

# URBAN EARTHQUAKE MANAGEMENT CHALLENGES IN BANGLADESH

## A CASE STUDY

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**Abstract:** These In spite of the increasing urban earthquake risk and almost no comprehensive approach to deal with the risks in Bangladesh, there are practically very few attempts to look into the disaster risk and vulnerability beyond the narrow view of approaches seeking mere technical input oriented solutions. With this understanding through literature review, the present study aimed at identifying the existing challenges in urban earthquake disaster management taking a case of community based earthquake disaster management initiative which was a part of a one-year pilot project on “Establishing Partnership for Disaster Preparedness” undertaken by ActionAid Bangladesh. Earthquake prone four wards at the urban context of Chittagong district constituted the study area. To identify the challenges the study captured a multidisciplinary perspective using qualitative techniques of data collection that included key informant interviews, focus group discussions, and case study analyses. The project aimed to establish a collective effort for reducing risk and vulnerability of these earthquake prone communities through developing partnership among the communities and NGOs, Civil Society Organisations, Business Groups and the Government to improve the level of disaster preparedness of most vulnerable families, schools, and hospitals.

The study revealed the following major challenges on the way to successful earthquake management in an urban context:

- minimising/overcoming gaps in urban planning to reduce the increasing risks
- effectively utilizing educational institutes to reduce the impacts of the urban risks
- establishing functional linkages with all different stakeholders;

- Strengthening the capacity of all the stakeholders along with mainstreaming of risk reduction activity
- Ensuring more effective resource allocation and
- Making risk reduction an integral part of all relevant areas of concern
- Ensuring regular updated training/orientation programmes at the implementation level to enhance knowledge and raise awareness on vulnerability and management process.

Urban contexts are unique in different ways and all the findings led to the realization that disaster discourses need to be contextualized for urban earthquake risk management and responses.

**Keywords:** Community partnership, earthquake management, vulnerability.

## I. INTRODUCTION

About half of the world’s current population is urban. In the developing countries, large cities are growing at a higher rate than those in the rest of the world and the local urban population has also increased threefold between 1950 and 1990 [6]. Due to higher concentration of population, buildings, infrastructure and economic activities in small areas, the greater interplay between the different urban elements creates higher vulnerability indices compared to the same elements widely spread in a rural environment. A multiplying effect occurs in urban areas and, therefore, losses due to natural hazards are usually much more severe than in rural areas [4].

TABLE I:  
Trends in World Urban Population Settlement

Year	Total World Population (thousands)	World Urban Population (thousands)
1980	4 451 470	1 740 551
1985	4 855 264	1 988 195
1990	5 294 879	2 274 554
1995	5 719 045	2 557 386
2000	6 124 123	2 853 909
2005	6 514 751	3 164 635
2010	6 906 558	3 494 607

Source: *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2007 Revision*<sup>1</sup>

Previous research identified that exposure and vulnerability are the components of hazard that are changing fastest and with the gravest implications for urban populations [3].

Due to its geographic location, Bangladesh is regularly experiencing natural hazards namely, floods, cyclones, storm surges, droughts, tornadoes, river-bank erosions and earthquake. It has a long history of seismic tremors.

TABLE II:  
Trends in Bangladesh Urban Population Settlement

Year	Bangladesh Total Population (thousands)	Bangladesh Urban Population (thousands)
1980	88 855	13 196
1985	100 532	17 589
1990	113 049	22 396
1995	126 297	27 398
2000	139 434	32 893
2005	153 281	39 351
2010	166 638	46 770

Source: *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2007 Revision*<sup>2</sup>

The annual growth rate of urban population in Bangladesh during 1975-1995 was 3.4%, which is higher than that in the neighbouring countries and in

other largely populated countries of Asia<sup>3</sup>. Because of increasing population density in the urban areas of Bangladesh, urban population is at high risk of earthquake losses.

The results of a survey, carried out under Phase-1 of the Comprehensive Disaster Management Programme (CDMP)<sup>4</sup> revealed that around 250,000 buildings in the three major cities of Bangladesh—Dhaka, Chittagong and Sylhet—are extremely vulnerable to earthquakes, according to a recent survey. Some 142,000 among 180,000 buildings in Chittagong; 24,000 out of 52,000 in Sylhet; and 78,000 out of 326,000 buildings in Dhaka were detected as risky<sup>5</sup>.

The data available on earthquake in Bangladesh is given below<sup>6</sup>:

TABLE III:  
1907-2004 Earthquakes in Bangladesh

DISASTER	EARTHQUAKE
# EVENTS	6
TOTAL KILLED	34
AVG. # KILLED	6
TOTAL AFFECTED	19,125
AVG. # AFFECTED	3,188

Source: Bangladesh Natural Disaster Profile<sup>5</sup>

Basic Facts:

Area: 144,000 km<sup>2</sup> GDP (PPP): \$258.8 billion

Coastline: 580 km GDP Per Capita: \$1,900

Population: 141,340,476 Population Below Poverty Line: 35.6%

Experts suspect that if an earthquake with a 7.0 magnitude occurred in large cities of Bangladesh, there would be a major human tragedy due to the structural failure of many buildings [5].

In spite of the increasing urban earthquake risk and almost no comprehensive approach to deal with the risks in Bangladesh, there are practically very few attempts to look into the disaster risk and

<sup>1</sup> Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2007 Revision*, retrieved on Sunday, January 31, 2010; 3:32:25 AM

<http://esa.un.org/unup>

<sup>2</sup> Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2007 Revision*, retrieved on Sunday, January 31, 2010; 3:32:25 AM

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<sup>3</sup> Banglapedia, retrieved on Sunday, January 31, 2010; 3:32:25 AM [http://www.banglapedia.org/httpdocs/HT/M\\_0235.HTM](http://www.banglapedia.org/httpdocs/HT/M_0235.HTM)

<sup>4</sup> The CDMP is being supported jointly by UNDP, DFID and European Commission in collaboration with Bangladesh government.

<sup>5</sup> Asian Tribune, Asian Tribune is published by World Institute For Asian Studies, Powered by World Institute for Asian Studies (WIAS) Vol. 9 No. 283

<http://www.asiantribune.com/news/2009/08/28/bangladesh-around-250000-buildings-three-major-cities-vulnerable-tremor>

<sup>6</sup> Bangladesh Natural Disaster Profile [http://www.ldgo.columbia.edu/chrr/research/profiles/pdfs/bangladesh\\_profile1.pdf](http://www.ldgo.columbia.edu/chrr/research/profiles/pdfs/bangladesh_profile1.pdf)

vulnerability beyond the narrow view of approaches seeking mere technical input oriented solutions.

It is reported in the literature that there are initiatives aimed at reducing social and economic vulnerability to disasters and investing in long-term mitigation activities but unfortunately such initiatives aimed at prevention and mitigation are few, poorly funded, and insignificant in comparison with money spent by donors and development banks on humanitarian assistance and relief, as well as on post-disaster reconstruction<sup>7</sup>.

In early 2000s, in different developed countries, United States of America, Canada, Australia, etc. at the policy level the focus was on the planning process for natural disasters and the emphasis was strong on risk assessment and the development and proper implementation of mitigation activities and programs (Wilhite, Donald A., Hayes, M. J., Knutson, Cody L. and Smith, K. H., 2000). In recent years it is claimed that, "Total Disaster Risk Management (TDRM) Approach" or, sometimes named, "Integrated Natural Disaster Risk Management (INDRM) Strategy", is a relatively comprehensive and integrated approach. It is sufficient an approach to manage all types of natural disasters at all the stages of the 'disaster management cycle'. The approach focuses on "disaster hazard and vulnerability, i.e. the underlying conditions of disasters, and emphasizes a multi-level, multi-dimensional, multi-disciplinary coordination among stakeholders" (Jiquan Zhang, Norio Okada, Hirokazu Tatano, 2005). This approach intends to integrate, complement, and enhance the existed disaster reduction and response strategies. Consequently, the approach promotes effective integration of stakeholders' action through multilevel, multidimensional and multi-disciplinary coordination and collaboration, and a critical strategy for improving disaster reduction and response. For Guzman (2002) and Guzman (2003) the priority is development and for that policy and program development in disaster reduction and response. Through ensuring wider participation of stakeholders in disaster reduction and response policy and program development, this approach can be highly effective. Although a few countries have adopted risk management concepts and principles in disaster management, most countries, especially developing countries, remain unfamiliar with this approach<sup>8</sup>. It

has three distinct but interrelated components: hazard assessment, vulnerability analysis, and enhancement of management capacity, and is more closely integrated with the ongoing development processes<sup>9</sup>.

The strategic objectives of the TDRM Approach to address disaster reduction issues and concerns more holistically, as reported by Guzman<sup>10</sup>, are three-fold (see also, Jiquan Zhang, Norio Okada, Hirokazu Tatano, 2005; Koos van Zyl, 2006):

- 1) To address holistically and comprehensively the various concerns and gaps in the different phases of the disaster management cycle by considering the underlying causes of disasters (i.e. the conditions of disaster risks) and the broader set of issues and contexts associated with disaster risk and its management;
- 2) To prevent, mitigate, prepare for, and respond effectively to the occurrence of disasters through the enhancement of local capacity and capability, especially in disaster risk management (i.e. recognizing, managing and reducing disaster risks, and ensuring good decision-making in disaster reduction and response based on reliable disaster risk information); and
- 3) To promote multilevel, multidimensional and multidisciplinary coordination and collaboration among stakeholders in disaster reduction and response as they ensure the participation of the community, the integration of stakeholders' action, and the best use of limited resources.

Instead of all these claims in favour of TDRM Approach, it is now necessary to reveal, whether using this approach, earthquake risks (physical, social, and economic) can be well managed or not.

In this context, the present study attempted to identify the existing challenges in urban earthquake disaster management using the case of community based earthquake disaster management initiative which was a part of a one-year pilot project on "Establishing Partnership for Disaster Preparedness" undertaken by ActionAid Bangladesh that took the 'disaster risk management approach' for actions.

<sup>7</sup> "Disaster Risk Management and Vulnerability Reduction: Protecting the Poor" By Dr. Suvit Yodmani, Paper Presented at The Asia and Pacific Forum on Poverty, Organized by the Asian Development Bank, retrieved on Sunday, January 30, 2010; 10:32:25 AM

<http://www.adpc.net/infores/adpc-documents/PovertyPaper.pdf>

<sup>8</sup> Towards Total Disaster Risk Management Approach by Emmanuel M. de Guzman

<http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan009657.pdf>

<sup>9</sup> 'Disaster Preparedness and Management' by Yodmani, S.

[http://www.adb.org/documents/books/social\\_protection/chapter\\_13.pdf](http://www.adb.org/documents/books/social_protection/chapter_13.pdf)

<sup>10</sup> Towards Total Disaster Risk Management Approach by Emmanuel M. de Guzman

<http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan009657.pdf>

## II. METHOD

A community based earthquake disaster management initiative which was a part of a 15 months' pilot project on "Establishing Partnership for Disaster Preparedness" undertaken by ActionAid Bangladesh served as the case for study. The project aimed to establish a collective effort for reducing risk and vulnerability of these earthquake prone communities through developing partnership among the communities and NGOs, Civil Society Organisations, Business Groups and the Government to improve the level of disaster preparedness of most vulnerable families, schools, and hospitals. It was an attempt to establish a collective effort for reducing risk and vulnerability of the selected communities.

The specific objectives of that project included:

- Minimising/overcoming gaps in urban planning to reduce the increasing risks
- Revealing effective utilizing institutions to reduce the impacts of the urban risks
- establishing functional linkages with key stakeholders and disaster management

The following dimensions of the project intervention were studied to reveal the challenges:

- Partnership
- Mainstreaming of risk reduction
- Responsiveness of institutions
- Immediate preparedness measures
  - Family preparedness plans
  - Schools contingency plans
  - Hospitals contingency plans

Earthquake prone four wards at the urban context of Chittagong district constituted the study area. Four wards were Alkaran, Patharghata, Pahartali and Uttarkattuli of Chittagong City Corporation. Alkaran and Patharghata (ward 34 and 31) are the part of old Chittagong City and are karnafuli river ports. Both of these wards are densely populated; the building structures are old and growth is unplanned. The lanes there are small and narrow and the existence of a number of schools, commercial buildings and religious institutions increases the physical and geographical vulnerabilities. The residents of these two wards are mainly poor and lower middle class families. They are not aware about the possible risks can be posed by any earthquake. The areas are also prone to 'fire' hazard and people there can report of incidences of fire in these areas that occur every year. Due to the narrow lanes, vehicles of the fire service department cannot enter and take timely measures to

put off the fire. Pahartali and Uttorkattuli (wards 9 and 10) wards are newly built residential areas. The buildings are mostly 'self built' following no building code and under no supervision by any technical person. It is a semi-hill area and the residential areas are at risk as the roads and lanes are narrow, and the accessibility for any responder after the disaster is limited.

To identify the challenges in urban earthquake disaster management the study captured a multidisciplinary perspective using secondary data and qualitative techniques that included key informant interviews, informal discussions, and household level discussions.

## III. FIELD FINDINGS

The earthquake disaster preparedness programme was incorporated into the management policy of School and Hospital. School and Hospital based disaster management committees were formed inline with the management of School and Hospital. Individual contingency plan of school and hospital were found to have been developed to reduce risk of earthquake and respond to disaster emergencies. The link with existing portfolio and mandate of school and hospital had been made through a partnership developed in facilitation of earthquake disaster preparedness activities for reduction of risk and vulnerability of earthquake.

The project reached and covered a large number households and beneficiaries and contributed to changing thinking, attitudes, behaviour and practice for the time the study was conducted (long term outcome is unknown). The following data support the above statement:

3,375 families of 135 Reflect Circles and spouse forums received orientation on 'Family Level Contingency Plan'. 663 families stored flattened rice and molasses. 1341 families were saving cash at family level for times of shortage.

At the community level, 175 circles or groups formed with mainly female as well as male and children [25 families each in one group = 3950 families] analyzed their vulnerabilities, identified safe place for taking shelter during earthquake, emergency exit route through the alleys, nearest hospitals, school buildings, ward commissioners office, family blood grouping, emergency phone numbers etc. The women developed social vulnerability and institutional mapping considering risk and hazards to earthquake.

Most of families, trained on earthquake disaster preparedness measures, during discussion of the present field study told that they are aware about the actions during and immediately after the earthquake

and know how to on and off switch of electric panel, gas lines, keeping heavy materials on the floor, clipping heavy furniture with wall, take shelter in safe place during shaking, etc. The disadvantaged poor people living in earthquake prone areas were thrilled to introduce their learning and told about the adverse impact of the previous earthquakes to their lives, livelihood, properties and belongings. Now, they believe to be capacitated at both family and community level earthquake disaster preparedness to reduce risk and vulnerability and they also introduced their awareness about their Rights to Minimum Standard during and after any disaster.

The number of families and individuals who took part in this project, responded well, but it was revealed that many of them were unable to remember many important issues introduced during the project for ensuring disaster management successfully and it need further longitudinal assessment study to reveal the long-term effect of building the community's capacity to prepare for and mitigate the effects of disasters.

Preparedness activities for schools were one of the major components of PPDP project. Three schools had evacuation plan; trained students and teachers about necessary first aid; blood grouping of the all had been done; regular simulation activities were also planned. The Chief Executive Education Officer of Chittagong City Corporation (CCC) comprehended the significance of earthquake evacuation drills/simulations at school level and asked for further coverage of other schools in the area to facilitate them. Being highly enthusiastic he precisely asked for technical support to cover total 43 schools under the jurisdiction of Education Department CCC. He has expressed his interests to build up a partnership between NGOs and CCC Education Department.

'Safe Hospital' was another component of disaster risk management. The study identified that three hospitals were prepared for mass casualty management. One of which, Bangladesh Railway Hospital, had developed their own emergency management system. Other two hospitals, Lion Eye Hospital and University of Science and Technology Bangabandhu Memorial Hospital (USTC BBMH) were found to have their own contingency plan, and were found to have conducted mass casualty management drills, and had established an emergency management committee. The hospital based earthquake disaster preparedness was found to be highly successful with active participation and involvement in simulation exercises, development of contingency plan by the Management Committees, doctors, teachers, students, nurse and staff. It is worth mentioning that USTC was found to have

incorporated disaster management issues into the curriculum of department of community medicine.

#### IV. CONCLUSION

The study revealed that there is more room than ever before for addressing the issues of risk reduction for the poor. This is also in consonance with the paradigm shift in the mainstream development practice that is now characterized by emphasis on good governance, accountability, and greater focus on bottom-up approaches.

But essentially, the resolution of urban disaster issues will require development of new collaborative strategies between victims, researchers, managers, policy makers and stakeholders in the earthquake hazard prone communities and their counterparts in the urban interest groups for regular update of the learning. Pilot projects like these show the importance and success of addressing disaster risk management but again the study established the necessity of regularly keeping people aware about the practices and otherwise they forget their learning.

The study revealed the following major challenges on the way to successful earthquake management in an urban context:

- minimizing/overcoming gaps in urban planning to reduce the increasing risks
- effectively utilizing educational institutes to reduce the impacts of the urban risks
- establishing functional linkages with all different stakeholders;
- Strengthening the capacity of all the stakeholders along with mainstreaming of risk reduction activity
- Ensuring more effective resource allocation and
- Making risk reduction an integral part of all relevant areas of concern
- Ensuring regular updated training/orientation programmes at the implementation level to enhance knowledge and raise awareness on vulnerability and management process.

Because hazards are only one part of the typical urban management agenda, hazards management in large cities should be pursued with careful regard to the context of general urban policy making and management.

Urban contexts are unique in different ways and all the findings led to the realization that disaster discourses need to be contextualized for urban earthquake risk management and responses.

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