URBAN RISK ASSESSMENT

A Facilitator's Guidebook
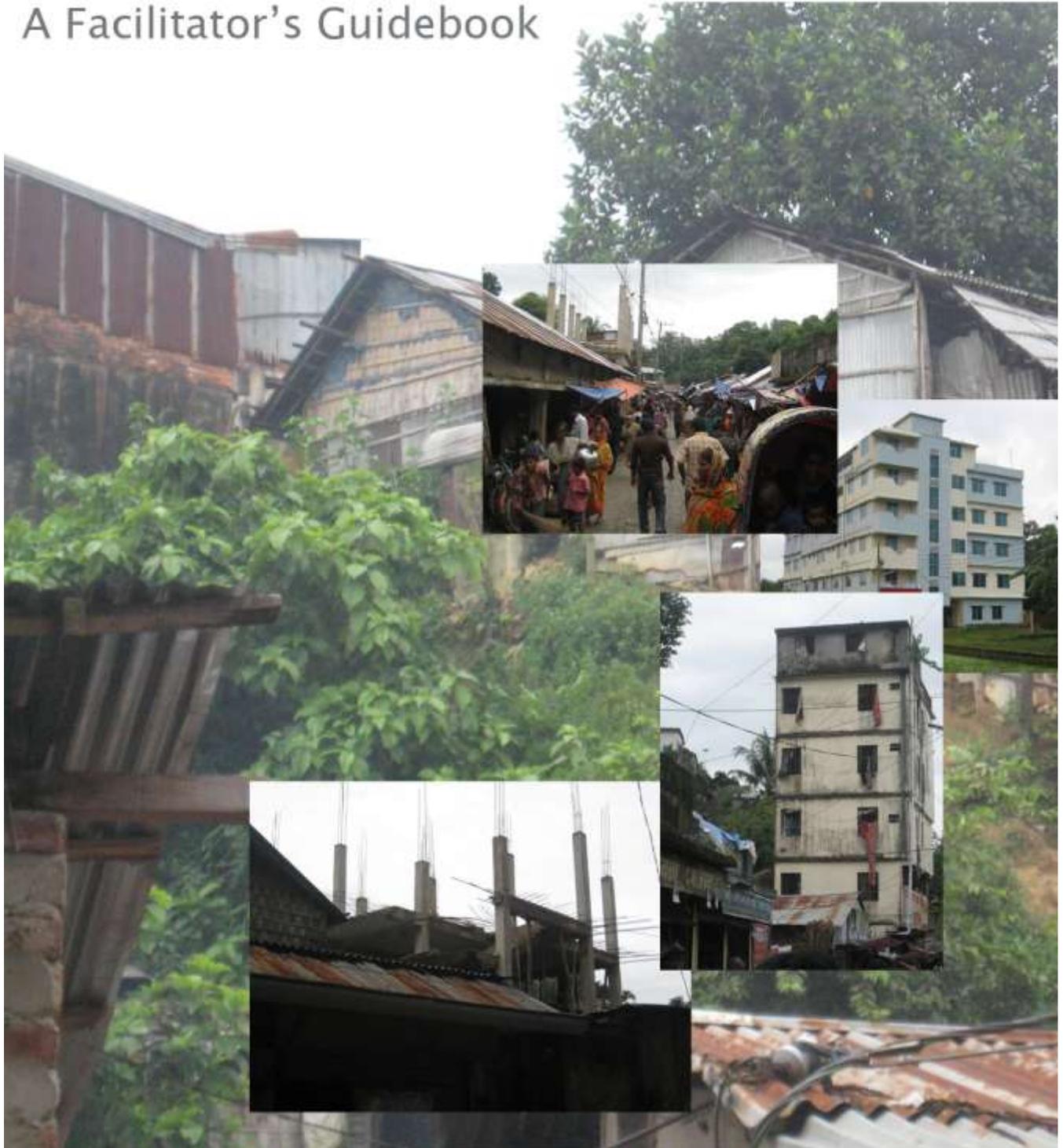
Preface

This guidebook is based on consultations with and inputs from a number of local, national, regional and international experts and stakeholders including, Comprehensive Disaster Management Program (CDMP).

In the backdrop of World Disaster Reduction Campaign on Making Cities Resilient, Plan Bangladesh and Islamic Relief Worldwide under the DIPECHO-V South Asia Plan have taken initiative in the urban areas of Bangladesh to prepare community and institutions for disaster risks. This facilitator guidebook on urban risk assessment is an attempt to bring science, institutions and society together to address the challenges posed by natural and human induced hazards to the city. The guidebook tries to scale down the urban risk assessment process from city to community level and vice-versa to encourage practitioners, government agencies, private sector and institutions such as school, hospitals, community based organizations, youth group, and children's organization to prepare for any disaster event.

This comprehensive guidebook has been developed for Bangladesh under DIPECHO SOUTH ASIA-V agreement between ADPC and Plan Bangladesh and Islamic Relief Worldwide Bangladesh with technical inputs from Handicap International. This has been developed after understanding the needs of urban community in Bangladesh by collecting primary and secondary data on hazards and vulnerability in cities of Bangladesh, related activities carried out by various agencies, and carrying out interviews and group discussions with community and different non-governmental organizations. Regional and national experiences of Asian Disaster Management Centre (ADPC), Islamic Relief and Plan Bangladesh have also been put together in realizing this guidebook.

Though care has been taken to develop this guidebook specific to Bangladesh, it will be necessary that the users of this guidebook understand the concepts used and adapt as suitable to the local conditions prevailing in various cities of the country.

Users are encouraged to send their comments on how to improve the guidebook for the future.

The ***European Commission's humanitarian aid department (ECHO)*** provides rapid and effective support to the victims of disasters beyond the European Union's borders. On average, approximately 16% of ECHO humanitarian relief is in response to sudden-onset natural disasters. The importance of disaster preparedness is clearly recognized in ECHO's mandate and in 1996 ECHO launched a specific program, DIPECHO (Disaster Preparedness ECHO) dedicated to disaster preparedness.

The DIPECHO program

Since the launch of the DIPECHO program, ECHO has invested more than €180 million in disaster preparedness. The DIPECHO program had been expanded over the years and

now covers seven disaster prone regions[1]. The projects funded by the program include simple and inexpensive preparatory measures, often implemented by the communities themselves. They have proven extremely effective in limiting damage and saving lives when hazards suddenly strike. DIPECHO projects will typically emphasize training, capacity-building, awareness-raising, establishment or improvement of local early-warning systems and contingency-planning. As any other relief provided by ECHO, DIPECHO projects are carried out by European-based aid agencies and UN agencies in close cooperation with local NGOs and authorities.

The Fifth DIPECHO Action Plan for South Asia

The Fifth DIPECHO Action Plan for South Asia was launched in 2009 with a principal objective to increase the awareness and the response capacities of local communities to potential and frequent natural disasters and to reduce the effects of these disasters on the most vulnerable. A total of 27 projects are being funded for a total of 10 M€ in Afghanistan, Bangladesh, India, Nepal and Pakistan. DRR needs in Sri Lanka and Bhutan are covered through two (2) regional projects.

For more information visit: http://ec.europa.eu/echo/

The DIPECHO Partners in Bangladesh (DPB)

In Bangladesh the European Commission is supporting six DIPECHO projects through its partners namely Actionaid Bangladesh, Islamic Relief, Concern Universal, Plan Bangladesh, IFRC and Oxfam. These six international agencies have developed a coordination forum to promote higher involvement, greater coordination and collaboration. Within the framework of the coordination forum, the DPB are working together at building the capacity of national and local disaster management governance structures, developing innovative and sustainable community-based approaches to disaster preparedness, implementing infrastructural mitigation in the most disaster-prone districts of the country, strengthening the policy framework on Disaster Management and raising general awareness and knowledge levels on DRR in the country.

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[1] The seven regions covered by DIPECHO program are the Caribbean, Central America, South America, Central Asia, South Asia, South East Asia and South East Africa and South West Indian Ocean.

Disclaimer

Abbreviations

BMD	**Bangladesh Meteorological Department**
BUET	Bangladesh University of Engineering and Technology
CRA	Community Risk Assessment
CEGIS	Center for Environment and Geoinformation Services
CDA	Chittagong Development Authority
CBOs	Community Based Organization
CCDMC	City Corporation Disaster Management Committee
CPP	Cyclone Preparedness Program
CDMP	Comprehensive Disaster Management Program
DOE	Department of Environment
DPHE	Department of Public Health and Engineering
DPO	Disabled People Organization
DPO's	District Project Officer
DVG	Disaster Volunteer Group
DCC	Dhaka City Corporation
EOC	Emergency Operating Center
FAP	Flood Action Plan
GIS	Geo Information System
IWM	Institute of Water Modeling
INGOs	International Non-Governmental Organizations
KDA	Khulna Development Authority

LECZ	Low Elevation Coastal Zone
LGED	Local Government Engineering Department
PWD	Public Works Department
PDMC	Pouroshava Disaster Management Committee
RAJUK	Rajdhani Unnayan Kartripakkha
RDA	Rajshahi Development Authority
SDA	Sylhet Development Authority
SOD	Standing Order of Disaster Management
SOP	Standard Operating Procedure
SDC	Slum Development Committee
UNISDR	United Nation International Strategy for Disaster Reduction
URA	Urban Risk Assessment

Contents

Chapter 1: Introduction to Urban Risk Assessment

1.1 Introduction

The urban population worldwide is growing at a much faster rate than the population as a whole, and by larger increments than ever before. Improving social and economic conditions for all people and promoting sustainable development is increasingly an urban challenge. As cities grow, these improvements become increasingly complex (UN, 1995). The world's urban population in 1996 was estimated at 2.6 billion. Within 10 years more than half of the world's population will be in cities, 3.3 billion of the 6.59 billion world total. Urban areas are globally expected to double to more than 4 billion people by 2025, some 80 percent of them in developing countries. The World Bank says Dhaka, with its current population of 15 million people, bears the distinction of being the fastest-growing in the world. Between 1990 and 2005, the city doubled in size — from 6 to 12 million. By 2025, the U.N. predicts Dhaka will be home to more than 20 million people — larger than Mexico City, Beijing or Shanghai. A study conducted by Handicap International and National Forum of Organizations Working with the Disabled (NFOWD) found 4.2% urban populations are living with disabilities.

The major challenge that cities of developing countries is facing is to offer basic services in terms of sustainable and equitable manner. Cities in developing countries are not been able to foresee, manage or control growth properly and this has resulted in the creation of many informal settlements and poor urban planning within the cities themselves. The concept of delimited growth and deconcentration of population has not even been considered during urban planning and development. Only selected cities in developing countries received adequate attention by their governments and investment was made accordingly by overlooking other potential cities.

The severity of the impact by natural hazards is linked to lack of proper urban development Impacts of climate change are also aggravating the vulnerability conditions of urban dwellers; for instance inaccessible and narrow roads hinder the mobility of person with disabilities in urban areas. Weak urban and local governance add to the difficulties to deal with disaster risk. Eight out of the ten most populous cities in the world have the potential to be severely affected by an earthquake, whereas six out of those ten are vulnerable to storm surge and tsunami waves[2]. Most of the governments in developing countries are in charge of critical developmental functions which are essential to reduce the risk of disasters such as land use planning, urban development planning, public works, construction safety and licensing, social services and responding to the needs of the poor and underprivileged, implementation and strengthening the decentralization process.

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[2] Chafe, Z. (2007) "Reducing natural disaster risk in cities", in *2007 State of the World: Our Urban Future*, World Watch Institute, Washington, DC.

1.2 United Nation International Strategy for Disaster Risk Reduction (UNISDR)

UNISDR coordinates global awareness campaigns in partnership with a wide range of stakeholders, including the International Day for Disaster Risk Reduction every 13 October. The 2010-2011 Campaign is specifically addressing local governments and urban risk issues "Making Cities Resilient". It responds to the call from many for establishing a National Platform for Disaster Risk Reduction, to accelerate the implementation of risk reduction activities, especially at local level. The work draws on the recent World Disaster Campaigns on safer schools and hospitals, which are features relevant also for local governments. It also builds on the sustainable urbanizations principles developed in the UN-HABITAT World Urban Campaign 2009-2013[3].

The *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disaster*s offers solutions for local government and local actors to manage and reduce urban risk. Urban risk reduction provides opportunities for capital investments through infrastructure upgrades and improvements, building retrofits for energy efficiency and safety, urban renovation and renewal, cleaner energies, and slum upgrading. Local governments are the closest institutional level to the citizens and to their communities. They play institutionally a first role in responding to crises and in attending to the needs of their constituencies, while community groups and other civil society organizations is the base. Both need to work together, in a participatory way, from assessment and planning to implementation. They deliver essential services to their citizens (health, education, transport, water, etc.), which need to be made resilient to disasters.

1.3 Why Urban Risk Assessment?

Risk assessment is an overview of the situation or conditions where community lives in hazard prone areas. This implies to know the level of risk that community is facing in that particular area within the administrative or city boundary. It also provides the spatial dimension of the risk spread across the city. Risk assessment enable environment where different stakeholders participate in the systematic approach and decide where and what disaster risk reduction intervention will be suitable in the local context. Urban risk assessment is a pre-requisite for disaster mitigation and preparedness measures as well as emergency response planning. Urban risk assessment is done to help local authorities and communities and other stakeholders to better prepare and respond to disasters. It also allows emergency management personnel to establish early response priorities by identifying in advance, potential hazards, vulnerable people and assets, and the capacities and resources that could be tapped/used during emergencies. Findings from URA have often been presented in training and educational programs as well as awareness campaigns in the pre-disaster phases. Urban risk assessments are also critical for guiding the future growth and land use pattern of cities. URA can also be integrated into the development planning process which can then identify actions that meet both development needs and reduce risk, and contribute to improved development decisions[4].

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[3] www.unisdr.org
[4] Urban Governance and Community Resilience Guides, pp-02, ADPC, 2010

1.4 What is URA?

Urban risk assessment is a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat, or harm, to people, property, livelihoods and the environment. Urban risk assessment is also a process which assists policy/decision makers, practitioners, government authorities to identify the most vulnerable communities with respect to existing hazards/disasters and allows them to develop strategies for further risk reduction interventions. While conducting urban risk assessment gives a glimpse of development and growth and highlights the bottlenecks of urban planning. At the community level, vulnerable groups are able to anticipate the possible risks and mobilize community to act together to reduce the impact of disasters.

1.5 The difference between Urban Risk Assessment and Community Risk Assessment in Rural Area

In terms of methodologies both the assessments would depend on hazard, vulnerability, capacity and risk analysis. Hazards and vulnerabilities in urban areas would certainly differ from rural and on the basis of these differences, the approach, tools and techniques will differ as well.

Risk assessment in urban areas (URA)	Risk assessment in rural areas (CRA)
Risk assessment in urban areas requires macro and micro level approach together because of the size and population of the city.	In rural areas compare to urban, size of the village is small and population will be low. Risk assessment in rural areas can be done either at micro level or macro level.
Urban risk assessment conducts the analysis based on population inflow and out during the day and night time in all season calendar	Whereas risk assessment in rural areas conducts the analysis of population which is mostly stable except during cultivation and harvesting season
Secondary data becomes the entry point in urban risk assessment	Whereas risk assessment in rural areas are mostly based on primary data.
In urban risk assessment, residential or private or commercial buildings, infrastructure, facilities and institutions are given more emphasis to assess the risk because of their location in hazard prone areas which makes people vulnerable.	In rural areas, the risk assessment gives emphasis on community institutions/organizations, asset, facilities and institutions.
Due to the dynamic nature of the city and complexities, risk assessment in urban areas need to be hazard specific and its impact on different sectors such as housing, health, livelihood, education etc. However, multi hazard approach can	In rural areas, multi hazard approach can be adopted to assess the risk in different sectors.

Risk assessment in urban areas (URA)	Risk assessment in rural areas (CRA)
be practiced in case of small cities.	
Urban risk assessment applies different approach at different level such as sectoral, target oriented, CBDRR and institutional approach to assess the risk.	Risk assessment in rural area focus on community based approach and target oriented approach.
Scientific and non-scientific tools are major requirements to conduct urban risk assessment. Such as GIS, remote sensing, risk modeling software. However, development authority/urban planning agencies do keep required scientific information in its database.	In terms of scientific and non-scientific information, assessment in rural areas depends on primary data. Though development of database in rural areas is still in slow pace.
Selective participatory tools will be applicable in conducting urban risk assessment such as institutional mapping or mobility mapping.	In case of risk assessment in rural areas, all participatory rural appraisal (PRA) tools will be applicable.

1.6 How to do URA?

Risk assessments are being conducted at all levels such as global/regional, national, city and community level. Urban risk assessment adopts a combination of scientific and non-scientific methodologies to conduct the assessment depending upon the nature of hazards and existing capacity of organization/institution as well. Scale and unit of analysis (national/regional/city/ward/community) is the driving factor in considering the scope of assessment. It is important to understand that the urban risk assessment begins at the macro level and then trickles down to micro level to see the impact on households and vulnerable community at large. Group of experts from a range of backgrounds such as urban planner, GIS experts, DRR/development practitioners, persons with disabilities or representative from Disabled People Organization (DPO) are involved in conducting the assessment at the city and ward level to provide an overview of the city or ward. Identification of natural or human-made hazards, vulnerabilities and capacity provides the probable risk to the individual, households and community.

1.7 Who is this guide for?

This guidebook has been developed for a range of stakeholders such as policy/decision makers, government and non-government organizations and donors as well. This guide takes a two stage approaches where focus has been to sensitize the readers about urban disaster risk reduction perspectives and at the same time allows practitioners to pilot with community as well.

1.8 Who are the participants of URA?

Participation of all stakeholders of the locality is essential in URA. Primary stakeholders are those who reside within the locality and are directly impacted by any hazards. Secondary stakeholders are those who may not be directly impacted but who provide support to people who are impacted. They may also have some influence (e.g. administrative, legal) or be affected (either positively or negatively) by decisions made by primary stakeholders. Participation of secondary stakeholders in URA is a critical factor for its success[5].

The diagram 1 shown below explains the stakeholders of urban disaster risk reduction.

Stakeholders of Urban Disaster Risk Reduction

National/district government decision makers, appointed local decision makers

The Urban elite:
Shape the city formally and informally and Well organized

Small scale entrepreneurs, trade unions

Daily wage earners, low level government employees, workers in the informal sectors-women, children

The Urban poor
Suffer the most, are exploited and beginning to get organized

Community based organizations

Elected local officials

Middle level government officers, national and local service providers, private sector employees, civil society organizations

The Urban middle class
Uninformed, uninterested and disorganized But has a greatest potential to bring about change

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[5] Community Risk Assessment (CRA)

Diagram 1

Impacted/Target group		Supportive
Primary Stakeholders	Ultra poor	Scientific Organizations including BMD, IWM, CEGIS, Climate Change Cell of DOE, BUET, Dhaka University, and others
	Women	
	Children	
	Elderly	
	Persons with disabilities	
	Adolescent, etc.	
	Orphan/street children	
	Marginalised groups	
Secondary Stakeholders	City Corporation, members	
	City Development Authority	
	City Disaster Management Committee	
	Local Administration	
	Public and Private service providers (e.g. Social Welfare Officer)	
	Local Influential (political/social)	
	Member of Parliament	
	Local institutional Network	
	INGOs/NOGs/DPO	

Source: CRA document

1.9 How to use this guidebook?

This guidebook has been developed by taking a two prong approach; the first part of the guidebook serves as a reference material about the urban complexities and Bangladesh. In this section it also discusses about the urban development, growth pattern and emerging problems in cities of Bangladesh. The second part of the guide is about the application of urban risk assessment where discuss will be made on work process. What strategy requires capture hazard and vulnerabilities at macro and micro level, what tools will be applicable knowing the mobility of the urban community and time factor.

This guide has been prepared for the practitioners and highlights the practical aspects of conducting URA at the field level. The Guide is written from the facilitator's perspective and provides him/her with concise procedures to follow. It contains 4 chapters, and an Annex.

1.10 What resources are needed?

Time and other resources required to conduct URA are flexible. They can vary considerably depending on the objectives; hence the guide provides scenarios and suggests timetables as well as resources based on the field experience. A list of materials is in the Annex.

1.11 Work process flow chart of Urban Risk Assessment

Scoping the Target Areas
↓
Risk Assessment from Ward to Community level
↓
Risk Analysis & Evaluation
↓
Specific Risk Reduction Options & Action Planning from community to ward level
↓
Consensus on options
→
Consensual Comm. Risk Ass. & set RR options
↑
Detailed RR strategy (incld. Preventions /mitigation & preparedness)
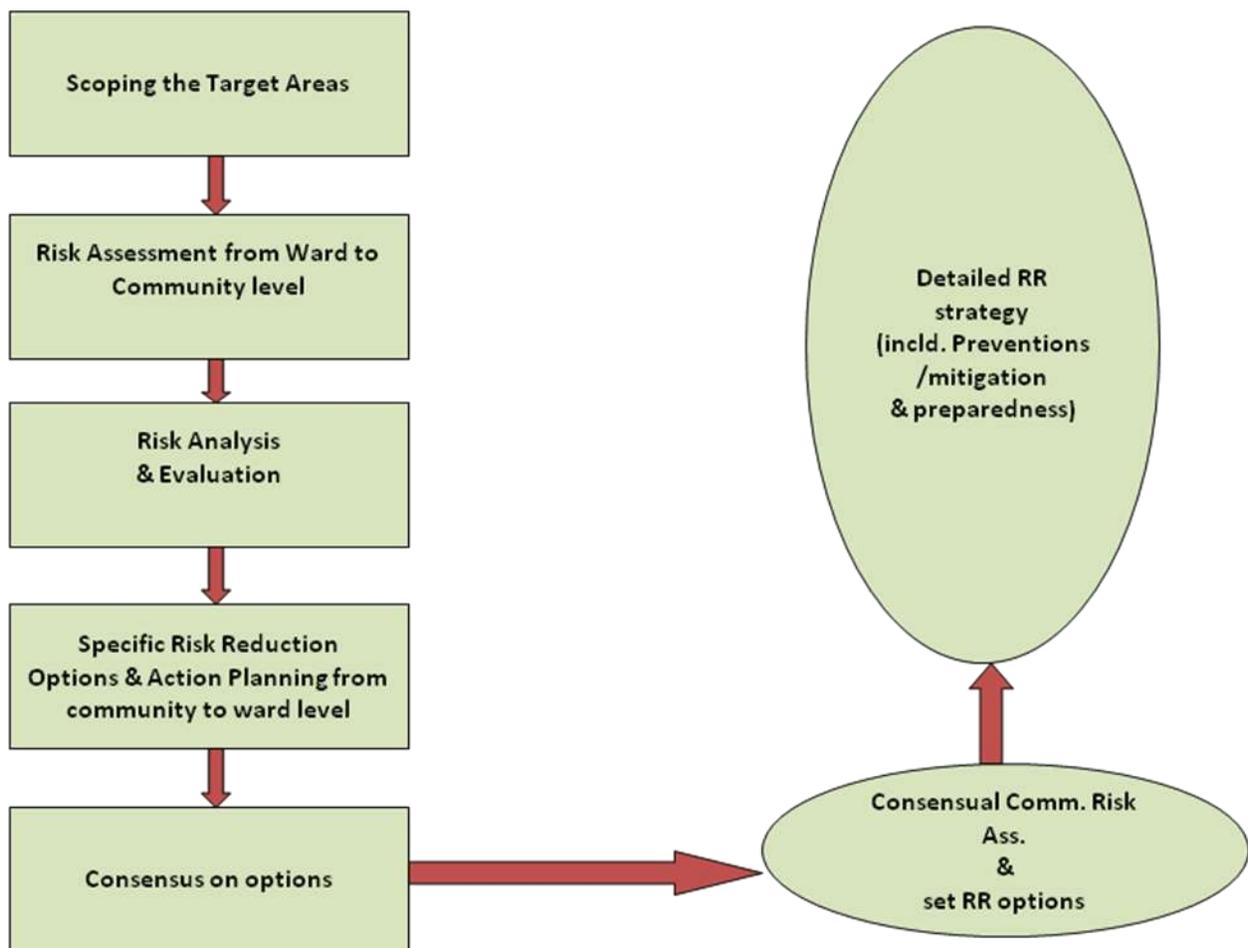
IMPORTANT!

► The urban population worldwide is growing at a much faster rate than the population as a whole, and by larger increments than ever before.

► By 2025, the U.N. predicts Dhaka will be home to more than 20 million people — larger than Mexico City, Beijing or Shanghai.

► The *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disaste*rs offers solutions for local government and local actors to manage and reduce urban risk.

► Urban risk assessment is done to help local authorities and communities and other stakeholders to better prepare and respond to disasters.

► Risk assessments are being conducted at all levels such as global/regional, national, city and community level.

REFERENCES!

✦ *Chafe, Z. (2007) "Reducing natural disaster risk in cities", in 2007 State of the World: Our Urban Future, World Watch Institute, Washington, DC.*

✦ *www.unisdr.org*

✦ *Urban Governance and Community Resilience Guides, pp-02, ADPC, 2010*

✦ *Community Risk Assessment (CRA) document.*

Chapter 2: Urban Environment and Institutions in Bangladesh

2.1 Regional perspectives of urban scenario

Urban hazards vary considerably compared to rural. It is not only represented by one-off event like earthquake or cyclones but also gets worse due to the complete collapse of basic services or public health services. The pace of urbanization in the developing world is led by Asia. Urbanization is increasingly located in the developing countries: in 1970s, 50% of urban residents lived in developing countries, whereas it is increased to 66% in 1990s, and is projected to be 80% by 2020. A majority of Asia's urban growth will be in seven developing countries: Bangladesh, China, India, Indonesia, Pakistan, Philippines and Vietnam[6].

To understand the urban risk and its impacts on local environment, it may be appropriate to deconstruct the underlying factors making urban risk more critical than in any other built-up environments. These factors may be summarized as follows (Surjan and Shaw, in press[7]):

Urban population: By 2050, the world population is expected to grow by 3 billion people. By 2030, 1 in 4 persons will live in a city of 500,000 people; and 1 in 10 persons will live in a city of 10 million population. Data shows that some 1.5 billion extra people will live in urban areas of various sizes during the period of 1994 to 2025[8]. Urban areas are characterized by high density population, which results to higher exposures. Combination of high vulnerability and exposure causes higher degree of urban risk.

Urban setting and urban planning: The tendency of cities to be located and expanded on river banks or coastal areas for economic reasons makes them more vulnerable to disasters. Number of densely populated areas in the world is in river deltas, coastal areas, seismically active zones etc. In fact, population started growing in productive floodplains and coastal zones, fertile volcanic slopes etc. as these offered most lucrative piece on the earth to settle in. The major cities in Asia are either located in the flood plain or in the coastal areas. Recent studies show that nations with largest urban population are in the Low Elevation Coastal Zone (LECZ) is China, India and Japan[9].

Urban structures: In most of the countries in Asia, the cities have poor infrastructures, with specific problems in water and electricity supply, sanitation and drainage system. Moreover, the vital infrastructures in many Asian cities have poor quality, which is shown in several recent disasters in the earthquake of 2005 in northern Pakistan, 2008 in Wenchuan earthquake in China.

Compact urban forms: Even in large urban areas, population density varies and determines the severity concentration in specific pockets of the city. Moreover, day-time and night-time density varies significantly. In downtown or in commercial and office areas, day-time population concentration is very high on working

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[6] ADB Urban Report 2003
[7] Surjan A. and Shaw R. (in press): Urban risk and disaster risk reduction. In: *Disaster Management: Global challenges and local solutions,* Shaw R. and Krishnamurthy R. eds., University Press.
[8] Urban Environmental Governance for Sustainable Development in Asia and the Pacific: A Regional Overview, UNESCAP, UN Publication, Bangkok (2005)
[9] id21 insights 71, January 2008

days. In case of Mumbai, although average city density is 27,000 people per sq km for the city, some areas have density astronomically high as 114,001 people per sq km.

Urban dependence on rural areas: Urbanization has its origin since industrialization gradually emerged in different parts of the world. The environmental impact of city on its adjoining areas kept growing resulting in larger 'environmental footprint' than ever. The ecological footprint of Tokyo is five times of Japan's land area.

Urban primacy: Many cites including Asian megacities are increasingly becoming the concentration of a particular country's major functions including physical, economic, social, political and cultural assets, which are being exposed to different types of disaster risks. For example, a hazardous event in a mega city like Manila, which is the hub of political, administrative, and economic activities of Philippines, may lead to complete disruption in the country as a whole. This makes Manila more vulnerable compared to other cities. A major earthquake striking in a city like Tokyo could have global impact specially damaging economy.

Urban informal settlements: The form and structure of informal settlements can vary from one urban context to another; however they remain 'illegal constructions'. In the urban mega cities in Asia, like Manila, Mumbai and Jakarta, almost 25 to 30% of the population lives in these informal settlements, and are exposed to different types of disasters like flood and typhoons.

Urban economic imbalances: As discussed earlier, poor tend to live in an unsafe environment. They live in most vulnerable housing, in absent of or degraded environmental conditions and hazard prone locations with very poor personal assets to help themselves in even minor emergencies. The socio-economic opportunities provided by Asian cities enable people from a wide range of income brackets to interact and live, but also create vulnerabilities resulting from lack of access to urban goods and services.

Urban services: Bigger the city, more complex is the infrastructure service systems it will have. In developed countries, urban services generally consists of complicated network spread across city and are dependent on high energy inputs and require sophisticated technology to fix problems. Dependency on infrastructure in developed world is much higher compared to developing nations. The intricate web of services makes it difficult and expensive to repair but needs attention during disasters. Provision of water supply, sanitation, become more crucial in disaster struck regions.

Urban environment: Urbanization itself, in most cases, is proved detrimental to local and regional environment. Once ecologically fragile areas now have been swallowed by expanding cities resulting in loss of biodiversity, disrupted balance of eco-systems and threat of extinction to many living organisms. In addition to this, ground subsidence, underground excavations, surface and ground water contamination, water table reduction, are some of the counter products of urbanization. In the city of Bangkok, the land subsidence is a crucial issue. In some places, the subsidence rate is almost 25 to 30 cm per year, which is caused due to over exploitation of underground water. The urban eco-system is characterized by interplay of the built, natural and socio-economic environment, which separately and collectively generate much of the risk that cities face today.

Urban management: Urbanization as a result of complex socio-economic process, poses a daunting task of managing cities. Heterogeneous societal structure, opportunist political system, lack of administrative capacities, very poor resource generation capabilities, archaic urban planning and development legislation etc contribute collectively in making city more vulnerable to poor management and disaster risks. Appropriate governance and decision making system is the core of risk reduction in urban areas. Special focus should be given to vital infrastructures like schools, hospitals and key public buildings.

In the above context, urban risks will be there in Asia, and we need to cope with these risks. Cities in developing countries of Asia also face cascading vulnerabilities that go beyond the original risk or hazard. The relevance of low probability and high consequence events should be increasingly recognized.

Climate change is becoming a threat to the urban environment. The uncertainty arises due to the changing climate, needs to be considered in the overall urban risk management framework. Climate change impacts are increasing accelerating these risks, and it is required to focus on the adaptation measures with specific emphasis on community based approaches. In several countries, new approaches to community based risk reduction have been practiced and its importance is realized. In spite of different threats, communities have their inherent capacities to cope with different types of disasters. Community resilience should be considered as an asset of risk reduction in the urban areas. An eco-community approach for informal settlement in Mumbai has proved to be effective during catastrophic flood in 2005. Similarly, the community based preparedness and neighborhood watching in Manila, Kuala Lumpur, Danang has proved to be useful to raise resident's interest in collective problem solving[10].

The forces and processes that constitute 'urban activity' have far-reaching and long-term effects not only on its immediate boundaries, but also on the entire region in which it is positioned. The causes of urban growth are varied and complex, but among the main ones are economic and environmental pressures driving people to seek a living in the towns.

2.2 Urban development in Bangladesh

Urban population has grown up to 6 % since Independence compared to national population growth which was 2.2 per cent. About 25 per cent of country's population lives in urban areas and half of this population lives in four major cities of Bangladesh; Dhaka, Chittagong, Rajshahi and Khulna.

Population

Due to rapid urbanization in Bangladesh, contribution of urban activities to the Gross Domestic Product (GDP) has increased. All the major cities of Bangladesh have outpaced national urban growth with the concentration of economic opportunities and population inflow. Most industrial activities and services are concentrated in these large cities. Dhaka alone accounts for 80 per cent of garment industry- the mainstay

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[10] **Thematic overview of Urban Risk Reduction in Asia**

of manufacturing in Bangladesh[11]. In Dhaka and Chittagong about one-tenth of labor force is engaged in garment industry which is over seven times the national average[12].
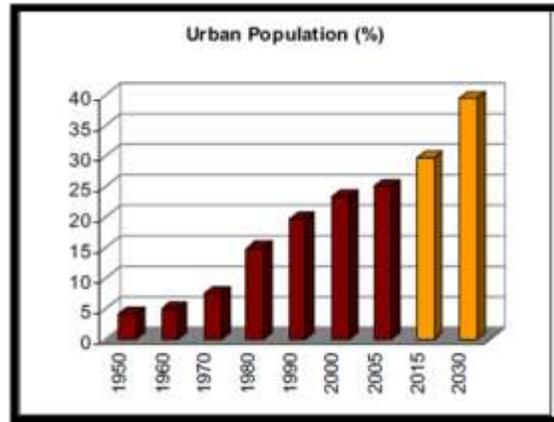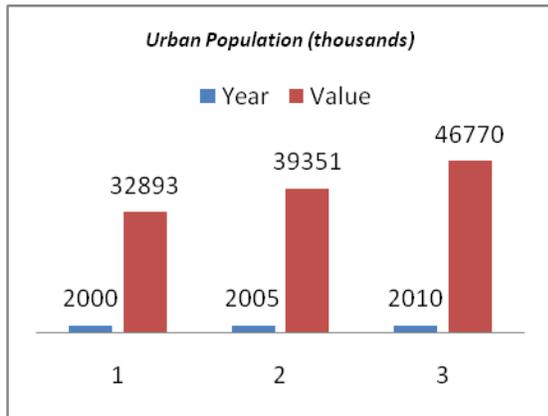
With the tremendous amount of population pressure to the cities, promotion of balance growth and development is indeed most challenging for any government in developing countries. Provision of housing and basic services, critical facilities and infrastructure development become difficult to equate with the population pressure. This leads to increase in informal settlement. The urban expansion has occurred only in terms of population size, devoid of urban facilities, let alone urbanization. It is interesting to note that four cities Dhaka, Chittagong, Rajshahi, and Barishal have never changed their rank throughout the century while other cities like Comilla, Brahmanbaria, Sirajgank, Pabna, Jamallpur and Madariapur have see rise and fall of urban activities[13].

Characteristics of cities

Urban areas have a separate set of local governments. The Bangladesh Census Commission recognized 522 urban areas in 1991 (with a population of about 5000 or more) but only about 138 of the larger urban areas among these have urban local governments. The four largest cities have a City Corporation status, while the rest are known as *Pourashava*s or Municipalities, which again are classified according to financial strength.

City Corporation	Dhaka, Chittagong, Khulna and Rajshahi
Pourashavas (Municipalities)	38
Category	Annual income level
Class I *Pourashavas*	6 million + (population)
Class II *Pourashavas*	2 million (population)
Class III *Pourashavas*	Less than 2.5 million (population)

In addition, there are also some urban centres that are under military Cantonment Boards. As the City Corporation and *Pourashavas* (Municipalities) are true urban local governments, their function,

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[11] Dhaka Urban Poverty: Land and Housing Issues, World Bank 2005
[12] Global Cities Database
[13] *Bangladesh e-Journal of Sociology*. Vol. 1. No. 1. January 2004

administration and financial structure will be further elaborated on below section 4. The large number of small urban centres are administered under the Union *Parishad* system of (rural) local government. Some urban centres have a fairly large population but have not yet been declared a Municipality and therefore also remain under Union *Parishad* management.

2.3 Structure of Urban Local Government in Bangladesh

The six major cities in Bangladesh - Dhaka, Chittagong, Khulna, Rajshahi, Sylhet and Barisal - have been awarded corporation status and are headed by City Corporations. In addition to the six major city corporations, there are 271 pourashavas (municipalities) across Bangladesh, a figure which has increased gradually in recent years. Although this trend is in line with the rapid urbanization and population growth experienced by Bangladesh.
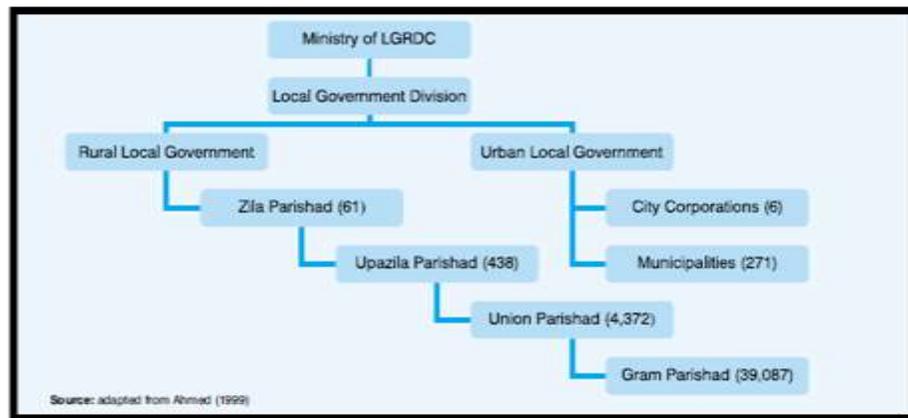
2.4 Urban local government functions

Pourashavas (Municipalities) and City Corporations constitute the two types of urban local governments. The four largest cities of Bangladesh (Dhaka, Chittagong, Khulna and Rajshahi) are City Corporations. The functions of *Pourashavas* and City Corporations are basically similar with one important difference: the 1997 *Pourashavas* Ordinance categorized the functions of Pourahsavas as compulsory and optional. This categorization does not apply to City Corporations. However, for both *Pourashavas* and City Corporations functions continue to be seen as compulsory and optional[14].

Mandatory functions

- Construction and maintenance of roads, bridges and culverts;
- Removal, collection and disposal of refuse;
- Provision and maintenance of street lighting;
- Maintenance of public streets, provision of street watering;
- Provision and regulation of water supply;
- Establishment and maintenance of public markets;
- Plantation of trees on road sides;
- Regulation of insanitary buildings and prevention of infectious diseases and epidemics;
- Registration of births, deaths and marriages;
- Provision and maintenance of slaughter houses;
- Provision and maintenance of drainage;

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[14] http://www.unescap.org/huset/lgstudy/country/bangladesh/bangladesh.html

- Control over the construction and reconstruction of buildings;
- Provision and maintenance of graveyards and burning places;
- Control over traffic and public vehicles.

Optional functions

- Checking adulteration of food products;
- Control over private markets;
- Maintenance of educational institutions and provision of stipends to meritorious students;
- Provision of flood and famine relief;
- Provision and maintenance of parks and gardens;
- Establishment of welfare homes, orphanages, prevention of begging and organization of voluntary social welfare services;
- Establishment of public dispensaries, provision of public urinals and latrines;
- Establishment of veterinary hospitals, registration of cattle sale and improvement of livestock;
- Celebration of national holidays;
- Reception of distinguished visitors;
- Establishment of public libraries and reading rooms;
- Promotion of community development schemes; and
- Naming of roads and numbering of houses.

The *Pourashavas*/City Corporations are empowered to perform a variety of socio-economic and civic functions, as described above. In practice, however, they cannot perform all these functions owing to the acute paucity of funds caused by poor and irregular collection of taxes, non-realization of taxes from government, semi-government and autonomous organizations for years together and insufficient government grants. The functions actually performed are:

- Construction and maintenance of roads, bridges and culverts;
- Removal, collection and disposal of refuse;
- Provision and maintenance of street lighting;
- Provision of water supply;
- Establishment and maintenance of public markets;
- Provision, maintenance and regulation of graveyards and burning places;
- Registrations of birth, deaths and marriages;
- Maintenance of slaughter houses;
- Control over private markets;
- Provision and maintenance of parks and gardens;
- Naming of roads and numbering of houses;
- Provision of nominal stipends to primary education institutions; and
- Slum improvement.

Apart from the formal functions described above, the *Pouroshavas*/City Corporations perform some additional functions such as issuance of certificates and settlement of petty disputes (over ownership/control of land, houses and markets) through discussions with concerned parties and with the help of commissioners and other functionaries. Some of the more important certificates are character, nationality, birth, death and succession certificates. Character and nationality certificates are required for

job applications and admission to educational institutions. Birth, death and succession certificates are issued to the legal heirs on request and are also necessary for mutation of land ownership.

2.5 Service providers in urban areas

City Corporation and Pouroshava: The main services of the city corporation is to look after sanitation, solid waste disposal, road building and maintenance, street lighting, traffic signaling, development of parks and playground, poverty alleviation and slum improvement. To facilitate the above mentioned activities, the city corporation gets financial support through property taxes, conservancy, lighting and water rates, fees, fines, rental income, government grants and donor funds.

Water and Sewerage Authority (WASA): provides services related to drinking water supply and sewerage and to offer these services, WASA collects fund from water tariffs, loans, grants from government and donors

Development authorities- Rajdhani Unnayan Kartripakkha (RAJUK), Chittagong Development Authority (CDA), Rajshahi Development Authority (RDA), Khulna Development Authority (KDA and Shylhet Development Authority (SDA)- the role of development authority is look after planning and development of physical infrastructure**.**

Department of Environment- is responsible for environment protection and control and entirely depends on the government budget.

Specialized authorities-PWD, NHA, DPHE and LGED- these authorities are responsible for civil works, housing and physical development of the cities.

Department of Social Services

The Department of Social Services is the implementing wing of the Ministry of Social Welfare and has offices up to the remote Upazilla (sub-district) level across the country. Disability is only one amongst many different vulnerable target groups they address.

2.6 Disaster management institutions at the local level in cities

At the city level there is a disaster management committee headed by the mayor. The committee is composed of all pouroshava/city corporation councilors, representatives from all the government departments, NGOs and CBOs. Chief Executive Officer of pouroshava/city Corporation is the member secretary of the committee. The committee is required to meet monthly during normal period and as and when necessary during the emergency situation. There will be a plan for each pouroshava/city corporation titled, "Pouroshava/City Corporation Disaster Management Plan" to be prepared by the "Pouroshava/City Corporation Disaster Management Committee having linkages with the National Plan for Disaster Management.
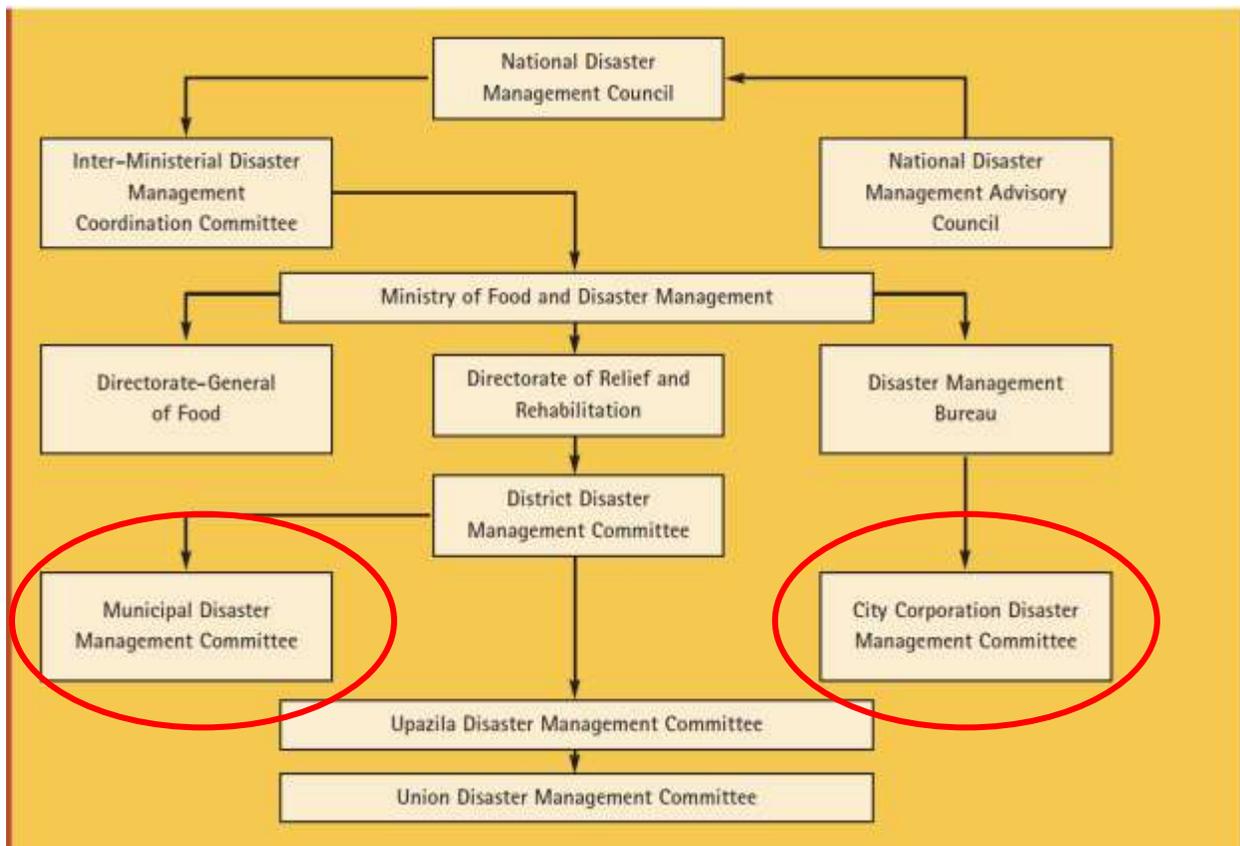
Pourashava Disaster Management Committee (PDMC): It is headed by Chairman of Pourashava (municipality) to co-ordinate, review and implement the disaster management activities within its area of jurisdiction.

City Corporation Disaster Management Committee (CCDMC): It is headed by the Mayor of City Corporations to co-ordinate, review and implement the disaster management activities within its area of jurisdiction.

At present there is an absence of disaster management committee at the ward level, lowest administrative unit at the city level. However, there are initiatives from I/NGOs to establish ward disaster management committee (WDMC). Islamic Relief Worldwide and Plan Bangladesh have facilitated the ward disaster management in line with city corporation/pouroshava disaster management committee. Structure of ward disaster management committee can be referred from Islamic Relief Worldwide and Plan Bangladesh experiences. The standing order of disaster management (SOD) provides the details of roles and responsibilities in normal, during and post disaster time.

2.7 Problems of urban development

Urbanization in Bangladesh poses two kinds of challenges: addressing the unbalanced structure of urbanization in the country and marshalling the efforts needed to solve the problems of individual urban areas or cities. Urban areas also experience widespread problems with both access to and quality of

services. Rapid urbanization has made ensuring access to services difficult, and has diminished the quality of existing services. It is therefore necessary to address immediately the first generation of service delivery problems such as access. Urban local government institutions, especially the major municipalities and city corporations, are not adapted to the needs of urban poor. For example, a ward member in Dhaka represents approximately 100,000 people and cannot provide adequate representation to the needs of the urban population, especially the poor. Also, there is a large number of floating populations, who belong to the poorest strata of the society, and remain out of reach of any institutional services in the absence of any explicit urban policy framework by the government[15].

At the individual city level, there are innumerable problems not only in the large urban areas but also in small urban centers. Their problems vary in dimension. These include:

1. A weak economic base in most towns and cities. Poverty and inequality are common problems.
2. Inadequate urban utility services (water, sanitation and sewerage, electricity, gas fuel, telephone, solid waste management etc)
3. Insufficient transport facilities and poor management of traffic. This situation leads to traffic congestion in most cities and towns
4. Inadequate education, health, and recreation services
5. Housing problems, which are particularly serious for those in the lower income strata. The problem manifests itself in the proliferation of slums and squatter settlements, especially in large cities
6. Deteriorating environmental conditions in cities and towns. Air pollution, water pollution and even sound pollution in cities and towns.
7. Poor planning, design and implementation of building code e.g. universal design and accessibility.

IMPORTANT!

► **The tendency of cities to be located and expanded on river banks or coastal areas for economic reasons makes them more vulnerable to disasters.**
► **In most of the countries in Asia, the cities have poor infrastructures, with specific problems in water and electricity supply, sanitation and drainage system.**
► **The form and structure of informal settlements can vary from one urban context to another; however they remain 'illegal constructions'.**
► **Bigger the city, more complex is the infrastructure service systems it will have.**
► **Due to rapid urbanization in Bangladesh, contribution of urban activities to the Gross Domestic Product (GDP) has increased.**
► **The Bangladesh Census Commission recognized 522 urban areas in 1991**
► **In addition to the six major city corporations, there are 271 pourashavas (municipalities)**

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[15] Bridging Urban Divide: MDG Perspectives by Ashekur Rahman

across Bangladesh.

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Chapter 3: Urban Hazards and Disaster in Bangladesh

2.1   The urban transition from security to risk

In the very beginning of early 80s cities were considered as places for opportunities to live and earn livelihood and this reflection is still very much and at the same time, cities have also become hotspot for disaster risk as well. From where the risk comes from; it comes mainly from increasing inequality, sustained poverty and failure of governance, crowded living conditions and population density. This force people who are poor and persons with disability came to city in search of livelihood and begging especially persons with disabilities and live in hazardous place and over the time hazardous places exist more than safer places in the city. On one hand cities attract better opportunity in terms of investment of human resource, material and financial which can bring security for the city while on the other hand basic services and governance have not delivered equitable and sustainable risk reduction either as part of development or in response and reconstruction from disaster events.

2.2   Trends of natural and human disasters in Bangladesh

Bangladesh does not require introduction to disasters. The country has always suffered and responded to severe disasters in 20th and 21st centuries. The northern part of Bangladesh is prone to floods where as southern affected is from cyclone. These two hazards are regular phenomenon in the country. Earthquake is the potential risk and Bangladesh will be under litmus test if tremor with intensity such as Haiti occures.

The risk in urban areas intensifies in the presence of huge population density and location matters where people have no choice other than to live in the hazard prone areas. In rural areas, natural hazards are still a biggest risk whereas in urban areas both natural and human made hazards possess the same risk to the people.

The table clearly shows the major natural hazards and disasters in Bangladesh. Floods and cyclones have

Top 10 Natural Disasters in Bangladesh for the period 1900 to 2010		
Disaster	**Date**	**Damage (000 US$)**
Flood	5-Jul-98	4,300,000
Cyclone	15-Nov-07	2,300,000
Flood	20-Jun-04	2,200,000
Flood	Jun-88	2,137,000
Cyclone	29-Apr-91	1,780,000
Cyclone	15-May-95	800,000
Flood	Aug-87	727,500
Flood	Jul-74	579,200
Flood	Sep-00	500,000
Source: EM-DAT		

Date	Name of Earthquake	Magnitude (Richter)	Epicentral Distance from Dhaka (km)	Epicentral Distance from Sylhet City (km)	Epicentral Distance from Chittagong (km)
10 January, 1869	Cachar Earthquake	7.5	250	70	280
14 July, 1885	Bengal Earthquake	7.0	170	220	350
12 June, 1897	Great Indian Earthquake	8.7	230	80	340
8 July, 1918	Srimongal Earthquake	7.6	150	60	200
2 July, 1930	Dhubri Earthquake	7.1	250	275	415
15 January, 1934	Bihar-Nepal Earthquake	8.3	510	530	580
15 August, 1950	Assam Earthquake	8.5	780	580	540

Source: Choudhury, 2005

devastated the country several times. Floods of 1988 and cyclone of 1991 was the wakeup call for country, government, civil society and community. Since then Cyclone Preparedness Program (CPP) and Flood Action Plan

(FAP) continues to build the community resilience in both urban and rural areas of Bangladesh. Despite of the initiatives of government on disaster risk management and due to urban complexities pose huge challenge to address the risk. Earthquake still remains the major threat for Bangladesh and cities in particular.

Floods

The fundamental physical fact regarding Bangladesh is that, together with West Bengal, it constitutes a

delta. While most other deltas are creation of single rivers, (like the deltas of the Nile, Mississippi, Yangtze, etc.), the Bengal delta is the creation of three mighty rivers, namely the Ganges, the Brahmaputra, and Meghna. This makes the dimensions of Bengal delta simply enormous. Floods are annual phenomena with the most severe occurring during the months of July and August. Regular river floods affect 20% of the country increasing up to 68% in extreme years. The floods of 1988, 1998, 2004 and 2007 were particularly

Map of Flood
Jamalpur Pourashava, Jamalpur

Legend
Road
Flood 2007
Rail line
Water body
Brammaputtra river
Pourashava boundary

0.07 0 0.070.140.210.28 Kilometers

Source: Jamalpur Pourashava, 2008
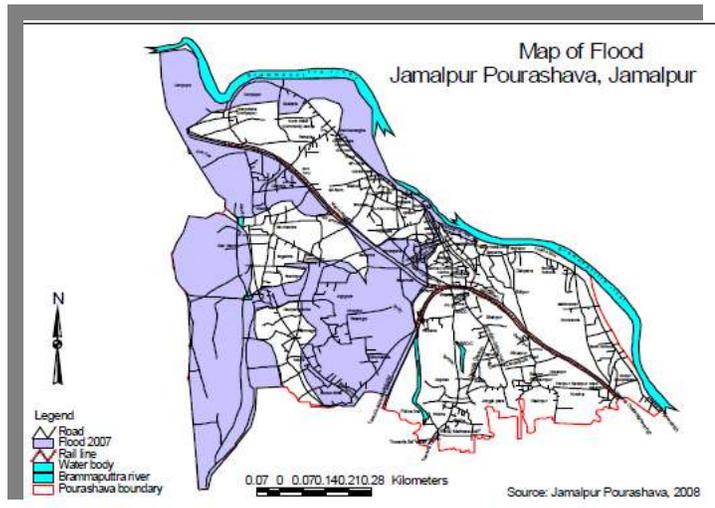
catastrophic, resulting in large-scale destruction and loss of lives. The 1988 and 1998 floods were catastrophic in Dhaka city. It was estimated that 85% of the city was inundated ranging from 0.3 to 4.3 meters. In 1998, 58% city was in water. Several other cities like Sirajganj, Jamalpur and Sherpur are also getting affected by floods on regular basis.

Cyclone

Tropical cyclones from the Bay of Bengal accompanied by storm surges are one of the major disasters in Bangladesh. The country is one of the worst sufferers of all cyclonic casualties in the world. Most of the cyclones that have made landfall in Bangladesh in the past have caused thousands of deaths. During the cyclone SIDR, the damage in Bangladesh was extensive. About a quarter of the World Heritage Site "Sunderbans" was damaged. The entire cities of Patuakhali, Barguna and the Jhalokati District were hit hard by the cyclone's surge of over 5 meters (16 ft). There was extensive flood damage at Barisal and at Baniashanta, across from the port city, Mongla, as the cyclone's surge rolled in. In the town of Mothbaria, one of the towns in the very center of the devastation, there was hardly anything left standing, except of a few brick and concrete buildings. Houses and and schools were demolished. The storm's surge washed away all roads in the region. About 500

Risk and Resource Map of Chittagong City

fishing boats were unnaccountable and over 3,000 fishermen were reported missing.

Earthquake

Bangladesh and the northeastern Indian states have long been one of the seismically active regions of the world, and have experienced numerous large earthquakes during the past 200 years. A recent study by Comprehensive Disaster Management Program (CDMP) on the liquefaction susceptibility of Dhaka indicates that the city's eastern and southwestern parts lie within the high to very high liquefaction susceptibility range. These parts are recently filled and developed marshy lands.

The CDMP study also identified several active faults within Bangladesh, based on historical events and evidence from geological investigations. The Madhupur and Dauki faults, about 90 and 230 miles, respectively, from Dhaka, are those identified by experts. The 1985 Mexico City earthquake caused a considerable amount of damage, even though the source was 240 miles from the city. In Dhaka, an earthquake from either Madhupur or Dauki may cause severe liquefaction effects to buildings, especially those developed on marshy lands on the eastern and western fringes, and even within the city in the infill areas like Begunbari, part of Mirpur etc.
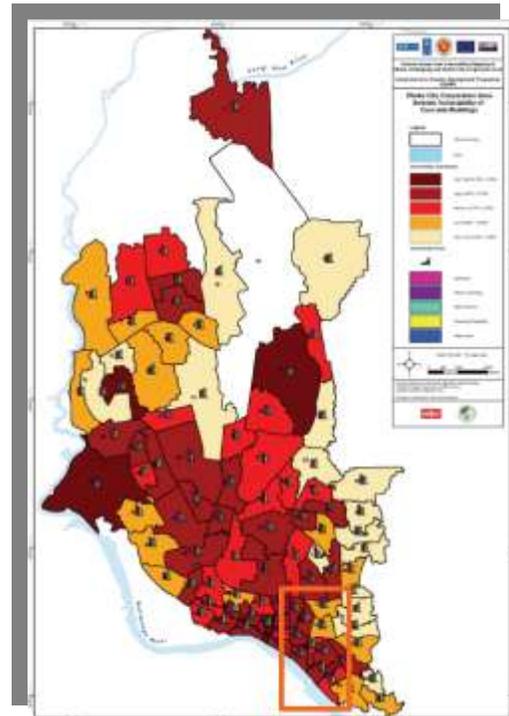
Landslide

Large and small landslides occur almost every year in nearly all regions of the world. In the past, landslide was not considered a major hazard in Bangladesh. However, recently landslide has emerged as a major hazard, particularly after the Chittagong Landslide 2007. Due to heavy rainfall during 10-11 June 2007, landslide and collapsed walls caused widespread damages in six areas of Chittagong city and in different Upazilas of the district. More than 120 people have been reported dead due to Chittagong Landslide.

Water logging

Water logging is also a big problem in cities of Bangladesh. This is the consequence of unplanned development. Due to rapid urbanization with unplanned construction, most of the storm water drainage have been encroached, filled up, diverted and caused obstruction to the smooth flow of water to the outfall-rivers, creating severe water-logging in the city every year during monsoon incurring huge loss in terms of adverse social, physical, economic and environmental costs. Heavy rainfall various cities bring in to a virtual standstill, demanding urgent need for long term planning to overcome water logging problem. The problem is exceptional and the government and development authorities have no control over the weather. Nevertheless, the devastating impact of the downpour that paralyzes these cities is a salutary reminder of the severity of the problem, and the necessity for the government to take counteractive measures on a

priority basis[16].

Fire

Fire hazards occur frequently in Bangladesh. Fire causes huge loss of lives and properties every year. Although termed as 'fire accident', most fire events are far from being accidental. Indeed, most fires are preventable. Industrial units, particularly garments industry, produce deadliest of the fires. For example, a fire broke out on 6 January 2005 on the fourth-floor of a building housing a factory in Narayanganj. It took fire-fighters four hours to extinguish the

Some fatal accidents in Bangladesh's garment factories	
November 2000	About 200 workers trapped in a burning factory were either killed or injured
August 2001	26 workers died trying to escape in a fire
June 2004	50 workers died in a stampede tragedy caused by false fire alarm
January 2005	22 workers died as fire engulfed a factory at Dhaka
April 2005	149 night-shift workers were killed as their factory building collapsed
June 2005	Fire incident in a garment factory leaving 14 workers injured

Source: http://cms.2456.com/mmmv207/adsale/media/20051011000325fs2l.jpg

blaze. Dozens of workers were injured as they desperately tried to escape down the narrow smoke-engulfed stairs. About 23 people died because they were unable to escape because many of the exits were blocked, and the fire extinguishers were not working.

Table shown below is compilation of existing hazards in various cities of Bangladesh:

Cities	Hazards	
	Natural	Human made
Dhaka	Earthquake, Floods	water logging, Fire, Building collapse, epidemics
Chittagong	Cyclone, earthquake, landslide	Fire, Building collapse, epidemics
Rajshahi	Floods, drought, river erosion, heat wave	
Khulna	Cyclone, Flood, tropical storm	
Sylhet	Earthquake, Landslide	Water logging,
Bandarban	Earthquake	
Rangamati	Earthquake	
Jamalpur	Floods, river erosion	Fire, water logging
Barishal	Cyclone, tropical storm, impact of climate change	

* Note: It has been observed that most of the stakeholder does not have/capitalize information regarding number of people being injured and subsequently becomes disabled from any disaster. Eventually none of the statistics reflect the situation of persons with disabilities during and/or after disaster

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[16] School Safety Manual, 2010
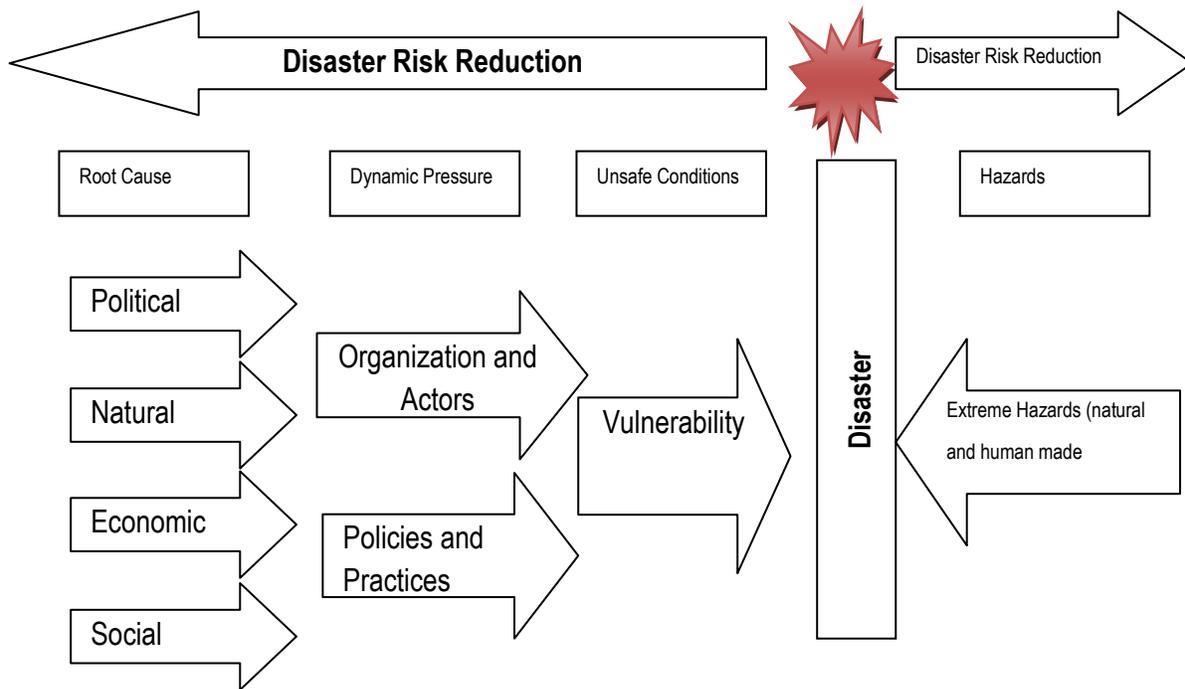
The Crunch Model

Let us take the trigger events, unsafe conditions, dynamic pressure and root cause to describe this model.

Hazard: is an event that could lead to danger, loss or injury. One example is an earthquake. An earthquake is one part the world can lead to the loss of many lives and destruction of buildings, roads and bridges. However, an earthquake of the same strength in another country may cause much less devastation. This may be because buildings are stronger, communities are better training. A hazard itself does not become threat only when it meets a vulnerable situation does a disaster happen. For example many parts of Dhaka city are built on marshy land and in case of earthquake the impact can be devastated. In western Dhaka, housing estates were initiated over the last two decades. In 1996, there were 211 acres of water bodies in the Mohammedia housing estate and Adabbor area. During development, about 91 acres of water bodies disappeared between 1996 and 2006 and 68 acres between 2006 and 2009[17].

Unsafe condition: people are vulnerable when they are unable to anticipate, withstand and recover from hazards. Poverty, living with disability contributes to vulnerability. People's lives rely on a number of different elements. These elements include houses, water supplies, social groups and networks, saving, jobs and the natural environment. If these elements are vulnerable, the hazard is more likely to cause damage to them.

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[17] Dhaka in danger, Md. Anisur Rahman 2010

Dynamic Pressures: Vulnerable conditions exist because of pressure acting on individuals and communities. We might not be aware of these pressure and they are often difficult to challenge. Pressures are structure and processes that create vulnerable conditions.

- Who is responsible for creating vulnerable conditions? Government agencies, public and private institutions or individuals, neighborhood or community. These are called the structure.

- How structure affect the vulnerable conditions, such as through policies and practices. These are called the process.

Underlying causes: The underlying causes may be political ideas, economic principles or due to cultural issues. People's vulnerability at local level can often be linked back to poor governance, inequality, lack of proper planning, and lack of land use control mechanism. These issues may seem far from the affected community but they can have powerful influence.
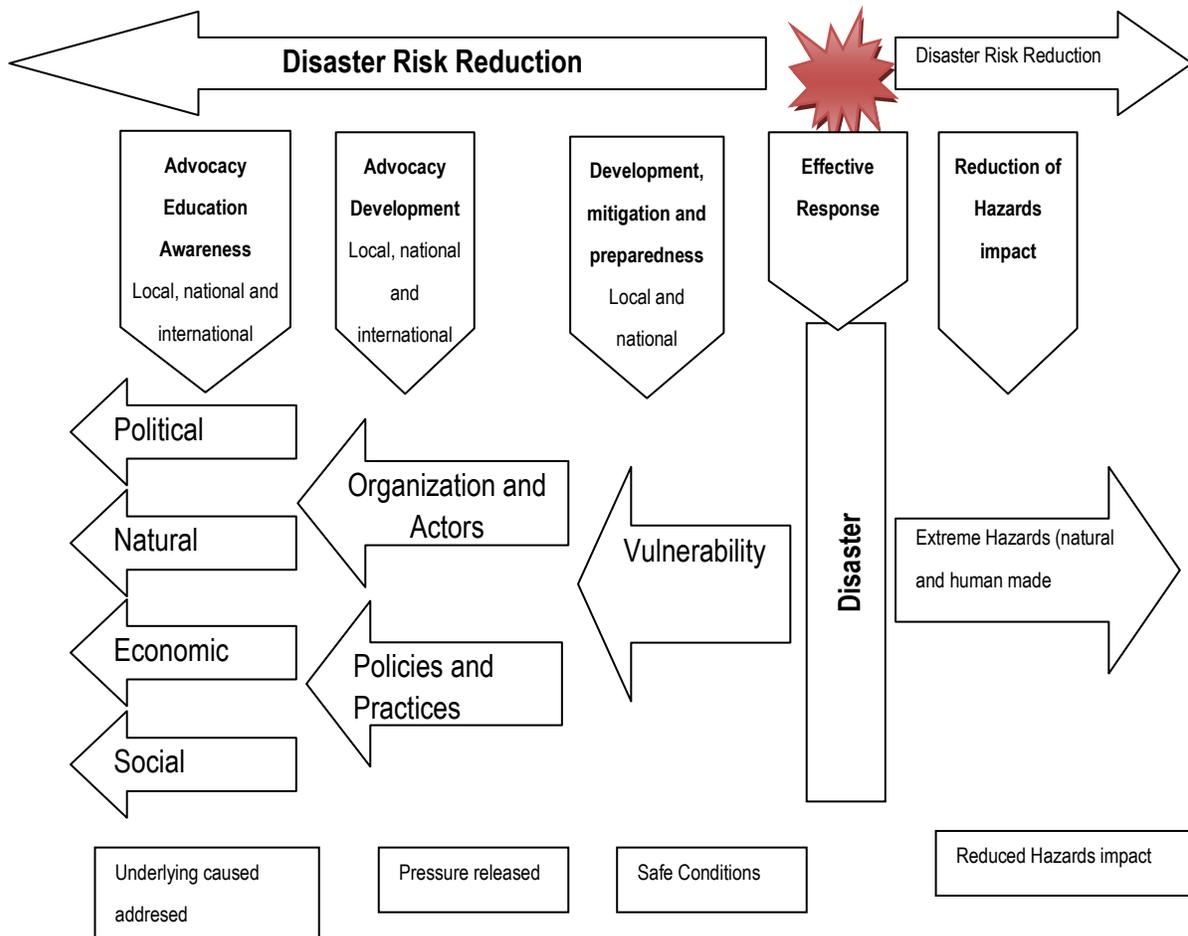
The release model

Reduced hazards impact: There are many ways in which the impact of hazards can be reduced. For example, earthquake is a potential threat to the cities like-Dhaka, Chittagong and Sylhet. Enforcement of building codes, strict land use control mechanism to not to allow real estate development on marshy land, and several other option can be identified.

Safe Conditions: Vulnerabilities can also be seen as capacity of the city. Elite group, middle class and poor people in cities-all are vulnerable to one or the other hazards and each group can act together to create safe conditions.

Pressure released- There is a need to identify Champions for the city those who can make difference releasing the negative pressures such as popular politicians, good local leaders, government officials, NGOs, children/youth organizations, school or religious center.

Underlying causes addressed- organizations, policies and practices may help to reduce the risk of disaster because of political, social and economic approaches which will ultimately address the underlying causes.

2.4 Element at risk in urban areas

Population, infrastructure and critical facilities will be at risk in case of natural and human made disaster. Why, how and what we need to identify in terms of elements at risk is much debated in the disaster management sector by various practitioners, government and other stakeholders.

Residential houses and commercial buildings- There are categories of buildings that need to be seen with respect to hazard perspectives. For example in case of earthquake event, impact on concrete, masonry or non-masonry buildings will be different. This also holds true in case of cyclone. Building types and their quality check is essential to prepare for any hazard event. In cities like Dhaka, Chittagong, Sylhet-high rise buildings are also major concern where the occupancy is high. It was also observed many times in cities of Bangladesh that the pattern of buildings are mix of commercial cum residential. In this case, building becomes more vulnerable. The recent event at home-based factories in the Kayettuli neighbourhood took 114 lives due to fire caused in the factory. Some families lost up to eight members, witnesses said, and many residents were trapped trying to rush out of buildings.

Garment factory and worker- There are about 3,700 garment factories in Bangladesh. Many of them are located in Dhaka, Savar, Gazipur, Chittagong and Narayanganj.The event of April 2005 reminds that how garment factory and its worker are at greater risk. The nine storey building of the Spectrum Garment collapsed in Savar and killed more than 70 people and injured about 84. The situation is similar in other cities of Bangladesh where garment factory needs to have safety policy in place.

Hospitals- Hospital is a critical facility for any city and risk assessment of the hospitals is as important as it is for other commercial or residential buildings.

Schools- Millions of children study in the school to develop future and contribute to their nation. School as learning and development center should be assess with respect to natural and human induced hazards

Slum dwellers- Slum dwellers living in unsafe conditions and in and around the vulnerable buildings are also at risk. Apart from that, the day to day challenges that slum dweller face to access basic services compound their problems with the disaster risk.

Working children- Working children are also in most vulnerable situation in cities of Bangladesh. Children working in garment, chemical, glass and leather factory are risking their lives on routine basis. Sometime children do not know even what substance or chemical they handle at work place.

Women- "Women are more vulnerable during disasters because they have less access to resources, are victims of the gendered division of labour, and they are primary caregivers to children, the elderly and the disabled," wrote the ILO's Rochelle Jones. "This means that they are less able to mobilize resources for rehabilitation, more likely to be over-represented in the unemployed following a disaster, and overburdened with domestic responsibilities leaving them with less freedom to pursue sources of income to alleviate their economic burdens." Women are also vulnerable to sexual violence and exploitation - including trafficking - in the aftermath of disasters.

Children- Experts say children orphaned by disasters bear psychological scars that may never fully heal, including feelings of deep guilt. "It's not a matter of psychological care - it's a question of survival," Noriko Tarukawa, a Tsukuba university professor who has studied orphans of the 1995 earthquake in Kobe, Japan, told Reuters. Children are also at risk of abuse following disasters. They can also be more at risk of ill-health. In flooding emergencies, children sometimes pick up diseases by playing in contaminated water. "Their vulnerability means they are among the most at risk of the diseases that now threaten to kill thousands more," says Heather MacLeod, international child protection director for relief charity World Vision. "And history has shown us that the humanitarian response to a disaster can often increase the vulnerability of children," says MacLeod.

Older people- As a group, the elderly are often among the most neglected in disaster relief programmes - yet they are among the most vulnerable. Up to half of those killed in the 1995 Kobe quake were elderly - a disproportionately high number given that they only made up around 14 percent of the population. Relief charity HelpAge International says elderly people are likely to be increasingly affected by disasters, with the number of older people in developing countries projected to double to 850 million by 2025. Those 850 million would account for 70 percent of older people worldwide. "For older people in emergencies, isolation from family and community support sharply increases levels of risk," the agency says in a briefing paper. "Abandonment, discrimination and self-exclusion are not uncommon. Older people may need special protection in refugee camps and support to cope emotionally - especially when they have suffered repeated loss and displacement throughout their lives[18]."

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[18] *Source: http://www.alertnet.org/db/topics/disasterreduction.htm?v=in_detail*

Persons with disabilities- "Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others". UNCRPD

Handicap International's experiences in the field of disaster management show clearly that persons with disabilities face additional barriers in accessing emergency support. In addition, there is greater risk of becoming disabled or increasing a person's level of disability in disaster-affected communities. Persons with disabilities are the most vulnerable group, they are missing from the mainstream initiatives and usually neglected and ignored. Their needs and aspirations are not taken care of. As we know vulnerability being a dynamic and complex issue cannot be analyzed directly and analysis through the direct participation of the community. According to UN Convention on the Rights of Persons with Disabilities, Article 11 "Situations of Risk and Humanitarian Emergencies: States parties shall take, in accordance with their obligations under international law, including international humanitarian law and international human rights law, all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including situations of armed conflict, humanitarian emergencies and the occurrence of natural disasters". Disaster preparation and emergency response processes, procedures, and systems can be make more effective for persons with disabilities, as well as for the population as a whole. An essential element of building appropriate levels of capacity, specific planning, and response success is to move beyond use of the "special needs" category. This will provides disability demographics and describes specific needs populations to lay the foundation for this change which will be better identify and address the specific needs. It suggests the development of a more accurate and flexible planning and response framework based on essential, sometimes overlapping, functional needs: communication, rehabilitation needs, maintaining functional independence, supervision, and transportation. However, the needs of persons with disabilities are exactly the same as everyone else in a disaster or emergency (water, sanitation, shelter, food), but they may need specific support to meet the need. Many activities can be undertaken in order to ensure that they and their families access the same benefits and services as other people. This is not to say that persons with disabilities (and other vulnerable people e.g. persons with elderly, women, children) may not have particular needs, but to treat them merely as in need of special attention dis-empowers them and denies them a voice in planning and implementation. It also denies that persons with disabilities have any role to play in disaster relief, disaster risk reduction and recovery. This perpetuates discrimination. Handicap International, as a humanitarian organization, intends to facilitate inclusion of persons with disabilities in the community, involve them in the development process create faith and confidence in them and mainstreaming them with the community and development activity.

Element at Risk	
Why to Identify?	In general, disaster does not differentiate between rich or poor people; have or have not. When disaster comes everyone gets affected. Who will be affected most? Who will take long time overcome from any external shock or event? Who has tendency to be trapped into the vicious cycle of poverty in case of disaster? In urban areas in many developing countries including Bangladesh large section of the city population live under the poverty line with the bare minimum infrastructure and critical facilities available to them. It is important to identify people, infrastructure and facilities that would be affected most so that city authority can take corrective measures to protect its vulnerable citizens.

How to Identify?	Element at risk can be identified by various risk assessment tools where RISK is being defined into HIGH, MEDIUM and LOW. Under these three category the element of risk can be defined and based on this action can be taken.
What to identify?	***Who and what can be damaged:*** • People (their lives and health) • Household and community structures (houses, community centers, schools) • Community facilities and services (access roads, bridges, hospital, electricity, water supply, etc.) • Livelihood and economic activities (jobs, crops, livestock, equipment, etc.) • Environment (natural resource base)

IMPORTANT!

► **Earthquake is the potential risk and Bangladesh will be under litmus test if tremor with intensity such as Haiti occures.**

► **Floods are annual phenomena with the most severe occurring during the months of July and August.**

► **Tropical cyclones from the Bay of Bengal accompanied by storm surges are one of the major disasters in Bangladesh.**

► **Recently landslide has emerged as a major hazard, particularly after the Chittagong Landslide 2007.**

► **Water logging is also a big problem in cities of Bangladesh.**

► **Fire hazards occur frequently in Bangladesh**

► **The crunch and release model explains the relationship among, hazard, unsafe conditions, dynamic pressures and underlying causes**

► **In the urban areas the element at risk varies from buildings(commercial, residential, institutional), garment factory and worker, hospitals, schools, children, women, persons with disabilities and elderly.**

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Annex

Terminologies	Definition
Hazard	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.
Vulnerability	The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.
Disaster	A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources
Capacity	The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals
Critical facilities	The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency
Building code	A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage
Exposure	People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses
Land-use planning	The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses.
Mitigation	The lessening or limitation of the adverse impacts of hazards and related disasters.
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.
Response	The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.
Risk assessment	A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.
Structural measures	Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard-resistance and resilience in structures or systems.
Non-structural measures	Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education

Chapter 4: Work Process of Urban Risk Assessment

This section describes the work process for conducting urban risk assessment. It is essential to understand the characteristics of resilient urban community and strategies for urban disaster risk reduction before going in depth on the process. This will enable user to contextualize the hazards and disaster risks and suitable actions that can be taken.

Urban environment is complex and difficult to visualize. Cities have become hotspots in terms disaster risk, the urban complexities have become more dynamic than ever to address without comprehending development and disaster together. Urban areas posses several challenges and identification of vulnerable population which is heterogeneous, floating and mobile is one of them. Overcome to this challenge, the urban risk assessment proposes the following strategies which should be seen as short and long terms strategies for making cities disaster resilient.

4.1 Characteristics of resilient urban community

Many attempts have been made to define resilience. The variety of academic definitions and concepts can be confusing[19]. For operational purposes it is more useful to work with broad definitions and commonly understood characteristics. Using this approach, system or community resilience can be understood as;

- Capacity to absorb or destructive forces through resistance or adaptation
- Capacity to manage, or maintain certain basic functions and structure during disaster events
- Capacity to recover or bounce back after an event.

Pre-Disaster	The ability to absorb the shocks of hazard impacts
	Prepared with community DM plans and maps
	Trained in emergency evacuation, search & rescue and First Aid
	Aware of the risks they face by living in the area
Immediate relief phase-post disaster	The capacity to bounce back during and after disaster
	Have enough basic necessities & relief stocks in safe places
	Ability to return back to normal life faster
Post-disaster, longer term recovery phase	The opportunity for change and adaptation following a disaster
	Knowledge on updating the existing DM plans
	Use of aid-resource effectively
	Take actions to reduce future vulnerability as the recovery proceeds

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[19] Characteristics of Disaster Resilient Community: A Guidance Note, 2007

The characteristics can be defined in terms of different thematic areas such governance, risk assessment, knowledge and education, risk management and vulnerability reduction, disaster preparedness and response. For detail reading in thematic areas, characteristics of disaster resilient community and characteristics of an enabling environment, a guidance note is available (please see the references).

4.2 Strategy for Disaster Risk Reduction at local level,

Prepare for possible consequences	Know safe, accessible and unsafe places in your environment
	Talk with your family, neighborhood and prepare for DRR
	Know safe and unsafe behavior
	Plan for emergencies – individual / institutional
Do not increase the future risk	All new construction – make safe from Potential hazards: follow building codes; respect universal design of accessibility
	All new infrastructure – make safe from Potential hazards: follow building codes; respect universal design of accessibility
	Consider DRR in all new development/planning activities
Decrease existing risk	Address all types of existing vulnerabilities
	Strengthen existing vulnerable buildings
	Strengthen existing vulnerable infrastructures- this will be all mandatory functions of city corporation/pouroshava
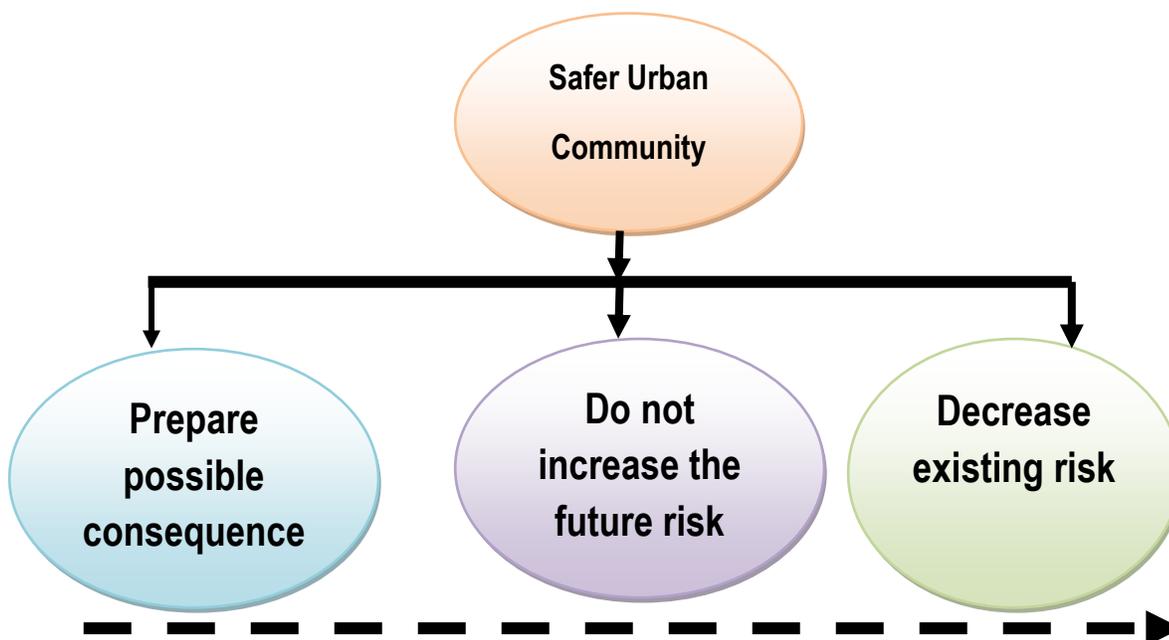
The urban disaster risk reduction strategies would be combination of all three as mentioned above. When a community/ward/city is prepare for possible consequence this means any time disaster can hit and we are all

prepare to face the situation through better preparedness. If we are prepare for any consequences, this will lead to not to increase future risk and finally there will be a decrease in disaster risks to the cities.

4.3 Different unit of analysis for urban risk assessment

The unit of analysis is the major entity that defines the level of assessment. For instance, any of the following could be a unit of analysis in a risk assessment:

- Regional/national, City, Ward, Community

Level/institutions	Purpose	Outcomes
Regional/national	1. To produce comprehensive multi hazard urban risk profile 2. To establish an urban risk information system 3. To strengthen the urban disaster risk reduction system as a whole 4. To enhance universal accessibility including development and generalize building code.	1. A well structured urban risk information system 2. A well established local capacity for risk assessment 3. Formulation or revision of an urban risk reduction strategy 4. Preparation or revision of urban contingency plans 5 Incorporation of risk management into urban planning 6 There is a national building code in order to build risk free building considering the universal accessibility of person with disabilities and others.
City	1. To develop city level multi hazard risk profile 2. To enhance inclusive disaster preparedness and emergency management planning for effective response 3. To strengthen the city level disaster management committee 4. To reach out the most vulnerable community/location with respect to existing hazard	1. A well structured urban risk profile of the city including the hazard, vulnerability and risk assessment for different hazards 2. A well established local capacity for risk assessment 3. Inclusive Disaster Risk Reduction Plan for the city 4. Mainstreaming city level DRR plan in land use planning, sector plans, town planning, building code and universal accessibility.

Level/institutions	Purpose	Outcomes
	5. To facilitate dialogue between disaster management institutions and public and private stakeholders within the city to address disaster risk	5. Development of Standard Operating Procedure(SOP) and establishment of Emergency Operation Center (EOC)
	6. To capacitated service provider in urban level about the Universal accessibility and National building code.	6. Establishment of effective service provider in the city level.
Ward	1. To identify the origin and location of hazards	1. Ward level risk assessment with disaster risk reduction planning
	2. To indentify the vulnerable pockets of the ward with respect to hazards	2. Integration of ward level assessment and plan to the city level
	3. To identify the vulnerable community, critical facilities in the ward	3. Clustering wards based on hazard or risk
	4. To develop the risk profile of the ward	4. Participation of community and stakeholders of ward level assessment and plan.
	5.To develop ward level inclusive disaster risk reduction planning	5. Establishment of ward level service provider for persons with disabilities.
	6. To enhance awareness among community and ward level service provider.	
	7. To increase the involvement of the community including persons with disabilities and their family members.	
	8. To distribution of collected data/information simultaneously to every service providers for persons with disabilities.	
Community	1. Community identifies root causes or contributing factors to the vulnerability among men, women, children, person with disabilities, elderly and other marginalized group of people living in the locality	1. Recognition of different set of vulnerabilities and vulnerable groups (men, women, children, persons with disabilities, elderly and others)
	2. Community recognizes the safe and unsafe environment through the risk assessment.	2. Attitudinal and motivational change to recognize the hazard, vulnerability and risk in

Level/institutions	Purpose	Outcomes
		day to day lives
	3. Community recognizes the level of preparation requires not only to face any disastrous situation but at the same time sustained the normalcy	3. Citizenry leadership development to mobilize the floating and heterogeneous urban community in the locality and raising voice to the ward and city level.
	4. Community identifies the actions to be taken to prepare for disaster.	
	5. Community recognized the special and emergency needs for the persons with disability, women, children, elderly and other marginalized group of people living in the locality	

4.4 Framework for Urban Risk Assessment
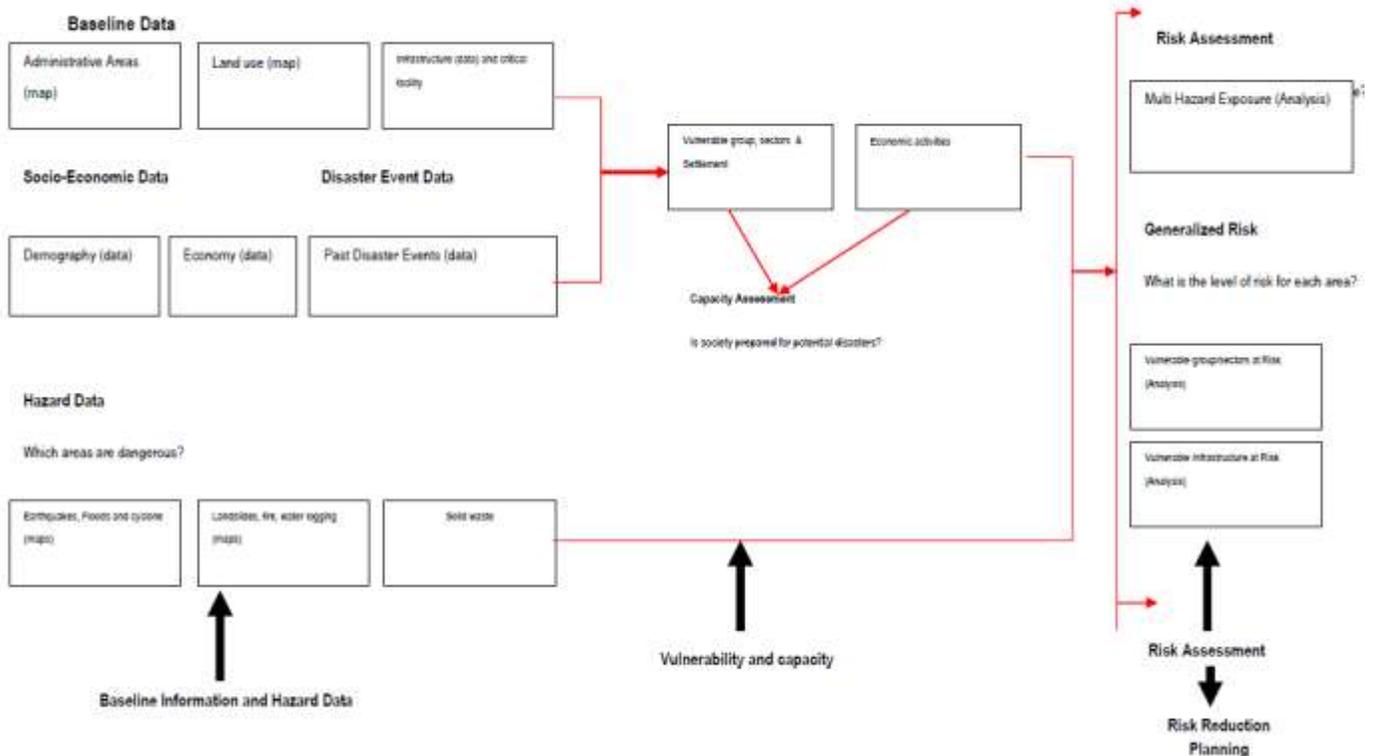
4.5 Framework explanation

Baseline and hazard data		
Data	**Information need to be collected**	**Sources**
Baseline data	Administrative maps	City Corporation, Development authority and LGED
	Land use map	City development authority, RAJUK
	Infrastructure and critical facility data (Shelters, Schools, Hospitals and Nursing Homes, Fire and Rescue, Police, Utilities, Communications, Transportation, Government)	City development authority and concerning agencies
socio-economic data	Demography	Census
	Economy- primary economic sector and center in the locality	Development authority, city corporation
Disaster event data	Past disaster event	City corporation, news paper, research articles and magazine
Hazard data	Natural and human made hazards	Newspaper articles, journals, survey and field visits, consultation with ward commissioners, City Corporation, government agencies and other stakeholders (NGOs and community)
Vulnerability and capacity		
Vulnerability and capacity data	Vulnerable groups	survey and field visits, consultation with ward commissioners, City Corporation, government agencies, NGOs, special service provider organization and institute for people with disabilities, DPO's and finally the community
	Settlement	survey and field visits, consultation with ward commissioners, City Corporation, government agencies, NGOs, special service provider organization and institute for people with disabilities, DPO's and finally the community
	Economic activities and livelihood	survey and field visits, consultation with ward commissioners, City Corporation, government agencies, NGOs, special service provider organization and institute for people with disabilities, DPO's and finally the community
Risk Assessment		
Who and What is the threat (Analysis)	People and infrastructure	
Level of risk (Analysis)	High, medium or low	

Vulnerable group at risk (Analysis)	people living in the risky area
Vulnerable infrastructure at risk (Analysis)	School, work place, hospitals, road, Residential houses and commercial buildings, Garment factory, Hospitals, Schools, community structure etc.

4.6 Approaches for urban risk assessment

In urban areas, disaster risk reduction has been practiced by both community and local authority like city corporation/PDMC to reduce the potential risk. Non-governmental organizations, community based organizations, academic and research institutions, media (print/electronic) are the other stakeholders who are directly/indirectly involved in disaster risk reduction in the urban area. Institutions at the community level like; Slum Development Committee (SDC) and Disaster Volunteer Group (DVG) play a great role in mobilizing the human and financial resources and at the same time, bring issues related to DRR to the city corporation/pouroshawa. In urban areas institutions will have a greater role to play in risk assessment than individuals and households such as industry, schools, hospitals, ward level committee, volunteer groups, and religious center.

There can be different approaches to be applied for facilitating and conducting urban risk assessment which are as follows:

Community based disaster risk reduction (CBDRR)	
Why?	Community is the central of this approach which allows community to prepare for possible consequences of disaster if not reduce the impact of the risk. This is a bottom up approach where community takes the lead role in assessing their risk and identifies the solution using existing resources which is more sustainable and cost effective.
How?	Risk assessment at city/ward level will provide the complete overview of the larger area or lowest administrative boundary in terms of hazards and vulnerability and this information can be shared further with the community living at high risk area within the ward itself.
What?	CBDRR is a movement which sensitizes community to prioritize the disaster risk reduction issues along with other development need and allow community to advocate for themselves.
Sectoral Approach (SA)	
Why?	Sector wide approach is relatively new way of working by government, international agencies/NGOs and donors. Many of the government funding has now adopted sector wide approach for example in Bangladesh the PDEP program. Settlement improvement, WASH, health and nutrition, livelihood and education and protection are the sectors in urban areas that require to be seen in terms of impact of disasters in these sectors.
How?	Through the sectors, the target community can be identified for example-men, women, children, elderly and person with disabilities to work with.
What?	Sector approach will bring the development planning or programs close to disaster risk reduction
Target Oriented Approach (TOA)	
Why?	The urban community is composed of urban elite, middle class and poor. The urban poor also have set of people having varying degree of vulnerability and risk to particular hazard (natural or human made). For example- women, children, person with disabilities and elderly.

How?	The target oriented approach becomes the entry point in the community and further gives emphasis to mainstream target group issues into community level. Through field experienced it has been observed that, often children/women/elderly/person with disabilities/other marginalized issues related to disaster or development are overlooked by the community or adults. The target oriented approach working with children/women/elderly/person with disabilities/other marginalized brings their issues to be recognized through risk assessment by community or adult.
What?	Through target orient approach, sector specific issues can be targeted
Institutional Approach	
Why?	The institutional approach of urban risk assessment is necessary to investigate the scientific aspect of urban risk. This helps community, local government, non-government organizations and community based organizations to get the overview of the risk over the space and specific locations.
How?	Academic institutions/university, international organizations, development authority or city corporations and private institutions are capable of conducting the large scale of urban risk assessment.
What?	Institutional approach can be supplemented to all the above mentioned approaches.

4.7 Steps of Urban Risk Assessment

Prior to the actual conduct of the risk assessment, a substantial amount of time and effort should be given to planning the risk assessment process. Identifying a suitable lead individual, team or agency that is qualified to oversee the process is critical to its success. In addition to having proven experience in conducting risk assessments and knowledge in a range of assessment methodologies, familiarity with the locality, knowledge of the local language, and good communication, consensus-building, facilitation and team work skills are added advantages[20].

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[20] Urban Governance and Community Resilience Guides, pp-16 ADPC 2010

Steps of Urban Risk Assessment	
Scoping the Target Area	
1.	Team formation
2.	Area and target group identification
3.	Consultation with the city corporation/pouroshava/development authority
4.	Secondary data collection
5.	Primary data collection (hazards, critical facilities, utilities)-based on target area
6.	Hazard and vulnerability assessment based on primary and secondary data
7.	Risk assessment
8.	Workshop with city/ward officials and validation
Risk Assessment from ward to community level	
9.	Presentation of the ward level hazard and vulnerability maps
10	Identification of hazard location
11.	Identification of vulnerable houses, people and infrastructure
Risk Analysis and evaluation	
11.	Risk assessment
12.	Integration of ward and community level hazards and vulnerabilities
13.	Workshop and validation
Specific Risk Reduction option	
14.	Risk reduction options and planning
Consensus on Risk Reduction option	
15.	Community level action plan and implementation

4.8 Details of steps of urban risk assessment

Scoping the target area- will be the first step towards the urban risk assessment process. In this step team formation, area and target group identification, consultation with city corporation/pouroshava, secondary data collection, primary data collection, hazard and vulnerability and risk assessment and validation will be conducted	
Team formation	Team formation can be done based on the experiences in the urban areas which can include GIS expert as well
Consultation with the city corporation/pouroshava/ development authority	This is important step of the urban risk assessment to take consent from the city or development authority.
Target area identification	This depends on the organization mandate and based on the consultation of city corporation/pouroshava the target area can be identified within the city. Ward level is the lowest administrative boundary in the city and can be considered as a target area.
Secondary data collection	At the city authority level, different layers of maps are available including utilities, critical facilities, water bodies and this information can be easily collected including demographic detail of the ward. Social welfare officer/Disabled People Organization (DPO)/ NGO works on disability can provide information and statistics relating to disability **For example:**

	Geographic Information System (GIS) is a fast emerging technology and keeping pace with advances made by DCC in other fronts. It embarked upon an ambitious plan to enable the easy archival, retrieval and analysis of data pertaining to its various departments in the corporation. Steps have been taken to make data base in the various networking of the roads, foot path, drainage, traffic town planning, land and estate, holding with land use, no of floors electricity line, water supply lines, telecom lines, slum Solid waste management facilities etc. with the associate attribute information on the length and width, area as well as various spatial and non-spatial data analysis of them. The ward map contains base map, road network map, holding distribution map, land use map. Preparation of Ward Based GIS Mapping was undertaken in 1998-99 on a pilot basis with its own limited revenue sources. 75 wards out of total 90 wards have already been completed. The completed wards were Ward No-1, 5, 17-40, 42-90. (Source: http://www.dhakacity.org/Page/Department/Link_1/1/List_id_1/11/Subid_1/97/Ward_Based_GIS_Mapping)
Primary data collection (hazards, critical facilities, utilities, statistics of persons with disability)-based on target area	Survey is very important aspect of the urban risk assessment. Using sampling method, information related to hazards can be collected. Ensure active participation of representative from different groups of people during primary data collection e.g. participation of children, women, persons with disability
Hazard and vulnerability assessment based on primary and secondary data	Using all the above information hazard and vulnerability map for the ward will be developed with institutional mapping, livelihood mapping, mobility mapping, Mapping of specific vulnerabilities: people with disabilities, people who are elderly, children, women
Risk assessment	Using hazard and vulnerability risk will be assessed.
Workshop with city/ward officials and validation	Validation can take place with the involvement of city authority/pouroshava officials to validate the maps and other information.
Risk Assessment from ward to community level- once the scoping the target area accomplished it will provide the macro level overview of the ward in terms of hazard and vulnerability which requires detailing at the micro level (community level).
Presentation of the ward level hazard and vulnerability maps	The hazard and vulnerability maps developed at the ward level require validating with community and getting consent from the community.
Identification of hazard and vulnerability (hazard and vulnerability mapping) Vulnerability identification	The ward level map will provide the existence of hazard and from this level hazard location at the community level should be identified. Based on the hazard, vulnerability can be identified among men, women, children, person with disabilities and elderly
Risk assessment	Based on the hazard, vulnerability and capacity the assessment would be conducted
Specific Risk Reduction option- Based on the hazard and vulnerability assessment the next step is to identify the risk reduction options

Risk reduction options and planning	Risk reduction option will be discussed based on structural and non-structural options.
Workshop and validation	Validation can take place at the city authority/pouroshava office level and community level as well to validate the maps and other information.

4.9 Necessary preparation for risk assessment

In order to facilitate the urban risk assessment both at macro and micro level, following are the necessary preparation that requires to be taken:

Necessary preparation	Explanation
Preliminary meetings within the organization and brainstorming workshop on urban risk assessment	In this meeting selected staff and senior management can participate together to work out the activities plan for urban risk assessment.
Stocktaking of institutions/organizations that need to be consulted	This will require specially for secondary data collection
Development of activity plan for risk assessment in consultation with stakeholders	As the urban risk assessment involves set of stakeholders in this case activity plan should be done in consultation
Logistics and administrative arrangements	Necessary equipment, stationary, meeting place and participants for the meetings should be discussed.
Identification of focal persons	Respective government agencies, city corporation, development authority, non-government organizations, elected representatives, academic institutions/university, representative from DPO

REFERENCES!

- *Characteristics of Disaster Resilient Community: A Guidance Note, 2007 (http://www.preventionweb.net/files/2310_Characteristicsdisasterhighres.pdf)*
- *Urban Governance and Community Resilience Guides, pp-16 ADPC 2010*

ANNEX-1-Scoping the Target Area

Introduction

Urban areas are complex and dynamic in terms of scale, population and nature of hazards and vulnerabilities. At the city level various government and professional agencies conduct the risk assessment with respect the different hazards or multiple hazards. It is important to downscale the process of urban risk assessment from city to ward level to get the overview of the situation. The purpose of downscale from city to ward level to identify the target area within the city where disaster risk reduction measures are required or need to strengthened. Scoping the target area will provide in-depth understanding to the practitioners to analyze hazard, vulnerability and risk existing spatially and in sectors too. Scoping the target area involves range of local stakeholders to come together and decide the entry point of the city. To facilitate this, following are the activities that will be conducted at various levels (city and ward). At the end of the scoping activities, a situation assessment report will be developed and shared with involved stakeholders.

Team formation

Team formation can be done based on the experiences in the urban areas which can include GIS expert as well. What the team will do at this stage? The team will discuss about following checklist regarding the risk assessment.

- Where will the assessment be conducted?
- What data need to be collected to assess the hazard, vulnerability and capacity of the chosen area(s)?
- How reliable or credible is the available data?
- How will the data be collected? Is data collection a major part of the risk assessment process?
- Who will collect data, and do the data gatherers need training on data collection methods?
- In what format will data be collected?
- Will the assessment be participatory, and if so who will be involved and what participatory tools will be used
- To engage individuals in the assessment process?
- How will the data be analyzed?
- How will results be presented? Can a GIS database be developed for a mapped presentation of the analysis?
- Who will receive the results, and how will the information be disseminated?
- What are the milestones in the assessment and what is the schedule for completing each milestone?
- What is the budget?

Consultation with city corporation/pouroshava/development authority

This is important step of the urban risk assessment to take consent from the city or development authority. This consultation will bring consensus to identify the target area within the city and inform the agencies as well about the objective of the risk assessment. As the city corporation/pouroshava/development authority is involved in developing the database and information with regards to hazards, involvement of these agencies will bring the ownership into the risk assessment process. City authority can also direct different government and non-government agencies to participate in this process.

Secondary data collection

Collection of scientific information

The collection of scientific information will vary from one hazard to other and the availability of the data at the city level and other professional agencies such as Center for environment and geographic information services (CEGIS), Institute of water modeling (IWM), Water Resources Planning Organization (WARPO), Geological Survey of Bangladesh(GSB), Bangladesh Meteorological Department (BMD), Flood Forecasting Warning Center (FFWC), Climate Change Cell(CCC), SAARC Regional Center (SRC), Disaster Management Information Center (DMIC), City Development Authority (CDA), Local Government Engineering Department (LGED).

Table-1

Collection of scientific information	
Information	**Probable sources**
GIS maps and remote sensing and satellite images	CEGIS
IWM offers advanced solutions within a number of topics related to urban drainage including flood risk assessment and radar based rainfall forecasts	IWM
water resource assessments	WARPO
Weather chart, radar image, satellite image, weather forecast, warnings	BMD
GIS based map display showing water level and rainfall status (Flood Watch), Flood forecast maps, River level forecasts for 24, 48 and 72 hours, Display of forecast water levels and discharges	FFWC
Land use information and map, urban area plan, drainage and flood protection system, Detail Action Plan (DAP), GIS maps-sector wise information such as water, heath, sanitation, gas pipeline, education, fire services,	CDA

commercial and residential building and industry.	
Hazard and vulnerability assessment of Dhaka, Sylhet, Chittagong with regards to earthquakes, cyclone and other hazards in urban areas	CDMP
GIS maps at the ward level	City Corporation
Hazard related information	Newspaper articles and journals,
Disability related information	Department of Social Service

Collection of socio-economic information

Table-2

Collection of socio-economic information	
Information	Sources
Location, Type and area	City corporation/Pouroshava
Types of buildings (commercial and residential)	CDMP, CDA, RAJUK
Structure of buildings (concrete, masonry and non-masonry)-	CDMP, CDA, RAJUK
Population (Gender), person with disabilities, children, elderly	City Corporation/Bangladesh Bureau of Statistics
Education (primary and secondary)	District Education Office
Bridges, roads, culverts, sluice gate, canal, drainage	City Corporation
Garment factory	BGMEA
Leather, glass, chemical and other industry	City Development Authority/City Corporation
Water and Sewerage	WASA
Institutions: educational, religious, government offices, local clubs,	City Corporation
GIS maps at the ward level	City Corporation

Primary data collection- Survey is very important aspect of the urban risk assessment. Using sampling method, information related to hazards can be collected.

Hazard assessment and mapping

At ward level

Each hazard type has unique characteristics that can impact a town or city. For example, an earthquake causes ground shaking that can cause buildings to crumble, heavy rain can produce the floods that drown people, and drought diminishes the water supply. Hazard map can be developed with the assistance with of GIS tools by using the scientific and socio-economic information. To produce the GIS maps, following information would be required by GIS tool to generate the hazard map for the ward level. In case of floods, cyclone, earthquake and fire, hazard maps are available at the city level and with this information ward level maps can be developed.

Table-3

S.N.	Hazard	Data sources	Significance of the hazard
1	Cyclone	Newspaper articles, journals, survey and field visits, consultation with ward commissioners, Chittagong City Corporation (CCC), government agencies and other stakeholders (NGOs and community)	There was huge devastation due to cyclone and it is a regular event for the city and the region
2	Landslide	Newspaper articles, survey and field visits, consultation with ward commissioners, CCC, government agencies and other stakeholders (NGOs and community)	Has become a new threat to the people living in and around hillsides. A number of casualties in recent years
3	Earthquake	Newspaper articles and other records	Chittagong is located in an earthquake zone and has records of earthquake in the past
4	Flood and Water logging	Newspaper articles, survey and field visit, consultation with ward commissioners, CCC, government agencies and other stakeholders (NGOs and community)	The city has been seriously affected a number of times in the recent past
5	Fire	Newspaper articles, survey and field visit, consultation with ward commissioners, CCC, government agencies and other stakeholders (NGOs and community)	Slum area residents are seriously affected in their daily life; fire has become a serious threat to the rest of the urban population as well

In case if GIS tools and maps are unavailable, using the ward level administrative maps (available at city corporation/pouroshava) can be used to assess the hazard and generate map. The flood hazard maps (city and ward level) shown in the next page were developed considering following factors:

- **Origin**-The cause of a hazard, which can be natural or human-made,
- **Warning Signs and Signals-** Scientific and indigenous indicators that a hazard is likely to occur, e.g. rainfall duration, intensity and quantity.
- **Rate of Onset-** The rapidity or slowness of hazard arrival and impact.
- **Frequency**- Time-related patterns of occurrence of hazards
- **Seasonality**- Occurrence of a hazard in a particular time of the year (this will not be applicable for earthquake).
- **Zone of Impact**- Area coverage or the zone of influence of the hazard that will create an impact.

Jamalpur City

Risk and Resource Map of Jamalpur Pourashava

Ward 12

Flood Risk Map of Ward No. 12
Jamalpur Pourashava
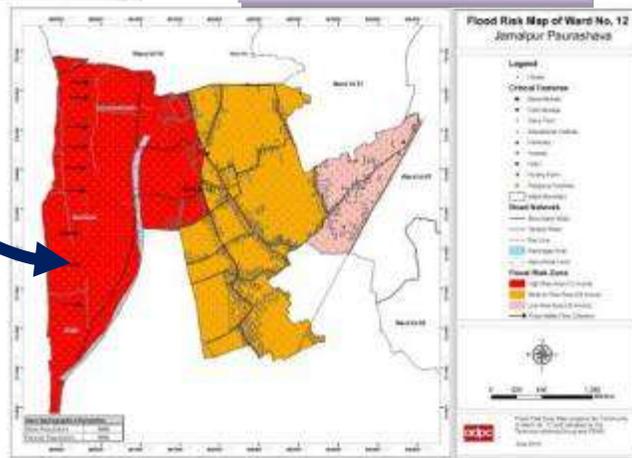
Hazard Assessment and Mapping from city to ward level

Task 1: Hazard mapping

Objective: to identify the and analyze common hazards in the locality and their magnitude and likelihood
Method: Venn diagram and mapping
Time: 2-3 hours
Materials: white flip charts, art paper pieces of different size and color, marker and adhesive
Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.
Preparation: the facilitator need to take following preparation:
- Gain idea on common hazards, their frequency, damage cause and risks
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.

Process:
- Facilitator would request participants to prepare a list of common hazard that takes place in the locality.
- One of the participants would read the list. The facilitator will ask if there are omissions.
- The participants will be requested to select round shaped art paper pieces (prepared earlier by the facilitator) for each of the hazards, size will depending on intensity and damage caused by the hazard, bigger size paper for the most intensive.
- Now the participants will be requested to put a piece of art paper in the middle of the big white paper writing the name of their locality and mark the upper side of the white paper as north, then they will put the hazards on the white paper around their locality depending on the direction they come into the locality.
- At this time participants will consider the frequency of occurrence of each of the listed hazards, most frequent one should be placed closest to their locality and so on. Now they will discuss among themselves and agree about the position of each hazard they listed.
- Then facilitator will collect information about hazard that leads to unsafe conditions and who is responsible and what are the root causes Now participants will discuss the following matrix and fill the information
- Once participants provide information for the above shown matrix, facilitator would then present the list of common hazard and will describe the unsafe conditions (at what level) and their root causes.
- The facilitator will then discuss about the locality boundary map along with common physical features so that participants can easily identify locations in the map.
- The facilitator will then request participants to draw hazard map within the locality
- Throughout the session allow participants to discuss and come to a consensus.
- By using the plastic sheets participants can overlay different existing hazards in the locality.

Table-4

Hazard	Unsafe conditions	Tick Mark (√)	Root cause	Score*
	At Individual level			
	At Neighborhood			
	At Community			
	At institutional level			
Hazard	At Individual level			
	At Neighborhood			
	At Community			
	At institutional level			

*Score can be assigned based on the severity of the hazard. Score will prioritize hazard in the community

Output: A consensual ward level hazard map for the locality.

Task 2: Vulnerability assessment

Objective: To identify and analyze vulnerability in the locality.
Method: Group discussion
Time: 1-2 hours
Materials: white flip charts, marker and adhesive
Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.
Preparation: the facilitator need to take following preparation:
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.

Process:
- Facilitator welcome all the participants in a stakeholder group for the session
- The facilitator explains the purpose and the process of this exercise so that participants can respond freely in it.
- The facilitator now clearly explains the understanding of community elements, risk location and the relevant sectors to be affected by the hazard and asks the participants to respond accordingly.
- Once the community elements/sectors/are identified, the facilitator will write in the specific format

- Facilitator should bring the ward level hazard maps and discuss with participants based on the matrix shown below.

Table-5

Sector	Location	Vulnerable conditions	Hazards				*Score
			Cyclone	Floods	Earthquake	Fire	
Housing							
Education							
Health and sanitation							
Livelihood							

*Score can be assigned based on the severity of the vulnerable conditions for each sector. This will assist community to prioritize the vulnerable sector

Output: A list of vulnerable sectors and elements relevant to the community is prepared.

Task 3: Capacity assessment

Objective: To identify and analyze capacity in the locality.
Method: Group discussion
Time: 1-2 hours
Materials: white flip charts, marker and adhesive
Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.
Preparation: the facilitator need to take following preparation:
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.

Process:
- Facilitator welcome all the participants in a stakeholder group for the session
- The facilitator explains the purpose and the process of this exercise so that participants can respond freely in it.
- The facilitator now clearly explains the understanding on different asset such as economic, constructed, individual and social.
- Based on the existing hazards in the locality the matrix will be filled by the participant.
- At the end, facilitator should conclude the session by thanking participants.

Table-6

Asset	Explanation
Economic	Which economic activities or asset are least affected by the hazard?
Constructed	What buildings are not affected by hazards?, are water supply protected from hazard? Are government or community buildings protected by hazard? Are communication protected by hazard?
Individual	Who is least affected during the disaster and after disaster?
Social	Which group are least affected by hazard? Are any relationship strengthened by hazard?

Output: Capacity identification of the locality with regards to the existing hazards.

Capacity assessment matrix- Table-7

Protected elements	Safe conditions	Pressure released	Positive underlying causes	Score
Which elements are not badly affected by the hazard	What capacities exist that help protect element at risk from the impact of the hazard	Who is helping to create safe conditions?, how is this done?	Why are safe conditions being supported?	
Economic Asset				
Constructed Asset				
Individual Asset				
Social Asset				

Score can be assigned based on the analysis of the asset with respect to hazard

Task 4: Institutions mapping

Objective: to understand the perceptions that local people have of the role and significance of various organizations within the community.

Method: Group work and discussion

Time: 1hour

Materials: Flip chart, white board marker

Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.

Preparation: the facilitator need to take following preparation:

- Gain idea on people's major livelihoods in the locality
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive

Process:

- Facilitator should introduce the session's objective

- Facilitator should ask the participants to develop a set of criteria for determining the importance of an organizations and to rank each one

    - What can be changed about the situation by involving the organizations?
    - What can be influenced about the situation with the involvement of organizations?

- Facilitator should ask the participants to what extent the organizations are linked to each other and note the kind of relationship between the organizations.
- Draw a circle to represent each organization or group. The size of the circle indicates the organization's/group's importance relative to others and also measure the importance given by the community as shown in the diagram 5.
- Continue with a focus group discussion on the history of the organizations identified and the activities they have undertaken in the community. This will provide information on how well the organizations function and how well they coordinate with one another. This will also help identify which organizations, groups and individuals play an important role in reducing the potential threat to the vulnerable groups.
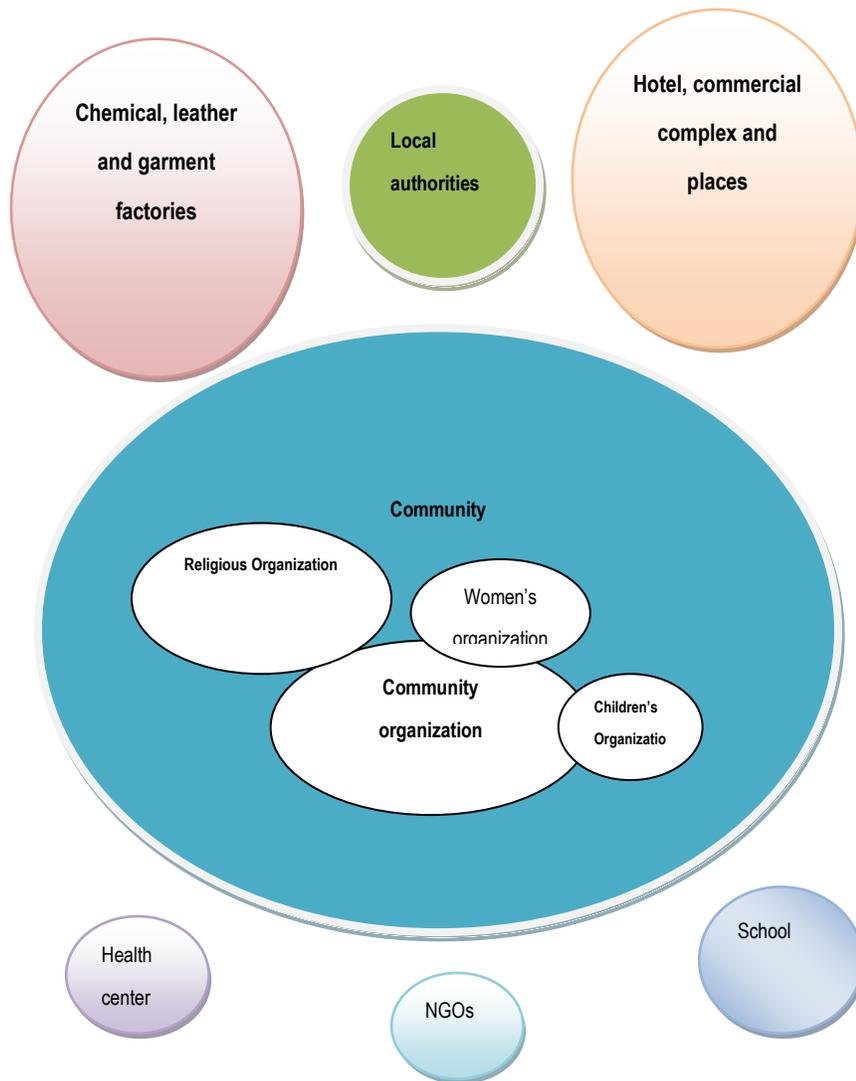
Output: A consensual institutional mapping for the locality.

Task 5: Mobility Mapping

Objective: to analyze people's mobility at different places during day and night time
Method: Mobility mapping
Time: 1-2 hours
Materials: white flip charts, art paper pieces of same size and different color, marker and adhesive
Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.
Preparation: the facilitator need to take following preparation:
- Gain idea on people's major occupation in the locality
- The venue should be suggested by the participants

- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive

Process:

- Facilitator would inform the participants about mobility mapping and its objective is to capture the people's mobility for different groups to understand the locality much better.
- Facilitator would then divide the participants into three groups to conduct the mobility mapping exercise
- Facilitator would then request participants to fill the matrix shown below.
- Facilitator would put the mobility mapping of different group and discuss with the participants.
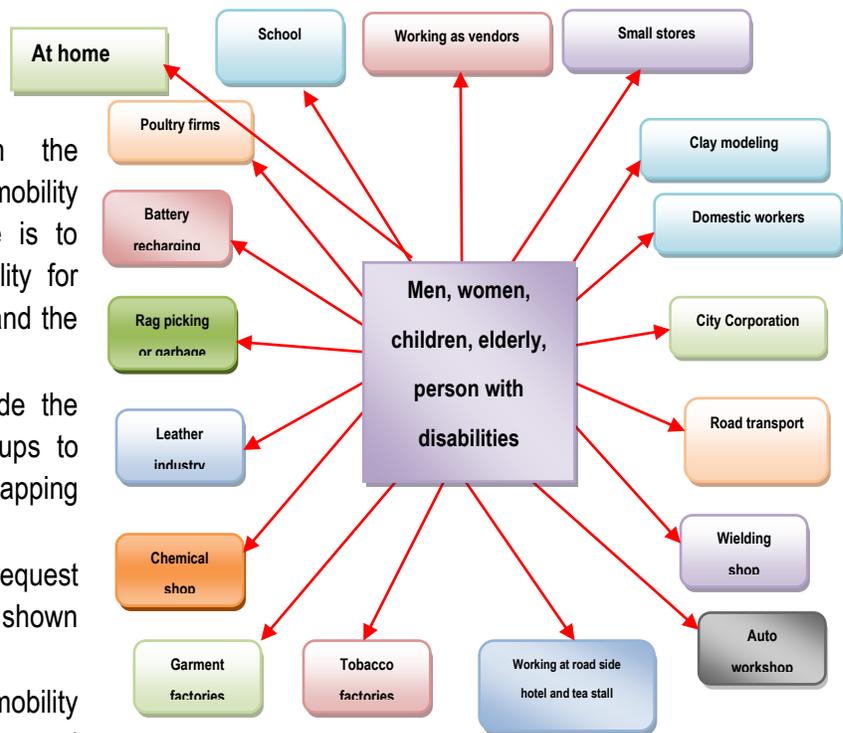
Table-8

Mobility Mapping	
Mobility	**Group (men, women, children, persons with disabilities)**
School	
Working as vendors	
Small stores	
Clay modeling	
Domestic workers	
City Corporation	
Road transport	

Wielding shop
Auto workshop
Working at road side hotel and tea stall
Factories (garment, leather, glass and chemical)
Rag picking or garbage
Poultry firms
Battery recharging
At home

Mobility will be mapped for separately for each of the group as mentioned above- men and women, children, persons with disabilities)

Output: A consensual mobility mapping for the locality.

Task 6: Livelihood mapping

Objective: to identify the major livelihoods in the locality and their importance in the context of existing hazards.

Method: Chapati diagram

Time: 1hour

Materials: white flip charts, art paper pieces of different size and different color, marker and adhesive

Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.

Preparation: the facilitator need to take following preparation:

- Gain idea on people's major livelihoods in the locality
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive
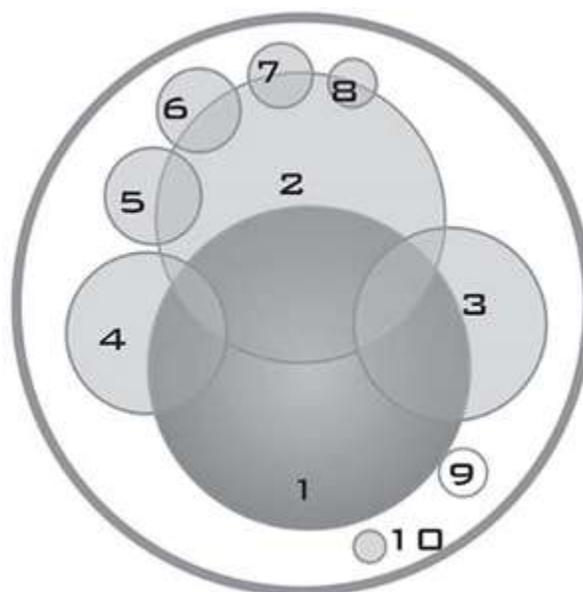
Process:
- Facilitator would introduce the objective of the livelihood mapping.
- Facilitator would request participants to Identify sources of livelihood.
- Establish whether the sources are of high, medium or low importance in the locality.

Output: A consensual livelihood mapping for the locality.

Task 7: Key informant interview

Objective: to gain information about the locality, people, past and potential future hazards.

Time: 1hour

Materials: KII checklist, notepad and pen

Informants: Key informants interviews should be with individuals who have involvement with a particular issue of interest, (key informant for cyclone related issue may be a cyclone affected individual, ward commissioner, industry owner (depending on subject interest).

Preparation: the facilitator need to take following preparation:
- Inform the respondent well in advance
- Go through the KII checklist carefully
- Take all the required materials to the interview and be on time

Process:

- Facilitator will introduce himself and explain precisely what he/she is going to facilitate and why?
- Facilitator will ask responder if he/she has anything to ask. If the facilitator can't communicate with person with disability especially person with hearing and speech impairment or persons with intellectual disability, can ask support form interpreter or family member.
- Facilitator will ask question based on the checklist to gather response from respondent?
- The facilitator will review the checklist to see if there is anything left or if any area needs further clarification.
- The facilitator will conclude the interview by thanking the respondent for his/her time and useful inputs.

Output: information on locality, people, past and future potential hazards

> **Note:**
> - To complete all these tasks from 1-5 might require 15-20 days depending upon the local institutional capacity and facilitator's skills.
> - Any specific issues identified in the above tasks can be shared with the stakeholder groups during URA workshops.

Risk assessment at the ward level

Once the hazard, vulnerability and capacity have been identified at the ward level, the risk assessment can be done based on ranking method to get the overview of the ward scenario. Following table can be taken as a sample to conduct the risk assessment.

For example, hazard and vulnerability can be scaled according to the severity.

Hazard	Value	Vulnerability	Value
Very high	4	Very high	4
High	3	High	3
Average	2	Average	2
Low	1	Low	1

To consider the capacity, following equation can be used:

$$Risk = \frac{Hazard \times Vulnerability}{Capacity}$$

Location	Exposure to Hazard	Vulnerability	Capacity	Risk
A	1	3	3	1
B	2	1	4	0.5
C	2	3	2	3
D	3	2	1	6

Hazard X Vulnerability

Risk

63
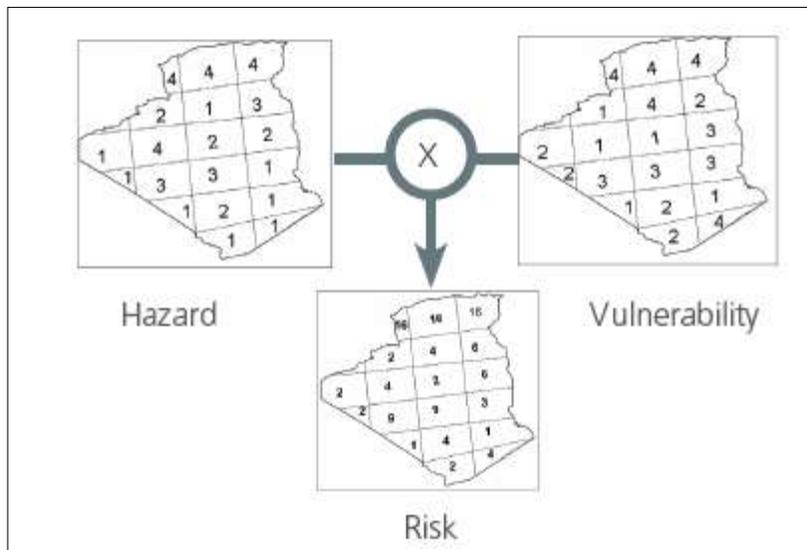
URA workshop[21]

Objective: validation of relevant secondary information with community

Time: 1 hr 20 minutes

Materials: relevant secondary information/maps, notebook, color, marker and pen and adhesive.

Participants: City disaster management committee member/PDMC member, ward commissioner, local elite, school teacher, industry owner, representatives of primary stakeholders, representative of persons with disability

Preparation:

- Contact with city corporation/pouroshava, disaster management committee, local elite, institutions (school, industry, religious center and community)

- A suitable venue for conducting the session should be identified. The venue should have a medium sized room with capacity for sitting 10-15 people.

- Arrange all necessary materials required for conducting session.

- Collect necessary secondary (scientific and socio-economic) information from respective persons, offices or organizations

- Analyze the available information to produce easily understandable graphs and charts.

- The facilitator should make all necessary arrangements before the participants come to the venue,

- A co-facilitator should take the note of discussion.

Process:

- Facilitator should welcome all the participants for the session.

- Ice breaking though the introduction of participants.

- The facilitator will explain the purpose and the detailed tasks of the session so that the participants can freely participate in the session.

- The facilitator then presents secondary maps and information to the participants in such a way that everybody can understand and authenticate them.

- The facilitator will document necessary changes on the map in front of the participants.

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[21] this section has been modified based on CRA document

- Facilitator should conclude and thank all the participants.

Output: Secondary information, maps related to hazard, mobility, livelihoods, institutions are validated.

Follow-up activity: preparation of report.

ANNEX-2- Assessing the Risk

Introduction

In the previous annex, the assessment at the ward level will provide and overview of the situation in terms of hazard and vulnerable community. Now from ward level, a target community can be identified as an entry point.

Task 1: introductory visit to the community
Objective: Presentation of ward level risk assessment to the community.
Time: 1-2 hours
Materials: White flip chart, marker and adhesive
Participants: ward commissioners, local elite, and primary stakeholders
Preparation: the facilitator need to take following preparation:

- The venue should be suggested by the participants, should be accessible
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive
- Prepare for different methods of communication e.g. verbal, sign language, picture, Braille

Process:

- Facilitator will welcome all the participants and discuss the objective for this introductory visit.
- Facilitator would then describe and share ward level scenario in terms of hazard, vulnerability and risk.
- Facilitator would also request participants to comment upon the develop scenario
- Facilitator should then describe how the present target community has been selected through a consultation process.
- Facilitator should then explain about the future activities with the selected community and their objectives and get the time and date from the community.
- Facilitator will conclude the session and thank all the participants.

Outcome: ward level scenario has been shared with community.

Task 1: Hazard mapping

Objective: to identify the and analyze common hazards in the locality and their magnitude and likelihood

Method: Venn diagram and mapping

Time: 2-3 hours

Materials: white flip charts, art paper pieces of different size and color, marker and adhesive

Participants: City disaster management committee members, local knowledgeable persons, local professionals, representatives from primary stakeholders, representative of persons with disability.

Preparation: the facilitator need to take following preparation:

- Gain idea on common hazards, their frequency, damage cause and risks
- The venue should be suggested by the participants
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.
- Prepare for different methods of communication e.g. verbal, sign language, picture, Braille

Process:

- Facilitator would request participants to prepare a list of common hazard that takes place in the locality.
- One of the participants would read the list. The facilitator will ask if there are omissions.
- The participants will be requested to select round shaped art paper pieces (prepared earlier by the facilitator) for each of the hazards, size will depending

on intensity and damage caused by the hazard, bigger size paper for the most intensive.

- Now the participants will be requested to put a piece of art paper in the middle of the big white paper writing the name of their locality and mark the upper side of the white paper as north, then they will put the hazards on the white paper around their locality depending on the direction they come into the locality.
- At this time participants will consider the frequency of occurrence of each of the listed hazards, most frequent one should be placed closest to their locality and so on. Now they will discuss among themselves and agree about the position of each hazard they listed.

- Then facilitator will collect information about hazard that leads to unsafe conditions and who is responsible and what are the root causes Now participants will discuss the following matrix and fill the information

Table-9

Hazard	Unsafe conditions	Tick Mark (√)	Root cause	Score*
	At Individual level			
	At Neighborhood			
	At Community			
	At institutional level			
Hazard	At Individual level			
	At Neighborhood			
	At Community			
	At institutional level			

*Score can be assigned based on the severity of the hazard. Score will prioritize hazard in the community

- Once participants provide information for the above shown matrix, facilitator would then present the list of common hazard and will describe the unsafe conditions (at what level) and their root causes.
- The facilitator will then discuss about the locality boundary map along with common physical features so that participants can easily identify locations in the map.
- The facilitator will then request participants to draw hazard map within the locality
- Throughout the session allow participants to discuss and come to a consensus.
- By using the plastic sheets participants can overlay different existing hazards in the locality.

Output: A consensual hazard map for the locality in line with ward map.

Task 2: Vulnerability assessment

Objective: To identify and analyze vulnerability in the locality.
Method: Group discussion
Time: 1-2 hours
Materials: white flip charts, marker and adhesive
Participants: ward commissioner, local knowledgeable persons, local professionals, representatives from primary stakeholders.
Preparation: the facilitator need to take following preparation:

- The venue should be suggested by the participants, should be accessible
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.
- Prepare for different methods of communication e.g. verbal, sign language, picture, Braille

Process:

- Facilitator welcome all the participants in a stakeholder group for the session
- The facilitator explains the purpose and the process of this exercise so that participants can respond freely in it.
- The facilitator now clearly explains the understanding of community elements, risk location and the relevant sectors to be affected by the hazard and asks the participants to respond accordingly.
- Once the community elements/sectors/are identified, the facilitator will write in the specific format
- Facilitator should bring the ward level hazard maps and discuss with participants based on the matrix shown below.

Table-10

Sector	Location	Vulnerable conditions	Hazards				*Score
			Cyclone	Floods	Earthquake	Fire	
Housing							
Education							
Health and sanitation							
Livelihood							

*Score can be assigned based on the severity of the vulnerable conditions for each sector. This will assist community to prioritize the vulnerable sector

Output: A list of vulnerable sectors and elements relevant to the community is prepared.

Task 3: Capacity assessment

Objective: To identify and analyze capacity in the locality.
Method: Group discussion
Time: 1-2 hours
Materials: white flip charts, marker and adhesive
Participants: ward commissioner, local knowledgeable persons, local professionals, representatives from primary stakeholders.
Preparation: the facilitator need to take following preparation:

- The venue should be suggested by the participants, should accessible
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.
- Prepare for different methods of communication e.g. verbal, sign language, picture, Braille

Process:

- Facilitator welcome all the participants in a stakeholder group for the session
- The facilitator explains the purpose and the process of this exercise so that participants can respond freely in it.
- The facilitator now clearly explains the understanding on different asset such as economic, constructed, individual and social.
- Based on the existing hazards in the locality the matrix will be filled by the participant.
- At the end, facilitator should conclude the session by thanking participants.

Table-11

Asset	Explanation
Economic	Which economic activities or asset are least affected by the hazard?
Constructed	What buildings are not affected by hazards?, are water supply protected from hazard? Are government or community buildings protected by hazard? Are communication protected by hazard?
Individual	Who is least affected during the disaster and after disaster?
Social	Which group are least affected by hazard? Are any relationship strengthened by hazard?

Output: Capacity identification of the locality with regards to the existing hazards.

Capacity assessment matrix- Table 12

Protected elements	Safe conditions	Pressure released	Positive underlying causes	Score
Which elements are not badly affected by the hazard	What capacities exist that help protect element at risk from the impact of the hazard	Who is helping to create safe conditions?, how is this done?	Why are safe conditions being supported?	
Economic Asset				
Constructed Asset				
Individual Asset				
Social Asset				

Score can be assigned based on the analysis of the asset with respect to hazard

Task 4: Key informant interview

Objective: To gain information about the locality, people, past and potential future hazards.

Time: 1hour

Materials: Notepad and pen

Informants: Key informants interviews should be with individuals who have involvement with a particular issue of interest, (key informant for cyclone related issue may be a cyclone affected individual, ward commissioner, industry owner (depending on subject interest), persons with disability.

Preparation: the facilitator need to take following preparation:
- Inform the respondent well in advance
- Take all the required materials, interpreter (if necessary, or seek support from caregiver to communicate) to the interview and be on time

Process:

- Facilitator will introduce himself and explain precisely what he/she is going to facilitate and why?
- Facilitator will ask responder if he/she has anything to ask
- Facilitator will ask question based on the checklist to gather response from respondent?

- The facilitator will review the checklist to see if there is anything left or if any area needs further clarification.
- The facilitator will conclude the interview by thanking the respondent for his/her time and useful inputs.

Output: information on people, past and future potential hazards

Note:
- To complete all these tasks from 1-5 might require 15-20 days depending upon the local institutional capacity and facilitator's skills.
- Any specific issues identified in the above tasks can be shared with the stakeholder groups during URA workshops.

Risk assessment at the community level

Once the hazard, vulnerability and capacity have been identified at the ward level, the risk assessment can be done based on ranking method to get the overview of the ward scenario. Following table can be taken as a sample to conduct the risk assessment.

For example, hazard and vulnerability can be scaled according to the severity.

Hazard	Value		Vulnerability	Value
Very high	4		Very high	4
High	3		High	3
Average	2		Average	2
Low	1		Low	1

To consider the capacity, following equation can be used:

Risk = <u>Hazard X Vulnerability</u>
      Capacity

Location	Exposure to Hazard	Vulnerability	Capacity	Risk
A	1	3	3	1
B	2	1	4	0.5
C	2	3	2	3
D	3	2	1	6

Hazard   Vulnerability

Risk

Outcome: Identification of risk with regards to hazards at the community level

ANNEX-3- Risk Reduction Planning and Implementation

With completion of hazard, vulnerability and capacity assessment at the community level, risk reduction planning and implementation is the next step.

Task 1: Risk reduction options

Objective: to prioritize risk reduction option in short and long terms

Method: group discussion

Material: flip chart paper and marker

Time -1-2 hours

Participants: ward commissioner, local knowledgeable persons, local professionals, representatives from primary stakeholders, representatives of persons with disabilities.

Preparation: the facilitator need to take following preparation:
- The venue should be suggested by the participants, should be accessible
- Invite the participants at least 2 days before
- Prepare all material and carry them to the venue before the participants arrive.
- Prepare for different methods of communication e.g. verbal, sign language, picture, Braille

Process:
- Facilitator should welcome the participants and discuss the objective of the meeting
- Facilitator should discuss about the risk prioritization based on previous tasks and also discuss the short and long term options.
- For risk reduction option and planning there are following things required to be discussed in order to see the feasibility of the plan itself which are as follows:

Table- 13

Risk Reduction options	Explanations
Short and long term options	The identified vulnerability factors must be seen into short and long terms perspectives. Some of the vulnerability factors can be address immediately and others may take longer time to be realized.
Structural and non-structural	Risk reduction options should provide space for all major stakeholders to contribute in terms of risk reduction.
Resource availability, requirements and mobilization	Resources play a key role in risk reduction options whether that can be sustainable or not. Utilization of availability of resources is equally important as further requirement. The resources can be mobilized based on the availability and requirement. As the difference in between available and required resources increases, mobilization part will become weaken.

- Facilitator should explain the matrix of short and long term options to the participants
- Facilitator should also discuss with participants about the resource availability and required.
- Facilitator then request participants to develop the risk reduction plan.

Table-14

Short /long term				
How	Activities	Who	Resource Available	Resources Required
There is need to explain how the short term intervention will be conceived. This means there should be an objective of the intervention in relation to the identified risk. Apart from it, there is a need to have strategy to conduct the activities. In urban areas, vulnerable groups most of the time are mobile for earning livelihood and it is difficult to mobilize them. In this case, targeting institutions where vulnerable groups work would be other alternative to think of.	Activities should clearly spell out that can be achieved in short span of time. Activities can also be decided whether it will be done the family/household level/community level	This section describes about stakeholders. Who will be involved in short term intervention.	In conducting the short term intervention what kind of resources would be required, need to be discussed. It is important first to see what is available at the local level.	Resource availability will provide information about the resources that are required. It is always better to start with what is available, this help focus objective and activities clearly. Because requirement of resources many times linked with expectations as well and develop a huge wish list.

Table-14

Resource Analysis		
WHAT?	*HOW?*	*WHY?*
An identification and analysis of the resources needed to implement the risk reduction measures.	Identifying needed resources and matching with existing	Even with a road map and a driver, the car will not run and reach its destination without a fuel!
What are the existing resources?	Determining the resources gaps	To determine which are the Immediately do-able risk reduction activities -- those which can be undertaken with available resources (existing and accessible resources)
What resources have to be generated?	How can these resources be made available and identifying who own or control these resources	To determine the mobilization

Table-16

Priority Risk	Risk Reduction Option	Risk Reduction Option									
		Short Term					Long term				
		How	Activities	Who	Resource Available	Resources Required	How	Activities	Who	Resource Available	Resources Required

Implementation strategy in Urban Disaster Risk Reduction

Unlike in rural areas, the risk reduction plan in urban areas requires not only community level intervention (which can be very limited due to the scale of the problem) but at the same time institutions level as well. Another challenge the of the risk reduction plan would be the social mobilization where urban community is not as cohesive as rural. Therefore, the identified risk reduction option should also be seen within the institutional framework of respective government and private agencies. In other words, the established institutions in community will have long presence than any other external agencies. For example, schools, hospitals, religious center, industry and so on.

The below shown diagram tries to develop the implementation strategy for risk reduction option;
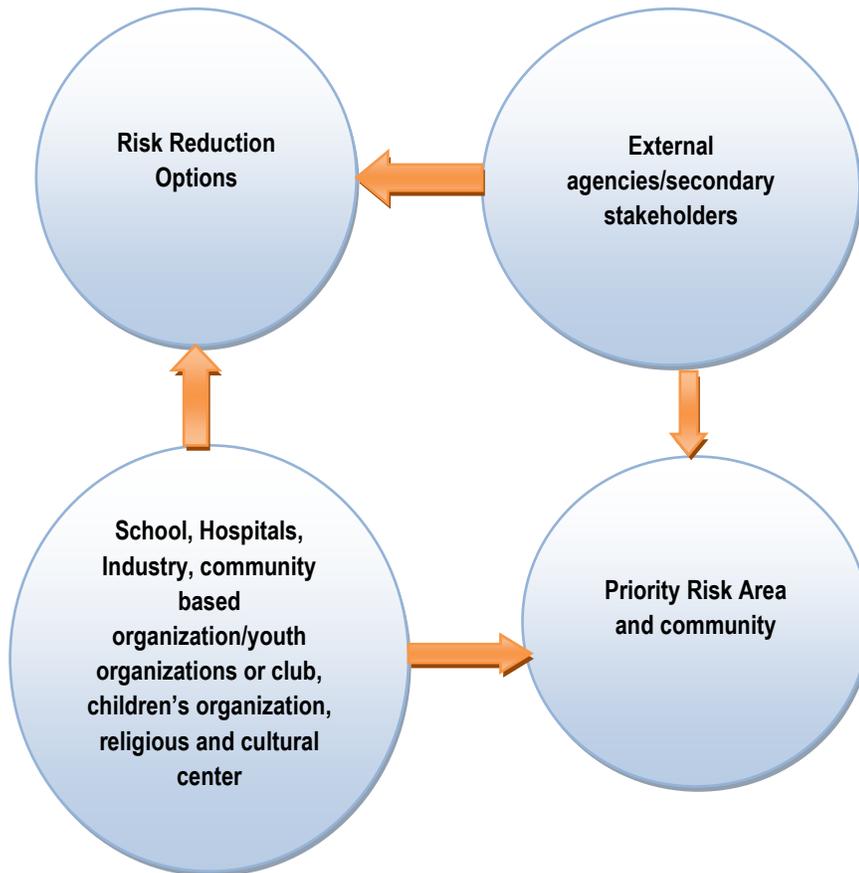
The risk reduction option needs to have technical support and resource input from the external agencies. Government and private agencies will provide external assistance to the risk reduction option (s). The risk reduction options can be addressed through institutions such as school, hospitals, industry, and community based organizations/youth organizations, youth clubs, children organization and religious and cultural center which ultimately reach out the priority risk area and community.

Task 2: Implementation strategy

Objective: to build consensus among the participants on proposed option and implementation strategy.

Time: 1-2 hours

Materials: marker, note pad, pen, white paper, display board, map related to hazard, vulnerability, livelihood and institutions

Method: discussion

Participants: ward commissioner, local knowledgeable persons, local professionals, representatives from primary stakeholders, representatives from persons with disabilities

Preparation:
- Invite secondary stakeholders including city disaster management committee members, representatives from line agencies.
- Write the compiled findings from all the tasks on poster so that they can be displayed.
- Prepare poster using large fonts with colored marker pens so that everybody can read them easily. Somebody can read out the document for person with visual impairment and person who can't read.
- Check whether posters are displayed in specific locations before the session starts.
- Check whether all necessary materials are taken to the venue in time.
- Prior to starting the session, ensure co-facilitators are available to document processes, discussions and comments or suggestions that arise during the facilitation.
- Prepare necessary copy of risk reduction option.
- Check whether all necessary materials are taken to the venue.

Process

- Facilitator should welcome all participants.
- Facilitator should then discuss about the risk reduction options in detail using table 16.
- Facilitator should discuss with participant about the implementation strategy that how Risk Reduction option can implemented.
- Facilitator should explain that there are limitations of community to address the risk reduction option by themselves. In this case, refer institution mapping (task 4-scoping the target area). How institutions and community can take the lead in reducing the risk.
- Facilitator should request participants to prepare a list of institutions who are primary and secondary stakeholders to the priority risk reduction option using table 16.

URA workshop[22]

Objective: Validation of risk reduction options and implementation strategy.

Time: 2 hours

Materials: all developed maps at the ward and community level, risk reduction option plan and strategy, notebook, color, marker and pen and adhesive.

Participants: City disaster management committee member/PDMC member, ward commissioner, line agencies (education, health, WASH, Social welfare, PWD, LGED), Development authority, local elite, school teacher, industry owner, NGOs, Member of Parliament (MP), representatives of primary stakeholders including person with disabilities.

Preparation:

- Contact with city corporation/pouroshava, disaster management committee, local elite, institutions (school, industry, religious center and community), line agencies, development authority, NGO, industry owner, Member of Parliament (MP).

- A suitable venue for conducting the session should be identified. The venue should have a medium sized room with capacity for sitting 30-45 people.

- Arrange all necessary materials required for conducting session.

- Arrange all compiled out of the previous task and put on to poster and display at the suitable place in the meeting hall.

- Analyze the available information to produce easily understandable graphs and charts which will make participants to understand easily.

- The facilitator should make all necessary arrangements before the participants come to the venue,

- A co-facilitator should take the note of discussion.

Process:

- Facilitator should welcome all the participants for the session.

- Ice breaking though the introduction of participants.

- Facilitator will explain the purpose and the detailed tasks of the session so that the participants can freely participate in the workshop.

- Facilitator should present the developed poster of compiled tasks to the participants.

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[22] this section has been modified based on CRA document

- Facilitator will also encourage participants to co-facilitate this session who were part of all the tasks conducted so far.

- Discussion should highlight the role of government and private agencies in addressing the risk reduction option.

- Facilitator should request the respective line agencies, private institutions and other stakeholders would to give their opinion about the risk reduction option.

- Co-facilitator should document all the suggestions given by line agencies, private institutions and other stakeholders.

- Facilitator should conclude and thank all the participants.

Output: Disaster risk reduction plan and implementation strategy.

Follow-up activity: preparation of report.