



## BACKGROUND AND IMPLEMENTATION OF URBAN RESILIENCE PROJECT IN BANGLADESH

M.A. Ansary<sup>(1)</sup>, A. L. Helaly<sup>(2)</sup>, M. Hassan<sup>(3)</sup>, A. Khair<sup>(4)</sup>, S. Saha<sup>(5)</sup>, S.A. Helaly<sup>(6)</sup>

<sup>(1)</sup> Professor, Department of Civil Engineering, BUET, e-mail address: ansaryma66@gmail.com

<sup>(2)</sup> Project Director, Urban Resilience Project: RAJUK Part, e-mail address: helalyrajuk@yahoo.com

<sup>(3)</sup> Senior Procurement Specialist, Urban Resilience Project: RAJUK Part, e-mail address: mahboobhassan@yahoo.com

<sup>(4)</sup> Assistant Engineer (Civil and Geotechnical), Urban Resilience Project: RAJUK Part, e-mail address: akhairce08@gmail.com

<sup>(5)</sup> GIS Expert, Jhilmil Residential Project, RAJUK, e-mail address: saha.shovon2k12@gmail.com

<sup>(6)</sup> Tactical Officer, Urban Resilience Project: RAJUK Part, e-mail address: rn\_jfd@live.com

### Abstract

Bangladesh is the most disaster prone country in the world, and is highly exposed to a variety of hazards such as floods, cyclones and earthquakes. The Government of Bangladesh (GoB) has instituted disaster risk reduction policies and invested in infrastructure along coastal areas to mitigate the risk from floods and cyclones, primarily after the catastrophic cyclones of 1970 and 1991. Over the years, the GoB has demonstrated that investments in flood management and cyclone preparedness saves lives, reduces economic losses, and protects development gains. As a result, the Government's actions are often cited in the argument for proactively investing in Disaster Risk Management (DRM) globally. Despite these tangible gains, the vulnerability of Bangladesh's urban areas is not as well understood – or addressed – in the country's policy framework.

With 7 million people living in the jurisdictional boundaries of Dhaka City Corporation, and 15 million in the wider Dhaka metropolitan area, the greater Dhaka area is particularly at risk. Land use planning regulation, and public service delivery in the urban areas of Bangladesh has failed to keep up with the pace of growth. The current regulatory environment is somewhat opaque and the enforcement mechanisms for urban development control do not address structural safety, creating an environment that lacks practical enforcement capability and accountability. In this context, physical and social vulnerabilities keep increasing and any hazards such as floods, building collapses, or earthquakes present a formidable threat to life and prosperity.

Recent events serve as grim indicators of the extreme vulnerability of the built environment in Dhaka. The collapse of the Rana Plaza building in Savar on April 24, 2013 resulted in the death of 1,127 people and was the latest and most deadly in a series of structural failures in the city. The tragedy in Savar has prompted the GoB to consider how to reduce disaster risks in urban areas and simultaneously increase its capacity to respond more effectively to emergencies including disaster events. The Rajdhani Unnayan Kartripakkha (RAJUK) – or Capital Development Authority of GoB – was established in 1987 under the Ministry of Housing and Public Works (MoHPW). Its mandate is to lead planning and development in Dhaka City and peripheral areas, in coordination with city corporations, pourashavas and union parishads. RAJUK's jurisdiction extends beyond the administrative boundaries of the Dhaka City corporations to adjoining secondary cities. Amongst its responsibilities, the Building Construction Rules (2008) provide authority to RAJUK to enforce the national building code in addition to the Construction Rules themselves. Under this broad mandate, RAJUK plays an important role in steering the development of Dhaka and overseeing the implementation of construction codes and standards.

To better understand the physical risk, as well as the institutional and legal structures in place to manage the risk, the GoB has been working with the World Bank since 2012 in preparation for the proposed Urban Resiliency Project (URP). This collaboration has been supported by the Global Facility for Disaster Reduction and Recovery (GFDRR) to address seismic risk and the structural vulnerability of urban buildings and infrastructure. This support convenes government officials across ministries and agencies to: i) reach consensus on the level of seismic risk in Dhaka and hazards in other parts of Bangladesh; ii) increase the understanding of legal and institutional arrangements and “on-the-ground” practices related to urban DRM; iii) define parameters to make development plans and risk sensitive land use processes; and iv) establish a data sharing platform. This paper will discuss the above issues and the implementation mechanism of Urban Resilience Project in Bangladesh from RAJUK's point of view.

*Keywords: Urban Resiliency; Earthquake; Building Code Enforcement; RAJUK;*



## 1. Introduction

Natural and anthropogenic hazards have made Bangladesh as one of the most vulnerable countries of the world. Bangladesh is the seventh most populous country in the world with a population of more than 160 million people inhabiting an area of 147,570 square kilometers [1], that is, an average population density of more than 1,100 persons per square kilometer among the highest in the world. The meteorological characteristics and geographical setting has made the country vulnerable to different hydro-metrological hazards and geo-hazards. Floods, cyclones, earthquakes, fire, infrastructure collapse, droughts, tidal surges, river erosion, arsenic contents of ground water, water logging, water and soil salinity and various forms of pollution etc. are the major disasters in the country. Although the country has built capacity by managing cyclone disasters and coastal flooding through repeated response experience and has support systems in place through local NGOs and government institutions under the ongoing Cyclone Preparedness Program, but the current set up is not sufficient to manage catastrophic events such as earthquakes, fire hazards in complex urban areas like Dhaka City. These catastrophic events are termed as disasters when they adversely affect the entire environment, including human beings, shelters and the resources essential for livelihoods.

The Global Earthquake Disaster Risk Index has placed Dhaka among the 20 most vulnerable cities in the world. According to the Comprehensive Disaster Management Programmes (CDMP) recent studies, Dhaka, Sylhet and Chittagong are the cities with the highest vulnerability to earthquake risk [2]. Apart from earthquakes, incidences of urban disasters like the Rana Plaza collapse on 23 April, 2013, where 1,134 people were killed, more than 2500 people were badly injured at the end of the rescue operation [3] and in 2005 Spectrum Building collapse where 100 people died have raised alarming concerns about the lack of preparedness as well as capability of Bangladesh to handle urban disasters effectively.

The general belief is that building construction is highly vulnerable because of rapid urbanization, lack of construction control and ethics. This is somewhat validated by more scientific risk studies, such as the micro-zonation study for Dhaka that was undertaken by CDMP2. This argument is strengthened by the rapid urbanization that the city is experiencing, which is quickly encroaching upon open space and increasing population density. Systems and processes for quality control of construction and adherence to building code provisions and other standards are believed to be insufficient. Land use planning, regulation and public service delivery in urban areas of Bangladesh has failed to keep up with the pace of growth. The rapid growth of Dhaka coupled with migration has increased its vulnerability to earthquakes and other hazards. The trend of increased vulnerability can be reserved into urban resilience and sustainability by implementing risk-sensitive planning and sustainable development policies and strategies.

Urban Disaster Resilience has been defined as the capability to be prepared, respond to, and recover from multi-hazard threats with minimum damage to public safety and health, the economy, and security of a given area. The focus of the proposed urban resilience project (URP) concerns natural disasters like flood, cyclone, tornado, earthquake etc. including accidents like fire, building collapse, landslide etc. that cause massive destruction and unrecoverable loses to the victims. All these incidents are frequent in the deliberate project areas of Dhaka and Sylhet City Corporation.

## 2. Rapid Urbanization and the Risks of Dhaka City

Strong and sustained economic growth in Bangladesh continues to fuel massive population growth in the country's cities: Dhaka alone contains 37% of total urban population, conforming to the classic case of primate city in which the population of the largest city is more than the combined total of the three next largest cities [4]. The great bulk of the urban population is concentrated in Dhaka, comprising more than one-third the urban population of the whole country; it is among the fastest growing megacities in the world with a population of nearly 14 million and projected to become the sixth largest megacity in the Asia-Pacific region by 2020 with a population approaching 20 million [5].

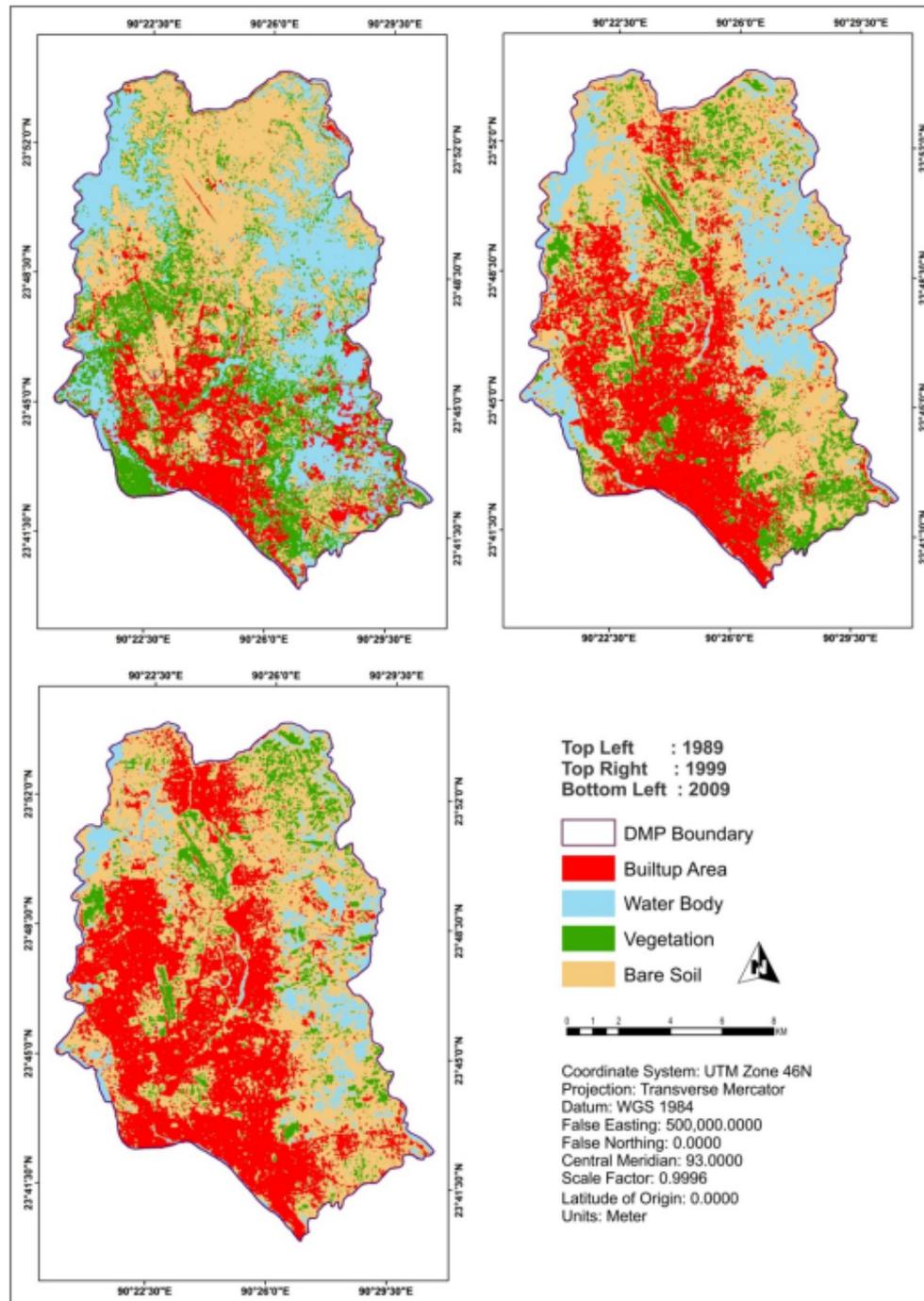


Fig. 1- Dhaka City build up area 1989-2009 [6]

Dhaka lies within the second seismic zone among three seismic zones of Bangladesh which covering the entire country [7]. Sometimes it has been suggested from research that an earthquake of up to magnitude 7.5 is possible within the country. Here the nearest fault line runs just 60 km from the Dhaka city. In the context of Global Earthquake Disaster Risk Index Dhaka has been placed among the 20 most vulnerable cities in the world [8]. With 7 million people living in the jurisdictional boundaries of Dhaka City Corporation and 15 million in the wider Dhaka metropolitan area, where the greater Dhaka area is particularly at risk. Land use planning regulation and public service delivery in the urban areas of Bangladesh has failed to keep up with the pace of growth. As a result, the urban areas has been developed being risky cities to disasters.



### 3. Disaster Risk Management (DRM) in Bangladesh

In worldwide on the context of disaster risk management (DRM) activities Bangladesh is cited often in the rationale for investment. To reduce the risk of any big disastrous event there are many agencies involved in accomplishing the activities for preparedness, response and early recovery. For efficient preparedness, response and early recovery it is needed that all the agencies to work together under a well-designed plan. Bangladesh now capable managing cyclone disasters and coastal flooding through repeated response experience and has support systems in place through local NGOs and government institutions under the ongoing Cyclone Preparedness Program, but the current set up is not sufficient to manage catastrophic events such as earthquakes, fire hazards in complex urban areas like Dhaka City. Bangladesh Government has taken the Urban Resilience Project (URP) to overcome these lickings.

#### 3.1 Govt. Policy to reduce disaster risk in Bangladesh

Disaster Management Act of Bangladesh mainly combination of three parts as Disaster Management Policy, National Plan of Disaster Management and Standing Orders on Disaster (SOD). Different sectoral policies for disaster risk reduction are being formulated from Disaster Management Policy which define the national perspective on disaster risk reduction, emergency management to describe the strategic framework & national principles of disaster management in Bangladesh and also from National Plan of Disaster Management that provides the overall guideline for the relevant sectors and the disaster management committees at all levels to prepare and implement their area of roles specific plans. Different Local Plans, Hazard Plans are also being formulated from National Plan of Disaster Management. On the other hand, SOD produce different kinds of guidelines and templates that describes the detailed roles and responsibilities of committees, Ministries and other organizations in disaster risk reduction and emergency management and establishes the necessary actions required in implementing Bangladesh's Disaster Management System. Through this Urban Resilience Project, the country's entire emergency management system will be guided by international standards and principles of emergency management<sup>1</sup> and in conformity with national laws and guidelines incorporated in the Disaster Management Act of 2012 and Standing Orders on Disaster 2010.

In terms of multi-phase national disaster risk management (DRM) program URP is being represented as the second phase to build up an institutional capacity to mitigate the impact of earthquakes in the rapidly urbanizing cities of Bangladesh. The objective of the overall engagement is to develop a comprehensive approach for managing earthquake risk through a structured process of knowledge development, education and planning that involves a wide range of stakeholders to increase engagement and ownership. This engagement will help to identify key entry points of DRM mainstreaming in the plan formulation, investment programming and implementation. Also the engagement shall look into the planning process and through this way the Project try to respond to this critical gap in the management of disaster risk in Bangladesh. A structured participatory process helps to support national level policy option analysis in DRM system where all relevant stakeholders, under the leadership of RAJUK's Town Planning Department, shall be put in place supported by experts in urban DRM mainstreaming as well as in relevant sectors of planning (e.g., housing, transport, infrastructure, social and economic).

Strengthening Institutional Mechanisms and Strengthening Emergency Response Systems both are the strategic goals of national plan of disaster management which are important parts of URP in Bangladesh.

#### 3.2 Ineffectiveness of Country Policy Framework

In Disaster Management Act 2012, there are first grade offences and second grades offences as policy negligence activities in urban area such offences mainly disobey wilfully or fail to obey any instructions of the Government, National Disaster Response Co-ordination Group (NDRCG), firefighting system are not being properly established in hospitals, clinics, community centres, shopping malls, cinema halls, restaurants, factory and warehouses, also not creating and marking evacuation routes are not in above places, Obstructing movement of fire-fighting and rescue vehicles, Stock piling or marketing hazardous chemicals without appropriate safeguards in residential areas or ordinary market places, Obstructing implementation of



any order to relocate or remove any individual or families living in any vulnerable areas. However, due to lack of specific urban resilience unit and proper resilient management system these offences are not being properly measured and controlled for implementing Disaster Management Act successfully [9].

Additionally, Building Code enforcement in Dhaka has been described as “largely problematic”. The capacity and numbers of personnel from RAJUK to meet the demands of continued building construction and carry out building permitting according to the requirements of the Bangladesh National Building Code (BNBC) are lacking. The shortage of building inspectors, the weaknesses in competency, and the lack of understanding of building code enforcement to protect human lives and property, has resulted in a negligent code enforcement process.

#### 4. Background and Context of Urban Resilience Project

In this backdrop, the Government of Bangladesh intends to implement the Bangladesh Urban Resilience Project (URP) in two cities, Dhaka (DNCC, DSCC) and Sylhet (SCC). The URP is the first phase of a series of projects which will initially focus improving the critical capacity and for planning and emergency response. The second phase would seek to further improve construction standards for future developments and reduce existing physical vulnerabilities. The third phase would consider broader investment in infrastructure development in water supply system, power system, transport, and construction of protective infrastructure.

The World Bank has provided a loan to improve the capacity of Disaster Risk Reduction (DRR) and Emergency Management (EM) systems in Bangladesh through the URP. The URP seeks to create an enabling environment for centrally coordinated and locally managed DRM in Bangladesh. There are three core pillars of disaster resilience in urban settings, as described in Figure 2 below, including: i) effective emergency management; ii) improving structural resilience through reduction of existing physical vulnerability; and iii) risk-sensitive land use planning and safe construction standards and practices to ensure sustainable growth.

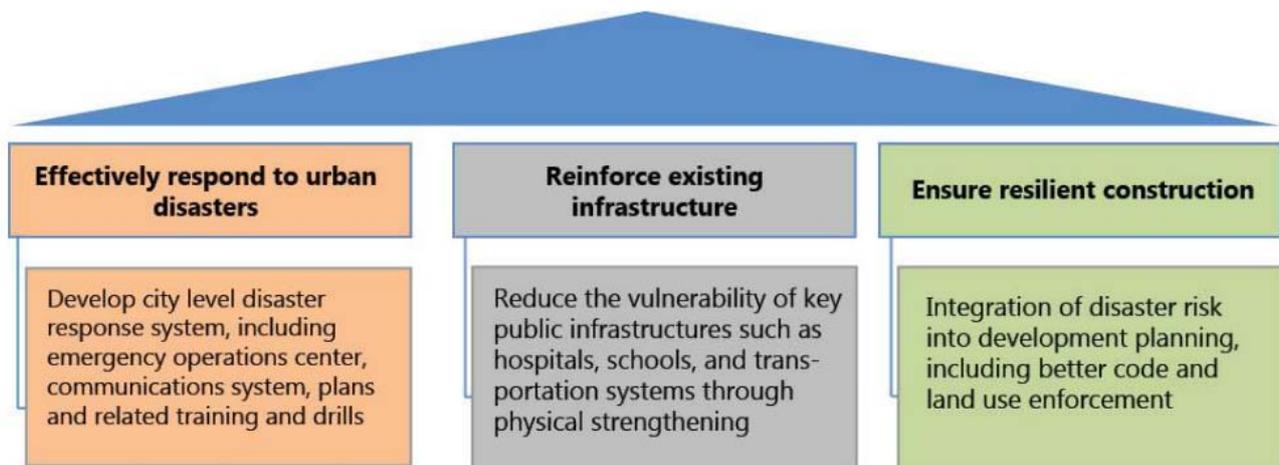


Fig. 2- The Three Pillars of Urban Disaster Resilience

The first URP investment consists of four main components:

**Component A:** Reinforcing the Country’s Emergency Management Response Capacity

**Component B:** Vulnerability Assessment of Critical and Essential Facilities

**Component C:** Improved Construction, Urban Planning, and Development

**Component D:** Project Coordination, Monitoring, and Evaluation



The above four components have been implementing by four agencies of four different ministries of Bangladesh. Component A will be implemented by the Department of Disaster Management (DDM) and Dhaka North City Corporation (DNCC), Component B and C will be implemented by RAJUK-which is briefly described here in this paper, and Component D will be implemented by project co-ordination and monitoring Unit (PCMU) of the Programming Division, Ministry of Planning

#### **4.1 Objectives of the Urban Resilience Project (URP):**

The overall objective of the URP is to strengthen the capacity of GoB agencies to efficiently and effectively respond to recurrent as well as large-scale disasters/emergency events and to improve construction permitting and physical audit processes in Dhaka and Sylhet City. The responsibility of PCMU, DNCC, RAJUK and DDM to implement the whole project briefly pointed out and describe below.

##### **Responsibility of PCMU:**

- To Coordinate, Monitoring and Evaluate the activities of URP Project for ensuring effective implementation;
- To develop appropriate methodologies in coordination with the Implementing Agencies (IAs) for effective implementation of the project;
- To Support and Facilitate the Project Management of sub-projects in Procurement & Financial Management;
- To conduct regular Monitoring, Annual Review, Mid-Term Review and end of the Project Evaluation;
- To Conduct and Manage need based strategic studies and other studies/pilot projects during project implementation;
- To enhance capacity of project related officials through local and foreign training/study visits and higher studies.

##### **Responsibility of DNCC:**

- To enhance the capacity of relevant government entities in Dhaka and Sylhet to effectively plan for, respond to, and recover from, emergency events.
- Build Disaster Risk Management and Emergency Response Capability of the Dhaka City Corporations (North and South), including the establishment of one fully operating EOC for Dhaka City as well as satellite control rooms stationed at institutions which are members of the Dhaka City Disaster Response Coordinating Group and the zone-level administrative unit of DCCs;
- Build Disaster Risk Management and Emergency Response Capability of the Sylhet City Corporation including the establishment of a fully operating EOC for Sylhet City Corporation,
- Enhance the Emergency Management Planning and Response Capability of the Fire Services and Civil Defense (FSCD) with fixed and mobile emergency command and control rooms, to include ICT equipment and additional life-saving equipment and construction of distributed warehouses to house emergency response assets for its facilities in Dhaka and Sylhet; and
- Increase Institutional Capacity to manage and respond to emergencies through comprehensive development programs, drills and exercises.

##### **Responsibility of RAJUK:**

- To Coordinate, Monitoring and Evaluate the activities of URP Project for ensuring effective implementation;
- To develop appropriate methodologies in coordination with the Implementing Agencies (IAs) for effective implementation of the project;



- To Support and Facilitate the Project Management of sub-projects in Procurement & Financial Management;
- To conduct regular Monitoring, Annual Review, Mid-Term Review and end of the Project Evaluation;
- To Conduct and Manage need based strategic studies and other studies/pilot projects during project implementation; and
- To enhance capacity of project related officials through local and foreign training/study visits and higher studies.

#### **Responsibility of DDM:**

- To enhance the capacity of the government to effectively plan for, respond to and recover from, emergency events.
- Establish the National Disaster Management Research and Training Institute (NDMRTI) to increase National Capacity of Disaster Management Methods;
- Build National-Level Disaster Risk Management and Emergency Response Capacity by establishing Emergency Response and Communication Center (ERCC) and enhancing the capacity of existing Disaster Management Information Center (DMIC); and
- Enhance the Emergency Management and Preparedness Capacity of the National-Level, ERCC and NDMRTI and the local-level City Corporations and FSCD in Dhaka and Sylhet through Training, Exercises and Drills (TED).

#### **4.1.1 Disaster Risk Management (DRM) and Establish an Emergency Operations Center (EOC)**

The setup of DRM Office which will be in charge of all aspects of disaster risk management activities within Dhaka. This includes planning and coordination of preparedness activities, prevention and mitigation, response, recovery and financial protection. Each of the two Dhaka City Corporations will have DRM Office. The Dhaka South City Corporation (DSCC) shall house the main EOC for the whole of Dhaka with a Satellite Control Room in DNCC. The DRM Offices will also be in charge of developing the various DRM Plans for their respective cities and coordinating their implementation. The DRM Offices will serve as the main institutional agent to advocate, coordinate, and support policy and action in urban resilience.

The EOC does not "command and control" the on-scene response. The decisions made at the EOC are not tactical decisions; rather for tactical decisions the Incident Commander and the Command Staff at the incident scene take the lead. The EOC personnel carry out coordination functions through: information collection, evaluation and consolidation, future planning, priority setting, resource management and tracking, financial oversight, After Action Review (AAR) analysis. For every large disaster, Emergency Managers and EOCs conduct key response functions. These include: Damage Assessments, Disaster Declarations, Urban Search and Rescue, Emergency Medical Care and Triage, Recovery and Reconstruction. The EOC must be staffed by dedicated personnel organized ideally under the Incident Command System. The EOC is the facility from which multiple agencies or organizations (Emergency Support Functions - ESFs) and EOC staff conduct response support tasks. The EOC will house a standard, system-wide, Emergency Management Information Data System to integrate disaster information among all key agencies. The EOC will have a standardized set of emergency management professionals organized in accordance with a form of Incident Command System that is scalable based on the event and requirements. The EOC will also be designed to accommodate a system of Emergency Support Function personnel. Finally, the EOC will be operated in accordance with established legal and institutional arrangements and under an adopted Emergency Operation Plan.

#### **4.1 Urban Resilience Project: RAJUK Part**

Urban Resilience Project (URP) is undertaken with the overall objectives to strengthen the capacity of GoB agencies, to efficiently and effectively respond to emergency events in Dhaka and Sylhet. The secondary



objective is to improve quality of new construction in Dhaka and Sylhet. Along with its overall objectives, the specific objectives of this sub-project are to implement Components B and C, which are comprised of the following sub-component:

**Component B:** The objective of this component is to develop the consensus-driven analytical foundation required for longer-term investments and to reduce risk in the built environment of Dhaka, Sylhet and other cities in Bangladesh. The overall scheme for Component B covers two areas of investment, which described below:

Sub-component B.1. Vulnerability Assessment of Critical and Essential Facilities and Lifelines

Sub-component B.2. Support the Development of a Risk-Sensitive Land Use Planning Practice in Dhaka

#### 4.2.1 Sub-component B.1: Assessment of Vulnerability of Critical and Essential Facilities and Lifelines

This component aims to identify at-risk public infrastructure, including critical and essential facilities and lifelines, assess their vulnerability to earthquakes and other hazards and develop city-wide vulnerability reduction program including priorities and budgets for physical strengthening, retrofitting or replacement.

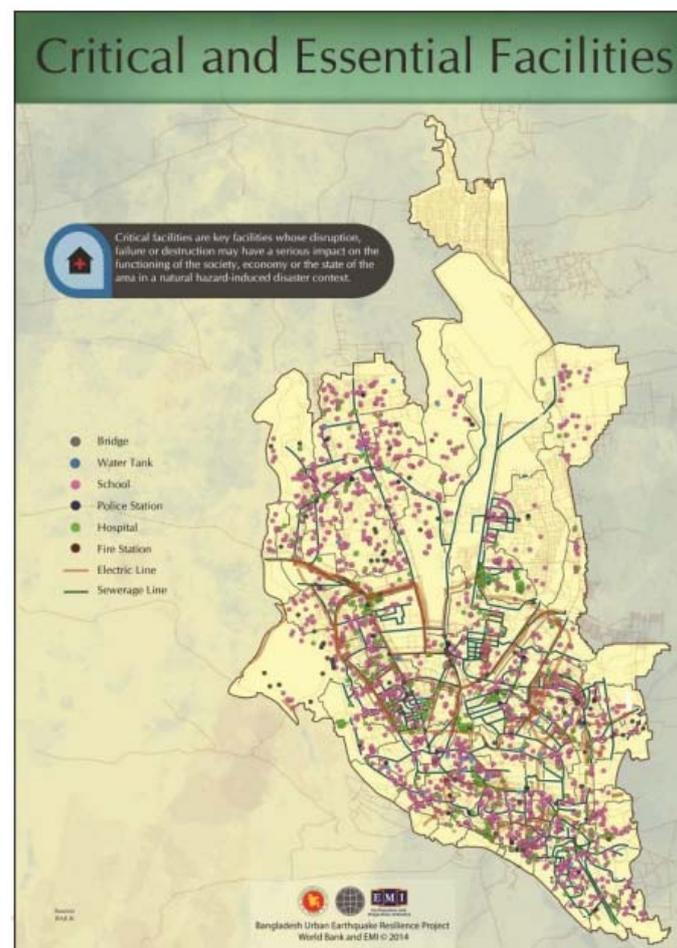


Fig. 3- Map showing the distribution of Critical and Essential facilities in Dhaka

The output of the vulnerability assessment is to develop a long-term risk reduction program combining various building and lifeline vulnerability reduction strategies. This includes techniques such as building retrofit, building abatement and replacement to reduce the number of unsafe, substandard and dangerous buildings and pipelines and facilities strengthening to ensure that infrastructures are resilient to extreme



environment stresses. The lifeline strategies include developing redundant distribution system and improve their reliability through system analysis. Figure 3 shows a mapping of some of the critical and essential facilities in Dhaka [10].

#### 4.2.2 Sub-component B.2. Support the Development of a Risk-Sensitive Land Use Planning Practice in Dhaka

Bangladesh UERP [10] evaluated the existing planning policies, systems and plans under RAJUK. It provided input and detailed guidance on how future plans can be made “risk-sensitive” and how mainstreaming can be incorporated in the land use management approaches and various sectors of development embedded in the plan. Component B2 will support the conduct of risk-sensitive planning exercises for Metropolitan Dhaka in coordination with the findings and outputs of Component B1. This will be informed by an understanding of the hazards, vulnerability and risk facing urban centers.

**Component C:** The objective of Component C is to put in place the institutional infrastructure and competency to reduce long-term disaster vulnerability in Dhaka. It would address both the existing built environment as well as future development. The overall scheme for Component C covers four areas of investment, which described below:

Sub-component C.1. Create and Operationalize an Urban Resilience Unit (URU) in RAJUK

Sub-component C.2. Establish an Electronic Construction Permitting System

Sub-component C.3. Set up a Professional Accreditation Program for Engineers, Architects and Planners

Sub-component C.4. Improve Building Code Enforcement within RAJUK Jurisdiction

#### 4.2.3 Sub-component C.1. Create and Operationalize an Urban Resilience Unit (URU) in RAJUK

This component will fund activities related to setting up an Urban Resilience Unit (URU) within RAJUK to develop human and capital resources, both in number and capacity, to undertake urban resilience activities. In particular, it will oversee the implementation of the BNBC, accreditation and code enforcement provisions, and implementation of building construction standards. The URU will also serve as RAJUK’s project implementation unit (PIU) for Components B and C, which will be implemented by RAJUK.

#### 4.2.4 Sub-component C.2. Establish an Electronic Construction Permitting System

This component will fund the design, development and implementation of an electronic permitting and monitoring system (e-permit) for construction applications. The funding will include a feasibility study, the design, development, testing, training, as well as deployment of the system, and related infrastructure (software and hardware necessary for institutionalization). The objective is to make construction permitting more efficient and transparent.

#### 4.2.5 Sub-component C.3. Set up a Professional Accreditation Program for Engineers, Architects and Planners

Component C3 will serve to improve the professional competency and ethical standards of practice of professional engineers, architects, planners and other construction professionals according to Bangladesh building code and international standards of practice. The objective is to develop a new program aimed at delivering a recognized professional accreditation based on international best practices. A major effort will go into developing the curriculum, requirements for skills and experience, and certification documentation agreed upon and accepted by the professional engineering community.

Component C3 will also first oversee a consultation process with stakeholders to establish a working relationship with RAJUK and the MoHPW. The Professional Accreditation Program should be promoted and the demand and requirements should be defined through a participatory process. In consultation with the professional associations, academia, building design and construction industry, an Accreditation Advisory



Panel should be convened to help build consensus around the parameters and conditions for the accreditation program and establish standards

#### 4.2.6 Sub-component C.4. Improve Building Code Enforcement within RAJUK Jurisdiction

This Component will build the capacities and administrative structure for RAJUK to implement and enforce the BNBC, the provisions of the Structure Plans and DAP, and building field inspection and controls. This funding is confined to RAJUK's jurisdictional responsibilities and mandate.

## 5. Conclusion

In Urban Resilience Project the main implementing organizations are Project Coordination and Monitoring Unit (PCMU), Dhaka North City Corporation (DNCC), Rajdhani Unnayan Karttripakkha (RAJUK) and Department of Disaster Management (DDM). This project is funded by the World Bank. Overall the main objective of this project is to strengthen the capacity of GoB agencies (DNCC, DSCC, SCC, DDM, RAJUK, FSCD and PCMU) efficiently and effectively respond to large-scale disasters / emergency events and also to improve quality of new construction, construction permitting and physical audit processes in Dhaka and Sylhet City. Through this project the Urban Resilience Unit (URU) is seen to play an important role to help RAJUK in mainstreaming Disaster Risk management (DRM) into its operations, functions, planning, policy and decision-making. The key output of this project will support the development of the effective organization within RAJUK for urban resilience activities where the Urban Resilience Unit (URU) will be supportive in terms of DRM mainstreaming and improving Dhaka urban resilience.

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