Risk-Sensitive Land Use Planning Guidebook

Bangladesh Urban Earthquake Resilience Project
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Executive Summary

The role of land use planning in building resilient cities

Rapid and uncontrolled urbanization is increasing the exposure of populations and infrastructure to potential hazards. There is a need to better plan growth in terms of infrastructure and construction by taking into account hazard and risk parameters that can protect these investments from major damages. There is also a need to improve the delivery of core services such as health, education, social welfare, transportation, power, water, sanitation, and others so that these services will continue to function even after major catastrophic events such as earthquakes.

The impact of natural and man-made hazards can be reduced through adequate planning and incorporating specific DRR measures in land use planning and urban development processes, thus minimizing the human, economic and environmental damage. By increasing the resilience of communities, DRR also improves the ability of people and infrastructure to recover from disasters.

The relevance of mainstreaming

Integrating the practice of risk management within the governance, functions and operations of local authorities can effectively accomplish urban disaster risk reduction. For local authorities, this translates into having processes and practices that inherently incorporate urban risk reduction in the key functions that they undertake such as land use and urban development planning, construction and building licensing, environmental management, and social welfare, as well as, in the services that they provide or regulate.

Mainstreaming DRM in land use planning

Mainstreaming activities in a general land use planning process pertain to the various initiatives which aim to build upon existing capabilities to initiate land use planning and integrate risk information and its management into the content of the land use plan and implementing tools (e.g. zoning, investments, building regulations) that dictate land use, land management, and building design and development. In the context of preparing a Disaster Risk Management (DRM) Plan, the Land Use component of the DRM Plan provides for this mainstreaming framework, and its application results into policies, strategies, and investment programs that build resilience.

In general, the process of mainstreaming disaster risk management parameters in land use planning is termed as Risk-sensitive Land Use Planning (RSLUP). RSLUP is a rather new practice – especially in developing countries - and many planners and planning organizations lack the experience in and methodology for RSLUP. For planning institutions which are only familiar with traditional planning, the main difficulty lies in understanding and interpreting hazard, vulnerability and risk information in sectoral and physical framework planning.

Risk-sensitive land use planning concepts

Defining RSLUP

Risk-sensitive land use planning (RSLUP) adds two new considerations to the conventional approach to land use planning:

- **Disaster risk reduction parameters and objectives.** Hazard, vulnerability, risk, and capacity parameters, together with the disaster/emergency management requirements, are identified, collected, and
integrated with traditional land use planning information (e.g., socioeconomic profiles, demographics, and transport networks), and DRR goals and objectives are formulated.

- **Integration through formal government activities.** Measures are taken to ensure understanding, acceptance, and support for the plan; to improve the competency and knowledge about risk-sensitive land use planning among planners and other professionals, and to raise the awareness and support of all stakeholders.

**Achieving RSLUP objectives through policy, capacity and investment**

Risk-sensitive land use planning recognizes that land use and disaster risk are related elements whose interactions need to be considered to determine the most appropriate and safest strategies for development. City-level land use planning and management can therefore serve as effective tools for mainstreaming disaster risk reduction into urban development processes.

By reducing disaster risk through land use planning, cities are able to:

- Promote controlled and sustainable urban growth without generating new risks;
- Identify and mitigate the root causes of disaster risks embedded in existing land development practices;
- Modify and reduce vulnerable conditions of people (physical/social/economic) and places;
- Pre-empt disaster damage before it happens through mitigation; and
- Reduce losses and increase people's ability to recover by speeding up the process of reconstruction and rehabilitation.

The objectives of risk-sensitive land use planning can be achieved by applying interventions from three basic groups of instruments - policy; capacity development, particularly at the local level; and investment - to support enhanced risk assessment, risk reduction, and management of residual risk.

**Urban resilience qualities as assessment areas for land use planning and management**

The ability of cities to recover quickly from disasters is a factor of various qualities. Several of the characteristics of disaster resilient cities mentioned earlier can be translated into a set of assessment areas and desired qualities (e.g., legal, institutional, plan, participation, data and norms, implementation and qualities) that should be present in a risk-sensitive land use planning system in order to effect appropriate adaptations in development. These qualities are then used to identify and describe gaps between the desired state and existing conditions.

These characteristics or “essentials” can be used to come up with criteria for developing appropriate strategies (e.g. land use management methods) and can serve as a basis for LUP goals or objectives to be implemented by Dhaka for building resilience. They can similarly be translated into outcomes, revealing where changes in policies and/or practice by development actors and stakeholders are needed. As outcomes, they provide a picture of what the Dhaka government would like to see as a result of the implementation of several strategies over the short or medium term.

**Engaging stakeholders in mainstreaming DRM in land use planning**

Mainstreaming disaster risk management in land use planning requires the meaningful
participation of stakeholders throughout the process so that the plan becomes enriched with inputs from stakeholders who have a stake in building the resiliency of a city. The meaningful participation of stakeholders also ensures that the plan is understood and owned by those who have key roles to play in its eventual implementation and enforcement. In order for the stakeholders to be meaningful participants in a highly technical process such as mainstreaming DRM in land use planning, it is important that a parallel process of awareness-raising and capacity development be undertaken to support the learning process of the stakeholders as they participate in the land use planning process. Participation in these activities requires that stakeholders understand and become familiar with the results of hazard, vulnerability, and risk assessments which could be complex even to most technical experts. As such, the need for awareness raising and capacity building as crosscutting interventions in RSLUP is necessary to facilitate informed and meaningful participation.

Risk-sensitive land use plan preparation

Risk information in land use planning and management

Risk information can be used as one of the basis to identify future directions and intensities of land uses. It begins with an assessment of natural hazards in relation to human and physical vulnerability, capacity, and development. This is included in the situational analysis of the different sectors. When stakeholders have a grasp of the impacts and implications (e.g. to plans, investments) of the hazard risk, disaster risk management is taken as a development concern and is carried forward through development policies, goals, objectives, strategies and PPAs. Avoidance and mitigation strategies, capacity and capability building are built into the different development sectors and residual risks are managed. It should be the goal of mainstreaming that risk governance prioritizes human, physical and environmental system resilience, and thus, various interventions (e.g. policies, investments, capacity building) address core needs (e.g. risk assessment, risk reduction, managing residual risks).

The risk information facilitates the following processes:

- Description of hazards, vulnerabilities and risk;
- Identification of new risk reduction goals, objectives and targets;
- Determining risk reduction strategies;
- Identifying DRR, development and land use-related programs, projects and activities (PPAs);
- Designing the implementation, monitoring and evaluation of DRR-related PPAs;
- Formulation of zoning ordinance.

Mainstreaming DRR in the land use planning process

Several entry points in the conventional process of land use planning provide opportunities for integrating risk reduction measures into land use plans through specific activities. These entry points are:

- Data collection, inventory and analysis;
- Setting the RSLUP vision;
- Formulation of goals, objectives and strategies;
- Generation and evaluation of alternative strategies;
- Detailing of preferred risk-sensitive land use plan;
- Formulating policies and implementation tools;
- Adoption and plan implementation.

The RSLUP process necessarily includes building the capacity of technical personnel familiar with conventional land use planning on what elements to mainstream and how to mainstream using these entry points.
Analysing the sensitivity of land use plans

Gaps analysis

The Gaps Analysis approach is a method which utilizes a set of desired resilience qualities, from which “gaps” in the current state of affairs or situation of the agency can be identified. The resilience qualities are translated into assessment areas where interventions related to changes in legal & institutional arrangements and implementation processes (e.g. enforcement) should be made to close the gaps.

The process undertaken for the review and gaps analysis involves gathering the data and information on the planning system and hazard, vulnerability and risk assessment (HVRA) information. All this information is then reviewed to: a) provide a situational analysis on the planning environment, practice of plan formulation and implementation, and knowledge and the city’s understanding of hazards and risks; b) assess whether current land use plans and processes, related legal frameworks and institutional arrangements and implementation (e.g. zoning, code enforcement) provide the internal and external environment to help agencies adapt to environmental hazards, build resilience and reduce risks, and c) identify gaps and provide recommendations (e.g. policies, strategies and actions) to close gaps between a desired state guided by the criteria developed (e.g. risk reduced, resilient communities) for risk-sensitive planning and the existing condition(s).

SWOC analysis

Similarly, the gaps can be determined from a SWOC analysis. With the objective of performing actions to address an identified problem, issue or concern, Dhaka city local governments have to identify a strategy (or strategies) and assess the strengths & weaknesses of its internal environment and determine the challenges and opportunities in its external environment. The pairings of strengths, weaknesses, opportunities and challenges may be seen as a way for the agency or local government to decide on possible actions. The final gaps analysis shall utilize the same assessment areas but shall be expanded to consider the strengths, weaknesses, challenges and opportunities. The assessment areas shall be grouped under the four themes of the disaster management cycle such as prevention/mitigation, preparedness, response, and recovery/rehabilitation. Land use management and planning fall under the prevention/mitigation themes and will focus more on this theme.

LUP investigation research design

Carrying out the analysis for risk sensitivity of LUP makes use of a three-pronged approach that triangulates the findings from three key methods, namely: (1) Desktop research (e.g. review of literature), (2) Use of analytical tools (e.g. system approach, spatial models), and (3) Field work and stakeholders participation (e.g. surveys, primary data gathering, key informant interviews, focus group discussions, workshops, etc.)

Because many aspects of the LUP analysis are contextual and not fully understood and documented, a process for the validation of findings and analyses with the stakeholders has to be undertaken at each stage.

Desk research looks into:

- Past plans and land use planning process

This consists of reviewing the past planning processes and approved plans (e.g. Dhaka Metropolitan Structure Plans and several Detailed Area Plan (DAP), terms of reference for updating proposals, and the manner of execution of the planning process.

- Legal and institutional arrangements in planning

The legal aspect focuses primarily on describing the legal environment for land use planning,
construction codes and standards, and relies on the desktop review of relevant documentation (laws and related statutes, regulations, policies, legislative briefs and judicial interpretations) drafted by national and local government agencies. This stage is focused on developing an understanding of the scope of existing legal documents and their relevance in defining mandates and in supporting effective DRM implementation. The institutional aspect of the LUP analysis is concerned with identifying which organizations have responsibilities and functions relevant to land use and zoning, development and enforcement of construction codes and standards, sectoral development planning and implementation, and the formal and informal mechanisms through which they interact and communicate with one another.

The desk review also incorporates an inventory and review of risk information. This involves an assessment of the following: (a) seismic hazard, (b) the vulnerabilities and risks of different elements (e.g. people, buildings, facilities, activities, etc.) in the city, and (c) requirements for emergency management (e.g., open spaces, open access, access routes, etc.). The inventory and review is necessary to generate sufficient data that will facilitate the integration (or mainstreaming) of risk information in the planning process.

Identification of hazards and risk, and assessment to planned system

This requires identifying the earthquake hazards and risks, drawing upon information from existing studies and reviews, or conducting new assessments. It looks into Dhaka as a system and looks into hazard and risk in its components and their interrelationships. This process requires that risk theme areas be considered for assessment, and that additional vulnerabilities and risks that arise due to the process of city development should also be reviewed.

Implications to plans and development practice

Stakeholders provide an in-depth analysis on the responsiveness of the land use plan in addressing earthquake disaster risk reduction concerns, based on their knowledge of the locality. They identify strengths, weaknesses, opportunities and challenges in existing clusters or unit areas for analysis. The phase involves many tools such as mapping, overlays, and Strengths-Weaknesses-Opportunities-Challenges (SWOC) analysis to understand implications to plans and practice, and for strategy development.

Field work and stakeholders’ participation

The information needed to support the analysis is collected through various qualitative methods, such as key informant interviews, focus group discussions, and stakeholder workshops. The primary mechanism for stakeholder participation is the Land Use Planning Focus Group (LUP FG), composed of representatives from key national and local organizations with responsibilities and functions relevant to planning and construction code development in the city. Additional venues for ensuring collective contribution and teamwork among the project team and stakeholders are provided by the Advisory Committee (AC), made up of policy and decision-makers from various government and non-government institutions in Dhaka, and the Scientific Consortium (SC), a small group of renowned local experts in the fields addressed by the project, mainly earthquake engineering, geology and geophysics, land use and regional planning, disaster risk management, law and business administration, environmental management, and other closely related fields.

Meetings, workshops, one-on-one consultations and surveys are undertaken during the project to accomplish the goals of the participatory process as explained above. While the process is guided by the experts, the outcome is controlled by the input and the level of engagement and contribution from the stakeholders. The validity of the LUP investigation relies to a great extent on the success of the participatory process.
RSLUP investigation: The case of Dhaka

Stages in the investigation process

The investigation process is composed of four phases, with the outputs of each phase contributing to the accomplishment of the objectives of the succeeding phases.

In the **Organization and Preparation** phase, scoping is conducted to gain a preliminary understanding of the prevailing enabling environment for risk-sensitive land use planning in Bangladesh, as well as to identify the relevant key institutional stakeholders. This is accomplished through the review of secondary sources of information and consultations with local experts. The schedule of investigation activities is also developed and finalized at this time with the LUP Focus Group.

For Dhaka, several preparatory activities were carried out in this phase:

- Initial Project Team Orientation and Scanning of LUP in DRM in Bangladesh
- Focus Group Discussion (FGD) on LUP Capacity and Needs
- LUP Workshop and Key Informant Interviews (KII) on the Planning System of Bangladesh.

These activities provided significant initial findings in terms of Dhaka development plans, the Bangladesh Government administrative structure, and development management for the Dhaka Metropolitan Area.

The **Data Collection** phase is focused on gathering relevant information that will inform the analysis on the responsiveness of the Dhaka and Region planning system and implementation of land use management methods for DRM. In-depth interviews with focal officials of key planning-related offices are also conducted, making use of guide questions developed based on the data gathered from desktop research. These interviews are supplemented by meetings with the LUP Focus Group, and other modes of discussion and knowledge sharing.

This phase generated valuable information on issues and problems relevant to the authority of organizations, institutional services, and coordination among relevant agencies.

In the **Analysis and Diagnosis** phase, the information collected from the data gathering activities is consolidated in order to describe the existing planning practice, plan formulation, plan document structure, implementing instruments (e.g., zoning, building code enforcement, and project identification, management and development) and their responsiveness to DRM at the city level. Current land use management practice for DRR is also compared against existing national and local DRR statutes and policies and accepted international standards, in order to further identify gaps and possible remedial actions. The major findings during this phase in terms of risks in the macro form and urban fabric; building stock, housing and shelter; lifelines, emergency facilities and special areas; planning process for Dhaka Metropolitan Development Plan (DMDP) formulation; and Detailed Area Plan (DAP) formulation resulted from a review and analysis of the of the DMDP and DAP.

As part of the **Findings, Validation and Recommendations** phase, the results of the initial reviews of the DMDP and DAP were similarly subjected to further reviews and discussions in open forums through the RSLUP Blended Training. A summary of key findings from participants of the RSLUP Blended Training reveals the top concerns:

a) Poor implementation of land use and environmental management strategies compounding the seismic;

b) Lack of enforcement of building construction codes and standards and unsafe building construction practices, contributing to
the increase in vulnerability and risks to seismic hazards;

c) Emphasis on capacity and capability building for the following: risk-sensitive planning and policy making, building monitoring and evaluation for enforcement of construction codes and standards in Dhaka-City Corporation Areas, preparing investment programs to support risk assessment, risk reduction activities and continued “awareness building” on earthquake preparedness, response and recovery measures.

Recommendations for making the Dhaka Land Use Plan risk-sensitive

In order to address the identified gaps in land use planning and management for DRM in Dhaka, a set of policy recommendations is proposed. The recommendations are meant to serve as a guide for implementing a series of practical and effective actions to enhance the enabling environment for DRM. Three (3) key policy recommendations are provided.

**Recommendation #1.** The planning structure and process, plan outputs and the structures to implement them must be risk-sensitive.

**Recommendation #2.** Make the process of plan development and implementation participatory at all levels.

**Recommendation #3.** Use the Hazards, Vulnerability and Risk Assessment (HVRA) findings to guide land use planning formulation, zoning ordinances and development regulations.
### Acronyms

- **AC**  
  Advisory Committee  
- **ADPC**  
  Asian Disaster Preparedness Center  
- **AFD**  
  Armed Forces Division  
- **AS/NZ**  
  Australia/New Zealand Standards  
- **BAPA**  
  Bangladesh Poribesh Andolon  
- **BELA**  
  Bangladesh Environmental Lawyers Association  
- **BIP**  
  Bangladesh Institute of Planners  
- **BIWTA**  
  Bangladesh Inland Water Transport Authority  
- **BMD**  
  Bangladesh Meteorological Department  
- **BNBC**  
  Bangladesh National Building Code  
- **BPC**  
  Bangladesh Parjatan (Tourism) Corporation  
- **BR**  
  Bangladesh Railway  
- **BRTA**  
  Bangladesh Road Transport Authority  
- **BRTC**  
  Bangladesh Toad Transport Corporation  
- **BTCL**  
  Bangladesh Telecommunications Company Limited  
- **BTTB**  
  Bangladesh Telephone and Telegraph Board  
- **BUERP**  
  Bangladesh Urban Earthquake Resilience Project  
- **BUET**  
  Bangladesh University of Engineering and Technology  
- **BWDB**  
  Bangladesh Water Development Board  
- **CCDMC**  
  City Corporation Disaster Management Committee  
- **CCDR**  
  Cabinet Committee for Disaster Response  
- **CCDRCG**  
  City Corporation Disaster Response Coordination Group  
- **CDMP**  
  Comprehensive Disaster Management Programme  
- **CEGIS**  
  Centre for Environmental and Geographic Information Services  
- **CPP**  
  Cyclone Preparedness Program  
- **CPPIB**  
  Cyclone Preparedness Program Implementation Board  
- **CRA**  
  Community Risk Assessment  
- **CSDDWS**  
  Committee for Speedy Dissemination of Disaster Related Warning/Signals  
- **DAP**  
  Detailed Area Plan  
- **DCB**  
  Dhaka Cantonment Board  
- **DCC**  
  Dhaka City Corporation  
- **DESCO**  
  Dhaka Electric Supply Company Limited  
- **DDM**  
  Department of Disaster Management  
- **DNCC**  
  Dhaka North City Corporation  
- **DSCC**  
  Dhaka South City Corporation  
- **DDMC**  
  District Disaster Management Committee  
- **DDRCG**  
  District Disaster Response Coordination Group
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About the RSLUP Document

What is the purpose of the RSLUP Guidebook?

This Guidebook provides a framework and process for analyzing the responsiveness of land use planning practice and its plans and their enforcement in relation to disaster risk reduction in the context of urban development. It explains the relevance, methodology, process, findings and recommendations for the investigations of Land Use Planning (LUP) practice conducted in the Bangladesh Urban Earthquake Resilience Project (BUERP). It can be useful for similar investigations in other cities and pourashavas for evaluating the responsiveness or sensitivity to disaster risk of local detailed area plans.

Who should read the RSLUP Guidebook?

The RSLUP Guidebook is intended for the following audiences:

- Land use planners;
- Authorizing officers from RAJUK, DCCs, and other agencies in Dhaka and the pourashavas;
- Zoning officers;
- Construction and housing officers employed in national and local government institutions;
- Environmental engineers;
- Urban planners;
- Housing and real estate professionals;
- Disaster risk reduction and emergency response managers;
- Specialists involved in urban planning and the development of public infrastructure, critical facilities, and lifelines;
- Private sector and community representatives involved in urban DRM in Bangladesh; and
- Focus Groups, Advisory Committee, and Scientific Consortium of the BUERP.

How will the Guidebook benefit the reader?

The RSLUP Guidebook provides readers with the basic principles and approaches to reduce disaster risk through land use planning, suggests steps in integrating risk information in the planning process, and shows entry points for disaster risk reduction (DRR) in strategy formulation and project identification. The Guidebook can be used as a general reference for building the resilience of Dhaka and is a helpful guide towards action planning for making development plans risk-sensitive.

What’s included in the RSLUP Guidebook?

The RSLUP Guidebook provides a framework and general process for evaluating the responsiveness of land use plans to seismic hazards and identifying initial strategies to reduce seismic risk and build city resilience in Dhaka. It draws upon reviews of past plans (Dhaka Metropolitan Development Framework and Structure Plan, Detailed Area Plans) by stakeholders and experts, discussions in focus groups, key informant interviews, and workshops and trainings with stakeholders from different sectors.

The content of the RSLUP Guidebook is based upon the experiences of EMI in DRR mainstreaming in urban governance and operations through the Disaster Risk Management Master Plan (DRMMP) DRMMP model implemented in selected megacities in Asia such as Kathmandu Metropolitan City, Mumbai, Metro Manila, and in this case, Dhaka. The Guidebook introduces relevant concepts, criteria and methodology for assessing the sensitivity of the planning system. Specific to the
BUERP, the Guidebook also highlights the use of a “blended” training on risk-sensitive land use planning\(^1\) to provide project stakeholders with appropriate learning experiences in:

- Situational and seismic consequence analysis, and
- Interpretation of such analysis in policy and strategy recommendations for making land use and construction codes and standards in the areas covered by the Dhaka City Corporation responsive to risk reduction (risk-sensitive).

The RSLUP Guidebook features a case study of how mainstreaming can be approached in the context of Dhaka and makes further recommendations on how it can be integrated into an actual process of physical framework or land use plan formulation.

**Limitations**

This Guidebook can only lend directions on how DRR mainstreaming can be organized and approached. The detailing of procedures at each step of an actual land use planning process is not described in this Guidebook. Guidance in the preparation of city or pourashava profiles and situational assessments should always be sought from mandated government agencies and organizations capable of preparing them.

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\(^1\) “Blended” training refers to training using combined online and face-to-face discussions. The RSLUP training implemented by EMI is done in partnership with the Global Facility for Disaster Reduction and Recovery as part of the Natural Disaster Risk Management Program (NDRMP)
1 Introduction

Building Resilient Cities and the Role of land Use Planning

Increasing urbanization resulting to poorly planned settlements is becoming a major driver of disaster risks. Rapid and uncontrolled urbanization is increasing the exposure of populations and infrastructure to potential hazards. There is a need to better plan growth in terms of infrastructure and construction by taking into account hazard and risk parameters that can protect these investments from major damages. There is also a need to improve the delivery of core services such as health, education, social welfare, transportation, power, water, sanitation, and others so that these services will continue to function even after major catastrophic events such as earthquakes. These are important considerations especially for cities where there are high concentrations of businesses, industries, and populations and where the negative impact of disasters is very high. Building a city’s resiliency to disasters should be on top of government’s agenda since the loss of life, destruction of property, and disruption of essential services have huge socio-economic, and even political, implications.

National governments, development agencies, private sector and non-government organizations (NGOs) are increasingly aware that there are ways to improve the resilience of populations and cities towards disasters. In January 2005, at the World Conference for Disaster Reduction in Kobe, Japan, 168 country members of the United Nations signed the Hyogo Framework for Action (HFA). It has since served as the key basis for disaster risk reduction (DRR) efforts at all levels of society. The UN Office for Disaster Risk Reduction (ISDR) has also released relevant guidelines and policy tools in order to help national and sub-national governments meet the objectives of HFA. One of its main goals is to encourage pro-active risk reduction. Behind the goal of shifting from reactive disaster management to pro-active disaster risk management is the overall goal to strengthen the resilience of people, communities, and institutions to disasters. The impact of natural and man-made hazards can be reduced through adequate planning and incorporating specific DRR measures in land use planning and urban development processes, thus minimizing the human, economic and environmental damage. By increasing the resilience of communities, DRR also improves the ability of people and infrastructure to recover from disasters.

1.1 The Relevance of Mainstreaming

Mainstreaming involves integrating the practice of risk management within the governance, functions and operations of local authorities to reduce disaster risk. For local authorities, this translates into having processes and practices that inherently incorporate urban risk reduction in the key functions that they undertake such as land use and urban development planning, construction and building licensing, environmental management, and social welfare, as well as, in the services that they provide or regulate.

The role of local authorities is explicitly recognized in the HFA. The Disaster Risk Management Master Plan (DRMMP) methodology, a participatory planning process developed by EMI and tested among its partner cities worldwide, provides the mechanisms for policy formulation, strategy development, action planning, awareness raising, and capacity development at the local level. Urban disaster risk reduction can be highly effective when local authorities, engaged in the normal conduct of their functions, responsibilities, and practices, integrate DRR measures and objectives in various aspects of local governance such as
urban planning. In this way, significant risk reduction occurs at the local level (Bendimerad et al., 2006).

The framework shown below suggests that DRR can be mainstreamed in local governance by harnessing mechanisms, processes, systems and resources that are already in place.

1.2 Mainstreaming DRM in Land Use Planning

Mainstreaming activities in a general land use planning process pertain to the various activities that integrate risk information and management into the content of the land use plan and implementing tools (e.g. zoning, investments, building regulations) that dictate land use, land management, and building design and development. In the context of preparing a Disaster Risk Management (DRM) Plan, the Land Use component of the DRM Plan provides for this mainstreaming framework, and its application results into policies, strategies, and investment programs to build urban resilience. The DRM Plan links with the planning process through the following elements:

- Assessment of natural hazard(s) in relation to human, physical vulnerability, capacity and development is included in the situational analysis of the different sectors. The Hazard, Vulnerability and Risk Assessment (HVRA) report should be primary reference.
- Disaster risks, emergency planning and management are taken as development concerns and that their implications to planning are understood, and carried towards development policies, goals, objectives, strategies and programs, projects and activities (PPAs);
- Avoidance and mitigation strategies, capacity and capability building are built into the different development sectors and residual risks are managed.

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**Figure 1. Framework for Mainstreaming Disaster Risk Reduction**

![Diagram](image_url)
Risk governance prioritizes human, physical and environmental system resilience, and thus, various interventions (e.g. policies, investments, capacity building) address core needs (e.g. risk assessment, risk reduction, managing residual risks).

In general, the process of mainstreaming disaster risk management parameters in land use planning is termed as Risk-sensitive Land Use Planning (RSLUP). RSLUP is a rather new practice – especially in developing countries – and many planners and planning organizations lack the experience in and methodology for RSLUP. For planning institutions which are only familiar with traditional planning, the main difficulty lies in understanding and interpreting hazard, vulnerability and risk information in sectoral and physical framework planning. The diagram in Figure 2 in the next section illustrates how DRM can be integrated in the conventional planning process, including the legislative and administrative process that will support the eventual adoption and enforcement of the plan.
2 Concepts on Risk Sensitive Land Use Planning

2.1 Definition of Risk-sensitive Land Use Planning

Risk-sensitive adds two new considerations to the conventional approach to land use planning:

- **Disaster risk reduction parameters and objectives.** Hazard, vulnerability, risk, and capacity parameters, together with the disaster/emergency management requirements, are identified, collected, and integrated with traditional land use planning information (e.g., socioeconomic profiles, demographics, and transport networks), and DRR goals and objectives are formulated.

- **Integration through formal government activities.** Measures are taken to ensure understanding, acceptance, and support for the plan; to improve the competency and knowledge about risk-sensitive land use planning among planners and other professionals; and to raise the awareness and support of all stakeholders.

These two additional considerations require the analysis, review, and evaluation of information gathered from government, the targeted communities, non-government organizations and the private sector, which are then incorporated as the plan is formulated. The plan

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1 Bendimerad, F. (2012). Risk-Sensitive Land Use Planning.


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**Figure 2. Framework and Process of Risk-Sensitive Land Use Planning, EMI, 2010**

*Source: Bendimerad, F. (2012). Risk-Sensitive Land Use Planning*
implementation and enforcement processes are indicated in the rules and regulations typically embodied in a zoning ordinance. Plan monitoring and evaluation are the responsibility of the plan’s administrators.

Land use planning involves an interactive and continuous process to regulate the use and development of land, allowing feedback between government planners and other stakeholders, who may have multiple and sometimes competing interests. This feedback process is important so that there is consensus, ownership, and trust among stakeholders who will support its implementation and enforcement.

Land use management provides the regulatory and non-regulatory tools that enable the government to establish its mandate on land use. They can be design-based tools that help ensure safe construction, and location-based tools that can regulate development in allowed areas and limit development in hazardous areas. See Figure 3.

2.2 Policy, Capacity, and Investment Actions in Risk Sensitive Land Use Planning

Risk-sensitive land use planning recognizes that land use and disaster risk are related elements whose interactions need to be considered to determine the most appropriate and safest strategies for development. City-level land use planning and management can therefore serve as effective tools for mainstreaming disaster risk reduction into urban development processes.³

By reducing disaster risk through land use planning, cities are able to:

- Promote controlled and sustainable urban growth without generating new risks;
- Identify and mitigate the root causes of disaster risks embedded in existing land development practices;
- Modify and reduce vulnerable conditions of people (physical/social/economic) and places;
- Pre-empt disaster damage before it happens through mitigation; and
- Reduce losses and increase people’s ability to recover by speeding up the process of reconstruction and rehabilitation.⁴

The objectives of risk-sensitive land use planning can be achieved by applying interventions from three basic groups of instruments - policy; capacity development, particularly at the local level; and investment - to support enhanced risk assessment, risk reduction, and management of residual risk. Table 1 provides indicative actions that can be taken to promote risk-sensitive land use planning.

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4 WBI, 2006.
Table 1. Policy, Capacity and Investment Actions for Risk-Sensitive Land Use Planning

<table>
<thead>
<tr>
<th>Core Needs</th>
<th>Policy</th>
<th>Capacity</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing Risk</td>
<td>Adopt policy to develop hazard, vulnerability, and risk assessments for urban areas</td>
<td>Build capacity in undertaking hazard, vulnerability, and risk assessment.</td>
<td>Develop risk assessment information technology platforms for data sharing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Train engineers in rapid assessment of building vulnerability.</td>
<td>Identify highly vulnerable buildings and infrastructure.</td>
</tr>
<tr>
<td>Reducing risk—</td>
<td>Adopt policy to mainstream disaster risk management (DRM)</td>
<td>Train planners in risk-sensitive land use planning.</td>
<td>Develop industry standards, guidelines, and case studies for risk-sensitive land use planning.</td>
</tr>
<tr>
<td>avoid, eliminate, and reduce</td>
<td>and climate change adaptation in planning processes.</td>
<td>Develop the capacities of local governments to improve project planning and project execution.</td>
<td>Update planning guides for various government agencies to make them risk-sensitive.</td>
</tr>
<tr>
<td></td>
<td>Decentralize the process for risk-sensitive land use planning and strengthen its linkages with local investment planning process.</td>
<td>Establish peer-to-peer sharing programs in land use planning.</td>
<td>Based on risk-sensitive land use plans, develop site-specific and scenario-specific participatory DRM plans for vulnerable areas.</td>
</tr>
<tr>
<td></td>
<td>Adopt policy to make urban redevelopment projects risk-sensitive.</td>
<td>Develop ownership through participatory processes, training, and capacity building.</td>
<td>Establish a system for prioritizing substandard infrastructure and public buildings for public action.</td>
</tr>
<tr>
<td></td>
<td>Amend planning laws and regulation to make them risk-sensitive.</td>
<td>Undertake extensive educational campaigns on risk-sensitive land use planning and the importance of community participation in the planning process.</td>
<td>Support priority funding for upgrade of vulnerable infrastructure and housing.</td>
</tr>
<tr>
<td></td>
<td>Strengthen land use control regulation to restrict and control development in hazardous areas.</td>
<td></td>
<td>Invest in retrofit and rehabilitation of critical facilities.</td>
</tr>
<tr>
<td></td>
<td>Strengthen laws and regulations related to building control and building code compliance.</td>
<td></td>
<td>Seek public–private partnerships in risk-sensitive urban redevelopment programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Buy back land and property in high-risk areas and transform into buffer zones.</td>
</tr>
<tr>
<td>Managing residual risk—</td>
<td>Develop long-term vulnerability reduction programs for highly vulnerable areas that cannot be relocated.</td>
<td>Undertake emergency drills and exercises.</td>
<td>Promote options for risk protection and insurance.</td>
</tr>
<tr>
<td>share and transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 Translating Urban Resilience Qualities into Assessment Areas for Land Use Planning and Management

The ability of cities to recover quickly from disasters is a factor of various qualities. Several of the characteristics of disaster resilient cities mentioned earlier can be translated into a set of assessment areas and desired qualities (e.g., legal, institutional, plan, participation, data and norms, implementation and qualities) that should be present in a risk-sensitive land use planning system in order to effect appropriate adaptations in development. These qualities are then used to identify and describe gaps between the desired state and existing conditions. Table 2 identifies the specific resilience characteristics and their corresponding qualities in risk-sensitive planning.

These characteristics or “essentials” can be used to come up with criteria for developing appropriate strategies (e.g. land use management methods) and can serve as a basis for LUP goals or objectives to be implemented by Dhaka for building resilience. They can similarly be translated into outcomes, revealing where changes in policies and/or practice by development actors and stakeholders are needed. As outcomes, they provide a picture of what the Dhaka City government would like to see as a result of the implementation of several strategies over the short or medium term. The LUP strategies (see Annex 1) then refer to the appropriate approaches (e.g. land use management) needed to implement the risk reduction objectives.

These strategies can consist of several actions carried out over time and applied in either specific or wider areas to implement desired changes. The choice of strategies will require resources (e.g. human, financial), plans & processes for execution, structures and arrangements for organization and management, technical capacities, legal support, and partnerships with stakeholders.

2.4 General Approach for Engaging Stakeholders in Mainstreaming DRM in Land Use Planning

Mainstreaming disaster risk management in land use planning requires the meaningful participation of stakeholders throughout the process so that the plan becomes enriched with inputs from stakeholders who have a stake in building the resiliency of a city. The meaningful participation of stakeholders also ensures that the plan is understood and owned by those who have key roles to play in its eventual implementation and enforcement.

In order for the stakeholders to be meaningful participants in a highly technical process such as mainstreaming DRM in land use planning, it is therefore important that a parallel process of awareness-raising and capacity development be undertaken to support the learning process of the stakeholders as they participate in the land use planning process. EMI’s experience with similar projects in the past points to the following reasons why awareness raising and capacity building are important in facilitating the participation of stakeholders in land use planning:

- Stakeholders need to process risk information prior to an actual planning exercise or integrating key findings in an actual planning process to give time for a shared and deeper understanding of the risk information and its implications.
- Stakeholders will be involved in validating risk maps as a starting activity for the spatial screening of hazard constrained areas.
- Stakeholders will be required to provide inputs in working sessions to integrate disaster risks into development issues and concerns in order to identify preferred solutions.
- Stakeholders will participate in problem solving sessions where complex problems will be posed such as competing issues of environmental constraints and infrastructure and land development, among others.
### Table 2. Translating UNISDR Urban Resilience Qualities into Assessment Areas for Land Use Planning and Management

<table>
<thead>
<tr>
<th>Characteristics of a disaster resilient city 4</th>
<th>Risk Sensitive Land Use Planning Assessment Areas 5</th>
</tr>
</thead>
</table>
| Has an inclusive, competent and accountable local government that is concerned about sustainable urbanization and that commits the necessary resources to develop capacities to manage and organize itself before, during and after a natural hazard event | Legal and institutional framework for Planning  
National Frameworks on land use planning, building & infrastructure development, and DRR are translated into local frameworks and institutional arrangements, processes, land use plan policies & strategies, ordinances, programs, projects and activities/practice (e.g. DRM office is functionally linked with city government departments). |
| The local authorities and the population understand their risks and develop a shared, local information base on disaster losses, hazards and risks, including who is exposed and who is vulnerable. | Technical Process of Land Use Planning  
• The situational analysis is informed by disaster risk assessments and emergency management requirements.  
• An HVRA serves as one requisite for plan decisions in land use and development planning.  
• Impact & implications of disaster risks (e.g. HVRA) and climate change risks inform LU land use and zoning decisions.  
• The vision of the future state and mission is area influenced by DRR/CCAdisaster risk and climate change information/adaptation information. |
| People are empowered to participate, decide and plan their city together with local authorities and value local and indigenous knowledge, capacities and resources. | Stakeholder Participation:  
• The local government has a clear plan and process for stakeholder participation and involvement in development and spatial plan formulation and implementation.  
• Institutional arrangements and partnerships are present to advocate for DRR and adaptation in planning and implementation, as well as to integrate these in other development sectors. |
| The organization has taken steps to anticipate and mitigate the impact of disasters, incorporating monitoring and early warning technologies to protect infrastructure, community assets and individuals, including their homes and possessions, cultural heritage, environmental and economic capital, and is able to minimize physical and social losses arising from extreme weather events, earthquakes or other natural or human-induced hazards. | Technical Data/Norms and Standards  
• An updated HVRA is always available.  
• Appropriate prevention, mitigation and preparedness are key policies and strategies for different land use policy areas and related development sectors (e.g. transportation, housing and shelter, energy, water), and are translated into ordinances, incentives, programs, projects and activities.  
• are key policies and strategies for different land use policy areas and related development sectors (e.g. transportation, housing and shelter, energy, water), and are translated into ordinances, incentives, programs, projects and activities. |
| Disasters are minimized because the population lives in homes and neighborhoods with organized services and infrastructure that adhere to sensible building codes; without informal settlements built on flood plains or steep slopes because no other land is available. | Technical Process of Land Use Planning/Construction Codes and Standards  
• New sites and redevelopment sites are identified for settlement & sectoral development is informed by the hazards and risks.  
• Environmentally constrained areas are protected.  
• Production qualities are enhanced  
• Building and infrastructure planning & design, construction and management are informed by hazards and risks.  
• Emergency Management spatial requirements (e.g.) are dealt with using land use management methods. |

5 The descriptions can be used for setting DRRMP Goals/Objectives for LUP or defining its outcomes.
Participation in these activities requires that stakeholders understand and become familiar with the results of hazard, vulnerability, and risk assessments which could be complex even to most technical experts. As such, the need for awareness raising and capacity building as crosscutting interventions in RSLUP is necessary to facilitate informed and meaningful participation.

Under the BUERP, a training program on RSLUP was implemented using the blended approach in order to support the meaningful participation of the stakeholders in the project. Annex 2 contains the blended training course components while Annex 5 provides the list of training participants. Annex 6 shows an example of an End of Course Project that highlights the technical contributions of informed participants on RSLUP.
3 Risk Sensitive Land Use Plan Preparation: General Guide

This chapter discusses guide points for mainstreaming DRM in the planning process and in plans. It describes how the risk information can be used in the land use plan (Section 3.1) and provides the entry points where mainstreaming can take place in the planning process (Section 2, Figure 2), the actions that can be taken to incorporate risk information and DRM, and the actions (how to) for incorporating DRM parameters in the land use plan (Section 3.2). Table 3 provides a summary guide to mainstreaming seismic risk reduction in the land use planning process and plans.

3.1 Uses of Risk Information for Land Use Planning and Management

Risk information can be used as one of the basis to identify future directions and intensities of land uses. It begins with an assessment of natural hazards in relation to human and physical vulnerability, capacity, and development. This is included in the situational analysis of the different sectors. When stakeholders have a grasp of the impacts and implications (e.g. to plans, investments) of the hazard risk, disaster risk management is taken as a development concern and is carried forward through development policies, goals, objectives, strategies and PPAs. Here, avoidance and mitigation strategies, capacity and capability building are built into the different development sectors and residual risks are managed. In mainstreaming, the priority should be on interventions that build human, physical and environmental resilience though policy, investments, and capacity building.

A. Describing hazards, vulnerabilities, and risk

The information on the hazard events considered and their related vulnerabilities are analysed to develop risk reduction policies and strategies. Their immediate use is to provide scenarios of exposure, and understand the vulnerability factors which create the risk for affected elements in the different sub-groupings: (a) population or settlements; (b) infrastructures and buildings; (c) the economic activities or livelihoods; and (d) the environment or ecosystem.

The identified risks and the vulnerability trends for the populations within hazard areas are taken as issues and challenges by the city and community and are identified for adjustments to reduce risks from identified hazards.

A review of existing policies on land use and zoning, building and infrastructure development controls, environmental management and the trends of spatial

Figure 4. Dhaka Liquefaction Susceptibility

Source: EMI 2013
projects and activities can be prioritized for “hotspot” areas. The risk reduction measures may be classified into three major categories as follows:

a) Risk avoidance or elimination;
b) Mitigation and Preparedness;
c) Risk sharing or risk transfer.

Annex 1 shows a matrix on land use management (LUM) tools by Banba et al (2004) which was originally drawn from the work of Burby et al, (1998). It provides examples of tools for earthquake risk reduction. The cases need to be assessed for applicability in Dhaka and can also be tried for other hazards of concern. The LUM tools are divided into six categories (Burby et al., 1998).

In this matrix, the building code for seismic hazards, development regulations, and information dissemination operate based on hazard information or the zoning ordinance. The critical and public facilities policies involving mainly infrastructure development provide alternatives with varying required capacities and resources for implementation.

D. Deciding on DRR, Development

With risk reduction becoming part of the development goals and objectives, the strategies are implemented through the land use- and development-related programs, projects, and activities in Dhaka. Dhaka can then develop their own land use management (LUM) strategies to reduce their vulnerability and risks to seismic hazards. In each community, that strategy may consist of specific mitigation initiatives, avoidance of the threat, preparedness or a combination of these approaches. A list of mitigation initiatives through programs,

B. Identifying new risk reduction goals, objectives and targets

Based on an analysis of the risk and how city land use management addresses the development issues and concerns, gaps are identified and addressed. These are either existing or potential land use conflicts, or possible adverse impact of the disaster risks to the different city sectors which will require intervention measures.

With the vision of Dhaka City (or Metro Dhaka) serving as a guide, the goals and objectives are reviewed and possibly redefined. The possible changes may be in relation to implementation timeframes, making target areas or population groups at risk more resilient, and downscaling or refocusing of goals, objectives and targets, among others. It is also possible that new goals, objectives and targets are formulated to directly address risks.

C. Deciding on the Risk Reduction Strategies

With risk reduction becoming part of the development goals and objectives, the strategies are implemented through the land use- and development-related programs, projects, and activities in Dhaka. Dhaka can then develop their own land use management (LUM) strategies to reduce their vulnerability and risks to seismic hazards. In each community, that strategy may consist of specific mitigation initiatives, avoidance of the threat, preparedness or a combination of these approaches. A list of mitigation initiatives through programs,
and Land Use-Related PPAs

Programs, projects and activities proposed in relation to risk reduction aim to reduce exposure to hazards, and reduce or eliminate the vulnerabilities and risks. Risk reduction projects are mainly hazard-related interventions, essentially aim to reduce exposure or reduce adverse consequences from the hazard. Projects that are more focused on addressing development concerns (e.g. education, nutrition, livelihood, poverty alleviation) aim to increase capacities of communities and local governments to improve wellbeing and their financial situation, improve the economy in general, and therefore contribute to the communities’ and the local institutions’ coping capacities or in reducing their vulnerabilities. (See references 11,17)

E. Designing Implementation, Monitoring and Evaluation of DRR Related PPAs

Projects that are prioritized become part of the investment programs, and are eventually budgeted and implemented following existing structures of project evaluation and development, approval, budgeting and implementation in the local planning process. Monitoring and evaluation of these programs, projects and activities provides a feedback process to determine success or failure in meeting development objectives, along with risk reduction objectives. Specific indicators can be designed to monitor progress (See references 13,14,15).

F. Zoning Ordinance

The risk, vulnerability and hazard maps can similarly guide the formulation of the zoning ordinance, as well as the development and building controls which have to be complied with by existing and future developments (See references 4,13,15).

3.2 Mainstreaming Activities in a Land Use Planning Process

Following the activities of the conventional process of land use planning identified in Figure 2, Table 3 indicates the entry points or items for mainstreaming in the process and plan, and the suggested activities (or actions) to accomplish the mainstreaming process. The “planning process entry points” portion partly describes the outputs of the phases described in A to F in the preceding section. The heading and cells describing “what to mainstream in the land use planning process/plan” suggest qualities and outputs that would make the plan risk-sensitive. The “how to mainstream” section describes the additional steps (e.g. actions, activities) that can be introduced to supplement or complement the planning to make sure the outputs are achieved. The matrix can be utilized and adapted for various natural hazards. It is presented here with earthquake hazards in mind.
A. Data Collection, Inventory and Analysis

Planning Process Entry Points

- Characterization of the city involves gathering, collating, and processing information necessary to provide a clear picture of the development situation of the city.
- A sectoral profile and thematic maps are used as a major reference for the analysis of the current situation.

What to Mainstream in the Land Use Planning Process/Plan

- Sesimic HVRA information on the existing seismic hazard, vulnerability and risk situation (from DRRMP-HVRA).
- Risk themes that reflect the situation of Dhaka under the M7.5 Madhapur Fault Earthquake (see Box 1 in Chapter 4 and Dhaka Risk Atlas).
- Strengths, Weaknesses, Opportunities and Challenges (SWOC) assessment in carrying out the BUERP strategies and implementing projects.
- DRM legal frameworks related to Land Use Management (LUM), Construction Codes and Standards (CCS), Development Permitting, policies, strategies, and PPAs (from other elements in the DRMMP such as Land Use Planning, Legal and Institutional Arrangements, Emergency Management, and others).
- Institutional arrangements and practices on Land Use Management, Emergency Management.

How to Mainstream

- Utilize seismic HVRA information and Risk Atlas to provide maps of possible or known hotspots (see Table 4, Chapter 4) for useful parameters.
- Utilize HVRA findings to prepare city profiles and situational analysis of development sectors (e.g., settlements, infrastructure, and natural environment).
- Include earthquake hazard maps in environment profile.
- Identify spatial development trends for Dhaka region, Corporation areas.
- Document impacts of HVRA findings to population, sectors and to spatial development of Dhaka Region and Corporation areas.
- Assess and document implications of HVRA to sensitivity and adaptation of communities to city plans and the planning process.
- Use the legal and institutional arrangement (LIA) findings to improve vertical and horizontal working arrangements among LUP and DRM organizations.
- Organize workshops for consultation meetings and validate information with stakeholders.

B. Setting the RSLUP vision

Planning Process Entry Points

- RSLUP vision statement includes resilience of city to disasters for sustainable development.

What to Mainstream in the Land Use Planning Process/Plan

- An RSLUP vision statement has elements for reducing threats to the following: population, productive assets, built and natural environment.
- Each element is given a set of descriptors (i.e. words and phrases that signify the quality of the future and resilience desired).

How to Mainstream

- Craft a vision/mission statement that is supportive of disaster resilience building.
- Hold consultation workshop(s) to agree on Vision/Mission among stakeholders.
- Engage the city development corporations, planning departments of ministries, community representatives, stakeholders and working committees in the planning activities and decision making processes.
### C. Formulation of goals, objectives and strategies

**Planning Process Entry Points**

- Goals and objectives address the development problems, issues and concerns to achieve sustainable development of Dhaka.
- The strategies provide for the approaches to achieve the desired goals and objectives (long and short term).

**What to Mainstream in the Land Use Planning Process/Plan**

- Goals and objectives that establish resilience desired for Dhaka.
- Harmonized components of various master plans showing river development plans, road development plans, and other higher level and city plans and projects for the Dhaka areas.
- Strategies, programs, projects responsive to DRR and climate change adaptation.
- Policy recommendations, strategies to be retained, modified and new ones for disaster resilience building.

**How to Mainstream**

- Organize workshops for setting sectoral development and land use goals, objectives and targets.
- Hold consultation workshops among stakeholders to identify, evaluate and agree on applicable and workable land use management methods (see Annex 1 for examples) that support risk reduction, emergency management and in general-adaptation.
- Document outputs and findings.

### D. Generation and evaluation of alternative strategies

**Planning Process Entry Points**

- Generation of alternative spatial strategies is a major activity in crafting a land use plan. The spatial strategy is the form or pattern of physical development of the city that will contribute to the realization of the long-term vision.
- Evaluations of the alternative spatial strategies are based on the advantages and disadvantages of each strategy to meet identified development goals, objectives and targets.

**What to Mainstream in the Land Use Planning Process/Plan**

- Urban structures that establish a sustainable balance between the built and natural environment with considerations of seismic hazards, risks and their possible management.
- Areas preserved in their open character are not built over.
- New development is directed into areas that are relatively free from hazards;
- Redevelopment in urban areas considers seismic hazards, vulnerabilities, risks and their management.
- Type, size and intensity of development are designed with the carrying capacity (e.g. soil, access to utility services), protection and safety (e.g. building codes, assigned open areas). (See Dhaka Risk Atlas).
- Land use management methods are used for risk reduction strategies (see Annex 1 for earthquakes), such as avoidance of unsafe areas, mitigation works, and adjustments in zoning character and these are incorporated into preferred spatial strategies;
- Strategies to improve enforcement of construction codes and standards are identified with other development controls by the city.

**How to Mainstream**

- Use seismic risk maps (e.g. derived from Dhaka Risk Atlas) as overlays to identify exposed features (e.g. buildings, utilities, transport) or “hotspots” and screen unsuitable areas in the different use zones and to develop hazard zones.
- Identify open space and routes for evacuations for emergency management purposes.
- Gather and document best practices on DRM for possible adaptation or innovation.
- Hold consultation workshops to agree on applicable and acceptable land use management strategies among stakeholders.
- Develop criteria with stakeholders for determining best plan of action.
- Hold consultation workshops with stakeholders to agree on the preferred actions.
- Document the process and outputs.
## E. Detailing of preferred risk-sensitive land use plan

### Planning Process Entry Points

- The preferred spatial strategy (or strategies) serves as a take-off point for preparing a detailed area plan (land use zoning plan).

### What to Mainstream in the Land Use Planning Process/Plan

- LUM strategies, construction codes and standards, development permitting process that support seismic risk management.
- Spatial strategies and corresponding urban arrangements are supported with zoning ordinances, sectoral development investment programs, projects and activities that reduce seismic risk.
- Capacity and capability building of institutions and communities for implementing DRR measures.

### How to Mainstream

- Identify and map the available and potential land supply for developments within and outside the city.
- Prioritize risk-sensitive redevelopment (e.g. increase open space, designs using carrying capacities, reducing fragmentation and incompatible use, improve environment quality and living conditions).
- Identify policies that reduce sprawl and incompatible uses.
- Invite legal experts, ministries, government departments and agencies, utility companies and academe to assess and offer solutions to existing conflicts in land use and zoning.

## F. Formulating policies and implementation tools (ex. Zoning, Monitoring and Evaluation)

### Planning Process Entry Points

- Major activities consist of reviewing existing relevant national laws, identifying needed land use policies, and drafting the initial zoning policies and ordinances.
- The enactment of possible regulatory measures by the legislative council or by the provision of certain incentives to attract private investments or partnerships (new local legislation) to provide “teeth” to the sectoral and spatial policies, strategies and PPAs.
- Identifying zones (e.g. residential, commercial, industrial) requiring safety or risk reduction considerations that are identified in the land use plan.
- Use of DRM performance indicators (e.g. Urban Disaster Risk Index-UDRI, Disaster Risk Reduction and Management Index-DRRMI) (See Dhaka Risk Atlas).

### What to Mainstream in the Land Use Planning Process/Plan

- National laws and local ordinances that support risk-sensitive zoning:
  - Delineated hazard (or risk) zones in existing areas.
  - New development located outside of high hazard-prone areas (e.g. fault lines).
  - Special construction limitations/conditions in areas where seismic hazard-prone areas cannot be avoided (e.g. liquefaction prone areas).
  - Proposed developments that do not transfer risk to others.
  - Avoiding or regulating alterations in land cover and land use where ground failures are likely to take place even under weak shaking events.
- Best management practices, advice and inputs by qualified professionals contribute to policy, strategy, implementation such as in development permits or exemptions issued.
### How to Mainstream

- Detail the zoning ordinances that support risk-sensitive zoning
- Clearly define zoning regulations: areas for development; the restricted areas and the no-development areas (or zones) for development permitting.
- Identify strategic locations of community facilities and discontinue facilities in areas that increase risk to life and damage.
- Consider carrying capacities of soil and geotechnical qualities in zoning regulations.
- Consider land use arrangements, building and population densities, building occupancies, and landscapes that promote safe densities and arrangements.
- Use of UDRI and DRRM index for monitoring progress.
- Review and improve the permitting process and adoption of risk sensitive construction codes and standards.
- Invite legal experts, government agencies mandated to plan and implement the different projects; utility companies and academe to assess and offer solutions on existing conflicts.

### G. Adoption and plan implementation activities

#### Planning Process Entry Points

- Follow-on activities (adoption, implementation, enforcement, monitoring, and feedback) are conducted in order for the land use plan to become a reality.

#### What to Mainstream in the Land Use Planning Process/Plan

- Advocacy campaigns, capacity building that support risk sensitive land use planning

#### How to Mainstream

- Use IEC materials of the BUERP for advocating RSLUP at all levels of the government.
- Use of DRM performance indicators to guide and monitor outputs and impacts of disaster risk reduction and management projects.
- Translate the physical development and land use management strategies into investment programs (Programs, Projects and Activities) and incorporate them into the various components of city development plans (social, economic, physical and land use, environment, institutional) according to existing legal process of approval, adoption, and allocation of resources.

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In 2010, Kathmandu Metropolitan City prepared its first risk sensitive land use plan (RSLUP), along with the KMC Sectoral Profile and Preliminary Zone Ordinance. These were products of a series of activities undertaken in two phases of a project titled “Disaster Risk Reduction in Megacities – A Pilot Application in Metro Manila and Kathmandu.” The two phases were a collaborative undertaking between Kathmandu Metropolitan City (KMC), Earthquakes and Megacities Initiative (EMI), and the National Society for Earthquake Technology - Nepal (NSET), with support from the German Federal Foreign Office (FFO) through the Deutsches Komitee Katastrophenvorsorge (DKKV).

Phase 1 of the project included the production of vulnerability and risk maps specific to Kathmandu City. These information sets formed the bases for determining the implications on the future development and land use of KMC. Phase 2 of the project, included the development of a risk sensitive land use plan for KMC undertaken between June 2008 to January 2010.

The outcome of these two phases resulted to (a) a rational land use plan for KMC that fully integrates risk reduction parameters into its spatial and physical development strategies and their related tools, bylaws and procedures, and (b) mobilization of political commitment and cooperation for DRR at the local and regional levels. **Source: Kathmandu Metropolitan City Risk-Sensitive Land Use Plan, 2010**
4 Methodology for Analyzing the Risk Sensitivity of LUP

In Chapter 2, Section 2.3 identifies the specific resilience characteristics and the corresponding qualities in risk-sensitive planning. Table 2 provides for this set of characteristics or “essentials” which can be used to guide risk sensitivity criteria development and for developing appropriate strategies (e.g. land use management methods). They can similarly serve as a basis for risk management goals or objectives to be targeted and implemented by local governments for risk reduction and for building resilience. These risk sensitivity criteria will then help direct “where changes in policies or practice or both can be carried out by development actors & stakeholders.” It therefore provides a set of guideposts for Dhaka governments to ensure that risk reduction and resilience building strategies are implemented over the approved plan period.

It is necessary therefore to prepare an assessment of the sensitivity of the Dhaka Area land use plan and process to earthquake hazard risks. Table 2 can be utilized as a guide to check risk-sensitive features of plans and processes. The following section provides for an analytical process to assess the risk sensitivity of the Dhaka Area land use planning system. It discusses Gaps and SWOC Analysis as tools for strategy development.

4.1 Gaps Analysis

Gaps Analysis approach is a method which utilizes a set of desired resilience qualities, from which “gaps” in the current state of affairs or situation of the local government can be identified. The resilience qualities are translated into assessment areas where interventions related to changes in legal & institutional arrangements and implementation processes should be made to close the gaps. A flowchart on this process is provided in Figure 3.

The process involves gathering the data and information on the planning system and hazard, vulnerability and risk assessment (HVRA) information. The information is then reviewed for three reasons: a) to provide a situational analysis on the planning environment, practice of plan formulation and implementation, and knowledge and LGU understanding of hazards and risks; b) to assess whether current land use plans and processes, related legal frameworks and institutional arrangements and implementation (e.g. zoning, code enforcement) provide the internal and external environment to help LGUs adapt to environmental hazards, build resilience and reduce risks, and c) to identify gaps and provide recommendations (e.g. policies, strategies and actions) to close gaps between a desired state guided by the criteria developed (e.g. risk reduced, resilient communities) for risk-sensitive planning and the existing condition(s).

4.2 SWOC Analysis

Similarly, the gaps can be determined from a SWOC analysis. With the objective of performing actions to address an identified problem, issue or concern, Dhaka local governments have to identify a strategy (or strategies) and assess the strengths & weaknesses of its internal environment and determine the challenges and opportunities in its external environment. It helps answer questions such as:

2 Gaps Analysis has been developed and used by EMI in various cities to determine if planning system, particularly the plan outputs, process and implementing tools are risk sensitive

3 SWOC analysis- Strengths, Weaknesses, Opportunities and Challenges analysis.

4 Internal- refers to the organization’s (LGU) environment (e.g. may refer to its capacities, institutional& legal arrangements, processes and implementation, among others) to implement a strategy

5 SWOC analysis (Strengths, Weaknesses, Opportunities and Challenges analysis)

6 External- refers to the environment outside of the
“Does RAJUK have the supporting environment to enable them to carry out the identified strategy or strategies?“

The pairings of strengths, weaknesses, opportunities and challenges may be seen as a way for the agency or local government to decide on the action proposed.

- Strengths and Opportunities (SO) – How can the agency use its strengths to take advantage of these opportunities?
- Strengths and Challenges (SC) – How can the agency take advantage of its strengths to avoid real and potential threats?
- Weaknesses and Opportunities (WO) – How can the agency use its opportunities with stakeholders (external) to overcome the weaknesses the government is experiencing?
- Weaknesses and Challenges (WC) – How can the agency work with its stakeholders (external) to minimize its weaknesses and avoid threats?

The actions based from the SWOC analysis help the agency or local government realize its DRM goals and objectives. The final gaps analysis utilizes the same assessment areas but is expanded to consider the strengths, weaknesses, challenges and opportunities. The assessment areas are grouped under the four themes of the disaster management cycle such as prevention/mitigation, preparedness, response, and recovery/rehabilitation. Land use management and planning fall under the prevention/mitigation themes and will focus more on this theme.

### 4.3 Research Designs for LUP Investigation

Carrying out the analysis for risk sensitivity of LUP makes use of a three-pronged approach that triangulates the findings from three key methods, namely:

1. **Desktop research** (e.g. review of literature),
   LGU (e.g. may refer to other organizations, their capacities, institutional & legal arrangements, processes and practices, possible partnerships, among others)

   2. **Use of analytical tools** (e.g. system approach, spatial models), and

   3. **Field work** and stakeholders participation (e.g. surveys, primary data gathering, key informant interviews, focus group discussions, workshops, etc.)

Because many aspects of the LUP analysis are contextual and not fully understood and documented, a *process for the validation of findings and analyses with the stakeholders has to be undertaken at each stage*. Collective agreement and understanding of a city’s legal and institutional arrangements, planning practice and plan preparation, use of construction codes and standards and their practice in building and infrastructure development, as well as an assessment of the existing planning system for its responsiveness to DRM, will lay the ground for mainstreaming. A fundamentally participatory process is thus required.

The LUP research design looks into the various aspects of the planning system, such as the legal and institutional dimensions, planning and implementation, plan content and support for DRM. The analysis process makes use of specific sets of expertise, methodologies, and processes which are described in detail in this section.
LGU and EMI gather documents related to land use plan & management (e.g. land use plan, ecological profile, zoning ordinances,) and information on hazards, vulnerabilities, risk information, emergency management (EM), Legal and Institutional Arrangements (LIA).

EMI –LUP team reviews the documents to reveal Dhaka land use plans, process and implementation levers. EMI prepares a report on findings about planning process, situation and practice.

EMI forms LUP-CCS focus group (e.g. RAJUK, DCC-see Annex 3) and discusses Dhaka planning system and building code enforcement, and fills gaps in information to describe planning process, situation and practice. EMI discusses concepts and frameworks, practice on Risk sensitive planning with LGUs.

Focus Groups member and EMI reviews report on Gaps Analysis, document and agree to recommendations in making current Dhaka LUP system risk sensitive and improving implementation practice (code enforcement, zoning and incentives, etc.)

Gaps Analysis is completed with new information. SWOC analysis can be used for DRM strategic planning.

Write Final Gaps Analysis and Recommendation Reports for LUP with concurrence of participating organizations in Dhaka planning.

Figure 7. Methodology for Risk Sensitivity of Dhaka Planning in BUERP
The approach used for understanding the responsiveness or risk sensitivity of plans and their implementation or practice involves several aspects:

### A. Desk Review/Research

#### Past Plans and Land Use Planning Process

This consists of reviewing the past planning processes and approved plans (e.g. Dhaka Metropolitan Structure Plans and several Detailed Area Plan (DAP), terms of reference for updating proposals, and the manner of execution of the planning process.

- The information should give an idea of the development context of the plan area. This also provides for a brief description of the area (ex. geographic, socio-economic information, infrastructures found, land use patterns, earthquake hazards and risks in the cluster).

- An assessment of the database used to detail the plan or cluster would also be relevant. For example, it would be useful to determine whether the current information on land use development (ex. infilling, densification, redevelopment, greenfield expansion), socio-economic profile, infrastructure, economic activities, and natural environment (ex. open space) is relevant for identifying the development issues and problems and aiding in decision-making. Similarly, it would be helpful to establish if the detailed plan or cluster is informed by earthquake hazard maps, vulnerability indicators and earthquake impact (risk) assessments.

#### Legal & Institutional Arrangements in Planning

The legal aspect focuses primarily on describing the legal environment for land use planning, construction codes and standards, and relies on the desktop review of relevant documentation (laws and related statutes, regulations, policies, legislative briefs and judicial interpretations) drafted by national and local government agencies. This stage is focused on developing an understanding of the scope of existing legal documents and their relevance in defining mandates and in supporting effective DRM implementation. These can include, among others:

<table>
<thead>
<tr>
<th>Land use planning and urban development</th>
<th>Survey and demarcation of land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Protection of parks and open spaces</td>
</tr>
<tr>
<td></td>
<td>Development, improvement and expansion of urban areas</td>
</tr>
<tr>
<td></td>
<td>Construction codes and building standards</td>
</tr>
<tr>
<td></td>
<td>Restrictions on buildings;</td>
</tr>
</tbody>
</table>

| Maintenance of utilities and critical infrastructure/services | Supply and use of electricity, water, fuel |
|                                                              | Maintenance of roads, regulation of motor vehicles |
|                                                              | Operation of telecommunications facilities |
|                                                              | Operation of railway stations, ports and airports |
|                                                              | Food supply and regulation of prices of basic goods |
|                                                              | Sanitation, drainage and sewerage; |

<table>
<thead>
<tr>
<th>Public health and health emergencies</th>
<th>Emergencies</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Environmental protection and pollution control</th>
<th>Sanitation, open space development (parks)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Insurance</th>
<th>Life insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Insurance of property</td>
</tr>
<tr>
<td></td>
<td>Compensation for damages</td>
</tr>
<tr>
<td></td>
<td>Public liability;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regulation of industrial activities</th>
<th>Zoning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fire Code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restrictions on regulated/hazardous substances</th>
<th>Weapons of mass destruction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Explosives</td>
</tr>
<tr>
<td></td>
<td>Flammable substances</td>
</tr>
<tr>
<td></td>
<td>Hazardous waste/chemicals</td>
</tr>
<tr>
<td></td>
<td>Poisons</td>
</tr>
<tr>
<td></td>
<td>Biomedical waste</td>
</tr>
<tr>
<td></td>
<td>Drugs and cosmetics</td>
</tr>
</tbody>
</table>

| International and regional agreements/commitments on DRR/DRM. | HFA, DRM Law |
|                                                               | Climate Change National Strategic Plan |
The institutional aspect of the LUP analysis is concerned with identifying which organizations have responsibilities and functions relevant to land use and zoning, development and enforcement of construction codes and standards, sectoral development planning and implementation, and the formal and informal mechanisms through which they interact and communicate with one another. This component also utilizes desktop research in its initial scoping of the city’s current LUP practice and implementation of approved plans, making use of the same documentation reviewed for investigating the legal and institutional arrangements of the DRM component. At this initial stage the aim is to inventory and classify national and local laws and regulations relevant to planning, national and locally approved plans (e.g. detailed area plans (DAP), Metro-Dhaka Structure Plan) and maps, and the documentation on current practice as published in books, articles, and government reports.

**Inventory and Review of Risk Information**

Several steps are required to generate sufficient data that will facilitate the integration (or mainstreaming) of risk information in the planning process. These involve an assessment of the following:

a) seismic hazard,
b) the vulnerabilities and risks of different elements (e.g. people, buildings, facilities, activities, etc.) in the city, and
c) requirements for emergency management (e.g., open spaces, open access, access routes, etc.).

Table 4 shows an example of risk parameters that need to be considered in land use planning. This set of information forms the bases for determining the implications on the future development and land use of a city.

It may be possible to include different types of vulnerability analysis in the risk assessment, such as socio-economic vulnerability and risk analysis related to other consequences (e.g. indirect damages and losses, i.e. monetary loss, loss of function of specific sectors), effects from climate change and climate variability. Understanding the implications of the risk assessment to development requires the collective experiences and expertise of the planners, scientific experts and stakeholders from different sectors to address these threats. To treat them as significant or not, or whether they are impediments to development and progress, will require further evaluation. In view of the spatial requirements for emergencies, information on possible escape routes at the core area, temporary sites for evacuation, and locations of critical infrastructure (e.g., hospitals, water sources) are mapped.

**B. Analytical Tools for Risk Sensitivity of LUP**

**Hazards and Risk Identification and Assessment to Planned System**

This requires identifying the earthquake hazards and risks, drawing upon information from existing studies and reviews, or new assessments. It looks into Dhaka as a system and looks into hazard and risk in its components and their interrelationships.

- Risk theme areas should be considered for assessment (See Box 1).
- Additional vulnerabilities and risks that arise due to the process of city development should also be reviewed.

**Implications to Plans and Development Practice**

Based on their knowledge of the locality, stakeholders provide an in-depth analysis on the responsiveness of the land use plan in addressing earthquake DRR concerns. They identify strengths, weaknesses, opportunities and challenges in existing clusters or unit areas for analysis. The phase involves many tools such as mapping, overlays, and SWOC analysis to understand implications to plans and practice, and for strategy development.
Table 4. Risk Parameters in Land Use Planning

<table>
<thead>
<tr>
<th>Items</th>
<th>Parameter description</th>
<th>Use of Assessment in Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard</td>
<td>Earthquake ground shaking</td>
<td>Exposure of the city to different degrees of possible damage using MMI intensities.</td>
</tr>
<tr>
<td></td>
<td>Earthquake potential liquefaction</td>
<td>Exposure of structures is high if located above these areas and such structures are tagged as having moderate or high risk.</td>
</tr>
<tr>
<td></td>
<td>Earthquake fault lines</td>
<td>Proximity to a fault would contribute to greater risk of damage, depending on the vulnerabilities of the building and site conditions.</td>
</tr>
<tr>
<td>Vulnerabilities</td>
<td>Number/ density of population</td>
<td>Indicative of the persons affected, or potential for injury and loss of human lives; also indicative of intensity of use in an area or the volume of traffic possibly to be affected by the hazard.</td>
</tr>
<tr>
<td></td>
<td>Building materials predominantly in use during the earthquake study.</td>
<td>Estimated damage and collapse of buildings related to the capacity of the building to resist strong ground shaking; represented through risk scales and color scales.</td>
</tr>
<tr>
<td></td>
<td>Lifelines such as roads and bridges in hazard prone areas</td>
<td>Indicates the breaks in these links and crossings which would lead to road closures and non-operation of utilities, which may impact emergency or response.</td>
</tr>
<tr>
<td></td>
<td>Exposure of critical infrastructures</td>
<td>Indicates threats to hospitals and schools which may require further evaluation and new inventory.</td>
</tr>
<tr>
<td></td>
<td>Density of structures based on building foot prints and closeness to each other</td>
<td>Provides intensity of use of built up areas. Lack of proper spaces for easements, foot and vehicular access and access to open areas may provide indication of dangerous areas that may be affected by structural collapse; requires reviews and studies.</td>
</tr>
<tr>
<td></td>
<td>Exposure in terms of number of establishments in high risk areas</td>
<td>Indicative of the concentration and specialization of the city being threatened</td>
</tr>
<tr>
<td>Risk estimates</td>
<td>Building Damage</td>
<td>Loss of life highly correlated to severe building damage and collapse. Collapse also highly correlated to the materials used and structural make-up of the building. Where there are greater numbers of affected population, injury and loss of life may similarly increase.</td>
</tr>
</tbody>
</table>
Box 1. Risk Themes

- Planning process and plan formulation
- Legal environment and institutional arrangements
- Implementation process (e.g. development permitting process, building code enforcement, zoning enforcement)
- Risks in macro-form and growth tendencies in the metropolitan area (analyses of alternatives in settlement configuration)
- Urban fabric risks, as related to location and nature of physical development (building height/proximity, plots, density, roads, carparks, etc.)
- Incompatible land use risks of neighbouring units (in buildings and adjacent land uses)
- Risks of productivity loss (industrial plants, SMOs)
- Risks of hazardous uses (LPG and petrol stations, chemicals, explosives, etc.)
- Risks in the building stock
- Risks in lifelines
- Risks in emergency facilities (locational, organizational, structural attributes of hospitals, schools, etc.)
- Special risk areas/ Special buildings (areas subject to landslide/flooding/tsunami, etc., as well as historic buildings and their environs)
- Open space deficiency risks (open space requirements of emergency access and storage, and/or temporary shelters)
- Risks in administrative incapacities (deficiencies in terms of infra-structure/hardware, experts, training programs, etc. of the municipalities and governorate)
- Risks of alienation of citizens (avoidance of participation efforts and involvement)
- External vulnerabilities and risks (climatic extremes, accidents, public unrest, terrorism, etc.)

Source: RSLUP e-learning, Earthquakes and Megacities Initiative.

C. Field Work and Stakeholders Participation

The information needed to support the analysis is collected through various qualitative methods, such as key informant interviews, focus group discussions, and stakeholder workshops.

The primary mechanism for the participation of Dhaka stakeholders in the activities of the investigation process is the LUP Focus Group (FG). The group is composed of representatives from key national and local organizations with responsibilities and functions relevant to planning and construction code development in the city who have been identified in the preliminary scoping activities and consultations. Representing their institutions and organizations, the FG members support the LUP analysis through data collection, analysis and validation. In addition, the group provides the forum to stimulate discussion, develop a common understanding, build consensus, and validate the assumptions, findings, and recommendations of the LUP analysis. At the same time, the group provides the opportunity for stakeholders to enhance their core competencies throughout and ensure sustainability of DRM practice in the long run.

In addition to the Focus Group, two other bodies ensure collective contribution and teamwork among the project team and stakeholders. The Advisory Committee (AC) is made up of policy and decision-makers from various government and non-government institutions in Dhaka. Designated by their respective institutions, the AC members provide overall guidance and oversight, and their meetings serve as a forum for policy-level consultation and engagement consistent with the project’s mainstreaming goals.

The Scientific Consortium (SC) is a small group of renowned local experts in the fields addressed by the project, mainly earthquake engineering, geology and geophysics, land
**Development Issues and Concerns**
- Here participants briefly discuss the development problems and issues of an assigned cluster (of a city corporation area). They identify the strengths and weaknesses prevailing in institutional arrangements, in the practice of land use planning, and in implementation processes for carrying out solutions.
- They can also discuss the opportunities and challenges of the city in carrying out solutions with stakeholders. In the 16 theme areas described above, they can reflect on the major gaps in their cluster and make an assessment of the extent of the problem for each theme identified. Persistent vulnerabilities are similarly assessed.

**Vision**
- The vision for the structure plan or urban plan covering the cluster is identified and the responsiveness of the plan (detailed area plans) is evaluated for sensitivity to risks, based on the criteria defined.

**Goals**
- The different development objectives identified in the detailed plan related to the cluster are reviewed for responsiveness, in relation to the 16 risk themes.

**Spatial strategies**
- The preferred urban form or urban patterns are reviewed for risk reduction details. For example, the urban land use zones for the cluster are reviewed for sensitivity to potential earthquake hazards.
- Map overlay(s) showing the cluster and the hazards and risks found in the area are prepared. The evolution of existing urban development patterns and the development of vulnerabilities over time are also reviewed.

**Policies formulated**
- The availability of policies which address seismic risk issues for different land uses are determined, and existing implementing tools (ex. zoning, construction practice, enforcement of codes and construction standards) are evaluated for their effectiveness in reducing risk.
- A summary of the key points of the analysis is provided and recommendations are given.
- Initiatives to reduce earthquake risks and related implementation activities are likewise reviewed.

**Recommendations**
- Based on the analysis and synthesis, recommendations such as policies, strategies (land use management-related), programs, and projects or activities to address earthquake related risk concerns in the cluster are provided.
- Map overlays are provided showing the cluster and the recommended interventions (ex. land use management) to be applied in the area.
- A proposed approach to improve the substance of the plan and the process of preparing an improved disaster risk-sensitive (urban) land use plan for the cluster is formulated.
- Validations and agreements on changes needed in planning and implementation are confirmed and finalized.

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**Table 5. Participants identify implications of earthquake concerns to plans and development practice**

<table>
<thead>
<tr>
<th>Development Issues and Concerns</th>
<th>The vision for the structure plan or urban plan covering the cluster is identified and the responsiveness of the plan (detailed area plans) is evaluated for sensitivity to risks, based on the criteria defined.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vision</strong></td>
<td>The different development objectives identified in the detailed plan related to the cluster are reviewed for responsiveness, in relation to the 16 risk themes.</td>
</tr>
<tr>
<td><strong>Spatial strategies</strong></td>
<td>The preferred urban form or urban patterns are reviewed for risk reduction details. For example, the urban land use zones for the cluster are reviewed for sensitivity to potential earthquake hazards. Map overlay(s) showing the cluster and the hazards and risks found in the area are prepared. The evolution of existing urban development patterns and the development of vulnerabilities over time are also reviewed.</td>
</tr>
<tr>
<td><strong>Policies formulated</strong></td>
<td>The availability of policies which address seismic risk issues for different land uses are determined, and existing implementing tools (ex. zoning, construction practice, enforcement of codes and construction standards) are evaluated for their effectiveness in reducing risk. A summary of the key points of the analysis is provided and recommendations are given. Initiatives to reduce earthquake risks and related implementation activities are likewise reviewed.</td>
</tr>
<tr>
<td><strong>Recommendations</strong></td>
<td>Based on the analysis and synthesis, recommendations such as policies, strategies (land use management-related), programs, and projects or activities to address earthquake related risk concerns in the cluster are provided. Map overlays are provided showing the cluster and the recommended interventions (ex. land use management) to be applied in the area. A proposed approach to improve the substance of the plan and the process of preparing an improved disaster risk-sensitive (urban) land use plan for the cluster is formulated. Validations and agreements on changes needed in planning and implementation are confirmed and finalized.</td>
</tr>
</tbody>
</table>
use and regional planning, disaster risk management, law and business administration, environmental management, and other closely related fields. The members of the SC are selected on the basis of their credentials and focus their activities on advising on scientific and technical matters.

Meetings, workshops, one-on-one consultations and surveys are undertaken during the project to accomplish the goals of the participatory process as explained above. While the process is guided by the experts, the outcome is controlled by the input and the level of engagement and contribution from the stakeholders. The validity of the LUP investigation relies to a great extent on the success of the participatory process.
5 Conducting a Risk Sensitive Land Use Planning Investigation -- the Case of Dhaka

What are the stages in the LUP investigation process?

The investigation process is composed of four phases, with the outputs of each phase contributing to the accomplishment of the objectives of the succeeding phases. Each of the phases are discussed in detail below.

![Figure 8. LUP Investigation Process](image)

5.1 Phase 1: Organization and Preparation

In this phase, scoping is conducted to gain a preliminary understanding of the prevailing enabling environment for risk-sensitive land use planning in Bangladesh, as well as to identify the relevant key institutional stakeholders. This is accomplished through the review of secondary sources of information and consultations with local experts. Representatives from the identified organizations are then invited to form part of the LUP Focus Group (LUP FG). The sectors represented in the LUP FG are varied, comprised of members from national government agencies, regional bodies, city corporations, academe, and business, professional and citizens’ organizations (see Annex 5). The schedule of investigation activities is also developed and finalized at this time with the LUP Focus Group. For Dhaka, several preparatory activities were carried out in this phase, as follows:

1. Initial Project Team Orientation and Scanning of LUP in DRM in Bangladesh

The first activity served as one of the venues for the formal introduction of the project to stakeholders. The approach and methodology for the LUP investigation were presented, together with the relevant project requirements, deliverables and timeframe. The orientation also provided an opportunity for open discussion and the collection of feedback and input from stakeholders about the responsiveness of land use planning and implementation in making development sensitive to seismic risk reduction. This dialogue was one of several modes of stakeholder engagement meant to promote commitment and support from local partners, and ensure successful project implementation.

2. Focus Group Discussion (FGD) on LUP Capacity and Needs

The first FGD was intended to gather information on the current institutional strengths of key organizations involved in urban development in Dhaka, as well as the challenges they face. Key issues were
identified by the discussion participants affecting the implementation of existing laws, the functions of planning and regulatory agencies, the practice of planning and building code enforcement, and the need to establish commitment and support from stakeholders for the project. The list of participants is available in Annex 3.

3. LUP Workshop and Key Informant Interviews (KII) on the Planning System of Bangladesh

The objective of the workshop and KIIIs was to gather information relevant to the land use planning practice, Dhaka Structure Plan and Detailed Area Plan implementation in Dhaka Metropolitan Region, particularly:

a) To identify roles, responsibilities and mandates of stakeholders on LUP and CCS;

b) To document the risk sensitivity of land use implementation of the Dhaka Structure Plan and Detailed Area Plans;

c) To identify issues and gaps in the implementation of various laws, policies, programs and plans in LUP, and measures to address gaps in planning practice.

The workshop was also conducted to familiarize stakeholders from planning agencies, utility providers, academe, and other government offices on their planning roles and initiatives on DRM. The list of key informants is enumerated in Annex 4.

The key phase outputs are:

- Identification of key agencies at the national and city levels through review of secondary sources and local consultations;
- Consensus on approach, methodology and timeline of project implementation;
- Initial understanding of national and local administrative planning arrangements, plan structure, process and implementation in Bangladesh;
- Creation of LUP Focus Group;

LUP Focus Group Workshop on Needs and Capacity Assessment held at World Bank Dhaka on November 20, 201

Phase 1 Findings from Dhaka

Dhaka Plans

An initial concern of the BUERP was to know about the integration of earthquake hazard information and risk reduction programs into the Dhaka Metropolitan Development Plan (DMDP) prepared in the early 1990s. The DMDP reports reviewed include the Structure Plan report (1995-2015) and Urban Area Plan (UAP) report (1995-2005). These two documents set the urban and rural development priorities, urban expansion and management policies, spatial strategies, general and urban zoning scheme, and aspects of building construction and related definitions. Detailed Area Plans (DAP) for Metropolitan Dhaka prepared within the plan period (1995-2015) replaced the Urban Area Plan and are supposed to implement the policies, strategies, and proposed zoning prescribed in the UAP. Although these DMDP plans were supposed to be reviewed every five years to keep them relevant, no updating on the plans were documented, and hence, the documents alone were not sufficient to provide the key information on the progress of implementation of the DMDP plans and on the changes made within the planning period. More information was obtained from the various planning agencies, local governments (DCCs), and RAJUK to draw information on the existing situation.
As another way of informing the project and providing guidance into activities such as the review, a focus group for land use planning (LUP) was formed in late November 2012. The LUP Focus Group was organized, comprised of various members from RAJUK, North and South DCC departments on physical planning, public safety, social development and environment, representatives from the various Ministries and Directorates, academe, utility service providers and from private sector groups. The LUP Focus Group provided better insights on plan formulation, and spatial and development policies & strategies, as well as the practice of implementing zoning ordinances, building code provisions on construction, monitoring, the permitting process, and non-regulatory tools (such as incentives) in Dhaka.

In identifying the gaps and challenges, and later recommendations of the DMDP, EMI used its RSLUP framework as main criteria (see Figure 2 of Section 2 for the RSLUP Framework). Gaps, in terms of missed process steps, participation and involvement of stakeholders, quality of data and information used, analysis and synthesis were identified based on the information made available during the investigations.

**Government Administrative Structure**

The development planning mechanism is centralized through the Planning Commission. At the top of the institutional framework (See Figure 9) Planning Commission oversees and maintains control of the city planning and development. The urban planning functions of the Capital Development Authority (RAJUK) and Dhaka City Corporation are at the heart of city urban governance.

The National Economic Council (NEC) is responsible for approving the National Economic Plan and for formulating and adopting the following: Five-Year Plans, Annual Development Program and the Poverty Reduction Strategy

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**Legend:**

- **UDD**: Urban Development Directorate, **NHA**: National Housing Authority, **PWD**: Public Water Department, **RAJUK**: Capital Development Authority, **DWASA**: Dhaka Water and Sewerage Authority, **DCC**: Dhaka City Corporation, **DPHE**: Department of Public Health Engineering, **LGED**: Local Government Engineering Department, **DESA**: Dhaka Electric Supply Authority, **DMP**: Dhaka Metropolitan Police, **DTCB**: Dhaka Transport Coordination Board, **DoE**: Department of Environment, **R & H**: Roads and Highways, **BIWTA**: Bangladesh Inland Water Transport Authority.

**Source:** Md Taibur Rahman, *Urban Governance and Informal Growth Regulation in Dhaka National Planning*, 2013.
Paper of the Government of Bangladesh. The National Planning Council advises the NEC and receives the capital expenditure proposals from individual Ministries that are prepared by their departments and agencies. Therefore, development projects for the Dhaka Metropolitan Area are among those included in the Ministry sectoral programs.

Development management for Dhaka Metropolitan Area

**RAJUK** is the planning authority and land development authority for the Dhaka Metropolitan Area. It is under the Ministry of Housing and Public Works (MoHPW) and is responsible for preparing and implementing the master plans for Dhaka. It also exercises development planning control and acts as authorized officer for the implementation of the East Bengal Building Construction Ordinance of 1952.

The **Dhaka City Corporation (DCC)** was originally a single unit under the Dhaka City Ordinance, 1983 and was divided into the North and South DCCs in 2009. It is under the Ministry of Local Government Rural Development and Cooperatives (MLGRD&C) and provides for the municipal services such as solid waste disposal, interior road construction, drainage, public health, disaster management among others. Though mandated for town planning and building control, these two functions are being performed by RAJUK.

Other Ministry Departments and Special Agencies are also empowered under separate laws to carry out sectoral development services. These departments and special agencies such as the Public Works Department (under MoHPW), Dhaka Water and Sewerage Authority (DWASA) are also involved in various aspects of urban development.

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**Figure 10. Positions of Local and City Government Authority in the Government Structure of Bangladesh**

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8 About 28 different functions of DCC described by Md. Taibur Rahman, Urban Governance and Informal Growth Regulation in Dhaka National Planning, 2013.
under MLRD&C), Dhaka Electric Supply Authority (DESA), Dhaka Metropolitan Police (DMP), Dhaka Cantonment Board (DCB), Department of Public Health Engineering (DPHE), Local Government Engineering Department (LGDE), Dhaka Transport Coordination Board (DTCB), are among at least fifty-one (51) others responsible for managing Dhaka urban affairs. See Figure 9 for a construct of the institutional framework for Dhaka Management.

Figure 10 provides a simpler construct of the government structure of Bangladesh and the positions of the local government and city development authority for urban areas. The arrows only indicate directions of administrative and executive authority.

### 5.2 Phase 2: Data Collection

The Data Collection phase focused on gathering relevant information that informed the analysis on the responsiveness of the Dhaka and Region planning system and implementation of land use management methods for DRM.

The desk review of documents on planning laws, terms of reference by government planning agencies for land use plan updating, development control regulations, urban governance, approved plans (ex. Dhaka Metropolitan Development Plans-DMDP, Detailed Area Plans -DAP), project reports on environmental impact assessment for Dhaka, and other secondary sources started in the Preparatory Phase helped support further data gathering by providing team members with information to develop an initial assessment on plan implementation of approved plans, enforcement and responsibility for institutional mandates and regulations at both the national and Dhaka City Corporation levels, as well as to define the roles of different stakeholders. The results of this desktop work provided insights that were used in the succeeding investigation activities, such as the key informant interviews and workshops.

In-depth interviews with focal officials of key planning-related offices are also conducted, making use of guide questions developed based on the data gathered from desktop research. These interviews are supplemented by meetings with the LUP Focus Group, and other modes of discussion and knowledge sharing.

#### 1. Workshop on Needs and Capacity Assessment

This activity gathered representatives from various government institutions and stakeholder organizations to discuss the different planning functions performed by various organizations, as well as their initiatives to promote disaster risk management. It was attended by 16 participants from Bangladesh Institute of Planners (BIP), Dhaka Water and Sewerage Authority (DWASA), Titas Gas Transmission and Distribution Company (TITASGAS), Bangladesh Railway, Planning Commission, Rajdhani Unnayan Katripakhaya (RAJUK), Dhaka South City Corporation (DSCC), Asian Disaster Preparedness Center (ADPC), Housing and Building Research Institute (HBRI), Geological Survey of Bangladesh (GSB), Comprehensive Disaster Management Programme (CDMP), Urban Development Directorate (UDD), and the local expert team of the project. Presentations on organizational profiles, current programs and projects were
conducted. In the same event, participants discussed the issues and concerns related to the responsiveness of land use planning and management for reducing seismic risk in Dhaka, and provided recommendations to address them.

2. Key Informant Interviews (KIIs)

Separate interviews were conducted with key planning and engineering offices from the following organizations: RAJUK, Dhaka North and South City Corporation Areas. The KIIs were intended to provide additional information about the functions and responsibilities of these organizations, implementation programs, practice of planning, and to exchange views about the institutional gaps and needs, together with suggested policy changes. The list of key informants is available in Annex 4.

The key outputs for this phase are:

- Summary of lines of enforcement and responsibility for institutional mandates and regulations, both at the national and Dhaka City Corporation (DCC) level;
- Definition of roles of different stakeholders;
- In-depth interviews with focal officials of key DRM-related organizations;
- Organizational mapping, document reviews and gap analysis workshops;
- Conduct of Blended RSLUP Training.

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Phase 2 Findings in Dhaka

Authority, Institutional Services and Coordination: Issues and Problems

RAJUK is a centrally placed institution and its organizational structure is hierarchal. It is governed by a Chairman and five other members appointed by the Government for a brief period (1-3 yrs). The chairperson holds the power and authority in decision making activities. The chairman reports to the Ministry of Housing and Public Works. Under a second tier in its structure are five divisions, namely: i) administration, ii) finance, budget and accounts, iii) planning and architecture, iv) development and engineering and v) estate and land. Head officials are appointed for a limited period (1-2 yrs.). The selection is likely influenced indirectly by the ruling government party.

Table 6 provides for the urban management and service responsibilities in Dhaka City Corporation Areas and in the extended Metropolitan region.

Key findings of this phase include:

- Horizontal coordination is weak among these institutions and no single agency or department takes the lead in the overall urban management of Dhaka;

- Capacity of RAJUK to guide and control development (under the MoHPW), and act as overall manager of urban affairs of Metro Dhaka is weak. Each government organization was perceived to act independently and each was not bound to comply with any other organization;9

- RAJUK exercised its influence on strategic planning through the Structure Plan, Urban Area Plans and Detailed Area Plans (1995-2015), but the lack

9 LUP-CCS Focus Group, Meeting No 2.
Table 6. Urban Management and Service Responsibilities in Dhaka City

<table>
<thead>
<tr>
<th>Sector</th>
<th>Function</th>
<th>Dhaka Metropolitan Region Sub-Areas</th>
<th>DCC Area</th>
<th>DCC &amp; Narayanganj</th>
<th>Dhaka Cantonment Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and Control</td>
<td>Strategic and Structural Planning</td>
<td>RAJUK</td>
<td>RAJUK</td>
<td>RAJUK</td>
<td>DCB</td>
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<td>RAJUK</td>
<td>RAJUK</td>
<td>DCB</td>
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<td>DCB</td>
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<td>DCB</td>
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<td>DCC</td>
<td>DCB</td>
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<td>DWASA</td>
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<td>DCB</td>
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<td>DESA</td>
<td>DCB</td>
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<td>TITAS</td>
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</table>

of resources (technical, financial, manpower) to implement the strategic and detailed plan in a metropolitan-wide scale had resulted to problems of coordination, poor enforcement of the plans, and resulted to further conflicts in land uses and increased uncertainty in the quality of buildings;

Discussions within the LUP Focus Group confirm that RAJUK has not maintained its function of strategic planning (or master planning). RAJUK has focused on land development and development control;

A metropolitan body with a mandate to coordinate, plan and implement various urban management functions had been raised to address Dhaka urban management;

There were attempts in the past to provide coordination for the Dhaka urban management by Dhaka City Corporation Areas but were not successful because of political and status competition among members, lack of statutory power, and non-cooperation among members. There are also other considerations, such as:

Agency initiatives uncoordinated with RAJUK and political competition, it has resulted to a poor spatial integration and land use management conflicts.

Each Dhaka City Corporation Area manages its urban functions through fourteen standing committees: finance and establishment, solid waste management; education, health family planning, sanitation and drainage; town planning and improvement; audit and accounts; works and building maintenance; water and electricity; social welfare and community centers; environment improvement; sports and culture; birth and death registration; communication; commodity price monitoring and disaster management. The concentration of power in DCCs rests with its mayor and that power sharing and delegation of workload depends on the mayor (Rahman, 2013).

Comparing the structure with RAJUK, DCC is more decentralized in terms of urban area management and the provision and management of sectoral services. However, its responsibility lies mainly in basic services provision, with very few planning and land development functions (DCCS, 2013).

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10 Inputs from the LUP Focus Group
5.3 Phase 3: Analysis and Diagnosis

In this Phase, the information collected from the data gathering activities is consolidated in order to describe the existing planning practice, plan formulation, plan document structure, implementing instruments (ex. zoning, building code enforcement, and project identification, management and development) and their responsiveness to DRM at the city level. Current land use management practice for DRR is also compared against existing national and local DRR statutes and policies and accepted international standards, in order to further identify gaps and possible remedial actions.

The key outputs for this phase are:

- Consolidation and analysis of collected data;
- Comparison of existing LUM/LUP, development permitting and code enforcement practice with local mandates/policies and international standards;
- Identification and prioritization of planning issues and gaps, formulation of recommendations.

Phase 3 Findings in Dhaka

From DMDP, DAP Reviews

The development of the DMDP was not informed by earthquake hazards such as from ground shaking, known ground ruptures and potential liquefaction. With the initial seismic risk assessment prepared under the Comprehensive Disaster Management Programme (CDMP phase I)\(^1\), a review of the impacts under several earthquake scenarios reveal significant disruptions, damage and loss to Metropolitan Dhaka.

In order to cluster initial assessments in this review, sectors were identified following DMDP plan sectors, namely:

- Risks in macro form and in urban fabric
- Shelter and housing (under building stock)
- Lifelines (road and rail, water, sanitation and sewerage)
- Social/Emergency facilities
- Special areas: flood control & retention ponds, cultural heritage and open spaces
- Hazardous use
- Management

Key points of reviews are provided as follows:

**Risks in Macro Form**

- In general, earthquake hazards and risks were not included in the DMDP Structure and Urban Area plan. Looking into earthquake hazards identified in CDMP reports, there is a need to review urban strategies of expansion & management in previously defined DMDP growth areas and special development areas;
- Lineaments and fault lines surrounding the Dhaka area were not studied;
- The Urban Area Plan and Detailed Area Plans need to be reviewed for high density areas and buildings, configurations, unauthorized developments (e.g. structural encroachments in flood zones), developments in rural and water-retention zones, and large-scale investments that ignore earthquake risks (e.g. road and rail);
- Earthquake risks in the structure of the main transportation system and current urban settlement area sizes, densities and configurations, current boundaries to expansion, cultural heritage sites and investments of metropolitan scale, need to be investigated in relation to hazard zones;
- There is no communication plan for increasing stakeholder awareness, knowledge and understanding of earthquake hazards, vulnerability and risks in order that implications to past and proposed strategies can be understood. Wider stakeholder participation in the formulation of Urban

\(^1\) Under the Asian Development Bank project
plans and Detailed plans will help in public support of these plans;

- The framework for mainstreaming earthquake HVRA into Structure, Urban and Detailed Area Plans is missing.

**Risks in Urban Fabric**

Urban fabric risks are risks related to location and nature of physical development (building height/proximity, plots, density, roads, etc.).

- The DMDP concerns cover the dimensions and shape of the plots, the building dimensions, ratio of coverage, density, proximity of buildings, provision set-backs, pedestrian systems and public open spaces, and width of roads. Permitted and conditional uses were arrayed in the main flood zones and sub-zones. However, there was little reference on permitting practice or the awareness of violations in development permissions, or where unauthorized development had occurred that would help understand exposure to flood hazards.

- In view of current seismic risk analysis, the different levels of vulnerabilities and seismic risks in the urban fabric comprising plots, building coverage and density, access roads, open spaces and other form arrangements need to be reviewed to inform zoning in future Detailed Area Plans.

- There is a need for reappraisal of the following: physical standards and development plans in terms of local seismic attributes, permitting process issues or where unauthorized development has occurred, and identifying seismic risk factors;

**Building Stocks, Housing and Shelter**

Discussions in the DMDP Urban Area Plan emphasized the sequential process of expansion with infilling and densification in Dhaka core areas, redevelopment strategies, infrastructure-led development and expansion into urban fringes.

- Housing and shelter for different income groups were targeted to be located in government acquired lands in the urban fringe, or where affordable lands were available. As seismic hazards were not included, no discussions on seismic risks to building stocks (social and economic) were discussed.

- There is a need to evaluate private and public buildings in terms of their design and structural performance;

- There is a need to identify critical buildings and information in terms of their structural condition as well as deficiencies in public buildings, historic buildings and emergency facilities;

- There is a need for comprehensive redevelopment in areas with concentrations of deficient buildings.

**Lifelines**

**Road and Rail.** The DMDP discussed mainly about improving north-south spines, east-west corridors and road access improvements. Networks disregarded local seismic attributes. The DMDP also highlighted the fragmented nature of authority and information (RHD12, RAJUK, DCC and other municipal and thana authorities).

- The DMDP sections on existing road networks did not take into consideration local seismic conditions as issues. Thus, the access network, service area and volume, vulnerable points and congestion risks with respect to seismic conditions were not yet identified.

**Water Systems.** The issues in this sector were about existing water supply and distribution system leakages and unmet consumer demands, as well as the considerations to provide water from water surfaces.

---

12 Roads and Highways Directorate
• As earthquake hazards were not taken as issues, priority for incorporation of redundancy and a network design for emergency facilities were not included.

**Sewerage Systems.** Only a portion of Dhaka was identified as being served by sanitary sewers. The DMDP assumed that increases in population in established urban areas meant that the sewerage would require extensions of the collector system, and environmental and public sanitation improvements. Programs linked to shelter policies need to be formulated and implemented.

• Like water systems, sewer networks and the treatment system were not reviewed for local seismic attributes.

**Emergency Facilities**

The identification of emergency facilities and strategies for earthquake risk management were not included.

• Strategies to identify and protect emergency facilities at the urban plan and detailed plan level need to be considered. This shall include, but not be limited to the following: hospitals, schools/dormitories, communications centers, fire-stations, police quarters, and other public and private network of facilities that are designated to provide emergency services after a strong flood or earthquake event.

**Special Areas**

**Flood Control and Water Retention Areas**

The DMDP Urban Area Plan report highlighted the importance of drainage and flood protection of the Dhaka core areas and immediate periphery.

» There was no mention of earthquake design requirements for the flood control structures, structures built in protected & landfilled areas, and retention pond areas affected by strong ground shaking and liquefaction.

**Heritage Areas**

There were no discussions on the flood exposure & their conditions for identified heritage areas in the Structure Plan.

» Buildings of historical and cultural significance in Old Dhaka and those dispersed appear to demand special analysis of structural and other forms of risks especially for earthquakes. Inventories, condition and spatial information were incomplete.

**Open Area Scarcity**

The Urban Area Plan described the allocation of open space per person as deficient, but looks into opportunities to make improvement. Old Dhaka remains to have the highest density and the lowest levels of open space. It also has the least opportunity to provide open space.

» The review finds that these available areas may not be sufficient for the emergency requirements. The distribution of available and appropriate open areas should be further investigated in relation to densities and pattern of built-up areas. More specifically, there is a need to use seismic HVRA and thes to identify exposure and vulnerability and risks in urban forms.

**Hazardous Uses**

The Titas Gas company supplies gas in Dhaka and Central Bangladesh. The main network covers Dhaka, Jinjira, Savar, Tongi, Gazipur and Narayanganj. Demand was noted to exceed supply. Major consumption is largely by non-domestic users. Major proposals for gas supply and distribution expansion were identified.
There is a need to identify buildings and land used to store or process hazardous materials which may be sources of direct or secondary potential damage to environment and could generate further disasters. Seismic vulnerability and likely damages of these need be carefully assessed.

Planning Process for DMDP formulation

The planning process utilized in the preparation of the DMDP Structure Plan and Urban Area Plan focused on central issues and problems of the sectors earlier identified. It provided for the options on directions, conditions to be maintained, manner and timing in carrying out decisions in the medium and long term. The options were evaluated based on the criteria developed from the aims and objectives of their sectors. The selected set of strategies was then integrated, forming the structure plan.

- Middle and higher level government appear to have participated highly and been represented in the process, but it may need more participation from lower levels (e.g. Pourashavas, DCCs), especially at the Urban Strategy Level and Detailed Area Planning level.

DAP Formulation

The Detailed Area Plan was implemented late (2010) and changes in landscape were left unregulated due to lack of monitoring and enforcement. These resulted to:

- High density buildings & configurations;
- Liquefaction threat is present in newly developed parts of Dhaka (ex. wetlands) where land filling is widely practiced without considering the earthquake hazards;
- Large-scale land filling ignored flood risks;
- High vulnerability and risks are present due to poor implementation of zoning ordinances and building codes and standards;
- Cultural heritage sites remained unprotected;
- Housing for low-income people was not addressed;
- Public participation process was in place, but there may have been limited representation from a wider group of stakeholders;

5.4 Phase 4: Findings, Validations and Recommendations

The results of the initial reviews of the DMDP and DAP were similarly subjected to further reviews and discussions in open forums through the RSLUP Blended Training. The first part of the LUP investigation therefore presents the findings from the reviews of the Dhaka Metropolitan Development Plans and Detailed Area Plans on the responsiveness of the plans to seismic risk reduction. The second part provides the findings and validations of participants for the North and South City Corporation areas in Dhaka. The discussion in this section examines these elements.

The Detailed Area Plan (DAP) will be valid till 2015 and RDP (2016-2035), and will be the planning document till 2035. The new plan, the City Region Development Plan (CRDP), is an opportunity to incorporate earthquake hazards and risks, and risk management into the strategic land use planning of Dhaka City Corporation Areas. The Terms of Reference (ToR) of the CRDP includes the disaster aspect, but no specific provisions are discussed on the earthquake issues and concerns. It is necessary to incorporate and utilize findings and learnings from the BUERP to influence CRDP and future detailed area plans, master plans and processes.

A summary of key findings from participants of the RSLUP Blended Training reveals the top concerns:

A. Poor implementation of land use and environmental management strategies as suggested by the Structure Plan and Detailed Area Plans have compounded the seismic risks and this should inform Dhaka Government (RAJUK, DCCs) to look into
urban renewal and redevelopment of Dhaka with seismic risk management provisions;

B. Lack of enforcement of building construction codes and standards and unsafe building construction practices have contributed much to the increase in vulnerability and risks to seismic hazards. There is a need to investigate vulnerability, principally of essential public buildings and critical facilities, and reduce potential damages and losses;

C. Emphasis on capacity and capability building for the following: risk-sensitive planning and policy making, building monitoring and evaluation for enforcement of construction codes and standards in Dhaka-City Corporation Areas, preparing investment programs that continue to support risk assessment, risk reduction activities and continued “awareness building” on earthquake preparedness, response and recovery measures.

The details of key findings are shown in the boxes below.

**Key Findings for the Dhaka North City Corporation Areas**

- Need to strongly enforce the BNBC;
- Need to develop more escape routes and open spaces for emergency management;
- Need to continue to protect the flood flow zone, water bodies (lowlands/wetlands);
- Narrow road network system;
- Low awareness by community and need to organize regular earthquake mock exercises for the community;
- Low awareness of people about the ground suitability of the area (geology, amplification and liquefaction) for land development;
- Probability of significant loss of lives and damage to property;
- Liquefaction susceptibility, vulnerability and risk would be higher if wetlands or water bodies are not protected;
- Various factors hamper search, rescue and recovery operations.

**Key Findings for the Dhaka South City Corporation Areas**

- Existing conditions of physical features: buildings are old and non-engineered; building set back rules, plan irregularities and vertical irregularities can contribute to serious pounding effects during ground shaking; many old heritage buildings at risk.
- Road networks: very narrow roads; condition of roads and materials are also poor; building height to road width ratio not properly maintained;
- Utilities and service facilities: widespread incidence of utility poles and wires that pose public risks; leakages in water supply lines; emergency services like fire services, hospitals are in very poor condition;
- Hazardous chemical industries located at ground floor of most of the residential buildings;
- Unplanned and densely built-up area (population density 72,792/sq.km.) lacking in emergency accessibility;
- Unauthorized encroachments (ex. wetlands) and violations of land use plan (DAP);
- About 65% of total building stocks are non-engineered structures;
- Need to Identify existing buildings in already developed liquefaction susceptible area;
- Need to locate fault lines in DAP and identify vulnerable buildings in fault zone;
- Poor construction practice and protection of lifeline services.
### 6 Validation of Mainstreaming Guide

A final dissemination workshop was held on December 18, 2013 at the World Bank – Dhaka conference rm. The objectives of the dissemination were to:

- Review the overall process, findings and outputs of the RSLUP and HVRA elements of the project
- Present and generate inputs from the FG members on the Draft RSLUP and HVRA Framework Guidebooks
- Confirm the proposed strategies in the Draft Framework Guidebooks
- Discuss the proposed future work for the HVRA and RSLUP component

For the workshop, the attending members of the HVRA and LUP Focus Groups reviewed the tables on mainstreaming seismic risk reduction in the land use planning process and plans. The table contained several guide points following the steps of the land use planning process and shown in Figure 1. The participants were divided into two groups and asked to perform two tasks: 1) Agree on mainstreaming entry-points in the planning process, items to mainstream in the land use planning process, and the process by which to mainstream them; 2) Provide assessment on the strengths, weaknesses of RAJUK institution on strategic planning and enforcement, and the opportunities and challenges they face to ensure a seismic risk sensitive land use plan and implementing tools. The table below summarizes the outputs from the two groups.

<table>
<thead>
<tr>
<th>Planning Process Entry Points</th>
<th>Agree on Item</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characterization of the city involves gathering, collating, and processing information necessary to provide a clear picture of the city.</td>
<td>✓ ✓</td>
<td>Local and regional socio-economic factors should be included;</td>
</tr>
<tr>
<td>The sectoral information is in the form of statistics and area profiles are presented with thematic maps.</td>
<td>✓ ✓</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A. What to Mainstream in the Land Use Planning Process/Plan</th>
<th>Agree on Item</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVRA information on the existing seismic hazard, vulnerability and risk situation (from DRRMP-HVRA)</td>
<td>✓ ✓ ✓ ✓</td>
<td>Include earthquake contingency plan;</td>
</tr>
<tr>
<td>Risk themes that reflect situation of Dhaka City</td>
<td>✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Strengths, Weaknesses, Opportunities and Challenges (SWOC) assessment in carrying out the BUERP strategies and implementation.</td>
<td>✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>DRM legal frameworks related to Land Use Management (LUM), Construction Codes and Standards (CCS), Development Permitting, policies, strategies and PPAs. (from LUP, LIA DRRMP reports)</td>
<td>✓ ✓ ✓ ✓</td>
<td>Develop mechanism for functional and implementable enforcement of BNBC</td>
</tr>
</tbody>
</table>
How to Mainstream

- Utilize HVRA information to provide maps of possible or known “hotspots” for use as planning parameters.
- Utilize HVRA findings to prepare city profiles and situational analysis of development sectors (e.g., settlements and natural environment).
- Include hazard maps in environment profile.
- Identify spatial trends for Dhaka region, Corporation areas.
- Document impacts of HVRA findings to population, sectors and to spatial development of Dhaka Region and Corporation areas.
- Assess implications of HVRA to sensitivity and adaptation of communities to city plans and the planning process and document.
- Use Legal and Institutional Arrangement findings to improve vertical and horizontal working arrangements among LUP and DRM organizations.
- Organize workshops for consultation meetings and for validating HVRA information with stakeholders.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strong will;</td>
<td>• Hotspots not identified;</td>
</tr>
<tr>
<td>• BC Act 1952;</td>
<td>• Lack of manpower;</td>
</tr>
<tr>
<td>• TI Act 1953;</td>
<td>• Lack of logistics;</td>
</tr>
<tr>
<td>• Building Regulation 2008;</td>
<td>• Lack of technical manpower for HVRA;</td>
</tr>
<tr>
<td>• Planners, Architects, &amp; Engineers (availability?)</td>
<td>• Lack of population density planning.</td>
</tr>
</tbody>
</table>

B. Setting the RSLUP vision

Planning Process Entry Points

- RSLUP vision makes use of statements that address the resilience of city to disasters for sustainable development

What to Mainstream in the Land Use Planning Process/Plan

- An RSLUP vision statement has elements for reducing threats to the following: population, productive assets, built and natural environment.
  - Each element is given a set of descriptors (i.e. words and phrases that signify the desired quality of the future and resilience desired).
### How to Mainstream

- Functional and technical working groups are formed and they draft enhanced vision/mission statements
- City development corporations, planning departments of ministries, community representatives, stakeholders and working committees are convened at different stages of the planning process to participate and be engaged in the vision setting.

<table>
<thead>
<tr>
<th>Strengths:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong will</td>
</tr>
<tr>
<td>Manpower in different fields in local government</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weaknesses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of skilled manpower;</td>
</tr>
<tr>
<td>Weak legal framework;</td>
</tr>
<tr>
<td>Lack of metropolitan governance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door to door manpower and</td>
</tr>
<tr>
<td>Infrastructure in local government institutions;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Challenges:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRR implementation in LUP;</td>
</tr>
<tr>
<td>Need to convince concerned Ministry;</td>
</tr>
<tr>
<td>Lack of decentralization of power in local government organization</td>
</tr>
</tbody>
</table>

### C. Formulation of goals, objectives and strategies

#### Planning Process Entry Points

- Goals and objectives address the development problems, issues and concerns to achieve sustainable development of Dhaka.
- The strategies provide for the approaches to achieve the desired goals and objectives (long and short term).

<table>
<thead>
<tr>
<th>What to Mainstream in the Land Use Planning Process/Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals and objectives that establish resilience desired for Dhaka</td>
</tr>
<tr>
<td>Harmonized detailed area plans, river development plans, road development plans, and other higher level plans and projects for the Dhaka metropolitan area with the Dhaka structure plan.</td>
</tr>
<tr>
<td>Strategies, programs, projects responsive to disaster risk reduction.</td>
</tr>
<tr>
<td>Land Use Policy recommendations, strategies needed to be retained, modified or improved upon.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How to Mainstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferably Technical Working Committees organize workshops for setting development goals.</td>
</tr>
<tr>
<td>City development corporations, planning departments of Ministries, community representatives, stakeholders and working committees are convened to hold consultation workshops to agree on goals, objectives, applicable and workable land use management methods with stakeholders.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Challenges:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government endorsement required</td>
</tr>
</tbody>
</table>
## D. Generation and evaluation of alternative strategies

### Planning Process Entry Points

| • Generation of alternative spatial strategies is a major activity in the crafting of a land use plan. The spatial strategy is the form or pattern of physical development of the city that will contribute to the realization of the long-term vision. | ✓ |
| • Evaluation of the alternative spatial strategies is based on the advantages and disadvantages of each strategy. | ✓ |
| • It should be linked to previous plan | ✓ |

### What to Mainstream in the Land Use Planning Process/Plan

An RSLUP ensures the following:

- Urban structures that establish a sustainable balance between the built and natural environment with considerations of natural hazards, risks and their possible management.
- Areas preserved in their open character are not built over;
- New built environment is directed into areas that are relatively free from hazards;
- Type, size and intensity of development are consistent with the capability of environmental resources;
- Land use management methods are used for seismic risk reduction strategies, such as avoidance of unsafe areas, mitigation works, and adjustments in zoning character and incorporated into spatial strategies;
- Construction codes and standards are adopted and enforced along with other development controls by the city.

### How to Mainstream

- Use risk maps as overlays to screen unsuitable areas in the different use zones and to develop hazard zones.
- Use the Emergency Management recommendations to identify open space and routes for evacuations.
- Best practices are gathered and documented and applicable risk reduction methods are identified.
- City development corporations, planning departments of ministries, community representatives, stakeholders and working committees are convened to hold consultation workshop(s) to agree on applicable and acceptable LUM among stakeholders.
- Stakeholders contribute to develop criteria for determining best plan of action.

### Strengths:
- Play field;
- There is mandate

### Weaknesses:
- Limited capacity;
- Insufficient space.
- Lack of trained manpower.

### Opportunities:
- DDM link

### Challenges:
- Human capacity build-up;
- Management of open spaces in built-up areas.
- Public awareness
- Land readjustment
- Ensure in revised DAP
### E. Detailing of preferred risk-sensitive land use plan

#### Planning Process Entry Points

<table>
<thead>
<tr>
<th>Planning Process Entry Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The preferred spatial strategy serves as a take-off point for preparing a detailed area plan (land use zoning plan).</td>
<td>✔</td>
</tr>
</tbody>
</table>

#### What to Mainstream in the Land Use Planning Process/Plan

<table>
<thead>
<tr>
<th>What to Mainstream in the Land Use Planning Process/Plan</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LUM strategies, construction codes and standards, development permitting process that support DRM.</td>
<td>✔</td>
</tr>
<tr>
<td>Designs of urban zones and supporting sectoral development investment programs, projects and activities (PPAs) for seismic risk reduction.</td>
<td>✔</td>
</tr>
<tr>
<td>Capacity and capability building of institutions and communities for implementing DRR measures</td>
<td>✔</td>
</tr>
</tbody>
</table>

#### How to Mainstream

<table>
<thead>
<tr>
<th>How to Mainstream</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and map the available and potential land supply for developments within and outside the city.</td>
<td>✔</td>
</tr>
<tr>
<td>Prioritize redevelopment, identify policies that reduce fragmentation and incompatible uses.</td>
<td>✔</td>
</tr>
<tr>
<td>Encourage designs using carrying capacities, identify policies that reduce sprawl and incompatible uses.</td>
<td>✔</td>
</tr>
<tr>
<td>Invite legal experts, government agencies mandated to plan and implement the different projects, utility companies and academe to assess and offer solutions on existing conflicts in land use zones and their management.</td>
<td>✔</td>
</tr>
</tbody>
</table>

#### Strengths

<table>
<thead>
<tr>
<th>Strengths</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapping and GIS Use and Technology</td>
<td></td>
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</tbody>
</table>

#### Weaknesses

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of single command</td>
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</tbody>
</table>

#### Challenges

<table>
<thead>
<tr>
<th>Challenges</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation</td>
<td></td>
</tr>
</tbody>
</table>

### F. Formulating policies and implementation tools (ex. Zoning, Monitoring and Evaluation)

#### Planning Process Entry Points

<table>
<thead>
<tr>
<th>Planning Process Entry Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Major activities consist of reviewing existing relevant national laws, identifying needed land use policies, and drafting the initial zoning policies and ordinances.</td>
<td>✔</td>
</tr>
<tr>
<td>The enactment of possible regulatory measures by the legislative council or by the provision of certain incentives to attract private investments or partnerships (new local legislation) provides “teeth” to the sectoral and spatial policies, strategies and PPAs.</td>
<td>✔</td>
</tr>
<tr>
<td>Drafting zoning ordinances that provide additional set of regulations intended to address safety or risk reduction considerations in frameworks/ physical structure plan.</td>
<td>✔</td>
</tr>
<tr>
<td>Use of DRM performance indicators (ex. Urban Disaster Risk Index, Disaster Risk Reduction and Management Index).</td>
<td>✔</td>
</tr>
</tbody>
</table>
### What to Mainstream in the Land Use Planning Process/Plan

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>• National laws and local ordinances that support land use management policies</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Risk-sensitive zoning:</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>o Well-identified hazard zones are crafted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o New development located outside of potential hazard areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Special construction limitations/conditions in areas where seismic hazard-prone areas cannot be avoided.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>o Proposed developments that do not transfer risk to others.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Avoiding or regulating alterations in land cover and land use where ground failures are likely to take place even under weak shaking events.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Best management practices, advice and inputs by qualified professionals contribute to policy, strategy, implementation such as in development permits or exemptions issued.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to Mainstream

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Define zoning ordinances that support seismic risk-sensitive zoning.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Zoning regulations define clearly the allowed areas for development; the restricted areas and the no-development areas (or zones) for development permitting</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Zoning policies and regulations prioritize preferred locations of community facilities and discontinuation of facilities in consideration of the seismic risks</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Zoning regulations consider carrying capacities of soil and geotechnical qualities</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Zoning regulations consider land use arrangements, net and gross built up and population densities, FARs, percentage of built up area coverage, building occupancies, and landscapes that promote safe densities and arrangements</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Use of UDRI and DRRMI for monitoring progress</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Review and improve the permitting process and adoption of risk sensitive construction codes and standards.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>• Invite legal experts, government agencies mandated to plan and implement the different projects, utility companies, and academe to assess and offer solutions on existing conflicts.</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

#### Weakness:
- Lack of zoning ordinance

#### Challenges:
- Zoning regulation (preparation and implementation)
- Codes and standards should be part of zones
### G. Adoption and plan implementation activities

<table>
<thead>
<tr>
<th>Planning Process Entry Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Follow-on activities (adoption, implementation, enforcement, monitoring, and feedback) are conducted in order for the land use plan to become a reality.</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What to Mainstream in the Land Use Planning Process/Plan</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Advocacy campaigns, capacity building that support risk sensitive land use planning</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How to Mainstream</th>
<th>Weaknesses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use IEC materials of the BUERP for advocating RSLUP at all levels of the government.</td>
<td>✓</td>
</tr>
<tr>
<td>• Use of DRM performance indicators to guide and monitor outputs and impacts of DRRM projects.</td>
<td>✓</td>
</tr>
<tr>
<td>• Translate the physical development and land use management strategies into investment programs (Programs, Projects and Activities) and incorporate them into the various components of city development plans (social, economic, physical and land use, environment, institutional) according to existing legal process of approval, adoption, and allocation of resources.</td>
<td>✓</td>
</tr>
</tbody>
</table>

Weaknesses: Items mentioned are not available
Summary of Discussions during presentations and meeting during dissemination:

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>LEAD PERSON</th>
<th>KEY POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-10:30</td>
<td>Registration</td>
<td>Mr. Zikrul Fahad Research Assistant</td>
<td></td>
</tr>
<tr>
<td>10:30-10:35</td>
<td>Welcome Remarks</td>
<td>Dr. Mehedi Ansary Deputy Team Leader</td>
<td>Overview and Context Setting Presented BUERP and highlights of Fi#6</td>
</tr>
<tr>
<td>10:35:11:50</td>
<td>Objectives and Mechanics of the HVRA and RSLUP Validation Workshop</td>
<td>Dr. Renan T.Tanhueco HVRA Local Investigator</td>
<td>Discussed about the SWOC analysis and agreements to be made by members of HVRA and LUP in attendance</td>
</tr>
</tbody>
</table>
| 11:50-12:20| Review of the process, findings and outcomes of the HVRA and RSLUP objectives | Dr. Fouad M. Bendimerad HVRA Practice Leader & Dr. Renan Tanhueco RSLUP Practice Leader | FB discussed the core actions needed to make system resilient  
1. Review and assessment on the need to reform DRM legal environment and institutional arrangement to enable mainstreaming;  
   Areas for reform to build resilience: “Change the mindset, put in the investments”  
   • Accountability: who takes responsibility  
   • Responsibility: tasks are specified  
   • Laws are available  
   • Efficiency  
   • Effective: a decentralized system to mainstream DRM  
2. Strengthen capacity of local authorities and local actors;  
3. The reduction of vulnerability of essential and critical public facilities;  
4. The introduction of risk sensitive land use planning and construction controls: A first line of defense  
5. The development of a culture of knowledge sharing  
6. Availability of financial mechanisms for paying up losses: ex. insurance, reinsurance;  
7. Bring experiences from outside as a way of reinforcing DRM practice  
8. Investment in DRM and Technical studies  
   • Changing procedures  
   • Protocol for involving stakeholders  
   • Training to build human resources  
9. Using international standards of practice: e.g. EMAPs  
10. Bringing in technologies for seismic retrofit of buildings;  
Dr. Renan discussed the chapters of the RSLUP guidebook and emphasized the need to validate the matrix on entry points, the process of mainstreaming DRM in the land use planning process. |
<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>LEAD PERSON</th>
<th>KEY POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:20 - 12:50</td>
<td>Plenary Discussion/Open forum</td>
<td>Moderators: Dr. Ishrat Islam, LUP Local Investigator and Dr. Raquib Ahsan</td>
<td>Stakeholders Inputs:</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>1. A clarification on the role and function of the EOC and how it is replicated among levels of government (e.g. national to local)</td>
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<tr>
<td></td>
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<td>2. The EOC at local level is developed with higher standards of construction and quality of operation</td>
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<td>3. From the President of the Institute of Planners</td>
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<td></td>
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<td></td>
<td>• Believes that poor planning or lack of it in the past had resulted to the complex problems currently experienced in Dhaka;</td>
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<td>• Emphasized that the best communities are properly planned communities;</td>
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<td>• RAJUK needs to activate its planning mandate given its wide geographic area of jurisdiction;</td>
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<td>• Surrounding Pourashavas, district centers, are developing fast and that</td>
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<td>• Upazilla plans are being developed but not implemented properly</td>
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<td></td>
<td></td>
<td></td>
<td>• Each and every parcel of land must be &quot;formatted&quot; (re-arranged?) first before earthquakes are considered,</td>
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<td></td>
<td></td>
<td></td>
<td>• Need to know about community/ward structures</td>
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<td>• Unauthorized accretion—community are not intervening</td>
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<td></td>
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<td></td>
<td>• Development of country side is replicating development path of Old Dhaka</td>
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<td>• Planners and engineers must take the first step to address strategic planning and enforcement problems; they must improve existing scenario</td>
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<td>• Include Pourashavas in the trainings;</td>
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<td>• Monitoring and evaluation must be in place</td>
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<td>4. SPARRSO</td>
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<td></td>
<td>• Implement this RSLUP in next planning</td>
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<td></td>
<td>• Seismic risks increased are related to permitting process by RAJUK;</td>
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<td>• Master plan coverage expanding, assist RAJUK</td>
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<td>5. JMC</td>
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<td>• Politically and financially, master plans are not supported</td>
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<td>• Filling of wetlands as an example</td>
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<td>6. Dhaka City Corporation Area-North</td>
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<td></td>
<td></td>
<td>• Availability of open space competes with high land values</td>
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<td></td>
<td>• DNCC capacity needs to be improved</td>
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<td></td>
<td></td>
<td></td>
<td>• Community involvement necessary</td>
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<td></td>
<td>• Many things need to be done</td>
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<td></td>
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<td></td>
<td>• MLGRD should be contacted and be involved</td>
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<td>7. Other organizations</td>
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<td>Suggest use digital billboards to disseminate information</td>
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<tr>
<td>12:50 - 1:30</td>
<td>Validation of the HVRA and RSLUP Framework Guidebook</td>
<td>Dr. Fouad M. Bendimerad &amp; Dr. Renan Tanhueco</td>
<td>Two groups made and outputs are presented:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Confirmation of findings</td>
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<td>• Agreement on the items for mainstreaming</td>
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<td>• SWOC on RAJUK’s capacity to carry out mainstreaming process in land use plans</td>
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<tr>
<td>1:30 - 1:55</td>
<td>Way forward/ Suggested future work</td>
<td>Dr. Fouad M. Bendimerad</td>
<td>Not continued to give way to workshop. This was continued in the AC-SC meeting</td>
</tr>
<tr>
<td>1:55 - 2:00</td>
<td>Closing Remarks</td>
<td>Dr. Mehedi Ansary</td>
<td></td>
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</tbody>
</table>
Meeting with RAJUK Chairman

Way forward meeting with RAJUK

Context: the CRDP plan is a structure plan which will provide a broad policy framework of Dhaka region. It is composed of several component plans covering various themes under the social, economic, land use, infrastructure, environment structure, institutional, disaster management structures. It is proposed to be supported by more than 20 working papers on critical issues of Dhaka development and that in line with regional development planning the RDP Structure plan is the conceptual structure for organizing the Dhaka region. The status of the RDP is that the Interim report is due by April 2014 which includes the data, review and analysis of related studies (e.g. land use plan, transport plan, drainage and hydrology) and communications plan (e.g. to involve public sector agencies, local communities, NGOs and professional groups) specified in the TOR. A draft plan is due by August 2014 and that the final report is due by December 2014. At the Framework level, the integration of the BUERP findings and CMDP was not part of the TOR of the consultants preparing the RDP; however, the geological attributes, suitability, land and infrastructure qualities had been considered. This is mainly because of the involvement of the Geological Survey of Bangladesh in the planning process. The window of opportunity to integrate findings of the CDMP and BUERP at the framework level may be little; however, it was suggested by EMI that the policies and strategies to be recommended in RDP should at least suggest to make use of the CDMP and BUERP outputs (HVRA, RSLUP, Geonode, LIA, risk atlas) for preparing the new detailed area plans (DAP) in 2015. To support this,

- Provide Trainings on HVRA and RSLUP
- Create an earthquake cell in RAJUK to assist in mainstreaming in the planning, implementation of plans and enforcement (e.g. EQ cell to assist in preparing and training of engineers and planners on structural vulnerability assessments)
- Address coordination issues among institutions.

- DAP preparation in 2015 considers the urban risks
- Extend BUERP study to the entire RAJUK jurisdiction (Metro-Dhaka)
7 Initial Recommendation for Making Dhaka Land Use Plan Risk Sensitive

In order to address the identified gaps in land use planning and management for DRM in Dhaka, a set of policy recommendations is proposed. The recommendations are meant to serve as a guide for implementing a series of practical and effective actions to enhance the enabling environment for DRM. Three key policy recommendations are provided.

**Policy Recommendation #1.** The planning structure and process, plan outputs and the structures to implement them must be risk-sensitive.

Following the DMDP review, it is suggested that RAJUK and the DCCs reinforce the features of the Metro-Dhaka Structure Plan and Dhaka Detailed Area Plans to make them seismic risk-sensitive:

**Strategy:** Use the opportunity presented by the next updating of the Dhaka Structure Plan (DSP 2016-2035), Detailed Area Plan and master plans to make them risk-sensitive.

- Utilize the HVRA findings and Dhaka Risk Atlas to influence the RDP Plan and preferred urban master plans and process. Define entry points and improvements of the RDP planning process (use RSLUP Guidebook of this project).
- Prioritize urban renewal as an alternative to forming satellite cities.
  - Consider improving the existing urban areas and make systems more efficient and resilient.
  - Find other areas to develop as a second option.
- Utilize findings and learnings of the LUP Blended Training participants, and make use of the Blended Training participants as local resource persons for making the DMP, DAP, and CRP risk-sensitive.¹
- Open up the process of plan updating by inviting relevant stakeholders to forums and workshops to get their inputs.

**Implementation Requirements:** RAJUK should review and amend the Terms of Reference (RAJUK, Section 5, Terms of Reference for Regional Development planning) for the technical assessment of the three interlinked components for ‘Strengthening Regional Development Planning in the Dhaka City Region’ to integrate seismic risk reduction considerations. They are:

b) Preparation of a feasibility study and master plan for future projects, including for at least one Satellite City;
c) Institutional capacity building and training for RAJUK professionals

**Concerned Offices:** RAJUK, DCCs, and other key local agencies.

¹ See Annex 5 for list of RSLUP Training participants
Strategy: Integrate the key recommendations of the Blended Training participants and the BUERP for the planning of North and South City Corporation areas of Dhaka City to strengthen the implementation process of suggested land use management (LUM) strategies and related projects that reduce earthquake risk and build Dhaka City resilience.

Strategies for Dhaka North City Corporation areas

- Enhance institutional capacity (technical capabilities, enforcement of codes, rules and regulations) of RAJUK, DCC and other related agencies;
- Prepare land use zoning map for density control with considerations of the seismic risk information;
- Apply realistic and implementable land use management methods considering the actual situation and earthquake disaster risk factors;
- Properly implement the DMDP and DAP, and improve coordination among line agencies directly or indirectly involved in planning and implementation, and development control in Dhaka City.

Implementation Requirements: RAJUK, DSCC, and DNCC should continue to organize follow-up activities to seek realistic and implementable land use management methods, to include adoption of risk sensitive construction codes and standards, improved enforcement, and improved development permitting processes. Support from the World Bank and other development partners to provide the resources to conduct discussion forums, pilot project identification, and other initiatives to improve awareness and urban land use management.

The period of implementation must be within 3 years to influence the updating of the Detailed Area Plans which started recently.

Concerned Offices: RAJUK, DNCC, DSCC, BIP, DWASA, TITASGAS, Bangladesh Railway, Planning Commission, ADPC, HBRI, GSB, CDMP, UDD, other key local agencies, and funding agencies.

Strategies for Dhaka South City Corporation Areas

- Create an independent authority free from political bias for the implementation of the Bangladesh National Building Code (BNBC) and Dhaka Mahanagar BC Act 2008 for building construction;
- Identify risk-prone buildings on the ground and retrofit heritage buildings & demolish other risk-prone buildings;
- Revitalize and redevelop areas, aside from retrofitting (seismic retrofitting can be applied on emergency services only);
- Delegate responsibility to and empower local government authorities;
- Strict enforcement of zoning and proper monitoring and evaluation of PPAs.

Strategies for All Areas

- Dhaka City Corporations and RAJUK should explicitly support a risk reduced environment, in order to ensure access of the population to basic social services and economic opportunities. This will involve locating services and infrastructure in hazard-free areas to enable people to avail themselves of adequate, reliable services uninterrupted by hazard events.
- RAJUK and the DCCs should similarly advocate for the sustainable utilization of resources and conscious avoidance of all forms of waste. Manufacturing or processing of resources is necessary, but care must be taken so that the process itself will not be a nuisance or create hazards that will tend to negate the benefits of resource use.
The position of RAJUK and the DCCs to protect the natural environment should be clear and they should strive to achieve this by integrating built-up areas with the city’s open spaces, complying with prescribed standards on open spaces, distributing urban development in self-contained communities, and the continued redevelopment of blighted areas.

**Implementation Requirements:** RAJUK, DSCC and DNCC should continue to organize follow-up activities such as stakeholder dialogues to seek realistic and implementable land use management methods, to include adoption of risk-sensitive construction codes and standards, improved enforcement, and improved development permitting processes. Support from the World Bank and other development partners can provide the resources to conduct discussion forums, pilot project identification, and other initiatives to improve awareness and urban land use management.

The period of implementation must be within 3-5 years to influence the future updating of the Detailed Area Plans.

**Concerned Offices:** RAJUK, DNCC, DSCC, BIP, DWASA, TITASGAS, Bangladesh Railway, Planning Commission, ADPC, HBRI, GSB, CDMP, UDD, other key local agencies, and funding agencies.

**Policy Recommendation #2. Make the process of plan development and implementation participatory at all levels.**

In its disaster risk management program and action plans, RAJUK and the DCCs should adopt a policy mandating a participatory approach at all levels as for the integration of risk reduction and mitigation in plan formulation, as well as the enforcement of the provisions in urban areas in order to reduce the risks from hazards, natural or otherwise, that cause emergencies and ultimately disasters.

**Strategy:** There should be a program for wider public participation in the next structure and DAP planning to promote greater understanding of the implications of HVRA findings to development. There should also be a program for wider public participation in HVRA and Risk Atlas information dissemination.

**Implementation Requirements:** RAJUK, DSCC and DNCC should develop a communications plan to build awareness on mitigation, earthquake preparedness, and response and recovery measures through workshops, seminars, mock drills and other efforts to maximize community participation. These organizations should utilize the IEC program developed for the BUERP. Each department should draw up their technical training, drills and exercises agenda.

The period of implementation must be within 3 years to influence the updating of the Detailed Area Plans and integrate Emergency Management requirements in the said plans of RAJUK.

**Concerned Offices:** RAJUK, DNCC, DSCC, BIP, DWASA, TITASGAS, Bangladesh Railway, Planning Commission, ADPC, HBRI, GSB, CDMP, UDD, other key local agencies, and funding agencies.
Policy Recommendation #3. This BUERP findings, especially the HVRA shall be used to guide land use planning formulation, zoning ordinances and development regulations.

Strategy: In its disaster risk management program and action plans, RAJUK and the DCCs should institutionalize use of HVRA findings and results for LUP, CDP and Zoning.

Implementation Requirements: RAJUK, DSCC and DNCC will develop a communications plan to build awareness on earthquake preparedness, and response and recovery measures through workshops, seminars, mock drills and other efforts to maximize community participation; These organizations should utilize the IEC program developed for the BUERP.

- Make the HVRA and Risk Atlas information public via websites and other means;
- Disseminate the City Risk Profile and Risk Atlas internally and to the external partners;
- Use of the Dhaka Risk Atlas for composing maps for screening unsafe areas and identifying "hotspots" for vulnerability and exposure reduction of buildings, utilities and other services.
- Ensure that the HVRA information is internalized and utilized for planning purposes at the city and ward level;
- Use HVRA data for preparedness, focusing on hotspot areas;
- Hold seminars and workshops to review and build awareness and understanding of the findings and results of the HVRA and Risk Atlas to ward DM committees.

The period of implementation must be within 5 years to influence the updating of the Detailed Area Plans and integrate Emergency Management requirements in the said plans of RAJUK.

Concerned Offices: RAJUK, DNCC, DSCC, BIP, DWASA, TITASGAS, Bangladesh Railway, Planning Commission, ADPC, HBRI, GSB, CDMP, UDD, other key local agencies, and funding agencies.
# Annexes

## Annex 1: Land Use Management Strategies for Seismic Risk Reduction

<table>
<thead>
<tr>
<th>Land Use Management Tools</th>
<th>DRM*</th>
<th>Required Ability and Resources</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Technology/ Knowledge</td>
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<td></td>
<td>Administration</td>
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<td>Financial</td>
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<tr>
<td>Building Code</td>
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<tr>
<td>• Special building standards/codes for seismic hazards</td>
<td>M/P</td>
<td>High</td>
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<tr>
<td>Development regulations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Zoning Ordinances</td>
<td>M/P</td>
<td>Moderate</td>
</tr>
<tr>
<td>• Subdivision ordinances</td>
<td>M/P</td>
<td>Moderate</td>
</tr>
<tr>
<td>• Special hazard Area, fault setback, Seismic hazard regulation areas (ex. Seismic micro</td>
<td>M/P</td>
<td>High</td>
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<tr>
<td>zones)**</td>
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<tr>
<td>Critical and Public Facilities Policies</td>
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<tr>
<td>• Capital improvements program (CIP)</td>
<td>M/P</td>
<td>High</td>
</tr>
<tr>
<td>• Location of Public facilities outside of hazard areas (to discourage development)</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Location of public facilities to reduce risk of damage to infrastructure</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>Land and Property Acquisition</td>
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<tr>
<td>• Acquisition of open space/recreation undeveloped lands for mitigation</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Acquisition of open space/recreation undeveloped lands for emergency evacuation, escape</td>
<td>P</td>
<td>Low</td>
</tr>
<tr>
<td>routes**</td>
<td></td>
<td>High</td>
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<tr>
<td>• Acquisition of damaged buildings in hazard areas</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Relocation of public facilities to reduce damage to infrastructure</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Acquisition of development rights or easement</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Transfer of development rights (TDR) away from hazard areas to safer locations</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>Taxation and Fiscal Policies</td>
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<tr>
<td>• Preferential (reduced) taxation for open space or reduced land use intensity of lands</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>• Impact taxes or special assessments to fund the added public costs of hazard area</td>
<td>M/P</td>
<td>Low</td>
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<td>development</td>
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<td>Information Dissemination</td>
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<tr>
<td>• Public information program</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>• Construction practice seminars or builder/developer mitigation</td>
<td>M/P</td>
<td>Low</td>
</tr>
<tr>
<td>• Hazard disclosure requirements in real estate transactions</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>• Hazardous Materials Reduction in urban areas**</td>
<td>M/P</td>
<td>Low</td>
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<tr>
<td>Recovery Strategy Plan</td>
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<tr>
<td>• City redevelopment plans</td>
<td>R/R</td>
<td>Moderate</td>
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<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
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<tr>
<td>Land Use Management Tools</td>
<td>DRM*</td>
<td>Required Ability and Resources</td>
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<tr>
<td>---------------------------</td>
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<tr>
<td>Number/density of population</td>
<td>Indicative of the persons affected, or potential for injury and loss of human lives; also indicative of intensity of use in an area or the volume of traffic possibly to be affected by the hazard.</td>
<td></td>
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<tr>
<td>Building materials predominantly in use during the earthquake study.</td>
<td>Estimated damage and collapse of buildings related to the capacity of the building to resist strong ground shaking; represented through risk scales and color scales.</td>
<td></td>
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<tr>
<td>Lifelines such as roads and bridges in hazard prone areas</td>
<td>Indicates the breaks in these links and crossings which would lead to road closures and non-operation of utilities, which may impact emergency or response.</td>
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</tbody>
</table>

*Additional column added to identify risk management category
**Additions to original matrix
M/P: Mitigation and Prevention
P: Preparedness
R/R: Recovery and Rehabilitation
Modified from Source: Burby, 1997; also see references 4,11,13,17
Annex 2: Blended Training Course Components

**Training Objectives** – The training focuses on land use planning and DRR mainstreaming concepts. The objectives of the course aim to improve the participants’ understanding of the following:

- Main concepts and approaches of risk-sensitive land use management and hazard, vulnerability and risk assessment tools;
- Land use planning and management interventions to reduce and mitigate disaster risk;
- Entry points for integrating disaster risk reduction into the local land use planning process.

**Work Plan and Analytic Process** – The training hopes to prepare the participants to analyze the existing situation in view of the earthquake risks, and recommend land use management strategies applicable to their study area. The analytical process described in Section 2 is applied in the training.

**On-line training Course (using a GFDRR platform)**

The other relevant features of the RSLUP online learning course are as follows:

- **Course Map** – The RSLUP Blended Training Course Map provides the participants a guide to the general content of the distance learning training course. The course content is arranged in a chronological manner following the weekly course activities.

- **Discussion Forum** – The online Discussion Forum (DF) board provides a venue for the participants to exchange ideas and employ what they have learned from the readings and their respective experiences at work.

- **Assignments** – There are weekly assignments given to each participant related to Seismic Hazards and Impact Areas in Dhaka City Corporation Areas and Elements of RSLUP Applied to Dhaka.

- **End of Course Project** – The End of Course Project (ECP) is the final requirement submitted by each participant, consisting of the evaluation of an actual land use plan document to determine whether and to what extent the plan is responsive to DRR concerns (See Annex 5).
Box 2.

The following questions were posed to the course participants in the Discussion Forums:

DF-1. Based on your readings on historic earthquakes and seismic risk assessment of Dhaka City, what negative impacts can result from very strong ground shaking in the city? Identify one or more wards in Dhaka City Corporation areas where government interventions should be a priority to reduce the physical damage and losses in those areas. What interventions do you have in mind?

DF-2. Which seismic source do you think may be most relevant for Dhaka City? Which areas of Dhaka City would be most severely affected in the event of an earthquake? Which types of structures should we be most concerned about for seismic risk? What particular risk parameters would be useful for your organization? How can these outputs of risk assessment be presented?

DF-3. What recommendations would you provide to improve the Dhaka Urban plan & detailed area plans and make these documents address earthquake-related hazards & risks? Where should the emphasis be placed in terms of implementing these plans (e.g. clear process for building and development permitting, strict enforcement of building codes)?

The existing GFDRR platform was customized by integrating the face-to-face modality, as well as adding the following features:

Face to Face and E-consultations

- **E-Consultations** – The E-Consultation was added into the online course. E-Consultation, in real-time, is conducted for 1-1.5 hrs., one day a week, for four (4) weeks. These meetings utilize the video/audio communication tools such as Skype in order for the participants and the training experts to discuss the course content (e.g. presentations, readings), provide feedback on the submitted course requirements (e.g. assignments) and clarify issues (e.g. related to the End of Course Project).

- **Face-to-face Training** Towards the end of the Blended Training Course, the SMEs join the participants and other facilitators in Dhaka during its last week and to help facilitate the end of course report writing or trainings programmed for the week. The SMEs also serve as resource persons for consultations and additional discussions. The culminating activity is the presentation of the participants’ end of course project (ECP) report in the closing ceremony.

Box 5.

The BUERP RSLUP Blended Training had two main groups of subject matter experts (SMEs) who provided the reading materials, content for presentation and facilitation of the discussion forums.

The first group was composed of the practice leaders of the Hazards, Vulnerability and Risk Assessment and handled the HVRA, and the second group was composed of practice leaders of the Land Use Planning and Management and handled the land use plan and management, DRR mainstreaming in plans segment of the forum.
### Annex 3: LUP Focus Group Members

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Organization</th>
<th>Designation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. MA Ansary, Professor</td>
<td>BUET</td>
<td>Professor</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Ishrat Islam</td>
<td>Dept. of URP, BUET</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>3</td>
<td>Md. Shahinur Rahman</td>
<td>BIP</td>
<td>Board Member (National &amp; Intl. Liaison)</td>
</tr>
<tr>
<td>4</td>
<td>Shaheen Ahmed</td>
<td>UDD Ministry of Housing and Public Works, 82 Segunbagicha, Dhaka-100</td>
<td>Senior Planner</td>
</tr>
<tr>
<td>5</td>
<td>Md. Moinul Islam Titas</td>
<td>General Economic Division, Ministry of Planning, Sher-E-Bangla Nagar, Dhaka</td>
<td>Deputy Chief</td>
</tr>
<tr>
<td>6</td>
<td>Md. Akbar Husain</td>
<td>Ministry of Railways, Govt. of the Peoples Republic of Bangladesh, Bangladesh</td>
<td>Deputy Secretary</td>
</tr>
<tr>
<td>7</td>
<td>Md. Abul Kalam Azad</td>
<td>CDMP Department of Environment, E-16 Agargaon, Dhaka</td>
<td>CDMP Deputy Chief</td>
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<td>8</td>
<td>Md. Zaki Mustafa Chowdhury</td>
<td>DWASA, Wasa Bhaban (8th floor), 98 Kazi Najrul Islam Avenue, Karwan Bazaar, Dhaka</td>
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<td>9</td>
<td>Md. Murad Billah</td>
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<td>Senior GIS Coordinator</td>
</tr>
<tr>
<td>10</td>
<td>Zikrul Hasan Fahad</td>
<td>EIMS</td>
<td>Urban Planner</td>
</tr>
<tr>
<td>11</td>
<td>Md. Abdus Salam</td>
<td>HBDRI</td>
<td>SRE</td>
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<tr>
<td>12</td>
<td>Abdul Latif Helaly</td>
<td>RAJUK</td>
<td>Executive Engineer</td>
</tr>
<tr>
<td>13</td>
<td>Md. Ashraful Kamal</td>
<td>GSB</td>
<td>Deputy Director</td>
</tr>
<tr>
<td>14</td>
<td>Md. Nuruzzaman</td>
<td>Capital Law Chamber</td>
<td>Barrister at law</td>
</tr>
<tr>
<td>15</td>
<td>Md. Sirajul Islam</td>
<td>DCC (South)</td>
<td>Chief Town Planner</td>
</tr>
<tr>
<td>16</td>
<td>Mokbul Ahmed</td>
<td>TITASGAS</td>
<td>Manager</td>
</tr>
</tbody>
</table>
Annex 4: List of Key Informants

Field Investigation 2
1. Md Sirajul Islam, Chief Planner, Dhaka South City Corporation  
2. Ms. Kazi Hasiba Jahan, Geographer, Dhaka South City Corporation  
3. Md. Emdadul Islam, Chief Engineer, RAJUK  
4. Sheikh Jahid Hasan Faruqui, Project Director of Jhilmil (residential and development projects), RAJUK  
5. MD. Ahasanul Haque Khan, Chief Architect, Ministry of Housing and Public Works

Field Investigation 3
1. Dr. Ing. K. Z. Hossain Taufique, Director, Town Planning, RAJUK, Dhaka  
2. Md Sirajul Islam, Chief Planner, Dhaka South City Corporation

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Job Title</th>
<th>Agency/Institution</th>
<th>Dep't./Office</th>
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<tbody>
<tr>
<td>1</td>
<td>Major Sayed Saeed Ahmad</td>
<td>Major</td>
<td>Bangladesh Army</td>
<td>Engineering</td>
</tr>
<tr>
<td>2</td>
<td>Md. Iqbal Bahar Bulbul</td>
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<tr>
<td>3</td>
<td>Md. Maksimul Islam</td>
<td>Lecturer</td>
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<tr>
<td>4</td>
<td>Sadia Afrin</td>
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<tr>
<td>5</td>
<td>Dr. Tariq Bin Yousuf</td>
<td>Superintending Engineer</td>
<td>Dhaka North City Corporation</td>
<td>Environment, Climate Change and Disaster Management Circle</td>
</tr>
<tr>
<td>6</td>
<td>Md. Shamim Ahammed</td>
<td></td>
<td>Dhaka North City Corporation</td>
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<tr>
<td>8</td>
<td>Ms. Firoza Akhter</td>
<td>Asst. Engineer</td>
<td>Dept. of Public Health Engineering</td>
<td>MIS Unit</td>
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<td>9</td>
<td>Md. Anisur Rahman</td>
<td>Traffic Engineer and Project Director, CASE-DTCA</td>
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<tr>
<td>10</td>
<td>Md. Hasibul Kabir</td>
<td>Asst. Director (Town Planning)</td>
<td>RAJUK</td>
<td>Plan Preparation Section</td>
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<td>11</td>
<td>Farhana Rahman</td>
<td>Asst. Director (Strategic Planning)</td>
<td>RAJUK</td>
<td>Plan Preparation Section</td>
</tr>
<tr>
<td>12</td>
<td>Abdul Latif Helaly</td>
<td>Exec. Engineer</td>
<td>RAJUK</td>
<td>Engineering Division</td>
</tr>
<tr>
<td>13</td>
<td>Farzana Khatun</td>
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<td>14</td>
<td>Mr. Mohammad Mazharul Islam</td>
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<tr>
<td>15</td>
<td>Engr. Md. Harun ur Rashid</td>
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<td>16</td>
<td>Md. Abul Kalam Azad</td>
<td>Part-time Teacher</td>
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</tr>
<tr>
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<tr>
<td>17</td>
<td>Ar. Shaila Joarder</td>
<td>(1) Managing Partner, (2) Member Education &amp; Research, (3) Asst. Professor</td>
<td>(1) Nayreet Architect, (2) Institute of Architects, (3) North South University</td>
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<td>18</td>
<td>Md. Anwar Hossain</td>
<td>(1) Lecturer and (2) Researcher</td>
<td>(1) University of Dhaka and (2) Centre for Urban Studies</td>
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<tr>
<td>19</td>
<td>Muhammad Ariful Islam</td>
<td>Senior Manager</td>
<td>Sheltech (pvt.) Limited</td>
<td>Planning &amp; Research</td>
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<td>20</td>
<td>Tanvir Morshed</td>
<td>General Manager, Head of Design Solutions</td>
<td>Hamid Real Estate and Constructions Ltd</td>
<td>Design Solution</td>
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<td>21</td>
<td>Mrs. Salma Akter</td>
<td>Deputy Director (Geology)</td>
<td>Geological Survey of Bangladesh</td>
<td>Ministry of Energy and Mineral Resources</td>
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<tr>
<td>22</td>
<td>Mrs. Nurun Nahar Faruqa</td>
<td>Deputy Director</td>
<td>Branch of Environment Geology &amp; Natural Hazard Assessment</td>
<td>Geological Survey of Bangladesh</td>
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<td>23</td>
<td>Musa Nurur Rahman</td>
<td>Executive Engineer</td>
<td>Bangladesh Water Development Board.</td>
<td>Planning-1</td>
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<tr>
<td>24</td>
<td>S.M. Ataur Rahman</td>
<td>Executive Engineer</td>
<td>Bangladesh Water Development Board.</td>
<td>Office of the Chief Engineer Hydrology</td>
</tr>
<tr>
<td>26</td>
<td>Zikrul Fahad</td>
<td>Research Assistant</td>
<td>BUET</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Mr. Md. Sirajul Islam</td>
<td>Chief Town Planner</td>
<td>Dhaka South City Corporation</td>
<td>Urban Planning Department</td>
</tr>
<tr>
<td>28</td>
<td>Ms. Kazi Hasiba Jahan</td>
<td>Geographer</td>
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<td>Urban Planning Department</td>
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<td>29</td>
<td>Md. Shahinoor Rahman</td>
<td>Board Member (Nat’l and Int’l Liaison), Lecturer</td>
<td>BIP, BUET</td>
<td>Bangladesh Institute of Planners</td>
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<tr>
<td>30</td>
<td>Md. Shamim Ahammed</td>
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Training Course on Risk-Sensitive Land Use Planning

(May 18, 2013 to July 04, 2013)

End of the Course Project: Critical Analysis of Land Use Plan

Cluster 4: DCC Ward 22-36

Abdul Latif Helalay (Rajuk)
MD. Iqbal Bahar Bulbul (Fire)
Muhammad Ariful Islam (Sheltech)
MD. Mehedi Hasan (Power)

June 28, 2013
Critical Analysis of Land Use Plan (DCC Ward 22-36)

1. Background of the Study

1.1 Introduction: Dhaka city is divided into 90 words. Among those only 15 words has been selected here for critical analysis of Detailed Area Plan. The land use plan of the study area is Detailed Area Plan (DAP) which is the third and final tier of DMDP (Dhaka Metropolitan Development Plan) 1995-2015. DMDP is a three tier plan package comprised of the Structure Plan, the Urban Area Plan and the Detailed Area Plan. The first two tiers of DMDP i.e. the Structure Plan (1995-2015) and the Urban Area Plan (1995-2009) were prepared in 1995. The DAP is prepared for RAJUK jurisdiction or DMDP area of 590 sq.mile (1528 sq. km.). The total DAP area was divided into five groups and a number of small locations. The study area is mostly under Group-C area along with location 9 & 10. Each group formulated several Detailed Planning Zones (DPZ) to prepare detailed plan. Maximum part of the study area is in DPZ-4 & 5 of Group-C.

1.2 Geographic Information of the Study Area: To critically evaluate the Dhaka City Corporation (DCC) Area has been divided into Nine Clusters. Our study area is Cluster Four comprised of 15 wards (22-36) in DCC South Area. The study area is situated between latitudes 23°43’ and 23°46’N and longitudes 90°24’ and 90°26’E. According to DCC database, total area is 14.35 sq. km. The study area covers Middle Rampura, East Rampura, West Rampura, Ullan, Aftab Nagar (Part), Banasree, Middle Meradya, Ansarbag, Sipahibag, Khilgoan, Malibagh (Part), Malibagh Chowdhury Para, Goran, Adashabag, North Basabo, Middle Basabo, South Basabo, Kadamtoli, Shantibag, Shahid Bag, Mugdharapa (Part), Golapbag (Part), Kanmlapur, Motijheel, Rajarbag, Shantinagar and Naya Paltan area. The area is plain land and urbanized with densely built-up residential and commercial buildings. The Central Business District (CBD) of the city is within this study area. Rapid urbanization without considering the geological aspects has brought significant changes in the geo-environment of the area. Water logging, pollution, changes in the hydro-geological system, localized land subsidence, and building collapse are the hazards associated with these changes in the geo-environment.
1.3 Socio-economic information of the Study Area: According to DCC database, total population of the study area is 1,044,569. The study area is south-east part of the capital city Dhaka. It is part of the national financial power and centre of culture, educational, banking opportunity. Its economic base takes a major share, while sale of all types of goods including construction materials (building) and other commodity are a significant commercial activity. Apart from this, plenty of trading houses have grown over a decade that does the imports of foreign goods especially foodstuffs. Another prominent feature of the economic activity is the operation of numerous commercial Banks, Insurances, which operate from their own building. The financial institutions of the area play a lead role in regulating the commercial activities. However, Informal sector trade at the roadside (hawkers) is a common feature that creates considerable financial turnover weekly, operating from selected place of the study area.

1.4 Infrastructures in Study Area: The study area is full of raw structures, constructed and Sami-constructed structures. There are several major roads connected to the national highways and the study area has plenty of secondary and tertiary roads. However, the road width is not sufficient enough to serve the community properly. Traffic congestion is a very common scenario here. In the study area there are Private Universities, Colleges, huge number of Schools, Madrasas, huge number of Mosjid, bridges and over bridges, culverts, cinema halls, bus stoppages, filling stations, hospitals or clinics, police stations, post offices, temples and monuments. There are three stadiums and rail station in the area.

1.5 Land Use Patterns in the Study Area: As per Detailed Area Plan database, a large portion of the study area is to preserve for Water Retention Area. There are also designated water bodies in the area. Except these, the land use of the area is mostly residential and commercial. Mixed use area (Residential-commercial) occupies a large portion of the area. In addition there are Administrative and Institutional areas. Very limited open space is available here.

1.6 Earthquake Risks in the Study Area: It is a fast growing and densely populated community, poses an extremely high risk because of its population density (72,792 per sq. km.) and
innumerable high-rise apartments and office buildings constructed through ignoring the Bangladesh National Building Code (BNBC) and failing to adhere to standard construction practices. According to Earthquake Disaster Risk Index (EDRI) parameters Dhaka is one of the top twenty high earthquake risk cities in the world.

The hazard that is inferred from tectonic analysis is backed by historic evidence. Bangladesh, a country of multiple natural disaster vulnerabilities, and its capital Dhaka are under the looming threat of cataclysmic earthquakes. Records show that large earthquakes have previously ravaged the country and the neighboring region several times over the last 450 years.

Baunia Fault is a small feature in the Baunia depression, west of Shahjalal International Airport; this lineament is characterized by sigmoidal fractures. This Baunia Fault is much closed to the study area. Bansi Fault is one of the major structural features near the study area. It has developed in the western part of the Madhupur Tract, along which zone the Bansi River flows. The fault is approximately 70 miles long. The western block is the down thrown block and the eastern block is the up thrown block. The Bansi Fault is also characterized by sharp fault scarps, hanging valleys, abnormal ground level and springs. Turag Fault is approximately 10 miles long. The feature is characterized by abnormal ground level. The northern block of the Turag Lineament moved west and the southern block east. The Turag River (Tongi Khal) flows along the northern side of the study area.

From geological setting and topography, it is clear that Dhaka City and its surrounding area have experienced major and minor faulting at different times. Some faults and lineaments were observed in satellite images and aerial photographs and were confirmed through field surveys of Detailed Areas Plan but, in many places, human settlement activities have destroyed the field evidences.

2. Themes for Risk Sensitive Plan

2.1 Planning Process and Plan Formulation:
The stages of DAP preparation included georeferencing of mauza maps, different types of surveys, consultation with stakeholders, draft plan preparation, public hearing and final plan
preparation. Socio-economic survey, physical feature survey, topographic survey and landuse survey were done during the period of 2005-2006. The high tech digital GIS (Geographic Information System) data base was prepared for the very first time for Dhaka under the project. Quality checking of survey activities was done by Survey of Bangladesh (SOB). A series of consultation meeting was held with local government authorities (Wards & Paurashavas), Honorable Members of the Parliament of the RAJUK jurisdiction, concerned development agencies (RHD, LGED, WASA, WDB etc.), academics, professionals, socially concerned groups, study groups, business groups, etc.

2.2 Legal Environment and Institutional Arrangements

The ‘Dhaka Improvement Trust’ (DIT) was established in 1956 under the provision of the ‘Town Improvement Act -1953’ (TI Act 1953). The objectives of the Act are aiming to improve physical and urban condition of the Dhaka City. After that Rajdhani Unnayan Kartripakkha (RAJUK) had been emerged through the ongoing crisis of planned and controlled development of Dhaka City. RAJUK established in April 30, 1987 by replacing Dhaka Improvement Trust (DIT). The prime intension of the organization was to develop, improve, extend and manage the city and the peripheral areas through a process of proper development planning and development control.

The national level agencies are the National Economic Council (NEC), the Planning Commission (PC), the Urban Planning Directorate (UDD) and the Board of Investment (BOI). Each plays an important role in urban development decision making for Dhaka. The special agencies for urban development, which are involved in Dhaka, are the Rajdhani Unnayan Kartripakhya (RAJUK), the Dhaka Water and Sewerage Authority (DWASA), the Dhaka Electric Supply Authority (DESA), the Dhaka Metropolitan Police (DMP), and the Cantonment Board (CB). The various sectoral agencies responsible for extension of services within the city include: Ministries of Finance, Industry, Education, Health, Commerce, Works, Defense, Irrigation, Water and Flood Control, Agriculture, Land, Youth and Sports etc. All have specific sectoral functions. The local level Agencies involved with planning and development of Dhaka Metropolitan Area (DMA) is the Dhaka City Corporation (DCC) and the Cantonment Board.

Among all these institutions the more comprehensive and obvious responsibilities lie with DCC and RAJUK along with important roles played by the Housing and Settlement Directorate (HSD) for housing, Power Development Board (PDB) for electricity, WASA for water and sewerage, Titas Gas and Transmission Company Ltd. For gas, Road and Highways Department (RHD) for major inter-city roads and the DMP for traffic management and maintenance of law and order.

2.3 Implementation Process:

Any development within the jurisdiction of RAJUK must be permitted by the authority. At first they check the proposed land use in Detailed Area Plan (DAP) of the plot with the use of proposed building. For permission of development building types can be categorized in three; (i) Low-Rise Building, (ii) High-Rise Building, (iii) Large or Special Projects. The building below 10 storied is considered as low-rise building. For low-rise building, plan is to prepare as per regulations such as Water Body conservation Act-2000; Dhaka Metropolitan Building Construction Rules-2008 and Bangladesh National Building Code-1993 (Gazetted 2006).

The building above 10 storied is considered as high-rise building. For high-rise building, plan is to prepare as per regulations mentioned above but it requires initial endorsement of eight more agencies before plan submission to RAJUK. The agencies are (a) Civil Aviation, (b) Concerned Word Commissioner (c) Dhaka Water and Sewerage Authority (DWASA) (d) Dhaka Electric Supply Authority (DESA), (e) TITAS Gas Transmission and Distribution Company Ltd. (DESCO), (f) Fire Service (g) Dhaka Transport Coordination Authority (BTCA), (h)
Department of Environment (DoE).

The project having more than 40 dwelling units or 7500 sq.m. floor space or 5000 sq.m. commercial floor space is considered as Large Project. Moreover any project within 250 meter of any conservative area is also treated as Special Project. For Large or Special Project, an additional pre-approval is required form a committee consisting of the following members (1) Member (Planning) RAJUK; (2) Urban Planner (Director), RAJUK; (3) Chief Engineer, RAJUK; (4) Representatives from Department of Architecture, Institute of Architect, Institute of Engineers, Institute of Planners; (5) Director (Development & Control), RAJUK.

Bangladesh National Building Code was formulated in 1993 but made mandatory in 2006. But no authority is enforcing the code. According to RAJUK the engineer signed in the plan document during approval is entitled to follow-up and supervise to ensure construction as per code. This is very weak enforcing method as our people do not try to follow any regulations if they are not bound to do that. RAJUK is now enforcing the land use zoning as per DAP proposal. However there is no density zoning or height zoning in Dhaka city.

2.4. Risks in Macro-Form and Growth Tendencies in the Metropolitan Area:
Seismic microzonation maps for Dhaka (Ansary, 2004) have been prepared by using microtremor observation as well as one-dimensional numerical simulation (SHAKE). The following figures present site amplification and liquefaction potential maps of Dhaka. The site amplification map has three zones with the following characteristics: zone 1 with resonant frequency of less than 3 Hz and mean ground motion amplification of 2.5; zone 2 corresponds to resonance frequencies in a band of 3 to 5 Hz having a ground motion amplification of 1.8; zone 3 corresponds to resonance frequency greater than 5 Hz and mean ground motion amplification of 1.8 Hz. The liquefaction map has two zones: a zone with liquefaction possibility and the other with no liquefaction possibility.

2.5 Urban Fabric Risks as Related to Location and Nature of Physical Development:
Development control function is very poor in the study area. With present capacity RAJUK
cannot oversee or pro-act to guide and steer development in desired areas of urban expansion. This resulted in:

- Un-necessary invasion of agricultural land by urbanization
- Non-conforming uses are found everywhere
- Residential areas are being invaded by industries

2.6 Incompatible Land-Use Risks of neighbouring units: Development in the study area is going on in spontaneously as a result land use is changing without considering the land use plan. In individual effort, people are constructing structures without engagement of professional engineers as a result BNBC is violated in most of the cases. In some cases people are occupying low lying areas and water bodies due to crisis of land in excessive population pressure. The study area has plenty of Non-engineering, Self-engineering building construction, slums & old Buildings. There also has densely build-up area & unplanned Narrow Lanes. Violation of Building Code, soft soil filling, shortage of evacuation Space, haphazard unplanned public utilities and lack of disaster management equipment are very common in the study area.

2.7 Risks of Productivity Loss: Motijheel, central business district of the Dhaka city is located in the study area. Here, commercial activities are very higher compared to other parts of the city. Approximately 0.5 sq. Km. is used as commercial and manufacturing activities of the study area. Total 1500 (appx.) structures are used as economic purpose.

2.8 Risks of Hazardous Uses: There are nine filling stations in the area is highly risky in natural hazard like earthquake in this densely populated community. The number of CNG station in and around Dhaka city has increased significantly.

2.9 Risks in the Building Stock: There are total 40,431 structures in the area consisting of 7,779 raw structures, 18,393 Concrete and 14,259 semi-concrete structures. Among structures 5% RCC, 30% Engineered Masonry, 30% Wood & Bamboo, 21% Non-engineered masonry, 5% Mud wall and 9% GI Sheet. Thus very limited engineered structures can withstand during earthquake hazard but most of the structures are vulnerable.

2.10 Risks in Lifelines: There are 1.2 sq. km. of road area, 1 gas transmission centre, 3 fire service stations, 8 bridges, 10 culverts, 4 flyovers, 2 over bridges and 5 overhead tanks are available in the study area.

2.11 Risks in Emergency Facilities: The office cum residence of the Honorable President known as Bangabhaban, the largest railway station of the country Kamlapur Railway Station, the central bank of the country Bangladesh Bank, One National Stadium, 3 private universities, 45 colleges, 161 schools, 36 hospitals and clinics are in the study area.

2.12 Special Risk Areas: The eastern side of the study area is near to Balu River and historically flood affected area. During previous flood history, most of the area was inundated. The study area is low and vulnerable to flood.

2.13 Open Space Deficiency Risks: There is shortage of open space which is revealed from the land use map. However in detailed area plan 1.73% open space has been proposed but which is difficult to avail as there is no step has been taken by the authority in last 3 years.

2.14 Risks in Administrative Incapacities: RAJUK chief is always claiming that they are in scarcity of skilled manpower to monitor the development works in the city. Many training programs were conducted among the existing personnel. Moreover, technological up-gradation and computerization is not at satisfactory level.

2.15 Risks of Alienation of Citizens: As per section 74 of Town Improvement (TI) Act 1953, RAJUK carried out a two month long Public Hearing on the draft plan from October 3, 2008
to December 4, 2008. A series of consultation meetings was appraise the city dwellers of the draft final DAP and obtain their valuable suggestions and recommendations. However, feedback from them is very poor. Most of the people are very indifferent of the land use plan as they have limited technical knowledge.

2.16 External Vulnerabilities and Risks: Dhaka experiences a hot, wet and humid tropical climate. Under the Koppen climate classification, Dhaka has a tropical savanna climate. The city has a distinct monsoonal season, with an annual average temperature of 27.5 °C (81.5 °F) and monthly means varying between 19.5 °C (67 °F) in January and 32 °C (90 °F) in April. Approximately 87% of the annual average rainfall of 2,121 millimeters (83.5 in) occurs between May and October. Increasing air and water pollution emanating from traffic congestion and industrial waste are serious problems affecting public health and the quality of life in the city. Water bodies and wetlands around Dhaka are facing destruction as these are being filled up.

3. Development Problems

3.1 Drainage and Flooding Problem: Flood is a serious hydrologic event which causes inundation of the area. Flood occurs due to heavy rainfall for longer duration and sometimes by oncoming of excess flood water carried by the rivers. The reason for flooding is topography, development and built-up area. Dhaka city east area (the study area) is lower than west area and floodwater comes from the Padma and Meghna basins. In most flood events, floods enter in Dhaka east area from the backwater flow of the Dhaleswari and Meghna rivers and the Sitalakkhya and Balu Rivers. Rampura, East Rampura, Basabo, Mugdapara, Khilgaon etc. are very low areas. Flood water of the Balu, Sitalakkhya and Buriganga could easily enter in the area and stay in the area until water level of surrounding rivers fall below danger level. In monsoon or wet months from April to September the area remains under pool of water.

3.2 Geological Fault: From geological setting and topography, it is clear that Dhaka City and its surrounding area have experienced major and minor faulting at different times. Some faults and lineaments were observed in satellite images and aerial photographs and were confirmed through field surveys but, in many places, human settlement activities have destroyed the field evidences. However, the study area falls in the earthquake Zone-2 of the seismic map of Bangladesh. Besides main sediments of the many parts of the project area are poorly compacted, highly plastic, collapsible thick peat and organic clay layers. With the presence of organic layers and sediments with low compaction, the area is considered to be a weaker foundation layer.

3.3 Uncontrolled Densification: There is no density control guideline in the study area. Population density is very high (72,792/sq.km.) where Dhaka city population density is 45,508/ sq.km. We know that Dhaka is densely populated area and study area is the densest part. High population density is one of the major problems in planned development of the area.

3.4 Spontaneous Development: Development control function is very poor in the project area. With present capacity RAJUK cannot oversee or pro-act to guide and steer development in desired areas of urban expansion. This resulted in (i) Un-necessary invasion of agricultural land by urbanization, (ii) Non-conforming uses are found every where, (iii) Residential areas are being invaded by industries.

4. Critical Analysis of Existing Plan

4. 1 Structure Plan Vision: The Structure plan provides a long-term strategy for the 20 years for the development of the greater Dhaka sub-zone with a population target of 15 million. It vision was to identify the order of magnitude and direction of anticipated urban growth and define a broad set of policies considered necessary to achieve overall plan objectives. During Structure plan preparation earthquake hazard assessment
based on fault line is considered but liquefaction affects were not considered. Ultimately proper risk assessment including exposure and vulnerability were not properly done. So, the plan is not appropriately risk sensitive.

4.2 Development Objectives of Detailed Area Plan (DAP): The provision of DAP is inherent in the Structure Plan with some specific purposes. These are:

a. Provide basic infrastructure and services in the project area through systematic planning.

b. Create congenial environment to promote economic activities.

c. Improve drainage system and protect flood flow zones from encroachment.


e. Provide guidelines for public and private investment priorities

f. Provide relevant planning polices for sustainable development

g. Serve as a document for Land Use and development control

Among the sixteen theme areas to consider is moderately addressed in DAP. Planning process and plan formulation were sufficient but they could not address the seismic risk in detailed. Legal environment and institutional Arrangements was adequate for plan preparation but in implementation phase there is lack of coordination among the institutions. It is very common problem in local context. Development permission is in a systematic manner but monitoring of development is very poor. There is no designated authority to enforce building code. RAJUK in default is responsible but they never take any initiative to enforce building code to ensure sustainable development. Zoning enforcement is also very poor. Considering risks in Macro-Form and Growth Tendencies in the Metropolitan area alternatives in settlement configuration has been proposed in detailed area plan. However there is not follow-up action to implement the proposals. Productivity loss has been considered but proposal are not addressed the things to do. In the study area relocation of filling stations and chemical uses are not proposed to address the risk. There is no proposal to strengthen the existing building stock in the study area. Only new building would be constructed following building code. The vulnerable existing stock should be demolished and redevelop or retrofitted. Proper guidelines to save the lifelines and emergency facilities in seismic hazard are not addressed in DAP. It considered the micro environmental aspects of Dhaka, both in its existing urban form as well as for future development to keep the city free from all sorts of natural and manmade hazards. The plan recognizes the role of green belts, preservation of high quality wet and agricultural lands and existing rivers in and around the city limits and their continuous upgrading and evaluation and thus recommends for building a circular waterways round the city. The plan also earmarks a number of retention ponds around the city limits for retaining rain water as well as for maintains an ecological balance too and a healthy environment. However, after passing 18 years city is not free from all sorts of natural and manmade hazards. Still there is no green belt, high quality wet and agricultural lands are occupying by illegal encroachers for unauthorized land development projects. Existing canals, wet lands and water retention areas are also affected by unauthorized development without following the plan proposal.

4.3 Proposed Urban Land Use in the Study Area: Total study area is 14.35 sq.km. According to detailed area plan, land use proposed for administrative area 0.28%, Commercial 2.78%, Industrial 0.98%, Residential-Commercial mixed use 10.49%, Open Space 1.73%, Transportation Purposes 17.30%, Water Retention Area 41.29%, Water body 7.45% and Residential area 14.45%. The existing land use proposal is not risk sensitive enough. There should have more accessibility for better communication especially emergency rescue operations. The area is highly densely built-up. Non-engineered and engineered structures are situated very
closely which will make sever problem for safe structures if unsafe structures collapsed on it. Density control zoning must be incorporated based on proper analysis.

4.4 Hazard Risk Map

4.5 Existing Urban Development Patterns: It is seen quite commonly in every development project that more than one agency is involved with its implementation and monitoring. So, there is always having a chance of duplication of effort of two or more organizations in sharing their responsibility. These results in conflict what ultimately fore the project life longer than expectation. This happens because of lack of knowledge about the jurisdiction of the boundary of responsibility. There is a straight provision of different rules and regulation by different agencies in a project starts from the project initiation to the project implementation. But it is quite a common picture in our country that most of the development initiative does not follow that rules and regulation properly. And the most unfortunate fact is that the line agency does not monitor theses things in most of the cases.

The success of a project mostly depends on its implementation enforcement mechanism. Presently, it is very much understandable that we are going with a very poor mechanism concerning the development project implementation; because not a single project completes in time and the implementation of the project is hindered significantly due to its poor quality relevance with reality. It’s quite common, especially in our country that a lot of stakeholder is violating the plan due to their own interest. There is a provision of taking action to that party to control the violation. The violation is not getting the slower speed as the concerned authority does not take the necessary action or the action cannot make its effect.

4.6 General Land Use Proposals in DAP: The CBD (Motijheel) needs to protect it’s commercial importance and thereby a corporate image by keeping the distinctiveness of it’s commercial use.

- Mixed use in the rest of area, needs to be limited along major and secondary roads in order to protect the residential sanctity of the inner areas as well as to freeze the total conversion of the previously renowned

Seismic Microzonation Map of Dhaka

Source: Ansary, 2004

Liquefaction Susceptibility in Study Area

Source: CDMP Report, 2009
residential areas (Arambag, Bijoy Nagar, Fakirapul, Moghbazar etc). Following the proposed road network of land use need to be controlled in these areas. These areas shall come under planned development and shall be compatible with Motijheel Areas.

- Areas of National importance (Baitul Moqarram Mosque, National Stadium etc) needs to be free from further densification in order to keep the civic image of this area high.
- Residential areas of Motijheel need to be reconstructed with higher densification for government staff with not less than 350 persons per acre.

The above land use proposal did not transformed in specific zoning ordinance. There is some proposal of land use zoning are given below. However, those are not properly implemented. Administrative capacity is not sufficient to address the risks and action accordingly. The main reasons for incapability are lack of political will, bureaucratic complexity, corruption and lack of qualified manpower. Finally the Detailed Area Plan for the study area is not properly risk sensitive. That is because; proper risk assessment was not done. The risk assessment program named Comprehensive Disaster Management Program (CDMP) findings should be incorporated in DAP.

5. Recommendations

In the area, mainly road circulation and widening should be primary considered. This area generates major traffic, as Motijheel CBD is located here. This area also harbors large-scale commercial activity and is a mixed-use zone. Therefore, road extension, widening, linking of roads etc. must be taken as strategy to develop the area.

The area has a major geological fault line. So, development control is vitally needed. Low and middle-income residential area may develop here with the co-ordination of private developers. Land readjustment policy is suitable and can develop through public and private negotiations. The retention ponds in this zone are playing vital role; these needs to be preserved along with canals, to keep the area flood-free. Future planning of new settlement areas (growth areas) must consider risk sensitive engineering planning, design and construction which allows for mitigation to earthquake risks in place. A rule may be enacted so that every private land developers should keep a separate area which should be kept open, which may be used as playground or other purposes for normal time use.

In case of land use planning, open urban space is a critical area in the disaster mitigation process. Within earthquake recovery scenarios consideration must be given to the planning, design, and provision of emergency shelter, temporary housing, and neighbourhood needs in study area land use plan. In appropriate earthquake preparedness planning efforts, urban spaces, including facilities such as public parks, large scale public parking lots, high school campuses, must be provided. Identification and developing escape routes and open spaces for evacuation is a good preparedness strategy.

RAJUK should ensure strict enforcement of building code incorporating earthquake-resistant design. Strict enforcement of building code will promote earthquake-resistant buildings which ultimately reduce the economic and social disruption due to earthquake. The enabling environment can come through appropriate regulatory mechanism where the existing building regulatory authority through the building rules, regulations, planning standards, development control rules or building codes operating in the city. Government should establish different standards and Manuals for Earthquake resistant buildings considering Risk Sensitive Land Use Planning, Earthquake hazard microzonation map (such as site amplification & liquefaction).

Awareness may be developed among the citizens about disaster and hazards. They may also be trained by drill how to cope with the hazards. Government should ensure Minimize gaps in urban planning in the context of increasing risks, effective utilization of educational institutes to
reduce the impacts of the urban risks, enhance the capacity of the stakeholders along with mainstreaming of risk reduction activity, arrange regular training/orientation programs at the implementation level to enhance knowledge and raise awareness on vulnerability and management process.

To reduce the liquefaction risk in those newly developed areas, government should establish different standard for building construction considering the earthquake. An immediate and appropriate strategic plan can make success of the ‘green building approach’.

It is to inform you that we have enough rules, regulations, national building codes, laws and acts etc. for improving resilience of Dhaka city and reducing risk of natural disasters but unfortunately lack of proper implementation of all these rules make our city vulnerable. Corruptions, bureaucratic entangle, lack of political will and shortage of technical man power of RAJUK has deteriorated the physical condition of Dhaka city.

To improve enforcement of building codes (for mitigation) and local ordinances, protecting critical environments, avoiding serious earthquake hazards (prevention), providing open spaces (preparedness), the following information and incentives may be provided:

- Reduced business permits costs or realty taxes
- Construction practice seminars or trainings
- Tax reduction incentives for developers who practice “green building”
- Defining a guide for urban forms and patterns and how this should be integrated into the natural environment

For the existing highly dense built up and fragile built environment, a recovery plan, temporary housing plan and reconstruction plan can be options to take in already developed areas. Future planning of new settlement areas (growth areas) must consider risk sensitive engineering planning, design and construction which allows for mitigation to earthquake risks in place. Identification and developing escape routes and open spaces for evacuation is a good preparedness strategy. This should be part of the DAP report and in ward map.

The existing Canals (Rampura), Lakes (Hatir Jheel), Retention Ponds (Khilgaon, Basabo & Mugdapara) demarked in the DAP should be protected and more water retention ponds near highly urbanized areas should be increased by proper re-development for controlling consequential phenomenon of earthquakes such as Fire.

Upgrading and retrofitting of buildings projects can be implemented by offering financial incentives to city dwellers. The existing Narrow roads, Lanes and By Lanes widening projects can be implemented by offering financial incentives to Land Owners.

6. Conclusion

Proper construction monitoring is essential to make everyone bound to maintain rules of construction. Zoning should be maintained and construction and development should not be allowed other than permitted land use by DAP. If there is any violation during construction of building, it should be stopped immediately and penalty should be imposed as soon as possible. Surprisingly, most of the people of our country are interested to reduce cost of building construction ignoring the risk of hazard and disasters in the future. Creating awareness among people is an important issue. All types of media, electronic and print, should come forward to urge people so that they maintain rules and regulations during building construction. Likewise, seminar, symposium, rally, demonstration and discussion should be arranged to disseminate disadvantages of violation of building codes. Incorporating proper risk assessment can ensure risk sensitive land use planning and development.
Reference

9 References


2. AS/NZS ISO 31000 :2009 Risk Management-Principles and Guidelines


8. Centre for Natural Hazards Research, Simon Fraser University(2011), Risk-based Land-use Guide: Reducing Risk from Hazards, Building a guide to considering land-use options to reduce disasters


10. Earthquakes and Megacities Initiative (EMI), FFO-DKKV Phase II - Sectoral Profile of Kathmandu Metropolitan City, Nepal, March 2009

11. Earthquakes and Megacities Initiative (EMI), FFO-DKKV Phase II - Risk Sensitive Land Use Plan of Kathmandu Metropolitan City, Nepal

12. Earthquakes and Megacities Initiative (EMI), FFO-DKKV Phase II - Structuring and Implementing a Competent Disaster Risk Management Function at KMC, Nepal

13. Earthquakes and Megacities Initiative (EMI), FFO-DKKV Phase II - Risk-Sensitive Urban Redevelopment Plan of Barangay Rizal, Makati City, Philippines


