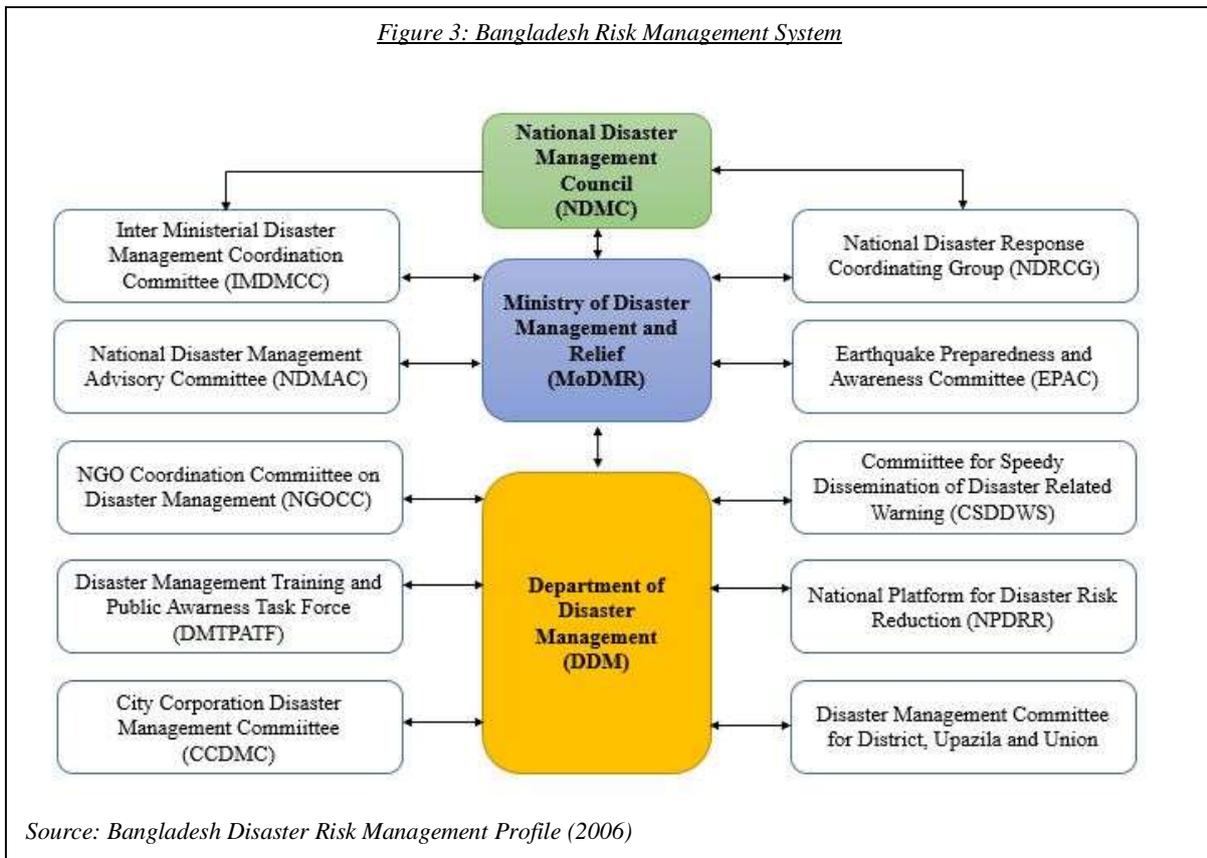
2.3 RISK REDUCTION POLICIES AND PRACTICES IN BANGLADESH

The Government of Bangladesh has recognized the necessity of disaster risk reduction practice as opposed to the earlier concepts of post-disaster plan, and has acknowledged the DRR as a rather cost effective approach (DMB, 2010). Their main objective is to improve community level preparedness, response, recovery and rehabilitation, providing training to the people in the disaster prone and coastal areas, improve capability to cope with disasters, design realistic guidelines for disaster management programs, and improving the policies and training material.

2.3.1 ORGANIZATIONAL STRUCTURE FOR DISASTER RISK MANAGEMENT IN BANGLADESH

In order to combat the natural risk, disasters and vulnerabilities Government of Bangladesh has an elaborate system of disaster management. A series of interrelated institutions, at both national and sub-national levels have been incorporated to create and ensure effective planning and coordination of disaster management and emergency response events. Since 2009, the Bureau of Disaster Management and Relief was upgraded into a division, Disaster Management and Relief Division (DMRD) and subsequently Ministry of Disaster Management and Relief was formed. Following enactment of the Disaster Management Act (DMA) 2012, the entire organizational structure for disaster risk management was prepared. Organizational structure at the national level for disaster risk management comprises of several ministries, departments and councils (DMB, 2010: 41). Few of the core sections includes National Disaster Management Council (NDMC) headed by the Prime Minister to formulate and review the disaster management policies, Disaster Management Training and Public Awareness Building Task Force (DMTATF) coordinates all the training and public awareness activities related with disaster, with the support of the Government, NGOs, and other organizations. The NGO Coordination Committee on Disaster Management (NGOCC) is there to review and coordinate the activities of concerned NGOs in the country. Along with these, as shown in the figure, several district, *upazila* (sub districts) and *union* (smallest rural administrative and local government units in Bangladesh) based committee and subcommittees have been formed for the implementation of the policies and strategies for disaster rehabilitation and disaster management activities (Bangladesh Gazette, 2012, chapter 2: 173445). As the United Nations “Local Governments and Disaster Risk Reduction publication explains, urban risk, city

planning and the role of local governments in dealing with risk reduction have been recognized as key factors to build resilient communities and nations (UN 2010: viii).



2.4 NATIONAL POLICIES FOR PREVENTION OF URBAN HAZARDS

To reduce the risk of people from the effects of natural, environmental and human induced hazards GoB has few efficient policies and plans capable of handling large scale disasters.

2.4.1 NATIONAL PLAN FOR DISASTER MANAGEMENT 2010- 2015

The National Plan for Disaster Management published in April 2010 for Disaster prepared for five years, stated the vision of the Government to reduce risk of people from the effect of both natural and man-made hazards and establish an efficient emergency response system capable to handle large scale calamities. One of the core emphasis of NPDM was given to increase awareness and develop strategies for preparedness with community involvement, with active support from Local Government, NGOs and other organizations.

Followed by that, the sixth five-year plan (2011-2015), Bangladesh Perspective Plan 2010-2021 as a part of the ruling Government’s “Vision 2021” and National Sustainable Development Strategy (NSDS) has separate plans in successfully implementing the strategies of NPDM. Few points that were given emphasis were maintaining a coordination in the range of all sorts of donor agencies, including Government, national and international NGOs and the

private sector in order to avoid duplication for disaster relief and post-disaster recovery, distributing the responsibilities when it comes to disaster prevention, mitigation, preparedness planning and the feasible measures to be taken (DMB, 2010: 3).

2.4.2 NATIONAL PLAN FOR DISASTER MANAGEMENT, 2016- 2020

The purpose of the newly improvised and Government of Bangladesh parliament approved NPDM is to provide proper safer and resilient communities as per the Disaster Management Act 2012. The core focus relies continuing to work on the risk reduction and resilience in collaboration of various ministries of the Government, agencies, sectors and to ensure that utmost priorities are given while the organizations are using the framework while forecasting their work plan and future endeavors (MoDMR, 2017: 6). The NPDM's approach is creating a comprehensive disaster risk management and response initiative while giving emphasis to both climate change adaptation, disaster preparedness and mitigation (MoDMR, 2017: 7).

2.4.3 DISASTER MANAGEMENT ACT 2012

As Act No. 34 of the year 2012, the National Parliament of Bangladesh in presence of the members passed the Disaster Management Act 2012 on September 2012. This act is considered as a reciprocal point in the path of the disaster management system of Bangladesh with contribution from and effort by the Government, Development organization, civil society to create a legislative tool (Bangladesh Gazette, 2012, chapter 2: 173444). The objective of the act was to reduce disaster risk, determine applicable risk reduction intervention, effective implementation of post disaster emergency response, provide humanitarian assistance to the most vulnerable community people and additionally establishing an active disaster management system with the capability of dealing with all kinds of hazards occurring country wide. In chapter 5 in the published Gazette, it mentions the punishments and/or fines for impeding the specific duties of organizations and individuals; the punishment ranges from either one to three years' rigorous imprisonment, or fine of \$1195 or both. The act clearly has placed mandatory obligations and responsibilities on ministries, committees, NGOs and other organization to ensure transparency and accountability when it comes to disaster management system (Bangladesh Gazette, 2012, chapter 5: 173462).

2.4.4 STANDING ORDERS ON DISASTER, 2010

The Standing Orders have been prepared with the avowed objective of making the concerned persons understand their duties and responsibilities regarding disaster management at all levels, and accomplishing them. All Ministries, Divisions/Departments and Agencies shall prepare

their own Action Plans in respect of their responsibilities under the Standing Orders for efficient implementation (MoFDM, 2010: 17).

2.4.5 DHAKA STRUCTURE PLAN, 1995-2015

Dhaka Metropolitan Development Plan (DMDP), identified the magnitude and direction of anticipated urban growth and defined a broad set of policies considered necessary to achieve the general plan objectives. It considered the existing urban form as well as for future development to keep the city free from all sorts of natural and manmade hazards.

2.4.6 DHAKA METROPOLITAN BUILDING CONSTRUCTION ACT 2007

After 1993 in 2006 initiative was taken to formally review Bangladesh National Building Code; the initiative for amendment was taken to include 18 A “empowering the government to promulgate the building code as a legally binding document”, as a new section. The purpose was to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of buildings in order to safeguard, within achievable limits, life, limb, health, property and public welfare. Further in December 2009 the House Building Research Institute (HBRI) involved leading experts from NHA, RAJUK, BRTC, BUET to update the code and act within a year and make it available to all (Shafi, 2010: 1).

The Dhaka Metropolitan Building Construction Rules 2007 superseded the earlier set of rules Dhaka Metropolitan Area and provided more authority to RAJUK, the Capital Development Authority of the Government of Bangladesh (DMINB, 2008). The main responsibility is to monitor the development of the city, inclusive and distribution of responsibilities among more organization and allotting specific responsibilities and instructions for building designers, structural engineers, site supervisors and their penalties etc.

One of the most significant improvements is the introduction of Floor Area Ratio, to manage the growth of the city by providing rules of building coverage area, allowable floor space and relation among building height - road width and plot size (Shafi, 2010: 4). Although the effectiveness of the rules to many extent depends on the credibility of RAJUK on how successfully implementation of these rules can be effected in a transparent and accountable way.

2.4.7 EARTHQUAKE CONTINGENCY PLANNING

On 29 November 2011 Dhaka City Corporation was dissolved by the Local Government into two corporations Dhaka North City Corporation and Dhaka South City Corporation. Thus

while preparing the ECP in 2010 it was intended and discussed the actions to be taken by DCC in response to earthquake. The goal was to develop a comprehensive geo-hazard reduction strategy with the participation of all stakeholders implacable for cities (CDMP, 2010: 8).

It includes all the steps the government will take to specify a policy framework on how the INGOs and NGOs will be able to operate and counterpart to the actions taken Ministries of Government. One of the core idea was on planning preparedness at community level as first response, creating awareness, advocacy and training.

2.4.8 FIRE PROTECTION ACT 2003

According to the Fire Protection Act, the provisions for all the buildings, high-rise commercial establishments, residential housings, it is mandatory to have sufficient firefighting equipment, spacious emergency exist, elevator and emergency electricity supply, and provide all required measures of public security (Islam, 2008: 64). The act also mentions that in order to tackle the initial stage in case of a fire occurrence, every multistory must have trained employees to operate the equipment. Unfortunately, the lack of monitoring has lead towards negligence of the act, and most of the high-rise building does not have sufficient, in many case no such gears. Bangladesh Fire Service and Civil Defense (BFSCD) is considered to be prepared with well-trained fire fighters and equipped with modern technology and machineries, often are hindered due to traffic congestions, lack of supply of water bodies, congested infrastructures in providing response and service well-timed (MoDMR, 2017: 14).

2.5 INTERNATIONAL POLICIES ADAPTED IN BANGLADESH

Mainstreaming DRR in development initiative is an integral part of preparedness for the hazards. In context of Bangladesh along with the national policies, the Government of Bangladesh has been following several international policies as an assistance to fulfil several milestones

2.5.1 HYOGO FRAMEWORK FOR ACTION 2005-2015

The Hyogo Framework was formed in the beginning of 2005, the first internationally accepted framework for Disaster Risk Reduction. The intention was to come up with a structure which would support to reduce the suffering and vulnerabilities of the people in community level from with disasters (Hansford, 2011: 24). The HFA has been adopted by 168 Governments at the UN World Conference on Disaster Reduction. The core purpose of the framework was to build the resilience of nations and communities as action oriented response with international concern about the growing impacts of disasters on individuals, communities and national

development (Shaw, 2014: 15). The HFA is a comprehensive action-oriented policy guidance based on a broad understanding of disaster risks, which arise from natural hazards to human vulnerability (Shaw, 2014: 15). The HFA became a useful tool while planning and advocating for DRR projects and as a result gave GoB an urgency to give higher priority to risk reducing activity.

2.5.2 SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030

As the successor agreement of HFA, the Sendai Framework for Disaster Risk Reduction has been adopted by UN members. The framework states that the primary role of the Government is to include the local government, private sector, development partitioning organizations and other stakeholders for reducing disaster risk. It aims for the outcome that “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” (SFDRR, 2015: 12). Currently the Government of Bangladesh have the four priorities for action of SFDRR as a core component while developing projects and policies for disaster risk reduction. Especially Bangladesh has committed to a guiding principle of disaster risk reduction: “Build Back Better”, under the forth priority action of the SFDRR.

Therefore, recovery, rehabilitation and reconstruction is now an important part for integrating disaster risk reduction in Bangladesh. Due to the growth of disaster risk in Urban area, capacity building and action planning in anticipation of calamities and encouraging the establishment of necessary mechanisms and incentives to ensure high levels of compliance is noticeable (SFDRR, 2015: 21,17).

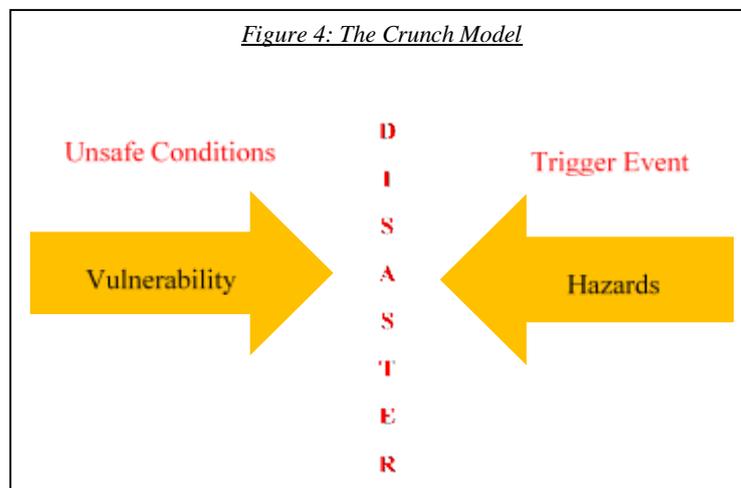
2.5.3 SUSTAINABLE DEVELOPMENT GOALS

Successive to the Millennium Development Goals, the United Nations have developed a transformative plan of action and adapted “Transforming Our World: The 2030 Agenda for Sustainable Development Goals”. One of the revolutionary approach is recognizing disasters as not just natural events rather endogenous to society resulting to an interaction of hazard, environment, social, physical and economic vulnerabilities and exposure of populations (Aitsi-Selmi, 2015: 1). There are 25 targets related to disaster risk reduction in 10 of the 17 SDGs, firmly establishing the role of disaster risk reduction as a core development strategy (UNISDR: 2015, 2).

If closely analyzed, the interrelation between DRR and sustainable development is evident. Thus in SDG the focus for DRR has transformed from external events and shocks to strengthening resilience by enabling sustainable development (Aitsi-Selmi, 2015: 1).

CHAPTER 3: THEORIES OF URBAN HAZARDS

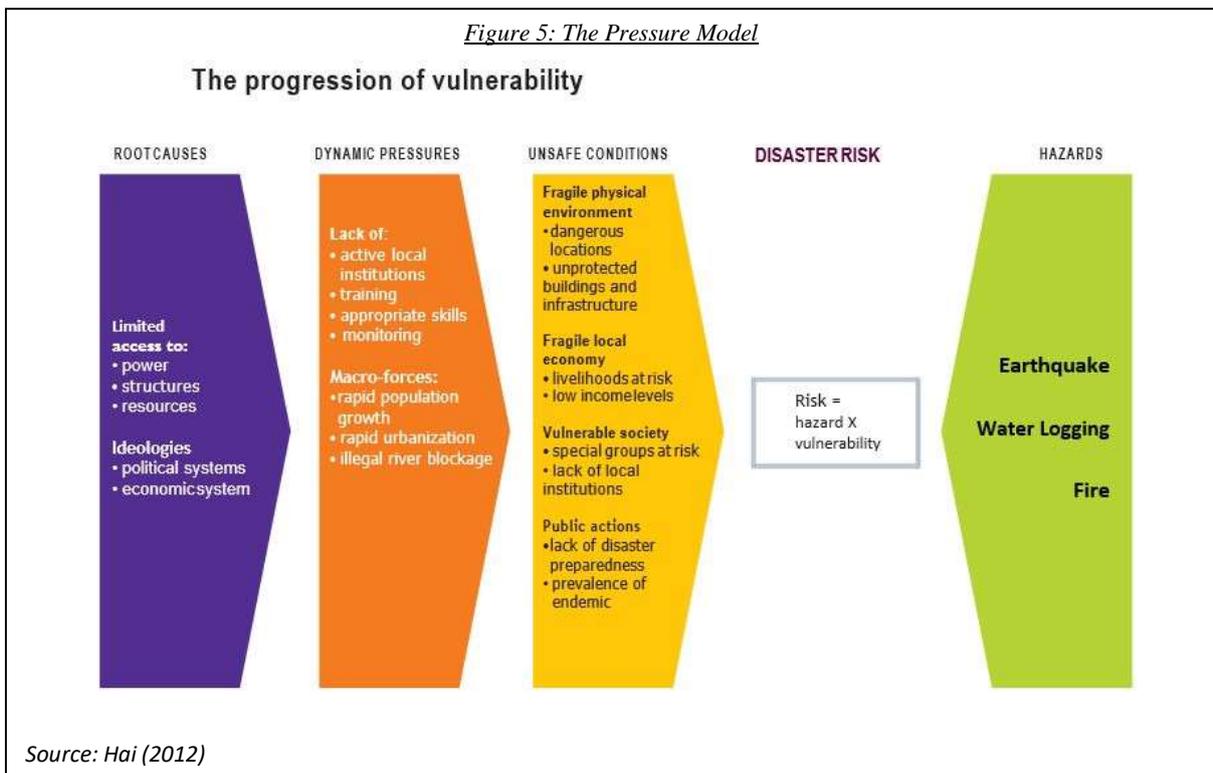
The Disaster Cycle, mentioned in chapter 2 to some extent has a drawback as it suggests a chronological sequence of rehabilitation, mitigation and preparedness, during and after a disaster. Although practically, DRR shall be incorporated and integrated during every step of the cycle. If risk reduction is delayed until mitigation and preparedness, opportunities for reducing future risk will reduce, giving an opportunity to past vulnerability to reappear. Thus, a convenient and useful DRR model was reformed by breaking the cycle by empowering the community to cope with future hazards (Hansford, 2011: 16). The Disaster Crunch Model shown in Figure 4, proceeds from the premise that a disaster happens when and only when, a hazard impacts on a vulnerable community or people (ADPC, 2005: 5).



3.1 THE PRESSURE MODEL

For urban hazards like earthquake, fire and water logging, the Pressure Model is more appropriate in order to understand on how and when a disaster takes place and the correlation between hazard and vulnerability in leading towards a disaster. As mentioned earlier, a natural phenomenon by itself is not a disaster; similarly, a population can be vulnerable for many years, yet without the “trigger event”, there is no disaster (Hai & Smyth, 2012: 5). Vulnerability to many extents can be connected to the socio-economic and political aspect including poverty, age-related discrimination, exclusion or exploitation based on gender, ethnic or religious factors, which requires to be addressed to reduce the risk of a disaster. The pressure model, first developed by Blaikie, Wisner et al, in 1994, illustrates that a disaster occurs, only if a hazard impacts upon a vulnerable group of people. People becomes vulnerable when they are unable to anticipate, resist and recover from a hazard.

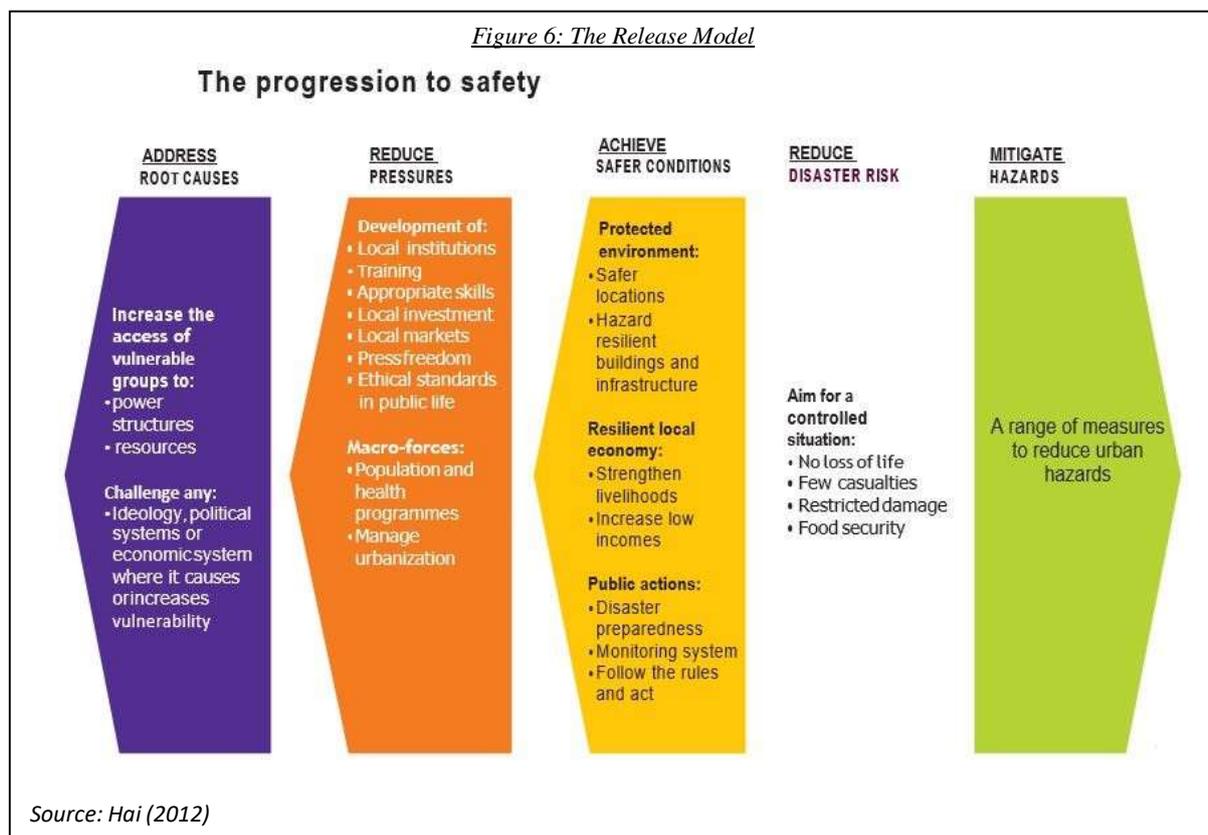
Figure 5 shows the advancement and vulnerability, known as the Pressure Model, to understand the impact and depth of an urban hazard and its effect on the citizens. It portrays three layers of social processes that causes vulnerability, they are: root causes, dynamic pressures and unsafe conditions (Hai & Smyth, 2012: 6). The model gives a chance practitioners and policymakers to analyze, understand, react and plan accordingly to people’s vulnerability to disasters.



3.2 THE RELEASE MODEL

In order to reduce disaster risk, the directions of the arrows in the Pressure Model requires to be directed to the opposite way, which demonstrate the release of the pressure that previously caused a disaster. The model is known as Release Model as shown in Figure 6.

As the figure illustrates, once the pressure between hazards and vulnerability are recognized and released, it can lead towards several outcomes. The factors of hazard should be mitigated in order to reduce the intensity that leads towards increase in population vulnerability (Hai & Smyth, 2012: 12). Vulnerability should also be reduced at different levels and activities are required need to convert “unsafe conditions” into “safer conditions”, “dynamic pressures” will be reduced and “root causes” will be addressed (Hai & Smyth,2012: 12). These DRR activities aim to achieve a controlled situation and a resilient community, where there is no loss of life, few casualties, restricted damage, food security and capacity to recover quickly from any impact of a hazard. Although it should be kept in mind that “changing the direction” is not always easy and requires intense activities, close monitoring and long term regular budget allocation at local, national level, with support regular direction from international policymaker and practitioners.



In later chapter, these models will be used in order to analyze the situation of Dhaka based on the findings of the research paper. The model indicates how the risk of disasters can be reduced by applying preventive and mitigation actions by addressing the underlying causes, and analyzing the nature of hazards. An in-depth discussion will lead to find out the current situation and what might help in order to prepare the community to deal with disasters.

CHAPTER 4: RESEARCH METHODOLOGY

This chapter describes the methodological choices of this research paper with research philosophy, research approach, followed by research design and implementation of Qualitative research theory using semi-structured interviews.

4.1 RESEARCH PHILOSOPHY

In “Research methods for business students (2009)”, Saunders defined research philosophy as the development and nature of knowledge, it is explaining precisely what a researcher is doing for conducting the research and how knowledge in the particular field is developing (Saunders, et al., 2009). For this research, it has been initiated with an assumption to seek understanding of the world around and develop a subjective meaning of the experience of the people and how it leads towards certain objects or things (Creswell, 2014: 265). The constructivism or **social constructivism** holds the assumption that individuals seek understanding of the world in which they live and work and develops subjective meanings of their experiences, meanings directed toward certain objects or things (Creswell, 2013: 37). These varied and multiple meanings lead the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas. This particular research is going to look into that disaster risk is an outcome of not only natural occurrence but a result of failure in implementing proper social, economic and institutional systems. Thus, similar to Creswell’s definition (2013: 35) the goal of the research is to rely as much as possible on the participants’ views of the situation being studied.

4.2 RESEARCH APPROACH

In reference to the research philosophy, to analyze and describe the concept of risk reduction in the context urban hazard in Dhaka, this study will take a qualitative approach semi-structured interviews. For better understanding of a social problem, this approach will guide through the means of exploration and understanding. In order to carry out the interpretation of the researcher, as mentioned by Creswell (2014: 32) the procedure included collecting data from participants’ perspective, enquire in inductive reasoning style by focusing on individual meaning and importance of the complexity of the situation. Instead of using a method with numerical data, the qualitative research approach will support finding the role of policymakers, social components and institutional analysis through observation, interviews and literature review.

To be very precise, the research will follow the inductive reasoning, and will move from a specific observation to a broader generalization and theories. As the inductive reasoning

suggests, the research began with observations and while detecting patterns, formulating tentative assumption lead towards conclusion with a foundation of theory (Trochim, 2000). This reasoning process will guide in proving the incorporation in the existence of the theory in practical circumstance, rather than testing a hypothesis.

4.3 RESEARCH DESIGN

Qualitative research uses a realistic approach that pursues to understand phenomena in context-specific settings, where the researcher is not required to attempt to manipulate the phenomenon of interest" (Patton, 2001: 39). Qualitative research design, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss, 1990: 17) but instead, the kind of research that produces findings arrived from real-world settings where the "phenomenon of interest unfold naturally" (Patton, 2001: 39).

For this research paper, the Grounded Theory was applied. As defined by Creswell (2014), Grounded theory is a design of inquiry from sociology in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants (Creswell, 2014: 42). Similar to the theory, this particular research began with raising question regarding the disaster risk reduction concept for Urban areas, which lead towards the in depth exploration. In order to create a link between the theoretical concept, several data, articles, policies were gathered and utilized. As the name suggests, the purpose of the grounded theory is to develop a theory which is rooted from the observation as of the surroundings and create a phenomena of interest.

4.4 RESEARCH METHOD

John W. Creswell (2013) described the qualitative approach of research as an inquiry of studying groups or individual meaning of social and human problem in its natural setting (2013: 44), which in this particular research paper is the inductive quest of search for contextual patterns built on theoretical and interpretative assumptions.

4.4.1 LITERATURE AND DATA SOURCE

In order to respond to the queries resulting from the theoretical positioning of the research for the collection of information, the policies and practices for disaster risk reduction in Bangladesh were analyzed, followed by institutional research by conducting interviews of development practitioners.

The information for this research paper has been gathered from a range of academic literature and online sources. The data used in the paper has been collected from reports of several Government organizations such as BBS, BFSCD, DCC, DMB, MoDMR, RAJUK. This research paper has conducted the study by interviewing professional representatives from the academic and NGO backgrounds for collecting the primary data.

4.4.2 INSTITUTIONAL LEVEL RESEARCH

Interview with the practitioners from disaster management, urban risk reduction and urban planning sectors of Bangladesh assisted for the completion of this level of the research. As this paper is focused on a particular issue, key informant interview method was used to receive specific, specialized knowledge for better understanding. It helped to receive specific information regarding current interventions, the practical challenges faced while implementing policies and the gaps while it comes to interventions in urban context, specifically Dhaka City.

4.4.2.1 INTERVIEW PROCESS

Interviews are usually one of the most important sources information (Tellis, 1997: 3), especially is an excellent tool when there are limited literature available on the specific topic of this research, as well as its multi-perspective nature.

For this research the **semi structured interview** structure was followed, a combination of structured and unstructured interviewing type. With semi structured interviews, the interviewer still has a list of predetermined questions on the specific issues to be addressed and answered (Denscombe, 2003 :167). However, as the structure allows the interviewer the freedom to probe far beyond the prepared questions during the interview depending on the answers of the interviewees it created a platform for further discussion between the interviewees and researcher. The answers are open-ended, thus have given an opportunity to both researcher and interviewee to elaborate the points of interest.

4.5 RESEARCH VALIDITY

In a research paper through the qualitative validity a researcher verifies the accuracy of the findings through few procedures, while qualitative reliability indicates the consistency of the approach across several similar researches conducted (Creswell, 2014: 251). A researcher acquires support to determine the accuracy of the research from strong validity from the participants and researcher's point of view (Creswell, 2014: 251).

For this particular research, this is quite important as the research is done with the intention of figuring the methods of how there can be improvement when it comes to implementing the findings in context of urban risk reduction in Dhaka. Additionally, from perspective of a research based on primary data collection from multiple sources, triangulation can be another factor of validation. It is accomplished in this research though the methodological choice of semi-structured interviews (Creswell, 2012: 265), which have responded according to the aim of research questions, presented in relevant figures, tables and description.

4.6 RESEARCH ETHICS AND SOCIETAL ISSUES

While conducting a research, the ethical and data protection issues shall always be considered. An ethical guideline seeks to work towards protecting the individuals, communities, policies, involved in the studies against any form of harm, manipulation or malpractice. The importance of the role of ethics and data protection is explored in this portion.

Ethical issues in a qualitative research defined by Creswell (2013: 56) is a point of moral and ethical considerations, especially according to social inquiry and the ability of the researcher to handle the social dilemma between empirical access and respect of integrity. The interviewees of this research are pioneer practitioners in Bangladesh, thus prior consent for sharing the interview content from the respondents have been taken. For transparency of the information and citations provided, the research has been shared with the respondents. Additionally, ethical issues have been under consideration during the entire process of research information collection, including policy and articles review.

CHAPTER 5: RESEARCH FINDINGS

This chapter for the research paper is based on the findings from the response of the research interview that has been conducted. The respondents were selected on basis of their association on issues related to disaster risk reduction and urbanization. The three respondents were: Specialist on Urban Disaster Risk Reduction working in a leading INGO in Bangladesh, Specialist- National Alliance for Risk Reduction active practitioner working in building collaboration between Government and NGOS, and the third respondent is an Urban and Regional Planner of Bangladesh. In order to maintain the transparency and confidentiality the respondents have been kept unnamed. All the interviewees are based on Dhaka thus the interview was conducted through skype and as per their choice the interview was conducted in Bengali. The questions were formulated in order to answer the research question as well as to find out the real picture when it comes to preparedness for Urban Hazard Risk; and as the interview was a semi-structured one, several follow up questions were discussed followed by their responses.

5.1 RESPONSE OF INTERVIEWEES

This subchapter is structured according to the questions related to the implementation of urban risk reduction, prominent policies followed by the Government and NGOs and the practical situation of implementation. Followed by this, remaining answers will also be brought in light related to the application of policies in context Dhaka.

Question 1: What are the main policies that are followed in context of Dhaka for Urban Hazard risk reduction? Are the existing policies sufficient for Dhaka?

All interviewees referred to the similar policies for disaster risk reduction when answering the question that are followed as the guiding policies of humanitarian architecture in Dhaka city. The practitioners extensively mentioned the DMA, SOD, BNBC and SDGs as adequate for prevention of hazards in Bangladesh. Along with these policies, in perspective of urban planning, the interviewee brought up the Natural Water Body Protection and Preservation Act 2000 for prevention of urban hazard like water logging. The important roles of Floor Area Ratio and Set Back Rule by RAJUK and DINB, for the prevention of a disaster from earthquakes and fire hazards, were also mentioned.

Each the respondent mentioned that the policies that are currently being used are sufficient, quite well versed and appropriate for present stage. For the time being SOD is used as a base for general disaster management and preparedness rather than hazard specific issues like

earthquakes, fire hazards and water logging in a densely populated city like Dhaka. NDMC is trying to provide strategic advice for Urban Hazards along with the armed force division, however have not being able to produce a document that can be used as a guiding principle. Thus, when there is anticipation that by the year 2025 30% of the population of Bangladesh will be in urban area a specific set of policy projected on basis of the Urban setting is a necessity. The prolong from finalizing the Urban Sector Policy, which has been in draft state for 8 years is making the process of preparedness challenging.

Key mentions and statements:	Significant positive outcome from Disaster Management Act and Standing Order on Disasters
	Specific set of policies for Urban setting are required straightaway

Question 2: What are the practical challenges and barriers for implementing the existing policies in urban settings?

Despite the difference in background of the respondents, they all agreed and emphasized upon the absence of a proper urban hazard base map of Dhaka city. A requirement of a map where areas can be recognized as vulnerable from certain hazards will help in better preparedness. For instance, it is creating a problem in order to identify the moderate and extreme earthquake vulnerable areas and prohibition of construction in those zones and leading towards duplication and contradiction among institutions like Bangladesh Meteorological Department, Red Crescent Society and Department of Disaster Management. If it is prepared it would have been easier to recognize areas and prevention would be easier.

Despite having several set of rules and acts that are available are sufficient for disaster preparedness, lack of monitoring, negligence of the authority and corruption is leading towards several problems. For example, in order to prevent hazard like building collapse and earthquakes, RAJUK has a rule of giving Occupancy certificate owner after the completion of a building, however, as it is not monitored properly, the certificate is often given without visiting the field properly and before detecting the requirements. If it is strictly followed, then in case of a titled building only one building will be affected, rather than the buildings those are built without following the setback rule and are in most cases attached to one another. All the interviewees have mentioned several times that if the deficiency in monitoring the implementation of the rules are reduced, several hazards will have less impact in creating vulnerabilities for the citizens.

Key mentions and statements:	Immediate requirement of Urban Hazard Mapping
	Lack of monitoring leading towards several man-made hazard
	Rules are too technical and often difficult for people to understand

Question 3: Disaster Management Act 2012 has classified several punishments and penalties mentioned for misconduct of act, corruption or lawbreaking; is it effective to prevent situation like lack of monitoring?

In response to the reference of punishments and penalties mentioned in DMA, the respondents had different standpoint. For two interviewees, the punishments mentioned in DMA seems quite minimum and negligible. Rather the interviewee believes that if accountability of the service providers is imposed, it might be more effective and the level of punishment must be revised to be stricter. The third respondent believes that rather than imposing much emphasis on the penalties or the punishments, if the incentives can be more clarified, then the Government officials would rather be encouraged and interested in following the rules and regulations beside their regular activities. For DMA Government has developed a structure to be followed which involves human resource from several departments and Ministries, who along with their regular activities has to work on disaster related work, so to articulate the work incentives will be better.

Interestingly, two respondents mentioned that in many other developed or developing countries the Act does not include punishments rather the distribution of the officials' responsibility, but Government in Bangladesh had to include such penalties or punishment in order to ensure the implementation. Thus, if more concentration is given on capacity building, incentives or on how more facilities can help to bring out the additional efforts from people, it can lead towards a better operation.

Key mentions and statements:	Penalties and punishments are not severe
	Monitoring system is not satisfactory
	Incentives may play better role for implementation of rules

Question 4: To what extent does collaboration exist between Ministries, the Departments of Government and the NGOS involved in disaster risk reduction?

As far as disaster risk reduction, preparedness and mitigation in Bangladesh is concerned, the respondents were extremely positive about the role and participation of the Government. Currently for emergency response and disaster preparedness it is now mandatory to work in collaboration with the Government, as they have their own set of rules and planning, and in case there is a gap the NGOs are playing an active role for advocacy. For coordination mechanism support is provided by the Ministries, departments and several committees.

The respondents also mentioned that the establishment of a separate Ministry like MoDMR in order to have concentration on policy formation and implementation for issues related to disaster and relief is something very unique from other Asian countries. Along with that articulation of a handy tool kit like SOD, which has been formed in a very short period of time, to involve and combine the entire tier of the Government hierarchy, starting from Ministry to the lowest tier the *Pourashava*, is also commendable according to the respondents.

Additionally, when it comes to Risk Reduction Planning, Government and NGO keeps a close association for follow-up and any budget allocation for such sector.

Key mentions and statements:	Positive collaboration exists between GoB and NGOs
	Cooperation for advocacy is provided by NGO to minimize any breaches
	Establishment of separate Ministries for more concentration is unique
	Involvement of Ministry to grassroots level is commendable

Question 5: What are the steps taken for the enlisted risky buildings recognized by RAJUK in Dhaka?

The respondents agreed that most of the disasters that Bangladesh have faced so far, for example the building collapse of Rana Plaza, was not due to any natural cause rather a man made one. Every time after an earthquake the awareness for recognizing the effected and vulnerable constructions lasts for a very small period of time and within few days the owners manage on getting an occupancy certificate. Negligence of implementing and following the rule and regulations of BNBC and DINB, and high rate of corruption often lead towards damage and fire accidents.

The specialist on the urban disaster risk reduction mentioned that in comparison to RAJUK’s identification of 312 buildings, CDMP recognized 72000 buildings in risk from earthquakes and fire hazard. Instructions are often given from the Prime Minister office to report about the protection and removal of such buildings; but the role of RAJUK and DDM is quite mysterious when it comes to the executing demolish of such establishment.

Along with RAJUK, HBRI as a Government Organization conducted soil testing and has identified few risky areas and suggested to prohibit establishment. However, no significant follow up has been taken by the authorities on whether or not the Government will give permission for establishment and the illegal constructions are on-going.

Additionally, there are a lot of times when the building owners of several identified risky buildings take stay order from the court in order to prevent it from demolishing and the solution of such cases take a long period of time; thus even if RAJUK wants to take step in demolishing the building, the laws for protection of owner can become a problem.

The respondents believe that as a huge portion of population living in such structure belongs to the lower income group, rectification, reconstruction or demolition will make them homeless, thus a stronger rehabilitation plan can be a benefit.

Key mentions and statements:	Role of RAJUK is often questionable
	Corruption and misconduct of act is main reason behind several calamities
	Poverty is a big reason behind halt in demolish of risky buildings
	Rehabilitation Planning for habitants of risky building is required
	Extensive and strict monitoring is required for preventing corruption

Question 6: What are steps that are taken in prevention of water logging?

For this particular question the Urban Planner respondent mentioned that Natural Water Body Protection and Preservation Act 2000 has guidelines for the prevention of water logging, which involves three major step for prevention. The respondent indicated frustration that despite the designs provided by the urban planner, experts from IAB and Government employed engineers, the failure in construction and management of the drainage system is creating a big problem.

Once there were several active Retention Ponds in Dhaka, they were built with the intention of preserving the rainwater and later drain out the excess water to nearby river with the usage of machineries. The respondents agreed upon resuming the plan for prevention of water logging.

Key mentions and statements:	Lacking in contingency plan
	The designs prepared for drains are not followed properly

Question 7: Which are the International policies that are considered in disaster risk reduction management in Bangladesh?

Along with following the National Acts and Policies, keeping the global priority in mind, the development practitioners take reference from several international policies. Sustainable Development Goals are playing a big role in order to set the priorities and to recognize the achievement in aspect of risk reduction. Along with that the discussion of IPCC are also an essential part of the policies set by the MoEF for addressing climate change adaptation.

Currently GoB is simultaneously focusing on effective strategies to assess gaps and challenges to inclusion throughout the DRM cycle. Thus international declaration such as Hyogo Framework, Sendai Framework of Action, Core Humanitarian Standard and UNCRC are useful for guiding the Government and experts.

Nevertheless, all the respondents stated that the policies that GoB currently has is sufficient and quite well-versed for in-country implementation. The main challenge lies in implementing and monitoring the execution of the policies properly.

Key mentions and statements:	Several International declarations are used in context of Bangladesh
	The current policies are sufficient and well versed
	Proper implementation will bring in positive changes

Question 8: Is the funding allotted by the GoB and received from the foreign donors sufficient for urban risk reduction and properly being utilized?

According to the respondents, with the budget that is allotted by GoB, rather than preparation the interest is more in procurement, especially for purchasing several equipment, as it involves “other interests” of several parties. Almost 60% to 70% of the allocated budget is spent over

the procurement of several equipment's, without keeping in mind if there are enough skilled manpower available for handling or has maintenance capabilities for such machineries.

Additionally, the foreign donation has slowly decreased as Bangladesh has declared to be economically more solvent in the last few years. However, the people in need are not in the receiving end of the funds, and their capability to cope with resilience is yet to be practically imposed. So along with a decrease of the funds of Institutional Donors, the traditional budget system of Government does not reach the people in need. So a deficiency is being created in addressing many areas like Gender issue during emergency, child protection, livelihood, with the limited funding of the GoB.

Another challenge the practitioner mentioned is that in most cases the budget or funding that is received is project based so the focus is allotted according to the working areas or issues the certain organizations work on. However, gap is often created in implementation due to slow decision making, canceling extension of programs, inclusion of new working areas by excluding previous or present ones.

Key mentions and statements:	The interest is more in procurement rather than preparation
	Funding is insufficient in addressing several issues
	Slow decision making is resulting in discontinuation of projects
	Recent decline in funding from international donors

Question 9: According to your experience, how preparedness for hazards in urban settings can be improved?

On the issue of earthquake, the respondents mentioned that the experts are saying that compared to the housing patterns and construction materials used in the buildings that collapsed in Nepal, it is stronger in Dhaka. It should also be noted that despite not having an earthquakes of higher Richter Scale, the losses that Dhaka have experienced occurred due to lack of information, failure in following the rules and panic among the citizens. Thus, in addition to structural development, at the moment concentrations should be given to non-structural issues like awareness building and advocacy for citizens, preparation for the mitigation in case of major disaster, strong monitoring tools, equip the service providers with modernized equipment, training for increasing the efficiency of the fire fighters and volunteers.

One of the practitioners mentioned a crucial point. As all the skilled firefighters are mostly based in Dhaka, in case of a calamity the probability of them being affected is quite high. Thus several organizations are taking initiative to include, train and increase human resource for fighting urban hazards like building collapse, fire accidents, and earthquakes from areas surrounding Dhaka.

In Urban aspect, usually Government wings involved requires a prime role by City Governance. However, the current work practice and approach of City Corporation in Dhaka is not sufficient, as until and unless a City Government has independence and control, cannot play a fruitful role in preparedness against any disaster or other issues. The respondent working on urban planning mentioned that on July 11, 2003, the government decided to bring the drainage system either under the control of Dhaka City Corporation or Water Supply and Sewerage Authority. Nevertheless, there has been no progress on the issue ever since. As the coordination level is not in the position as anticipated, if all the service providers such as Titas, DESA, WASA, PWD are brought under one unit rather than several ministries and department, coordination will be better

In Urban aspect, although the Government has provided the NGOs with an Urban Risk Assessment guideline, and on regular basis it requires to be validated; however, the practitioners have all emphasized that finalizing the Urban Sector Policy must be given prime importance now.

Key mentions and statements:	Finalize the draft of Urban Sector Policy
	More concentration on non-structural issues
	Strengthen the City Government
	Increase coordination among the service providers in Dhaka

CHAPTER 6: ANALYSIS

The chapter has been formulated on the findings of the study to answer the research question keeping the literature review, research findings from the interviews, policies and practices of Bangladesh in consideration. To go in deeper understanding of the urban disaster risk reduction in Dhaka, the researcher has analyzed through the lens of the pressure and release model as mentioned and discussed elaborately in chapter 3. The models individually show the progression towards vulnerability and safety in figure 3 and 4 respectively. Each has three layers, and the reasons for increase in vulnerability have been recognized as *unsafe conditions*, *dynamic pressures* and *root causes*. Subsequently, in order to reduce the intensity of affected population from vulnerabilities, hazards require to be mitigated to *achieve safer conditions*, *reduce the pressures* and *address the root causes*. This model, first developed by Blaikie, Wisner et al in 1994 has been further discussed by Hai and Smyth in their article The Disaster Crunch Model. The analysis chapter has been formulated for earthquakes, fire hazards and water logging, the prominent urban hazards in Dhaka and each hazard will be discussed on basis of the progression to vulnerability and safety.

6.1 REASONS FOR VULNERABILITY:

Similar to the definition provided in the sub chapter 2.1.1, Hai and Smyth (2012: 6,7) mentions that any hazard can be analyzed on basis of the force, warning signs, frequency and duration and the time of occurrence, as well as it has to be both hazardous and vulnerable to be a disaster. Thus the intensity of any disaster risk does not only depend on the magnitude of the hazard but also the degree of vulnerability of the people and based on this Dhaka can be considered as a vulnerable city.

6.1.1 UNSAFE CONDITIONS

The citizens of Dhaka are vulnerable, this statement is based on several hazard occurrences that have taken place and which are difficult to anticipate, resist and recover. During the interview session a respondent mentioned that the reason behind the extremity of Dhaka's hazard is the dependency, requirement and presence of several fundamental elements for livelihood and the social boundaries. Hai and Smyth also recognized the higher poverty rate, poor infrastructure, unsecured livelihoods (2012: 7), lack in disaster preparedness and skills as a lead towards unsafe conditions in Dhaka. Thus when any of these elements are vulnerable, it leads towards hazard.

For the higher risk of earthquakes in Dhaka, all the respondents have recognized the lack in following the building codes as the core problem. In the Urban Disaster Risk Reduction Framework Report it was shown that from most areas of Dhaka, only 10% of the buildings have followed the official building codes. In reference to the CDMP and another report prepared by Stott and Nadiruzzaman (2014: 15) even one interviewee has specifically mentioned that around 78, 000 from 326,000 buildings are most likely to collapse in case of an earthquake. The numerous people including the floating population, slum dwellers who does not have access to live in the large structures, are at risk of leaked gas line, electric short circuit, collapsed under surrounding buildings resulting from earthquake.

The rapid and unplanned urbanization that takes place in Dhaka has forced the people from low-income group and lower middle income group to live in slum areas with unsafe working and living conditions; thus confronting greater risks of fire hazards on regular basis with minimum mitigation measures. On regular basis, fire incidents take place in *Korail Slum*, the largest slum in Dhaka with a population of about 175,000 and most recently, as reported by Salman for the Daily *Prothom Alo*, a similar fire broke out in December 2016 destroying almost 500 shanties.

It is quite an irony that on one hand lack of water often prolongs the incident resulting from fire hazard, whereas Dhaka faces tremendous problem when it comes to hazard like water logging. All the interviewees have mentioned mismanagement of waste disposal, clogged drainage system, unplanned construction and renovation works by various government agencies including DCC, WASA, Roads and highways for the constant deterioration of the condition.

6.1.2 DYNAMIC PRESSURES

DIPECHO has recognized structural deficit and insufficiency in preparing policies and practices as a reason behind pressure being build up (2010: 34) on the individuals and communities for vulnerability. Supporting this definition, the interviewees agreed that often negligence of Government, public and private organizations, individuals, neighborhood or community are responsible for creating vulnerable conditions. The existence of these pressures are not noticeable immediately and often tend to be difficult to challenge in due course of time. While answering for the first sub question the interviewees also mentioned that often the dynamic pressures, such as lack of active local institutions, deficit in training and monitoring are not explicitly stated in the policies.

For instance, Dhaka once was surrounded by channels, canals (locally known as *khals*) and lakes which were connected to the rivers and drained out the water of the city effectively. In his study Tawhid mentioned there were approximately 50 *khals* in Dhaka once with total length of 256 km, whereas now only 26 *khals* with 125 km (2004: 32) is left. Dhaka is losing the natural drainage system in due course of time with regular possession of the water bodies, both legally and illegally. Through the interviews and literature review conducted, it has been found that the existing practice of the infrastructural progress including construction of concrete roads and highways, bridges and culverts, water pockets and dams that established with an intention as development often appears as short term goals of the Local Government. As a result, water logging is now a regular problem that is faced by the city dwellers, the effect can be distributed into communal disruptions, infrastructural difficulties, economic problems and impacts on environment.

6.1.3 ROOT CAUSES

According to the interviewee working on Urban and Regional Planning, the absence of proper feasibility study prior to the physical development in sense of nature preservation is one of the core reason of having the high risk of construction damage after an earthquake, fire accidents and tendency of water logging. It was interesting to that all the interviewees brought up several times that the lack of collaboration between Government policy and implementation, poor governance, inequality, deficiency in monitoring and planning, improper land usage, and negligence in emergency response, are the main problems behind the condition of Dhaka. This was mentioned by Hai and Smyth in their article as well. Although these issues are often not visible to common people, but have dominant effect.

Another aspect that has been found during this research is that the authority does not have any database or sufficient resource to develop risk mapping for Dhaka city, this has been mentioned by all three respondents as well as Sarkar (2014: 7). The interviewees cited that the challenges for fire safety and risk of collapsed building subsequent to an earthquake in Dhaka City are resulting from the lack in monitoring of several policies and acts of Bangladesh. This discussion answered the first sub-question of the research paper of how the concepts of urban hazard is included in risk reduction planning. According to the interviewees, while answering the third sub-question of the research paper, policies like DMA, SOD, BNBC, Building Floor Area Ratio of RAJUK, NWBPPA are adequate for prevention of hazards in Dhaka. Unfortunately, limited execution of the rules and regulations, planning irregularity in city perspective, low mobility of the road system, filling up of retention ponds and natural reservoirs

of water due to excessive population pressure are leading to limited source of water during fire accidents and real estate development on marshy and unsuitable risky land. The interviewees agreed that often authority's capacity is minimized due to political influence, Government's inefficiency in creating public awareness and shortage of training programs, trained manpower, modern equipment and modern information system are reason behind the fallout in Urban Risk Reduction.

6.2 PROGRESS TO SAFETY

Through the concept from a theoretical point of Release Model, shown in figure 6, the progress towards safety is analyzed which can transform unsafe conditions into safe conditions by addressing root causes and dynamic pressures. The key idea is to lead towards mitigation, through interventions that could reduce the impacts of urban hazards by addressing governance systems, policies and laws which are part of the pressures or root causes that increase people's vulnerability.

6.2.1 ACHIEVE SAFER CONDITIONS

One of the interviewees mentioned that to some extent vulnerabilities can also be seen as a string that brings people together and this successfully helped to empower the rural preparedness in Bangladesh. Unfortunately, the lack in community mobilization is evident in Dhaka. So in order to create a safer condition, it is important to challenge any power structure that is creating the problem. Thus the respondents and researcher came to an agreement that a platform is required with collaboration of Government, NGOs, organizations, policy makers, practitioners with the common interest of reducing pressures of the citizens of Dhaka.

6.2.2 REDUCE PRESSURES

One of the noticeable point that came up during this research is that, Urban Hazard is comparatively a new concept that has been brought forward in disaster risk reduction aspect in Bangladesh. Until now the DRR programs has been mostly focused on minimizing the risks and vulnerabilities, capacity building and emergency response in rural and coastal areas of Bangladesh. All the respondents agree with the perception of Hai and Smyth (2012: 7) that despite the rapid tendency of migration to Dhaka, deficiency in urban community preparedness compared to rural communities is a dynamic pressure. One of the respondents is directly involved along with several organizations to work on the approach of focusing on urban disaster risk reduction in policy preparation. According to the respondents, emphasize on planning, monitoring and implementation must be taken into account.

6.2.3 ADDRESS ROOT CAUSES

During the interview session one of the research sub questions was asked whether the current policies accord with international standards for urban hazards. The respondents strongly agreed that the policies that are now being in practice have been prepared keeping the international standards such as SDG, HFA, SFDRR in mind. However, the delay in finalizing the Urban Sector Policy, which has been in draft state for 8 years is making the process of preparedness challenging. Nevertheless, the answers of the respondents often showed their positivity as they feel the awareness among the citizens are increasing day by day and the tendency of following the rules are also establishing in their practice. By analyzing the response of the interviewees, the researcher believes once a close coordination and collaboration among authorities, public and private sectors is established, instituting a sustainable operation system is possible to minimize the tendency of hazards in Dhaka.

CHAPTER 7: CONCLUSION

As this thesis covers an emerging issue with limited prior research and practical application of the concept urban hazard reduction, the researcher found it influencing to have an in depth look in the issue. In doing so, the researcher draws on a review of the existing policies and approaches of Bangladesh as well as on practical experiences from urban planning and disaster risk management practitioners.

7.1 RESPONSE TO RESEARCH QUESTION

The main objective of this study was to determine how preparedness of urban hazard are included in the disaster risk reduction policies in Dhaka. In order to reach this objective, the following research question has been posed:

“To what extent the Government and NGOs play an active role in limiting the risks of civilians from Urban Hazards in Dhaka?”

In order to better structure the research study, three sub questions were prepared that guided the research efforts.

- How is the concept of urban hazard included in risk reduction planning and implementation?
- What are the prominent policies for reducing urban hazard?
- How do current policies accord with international standards for urban hazards?

According to the research findings, analysis with literature review and primary data, sufficient Government policies has been found to be prominent in context of urban hazard in Bangladesh. In order to analyze the practical application of the policies in more detail, semi-structured in-depth interviews have been conducted with experts in urban planning, urban disaster risk reduction and national alliance for risk reduction who are experienced in implementing disaster recovery in urban settings. The prominent existence and vulnerability of urban hazard is addressed in the policies prepared for risk reduction and thus it answered the first sub question. This leads towards answering the second sub question as well, the policies that are to be standing out for reducing urban hazard includes Disaster Management Act, Standing Orders on Disaster, Bangladesh National Building Code additionally the role of National Disaster Management Council has also been found to be commendable. During the analysis of the literature review and primary data it was quite clear that the Government of Bangladesh keep a constant connection to several international policies, including the Sustainable Development

Goals, Hyogo Framework, Sendai Framework of Action. Nevertheless, it must be kept in mind that each country has unique geographical formation and challenges. Thus the policies are prepared distinctively for Bangladesh with significant reference to international policies. This practice is quite appreciated by the practitioners as they believe the current policies are admirable.

After the sub questions are answered, it is important to measure the extent to which the Government and NGOs are involved in limiting the risks occurred due to urban hazards. Thus to answer the research question, the researcher looked into the implementation of the policies. This paper found that despite the presence of several policies on paper, there is a lacking while it comes to proper implementation. The reason circles around the lengthy decision making process of the bureaucrats, tendency of procurement of machineries due to interrelation with corruption and political influence. Additionally, the Urban Sector Policy has been in draft phase for almost 8 years now. Therefore, it can be said that the impact of Government and NGOs are still not quite adequate to mitigate the challenge of urban disaster risk management in Bangladesh.

Although the role of the Government for preparing policies are satisfactory and the NGOs are constantly in contact with the Government to provide assistance and support for improvement and implementation of strategies for reducing hazards. However, when it comes to the landscape of the organizations responsible in ensuring the proper implementation of the policies, more effort is required. Gap, barrier and overlapping of working strategies within and between service providers like Titash, DESA, WASA, PWD ends up creating problem for citizen with the repeated road digging and development works all year long. Thus requires an immediate action for better coordination, as well as to assess not only what is being done, but how it is being done, and how effective it is.

Another interesting aspect was the discussion of inclusion of penalties and punishments in the DMA. Two of the respondents mentioned that in many other developed or developing countries, the Act does not include punishments rather the distribution of the officials' responsibility. Although the Government included such penalties and punishment in order to ensure the implementation, the deficiency in monitoring is not bringing the action in practice. As the pressure model shows, lack of monitoring increases the corruption rate which is one of the dynamic pressure to progress towards vulnerability. Therefore, a better strategy will also address and reduce this prominent problem.

7.2 CONCLUDING NOTE

One of the most common trend that has been seen while conducting this research is, subsequent to any hazard or incident a major impact is created among the people. This results in formation of several investigation committees and the affected families are provided with compensations against the losses of their family members and properties. Whereas, proper enforcement of building codes, strict land use control mechanism can bring a stop in several hazards. It should be kept in consideration that the residents of Dhaka do not have memories of major earthquake. Nevertheless, given the history of building collapse incidents, the people are willing to be trained for preparedness of such disaster. Therefore, keeping in mind the communities' physical vulnerability, the community people's response to such initiative must be given high importance. One of the most interesting feature of urban community preparedness is that it does not match the usual features of conventionally understood rural communities, thus defining urban community is equally important for implementation of any strategy. Along with that, in order to reduce the repeat construction work by the service providers, if they are brought under one unit rather than several ministries and department, coordination will be better.

Additionally, during literature review the researcher felt that the policies that are available now in Bangladesh are too technical and seems quite difficult for people to understand; so a set of policies or acts with easier narratives and interpretation will rather help people to execute it properly.

7.3 RECOMMENDATION FOR FURTHER RESEARCH

After the completion of this research there are several issues which have concerned the researcher in the area of policy execution in Bangladesh. Further research on specific hazards by addressing the policies and implementations more deeply will give an insight of the situation in Bangladesh. For better understanding and observation, inclusion of more organizations and practitioners working on DRR will be useful along with close discussion in the Government policymakers.

REFERENCE

- ADPC, (2005), Community-based Earthquake Risk Management in Dhaka City Community empowerment for earthquake preparedness
- Aitsi-Selmi A. & Murray V., (2015), Disaster risk reduction; a cross-cutting necessity in the SDGs, United Nations Sustainable Development Knowledge Platform
- Albala-Bertrand J. M., (2004), Urban Disasters and Globalization. In Kreimer A., Arnold M. & Carl A., World Bank-Disaster Risk Management Series No III, World Bank Publications
- Alwang J., Siegel P. & Jørgensen S., (2001), Vulnerability: A View from Different Disciplines, Social Protection Unit, Human Development Network, The World Bank
- Bangladesh Disaster Report, (2012), Foundation for Disaster Forum
- Bangladesh Gazette, (2012), Government of the People's Republic of Bangladesh, Additional issue, September 2012, Page No. 173441-173471
- BFSCDA, (2007), BFSCDA Annual Report 2001-2007. In: Bangladesh Fire Service and Civil Defense Authority, Dhaka
- CDMP (Comprehensive Disaster Management Programme), (2010), Earthquake Contingency Plan for Dhaka City Corporation, Ministry of Food and Disaster Management for Earthquake and Tsunami Preparedness Project
- Creswell J. W., (2013), Qualitative inquiry and research design: choosing among five approaches, Third Edition, Thousand Oaks: SAGE Publications
- Creswell J. W., (2014), Research Design: Qualitative, Quantitative and Mixed Methods Approach, Fourth Edition, Thousand Oaks: SAGE Publications
- Denscombe M., (2003), The Good Research Guide for small scale social research projects, Second Edition, Open University Press
- DIPECHO, (2010), Phase V, Urban Risk Assessment, A facilitator's guidebook
- DMB (Disaster Management Bureau), (2010), National Plan for Disaster Management 2010-2015, Disaster Management & Relief Division
- DMINB (Dhaka Mahanagar Imarat Nirman Bidhimala), (2008), Dhaka Metropolitan Building Construction Rules
- German E., (2010), Dhaka: Fastest megacity in the world. In: PRI, Public Radio International
- Hai V. M. & Smyth I., (2012), The Disaster Crunch Model, Oxfam
- Hansford B., (2011), Reducing risk of disaster in our communities, ROOTS, Second Edition
- Ishtiaque A., Mahmud M. S. & Mahmudul H. R., (2014), Encroachment of Canals of Dhaka City, Bangladesh: An Investigative Approach. In: GeoScape, the journal of Jan Evangelista Purkyne University, Volume-VIII, Issue-I, June 2014, Page No. 48-64
-

Islam M. M. & Adri N., (2008), Fire Hazard Management of Dhaka City: Addressing Issues Relating to Institutional Capacity, Jahangirnagar Planning Review, Volume- VI, Page No. 57-67

Khan H. & Khan A., (2008), Disaster management cycle – a theoretical approach. In: Management & Marketing 6(1):43-50, January 2008 edition

MoDMR (2017), National Plan for Disaster Management (2016-2020), Building Resilience for Sustainable Human Development, published by Government of the People's Republic of Bangladesh

MoFDM, (2010), Standing Orders for Disaster, Disaster Management & Relief Division, Disaster Management Bureau

Patton M. Q., (2002), Qualitative evaluation and research methods, Third Edition, Thousand Oaks, Sage Publications, Inc.

Paul B.K. & Bhuiyan, R.H., (2010), Urban Earthquake Hazard: Perceived Seismic Risk and Preparedness in Dhaka City, Bangladesh

Prothom Alo, (2014), 321 risky buildings identified in Dhaka, Daily Prothom Alo, Published on June 16, 2014

Rahman K. M. A. & Debnath S. C., (2015), Water Logging and Losses in Ecosystem: A Case Analysis on DND Embankment, Bangladesh. In: International Research Journal of Interdisciplinary & Multidisciplinary Studies, Volume-I, Issue-VIII, September 2015, Page No. 27-33

Raihan, S., (2016), Is Bangladesh all set to be a middle income country? Daily Star, Published on March 06, 2016

Salman S., (2017), Over 16,000 fire incidents took place last year, The Daily Sun, March 25

Sarker S., (2014), Fire Hazard in Dhaka City: History, Spatial Distribution, Causes and Consequence, Disaster Management Watch

Saunders M., Lewis P. & Thornhill A., (2009), Research methods for business students, Fifth Edition, Harlow, Pearson Education

SFDRR, (2015), Sendai Framework for Disaster Risk Reduction 2015-2030, United Nations

Shafi S. A., (2010), Round Table Discussion on Implementation of National Building Code

Shaw R., (2014), Urban Disaster Risk Reduction Framework: Assessing Urban Resilience in World Vision Project Sites in Bangladesh, China, and Indonesia Final Report, World Vision International

Somik V. Lall S. V. & Deichmann U., (2009), Policy Research Working Paper, Density and Disasters: Economics of Urban Hazard Risk, The World Bank Finance, Economics, and Urban Development Department

Stott C. & Nadiruzzaman M., (2014), Disaster risk reduction in Dhaka city: from urban landscape analysis to opportunities for DRR integration, International Centre for Climate Change and Development, World Vision International

Tawhid K. G., (2004), Causes and Effects of Water Logging in Dhaka City, Bangladesh, Department of Land and Water Resource Engineering, KTH, Stockholm

Tellis W., (1997), Introduction to case study, The Qualitative Report

Trochim W., (2000), The Research Methods Knowledge Base, Second Edition, Atomic Dog Publishing, Cincinnati, OH

United Nations (UN), (2010), Local Governments and Disaster Risk Reduction: Good Practices and Lessons Learned, UNISDR, Geneva

United Nations (UN), (2014), Department of Economic and Social Affairs, World Urbanization Prospects: The 2014 Revision Highlights

United Nations International Strategy for Disaster Reduction (UN/ISDR), (2009), UNISDR terminology on disaster risk reduction, UN/ISDR, Geneva

United Nations International Strategy for Disaster Reduction (UN/ISDR), (2004), Living with risk: a global review of disaster reduction initiatives, 2 vols. United Nations, Geneva

United Nations International Strategy for Disaster Reduction (UN/ISDR), (2015), Disaster risk reduction and resilience in the 2030 agenda for sustainable development, New York UNHQ Liaison Office
