City
STRENGTH
RESILIENT CITIES PROGRAM

CityStrength Diagnostic
Methodological Guidebook

First Edition

May 2015

WORLD BANK GROUP

GFDRR
Global Facility for Disaster Reduction and Recovery

CityStrength Diagnostic

Methodological Guidebook

First Edition

May 2015

WORLD BANK GROUP

GFDRR
Global Facility for Disaster Reduction and Recovery

Table of Contents

Acknowledgements

CityStrength Pilot in Can Tho, Vietnam	CityStrength Pilot in Addis Ababa, Ethiopia
Margaret Arnold	Abebaw Alemayehu
Marc Forni	Ahmed Alkadir
Roger Gorham	Fernando Armendaris
Stephen Hammer	Gulilat Berhane
Hoa Thi Hoang	Issa Diaw
Pavel Kochanov	Roger Gorham
Catherine Lynch	Alex Kamurase
Iain Menzies	Catherine Lynch
James Newman	James Markland
Dzung Huy Nguyen	Rosanna Nitti
Hoa Thi Mong Pham	Chukwudi Okafor
Ifeta Smajic	Elisa Portale
Van Anh Thi Tran	Manjusha Rai
Astrid Westerlind Wigstrom	Dinkneh Tefera
	Astrid Westerlind Wigstrom

Abbreviations and Terminology

Actions	'Soft' measures to enhance resilience such as capacity building, institutional strengthening, or regulatory improvements.
City Focal Point	Local government staff responsible for working with the World Bank on day-to-day planning and implementation issues.
CityStrength Coordinator	World Bank staff responsible for providing support to Task Teams that are implementing the CityStrength Diagnostic with client cities.
CMU	Country Management Unit
CSO	Civil Society Organization
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
Facilitator	Individual who serves as an unbiased enabler of cross-sectoral dialogue during the Launch Workshop and Prioritization Session.
ICT	Information Communications Technology
Investments	'Hard' measures to enhance resilience such as the construction of infrastructure, establishment of safety net systems, or creation of service delivery programs requiring significant financial resources.
PMU	Project Management Unit
NGO	Non-governmental Organization
Resilience	The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience. A resilient city can adapt to a variety of shocks and stress while still providing essential services to its residents, especially the poor and vulnerable.
Shock	A single unpredictable event.
Stress	An ongoing hardship that a community experiences every day.
Task Team	Group of World Bank staff and consultants with multi-sectoral expertise responsible for implementing the CityStrength Diagnostic.
Task Team Leader	World Bank staff responsible for guiding the implementation of the CityStrength Diagnostic and leading dialogue with city officials.

Introduction

With most of the global population and capital goods concentrated in urban areas, cities are key to social development and economic prosperity. They are drivers of national economic growth and innovation, and act as cultural and creative centers. But urbanization also brings challenges. With a greater concentration of people, assets and infrastructure in urban areas, an increasingly complex range of shocks and stresses can put in jeopardy human wellbeing and hard-won development gains.

The risks that cities face are becoming more complex and unpredictable. Urbanization, globalization, and climate change are interacting in a way that is unprecedented, and, at the same time, urban service delivery systems are becoming increasingly interlinked. This requires us to think differently about cities and how to address the shocks and stresses—both natural and human—that could inhibit their ability to achieve their development goals.

Shocks impact on all aspects of development. Impacts are felt directly through the loss of lives, livelihoods, and infrastructure, and indirectly through the diversion of funds from development to emergency relief and reconstruction (DfID, 2005). Moreover, shocks disproportionately affect the urban poor. For example, during the 2011 Thailand floods, 73 percent of low-income households in Bangkok were affected compared to only 21 percent of the total city population (UNISDR, 2013). Moreover, countries that experienced major violence over the period 1981-2005 have an extreme poverty rate 21 percentage points higher than countries with no violence (World Bank, 2011a). Of the seven countries that are unlikely to meet any Millenium Development Goals by the 2015 deadline, six are fragile states (OECD, 2014).

Many development partners and other organizations are active on the topic of resilience in cities, and there has been a recent upswing in the development and promotion of innovate programs, tools, and initiatives. For example, UN-Habitat's City Resilience Profiling Tool, designed as a self-assessment, aims to help city officials and other stakeholders identify a host of possible risks facing urban areas and prioritize policies and action plans accordingly. Arup International and the Rockefeller Foundation have developed the City Resilience Framework, which provides a lens through which the complexity of cities and the numerous factors that contribute to a city's resilience can be understood. The framework is being used to facilitate agenda-setting sessions in cities selected to participate in the 100 Resilient Cities Challenge. UNISDR has launched the Disaster Resilience Scorecard for Cities, which is intended to provide a single integrated perspective on a city's total disaster resilience posture.

In an effort to promote partnership and enhanced impact for cities, nine institutions, including the World Bank, formed the Medellin Collaboration on Urban Resilience in 2014. The aim of the collaboration is to facilitate the flow of knowledge and financial resources necessary to help cities become more resilient to disruptions related to climate change, disasters caused by natural hazards, and other systemic shocks and stresses, including the socio-economic challenges associated with rapid urbanization.

Within this global context, the CityStrength Diagnostic was developed to help World Bank staff apply this new holistic approach to urban resilience to operations. It was designed to help facilitate a dialogue among stakeholders (e.g. government, civil society, residents, and the private sector) about risks, resilience, and the performance of urban systems. It is important to note that CityStrength is an engagement process, not an analytical study. The CityStrength Diagnostic results in the identification of priority actions and investments that will enhance the city's resilience as well as increase the resilience-building potential of planned or aspirational projects. It promotes a holistic and integrated approach that encourages cross-sectoral collaborations to more efficiently tackle existing issues and to unlock opportunities within the city.

Because cities depend on a complex network of infrastructure, institutions, and information – the resilience of each informs the resilience of the city as a whole. With this in mind, the CityStrength Diagnostic is structured around sectoral modules that cover topics within the city and metropolitan area purview, including Community and Social Protection, Disaster Risk Management, Education, Energy, Environment, Health, Information and Communications Technology, Local Economy, Logistics, Municipal Finance, Solid Waste Management, Transport, Urban Development, and Water and Sanitation. These modules were created based on a review of over 40 tools and methodologies related to resilience and the analysis of over 600 indicators contained within them.

The CityStrength Diagnostic can be used in any city regardless of size, institutional capacity, or phase of development. As a qualitative assessment, the effectiveness of the diagnostic depends on the capacity of the specialists involved, significant stakeholder participation, and local government commitment to the process and follow-on engagement.

Benefits of the CityStrength Diagnostic

The CityStrength Diagnostic was piloted in two cities – Can Tho, Vietnam and Addis Ababa, Ethiopia—which provide two very different contexts for assessing the benefits of the process. Can Tho is a city of 1.25 million residents located on the Hau River in the Mekong Delta. It suffers from chronic river and tidal flooding, and is likely to be impacted significantly by sea level rise. Can Tho is also the fifth largest city in Vietnam, a country that recently achieved middle-income country status. Poverty is

estimated at less than 12% and the unemployment rate is very low at less than 5%. In contrast, Addis Ababa is the largest city in Ethiopia with a population of approximately 3.3 million that is anticipated to double by 2020. Over 28% of the population is officially below the poverty line, and it is estimate that 29% of households have an unemployed adult. Addis Ababa is challenged by water scarcity, urban fire, unprecedented urban growth, and social vulnerability, among other shocks and stresses.

Across these two pilots, several benefits of the diagnostic have been highlighted by city stakeholders, technical specialists, and World Bank management:

- **Client Relationship.** CityStrength enables a more internally coordinated approach from the World Bank Group *vis* a *vis* the local government. It is an opportunity to bring a multi-sectoral team together to support local leadership in an integrated way, rather than sector by sector.
- **Inclusion.** CityStrength invites multiple stakeholder perspectives, including across departments and tiers of government, civil society, and the private sector.
- **Learning.** CityStrength encourages a wider appreciation by sectoral specialists of issues in other sectors and how they relate or influence their own sectors. This learning applies to both the World Bank team and the counterpart technical staff.
- **Development Impact.** CityStrength considers investment priorities in relation to city-wide resilience building needs rather than only sectoral issues. This enables the delivery of better advice and ultimately enhances impact.
- **Business Development.** CityStrength produces an output—a prioritized set of recommendation that enables the World Bank specialists to develop proposals for follow-on support to the city.

Stages of Implementation

The CityStrength Diagnostic consists of 5 stages, book-ended by leadership commitment for resilience on the front-end and a longer-term engagement with development partners through financing or technical assistance at the back-end.

Figure 1: Stages of the CityStrength Diagnostic

After Stage 5, the process and recommendations can then be captured in a publication that the city can use for internal purposes or as a tool to seek funding from development partners. The diagnostic will identify specific actionable projects that can be implemented by the city with the technical or financial support of the World Bank or other development partners. Like all World Bank activities, decisions about the World Bank's role will be driven by the relevant Country Management Unit (CMU).
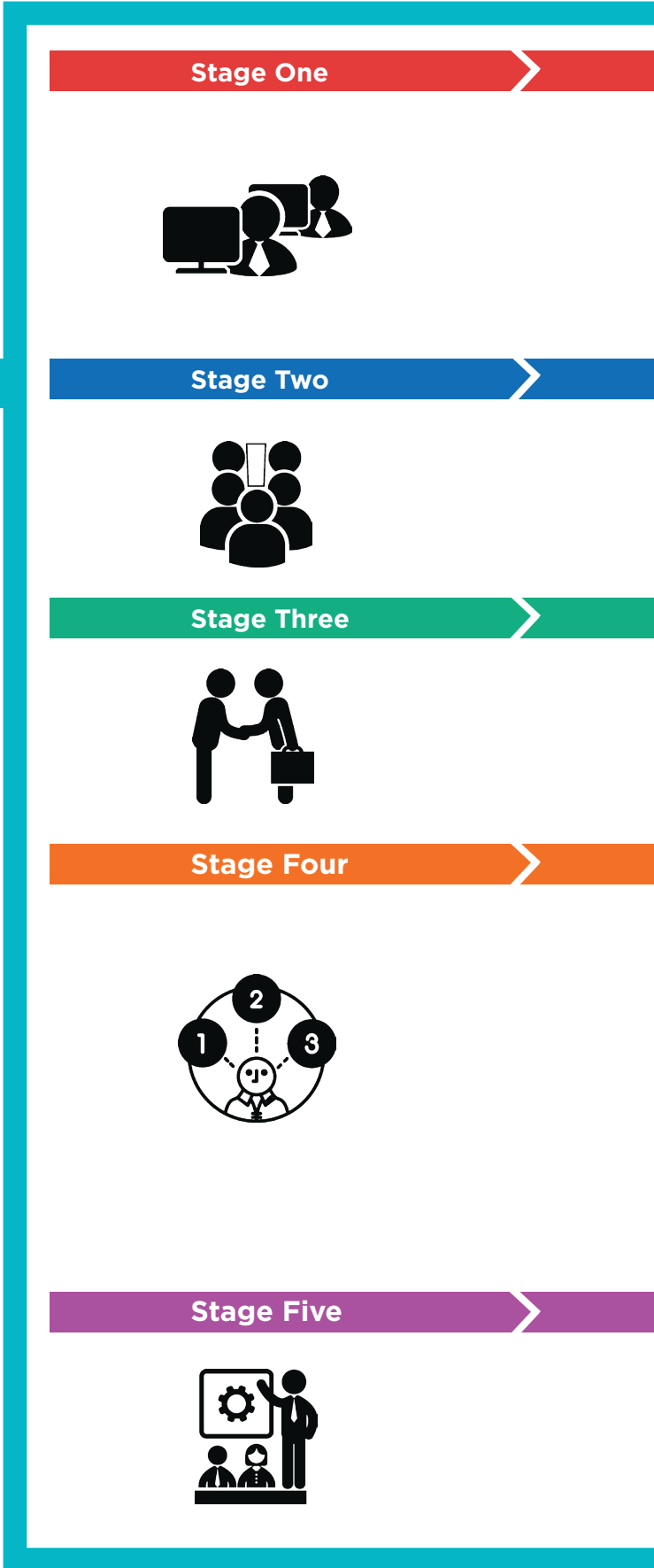
Stage One

Stage Two

Stage Three

Stage Four

Stage Five

PRE-DIAGNOSTIC DATA REVIEW

The **first stage** focuses on collecting information and leveraging efforts that have already been undertaken in the city. A review of all relevant studies, reports, or plans developed by the city, the World Bank, or other development partners is conducted. Who prepared it? Why? And how 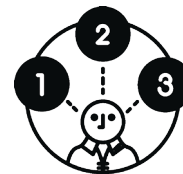was it used? Key findings are summarized in order to brief participants during the Launch Workshop as well as Bank specialists supporting the implementation of the diagnostic. Specific background studies or data collection initiatives could also be undertaken during this stage depending on the context.

LAUNCH WORKSHOP

The **second stage** is a Launch Workshop. The objectives of the workshop are to 'officially' launch the CityStrength Diagnostic process in the city, to explain the concept of urban resilience, to learn about the city's goals and objectives, to verify the initial findings from the first stage, to introduce the multi-sectoral Bank team, and to engage with a broad set of stakeholders.

INTERVIEWS AND FIELD VISITS

The **third stage** consists of interviews and site visits to help the Bank specialists better understand the challenges and opportunities in the city and to qualitatively assess how well key systems are performing in relation to defined Qualities of Resilience. It is also meant to give the city departments the opportunity to learn about each other's work programs and ongoing resilience activities.

PRIORITIZATION

The **fourth stage** is the identification and prioritization of actions and investments to enhance resilience in the city. This is done using multiple "lenses" to qualitatively identify measures that the Bank specialists recommend as the most important for the city leaders to consider. While the ultimate goal of the CityStrength Diagnostic is to enhance the city's long-term resilience, it is important to understand the nature of any immediate threats to people and assets (Lens 1). It is also crucial to understand dependencies and interdependencies within urban services and systems, which can cause cascading disruption or failure, or compound existing vulnerabilities (Lens 2). Thinking holistically (rather than sectorally) about the city's resilience (Lens 3) is necessary to identify critical gaps or areas of weakness at the city scale. Finally, aligning recommended actions and investments with local goals and objectives (Lens 4) increases the likelihood that the recommendations will have sufficient stakeholder support to become a reality.

DISCUSSION AND NEXT STEPS

The **fifth stage** is a meeting with local leadership and other stakeholders to present the findings of the diagnostic, discuss recommendations, and agree on priorities and next steps.

How to use this Guidebook

This guidebook is designed for use by World Bank task teams who are implementing the CityStrength Diagnostic in a client city. The methodology is new and evolving, reflecting state of the art approaches to holistic urban resilience. As more cities implement the diagnostic, guidance materials, including this guidebook, will be updated and revised.

The guidebook provides an introduction to urban resilience, offers guidance on initiating the CityStrength Diagnostic process and forming a strong implementation team, and describes the 5 main stages of the diagnostic in detail. Each chapter includes step-by-step instructions, advice, and examples from the pilot implementations in Can Tho and Addis Ababa. A series of resources are provided at the end of the guidebook. Teams choosing to use the CityStrength Diagnostic to further a dialogue with a city client will receive support from the CityStrength Coordinator within the World Bank, as well as access to a repository of useful materials such as templates, sample communications and agendas, and lessons learned from colleagues.

Each implementation of CityStrength will be different; every city has a unique set of attributes and development constraints. This guidebook offers a framework that can be used by Bank specialists to guide their engagement with a client city or to obtain advice on matters specific to different stages. Each team's experience will help to enrich the methodology. It is therefore important for each team to share its ideas and lessons learned with the aim of improving the guidebook and the effectiveness of the CityStrength Diagnostic.
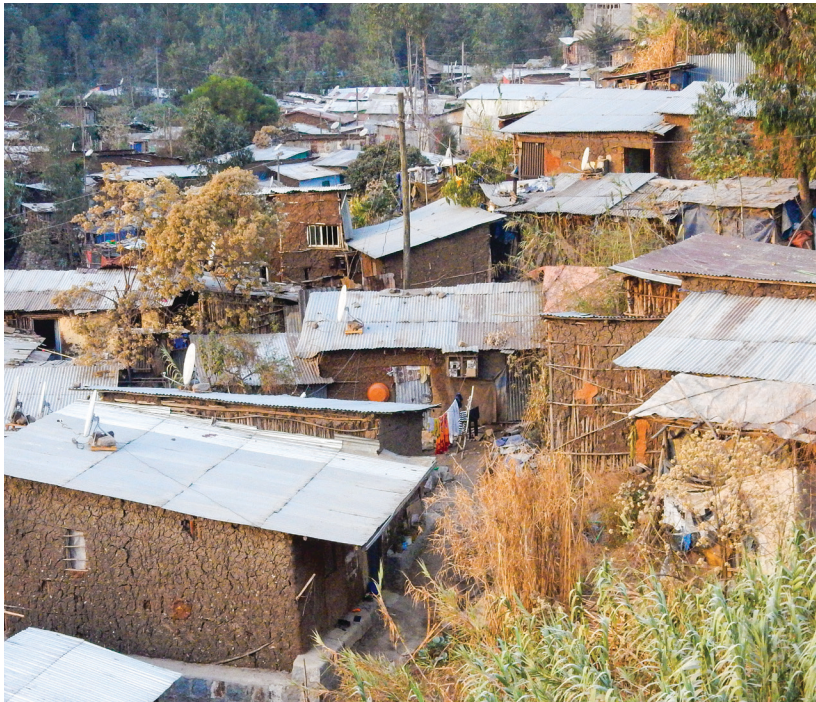
What is Resilience?

Resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.[1] A resilient city can adapt to a variety of shocks and stress while still providing essential services to its residents, especially the poor and vulnerable.

Resilience is not synonymous with disaster risk management or climate change adaptation. Urban resilience accepts the possibility that a wide range of disruptive events — both stresses and shocks, natural and human induced—may occur in a city but are not necessarily predictable. Disaster risk management is typically limited to natural hazards and, to a growing extent, incorporates climate change adaptation.

Resilience is not synonymous with sustainable development either. Resilience works toward long-term sustainability objectives—meeting the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission, 1987)—but specifically embraces the turbulence of daily life (Arup et al, 2012). Resilience is about learning to live with the spectrum of risks that exist at the interface between people, the economy, and the environment; where sustainability aims to put the world back into balance, resilience looks for ways to manage in an imbalanced world (Zolli, 2012). Resilience and sustainability are complementary approaches.

Resilience is more than the ability to recover from shocks; it incorporates the ability to avoid shocks and to manage risks. The *World Development Report 2014: Risk and Opportunity: Managing Risk for Development* argues that risk management can be a powerful tool for development. It contends that "the solution is not to reject change in order to avoid risk but to prepare for the opportunities and risks that change entails. Managing risks responsibly and effectively can save lives, avert economic damages, prevent development setbacks, and unleash opportunities. It has the potential to bring about security and a means of progress to people in developing countries and beyond." Trade-offs and synergies must be considered in order to identify "win-win" situations that reduce the possibility of loss and increase potential benefits.

Resilient city development is a dynamic and ongoing process focused on strengthening the ability of the urban system to change, adapt, absorb, and learn from a wide range of acute shocks or chronic stresses it encounters along its path toward sustainable development.

---

1   Adapted from 100 Resilient Cities pioneered by the Rockefeller Foundation.

Resilience as a Development Priority for Cities

Natural disasters like storms, droughts, and earthquakes are not the only risks cities face. Cities are also vulnerable to economic downturns, crime and violence, public health epidemics, and even infrastructure failure. These shocks can have devastating effects, bringing some or all of an urban system to a halt, and possibly causing asset damage and loss of life. Acute shocks and chronic stresses can also have a deep and lasting impact on human development. Disaster losses are often linked with, or exacerbated by poverty and vulnerability of the poor that stem from socio-economic and environmental imbalances. While the origins and long-term impacts of shocks may differ dramatically, the necessity of the city to absorb, adapt, and continue functioning in the short-term remains constant.

To put the economic impact of these risks into perspective, the United Nation's Global Assessment Report on Disaster Risk Reduction highlights that for three consecutive years direct economic losses from disasters have soared past US$100 billion—total expected annual global loss from earthquakes and cyclone wind damage alone now amounts to US$180 billion per year (UNISDR, 2013). Moreover, sea-level rise and subsidence in the 136 largest coastal cities could result in losses of US$1 trillion or more per year by 2050 (Hallegate et al., 2013). The Arab Spring resulted in US$800 billion in lost output (HSBC, 2013) and over 50,000 deaths (Ibish, 2012) in the 7 hardest-hit countries, Singapore's exposure to SARS cost the government nearly US$570 million (Sitathan, 2003), and the collapse of the Rana Plaza building in Dhaka in April 2013 resulted in the death of over 1,000 people. Indeed, cities' greatest strengths for economic growth – efficiency and interrelation of infrastructure and density of population—can also be their potential weaknesses to cascading failure during overstress from disasters (Graham, 2010).

The resilience of a city depends on the overall performance and capacity of its systems, not solely on its ability to cope with specific natural hazards or to adapt targeted areas to the impacts of climate change (Brugmann, 2012). Cities are complex systems, and like all systems, a city depends on the smooth functioning of its constituent elements and the larger organization in which it is nested. A city's resilience is therefore affected by the resilience of those smaller and larger systems. Disruptions to the basic services they provide can have cascading impacts well beyond the city itself. The complexity of cities also makes resilience building especially challenging. Focusing on one policy goal, such as climate protection, without considering others can lead to undesirable outcomes. These decisions may come as explicit trade-offs, unintended consequences, or some combination of the two. Building a resilient city, therefore, requires a holistic, multi-sectoral, and flexible approach to urban development.

Shocks and Stresses

Managing risks from specific shocks and increasing overall resilience of urban systems are different yet complementary practices. The first requires knowledge of the specific shocks the city faces and that the events are measurable and predictable. However, many shocks and stresses that cities face are unpredictable. Resilience building depends on the city's ability to avoid shocks and to manage risks when faced with uncertainty. In these circumstances, the more successful management and decision-making approach is to focus on resilience, including increased risk tolerance, flexibility, and adaptability (Comfort et al, 2010). And, indeed, resilience focuses on enhancing the performance of a system in the face of multiple shocks and stresses, rather than preventing or mitigating the loss of assets due to specific events (Arup International, 2014).

Considering a broader spectrum of risks in a city is the opportunity to take a strategic view across different types of risks, including the underlying drivers of the risks and the systems they impact, and thereby better prioritize risk mitigation interventions. Indeed, CityStrength promotes urban resilience in the context of a broad spectrum of risk that may result from a wide range of shocks and stresses.

Shocks are sudden events that impact the performance of a system. There are many different types of shocks that can strike at different levels, including disease outbreaks, floods, high winds, landslides, droughts, or earthquakes. Outbreaks of fighting or violence, or severe economic volatility, could be included in this category as well.

Stresses are longer-term trends that undermine the performance of a given system and increase the vulnerability of actors within it. These can include natural resource degradation, loss of agricultural production, demographic changes (e.g., aging and depopulation), climate change, political instability, or economic decline (DfID, 2011). A significant stress facing many cities in developing countries is urbanization itself due to the pressure it places on urban systems and the delivery of basic services. Stresses can be cumulative, compounding gradually until a tipping point is reached, and transformed into a shock.

The CityStrength Diagnostic methodology includes a framework for classifying shocks and stresses (see Figure 9). A total of 96 unique shocks and stresses that could occur in cities have been identified and are listed in Resource 1. Within this universe of shocks and stress, over half are 'human' induced.

Resilient Cities

Qualities of Urban Resilience

What makes an urban system resilient? Using a systems thinking approach, it is possible to consider how well each element of a city reflects qualities that are typically present in resilient systems, and are distinct from other qualities (e.g. efficiency, competitiveness) that might be associated with sustainability or economic performance (Figure 2). The evidence that underpins the qualities listed below has emerged empirically from research on resilient systems; generally, as well as specifically in cities. They can be used to describe physical assets, human behavior, network systems, and institutional processes.

Figure 2: Qualities of Urban Resilience
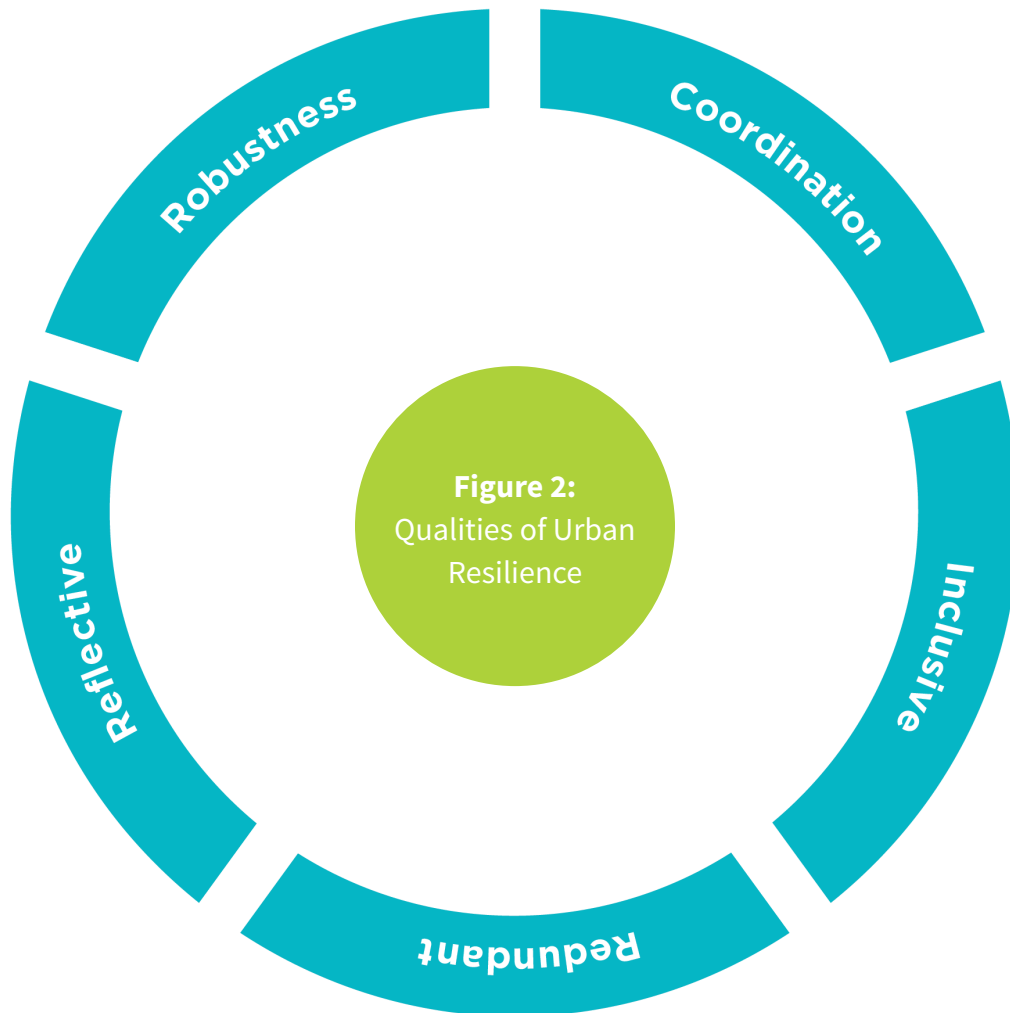
Robustness

Robust systems include well-conceived, constructed and managed physical assets, so that they can withstand the impacts of shocks without significant damage or loss of function. Robust design anticipates potential failures in systems, making provision to ensure failure is predictable, safe, and not disproportionate to the cause. Overreliance on a single asset, cascading failure and design thresholds that might lead to catastrophic collapse if exceeded are actively avoided. An important aspect of robustness is proper operations and maintenance to ensure that systems are functioning properly. (E.g. A building is designed to accommodate a seismic event without collapse or excessive damage.)

Coordinated

Coordination between city systems and agencies means that knowledge is shared, planning is collaborative and strategic, and decision-making is based on investments that are mutually supportive towards a common outcome. Exchange of information between systems enables them to function collectively and respond rapidly through feedback loops occurring throughout the city. (E.g. A coordinated transport systems is not only aligned with urban growth dynamics and land use but also has open communication with other agencies so that it can divert user traffic to different modes of transport based on changing conditions.)

Inclusive

Being inclusive recognizes that risk is perceived differently by different stakeholders and that shocks and stresses affect the most vulnerable the most. An inclusive approach contributes to a sense of shared ownership or joint vision to build a resilient city. This can be achieved through consultation and engagement with a wide range of stakeholders, including the most vulnerable groups, to ensure that systems are more resilient by considering a wider range of vulnerabilities, risk management capacities, and localized information. Equity in access to infrastructure and services underpins social cohesion and opportunity. (E.g. An inclusive budgeting process could help ensure that the allocation of city resources reflects community priorities.)

Redundant

A redundant network or system has a belt and braces approach which includes spare capacity or back-up to accommodate disruption, extreme pressures or surges in demand. Providing diverse ways of achieving a given need or fulfilling a particular function is a means to achieving a redundant system. If one service channel gets disrupted, another can be used. (E.g. A power distribution network is able to rebalance to respond to a surge in demand in a particular area.)

Reflective

Resilient urban systems examine, learn, and evolve based on their past experiences and new information, modifying standards or norms based on emerging evidence rather than seeking permanent solutions based on the status quo. As a result, people and institutions examine and systematically learn from their past experiences, and leverage this learning to inform future decision-making. (E.g. A financial management system might make use of information on past shocks and stresses to improve budget reserving policies.)

Resilient Cities

Looking at systems in relation to these qualities can help to reveal underlying weaknesses that may not be apparent when using more traditional risk assessment methods. For example, one might ask, how resilient is our city's road network? Typically, the approach would be something similar to the following. First, an assessment would be done to understand the hazards in the city. In this case, let's assume the main issue is flooding. The city might opt to increase the height of select roads to ensure they are functional when anticipated flood levels are reached or increase the capacity of storm water drainage channels to collect a greater amount of run-off. This, indeed, will make the road system more robust by enhancing its ability to absorb and withstand urban floods. But what if a section of the city doesn't have access to paved roads at all (*inclusive*)? Are there alternative routes if flooding reaches unprecedented levels (*redundant*)? Does the roads department regularly share information with emergency services providers or the urban planning department (*coordinated*)? Are roads rebuilt where others have been damaged by repeated disaster (*reflective*)? The existing road infrastructure would be resistant to an anticipated level of flooding, but the road system would be far from resilient. Moreover, the road system would likely be contributing little to the overall resilience of the city.

From Sectors to Citywide Resilience

The ability of urban communities to survive and thrive despite the inevitability of shocks occurring, or stresses accumulating, relies on the performance of the various systems that make up a city. An underlying premise of CityStrength is that a city is more likely to be resilient if its many systems exhibit the qualities described in Figure 2. This aligns with current thinking on city resilience, and addresses the fundamental challenge that cities are complex systems, and that resilience at a city scale cannot currently be observed or measured directly, other than in terms of changing performance over time in response to repeated events.

The CityStrength Diagnostic first evaluates resilience on a sectoral basis and then brings together the findings to think holistically (rather than sectorally) about the city's resilience in order to identify critical gaps or areas of weakness. To support this process, 14 sectoral modules are provided in the Resources section of this guidebook. They are designed for use by technical specialists and integrate economic, social, and environmental issues from the perspective of the respective sector. During the group Prioritization Session, technical specialists discuss inter-linkages between and among sectors as well as the extent to which the *Qualities of Resilience* are reflected across multiple elements of the city. As an alternative to the *Qualities of Resilience* for discussing holistic urban resilience as part of the Prioritization Session, the City Resilience Framework (CRF) can be used. The CRF, developed by Arup International, provides a framework for better understanding the complexity of cities and the drivers that contribute to their resilience—the health and wellbeing of individuals (people); urban systems and services (place); economy and society (organization); and leadership and strategy (knowledge). In both cases, the focus is on spurring a conversation among experts that cuts across sectors and supports critical reflection on the steps the city need to take to enhance city-wide resilience.

How do you initiate the Process?

Below are five fundamental steps for initiating the CityStrength Diagnostic process:

a. Arrange for a letter of request from the client city or local government entity.
b. Identify the key local and national stakeholders who will participate in and contribute to the implementation of the diagnostic.
c. Agree on the sectors that will be included in the diagnostic.
d. Prepare a schedule that identifies the time periods for each stage using either a *rapid* or *incremental* approach to the process.
e. Form the team of technical specialists from within the World Bank who will support the implementation.

Get Local Government and World Bank Leadership Support

It will be important to ensure the participation and engagement of city leaders and World Bank management from the very start of the diagnostic and throughout the entire process. As such, the first step in formally launching the effort should be a letter from the city (likely the Mayor) to the World Bank (the relevant Country Director) requesting implementation of the CityStrength Diagnostic and indicating a focal point within the local government. Because CityStrength will result in a series of recommended actions and investments to enhance resilience in the city, it is critical that the Country Director endorse the process as it may result in a request for World Bank support to carry-out the recommendations either through analytical work, technical assistance, or financing. Given that CityStrength is a new initiative in the World Bank, it may be necessary to brief the Country Director on the process.

The CityStrength Diagnostic is an inclusive multi-stakeholder process that facilitates not only a cross-sectoral and cross-departmental dialogue, but also allows for the participation of other key stakeholders in the city such as civil society organizations, the private sector, and academia. To enable this type of approach, the city will need to designate a City Focal Point responsible for internal collaboration as well as engagement with the Bank. Ideally, the City Focal Point will have direct access to local leadership and have the ability to convene technical staff from line departments in the city.

Select the Sectoral Modules

The CityStrength Diagnostic includes 3 required modules – Urban Development, Disaster Risk Management, and Community and Social Protection – that must be used in all implementations as

well as 11 optional modules covering various sectors in the city (see Figure 3). The optional modules cover human services, basic services, technology, and economics.

The number of sectoral modules included during any one CityStrength Diagnostic implementation depends on whether a *rapid* or *incremental* approach is taken. With the rapid approach, it is recommended that no more than 8 modules be included. That is, the 3 required modules plus 5 optional modules. The recommendation to limit the number of modules is largely due to logistics, including Task Team size and number of local participants. That said, an emphasis of the methodology is to identify system interdependencies, bottlenecks, and vulnerabilities, which is strengthened by including as many sectors as possible. It could be possible to apply all modules if an incremental approach is used. The timing of the diagnostic is described in the next section.

Figure 3: Sectoral Modules

REQUIRED MODULES

Urban Development

Community & Social Protection

Disaster Risk Management

OPTIONAL MODULES

Human Services

Education

Health

Economics

Local Economy

Municipal Finance

Basic Services

Energy

Environment

Solid Waste

Transportation

Water & Sanitation

Technology
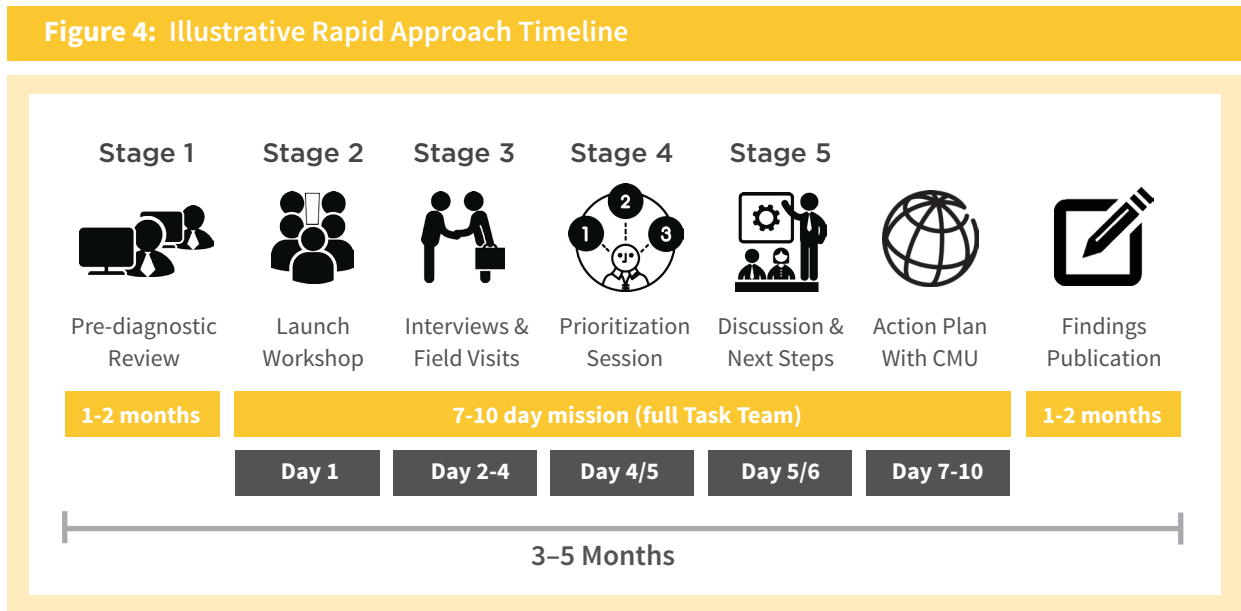
Logistics & Supply Chains

Information & Communication Technology

The decision on which sectoral modules to include in the application of the CityStrength Diagnostic in a specific city is made jointly by the City Focal Point and the World Bank, and is largely a negotiated process. Factors to consider should include historic vulnerability of the sector to shocks and stresses, plans for substantial investment, and the local government's decision-making role in the sector.

Prepare the Implementation Schedule

The CityStrength Diagnostic can be implemented using a *rapid* or *incremental* approach. CityStrength was initially designed as a rapid diagnostic requiring 3-5 months for completion, consisting of 1-2 months of preparatory work, a large multi-disciplinary mission of 5-10 days, and 1-2 months to prepare a findings report (Figure 4). There are two main benefits to a rapid approach. First, the amount of time and resources that a multi-sectoral group of local officials can commit to the process is limited. This is true on the Bank-side as well. Organizing the diagnostic around a single, relatively short mission facilitates the participation of Bank staff specialists, especially those with deep experience.

Figure 4: Illustrative Rapid Approach Timeline

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5		
Pre-diagnostic Review	Launch Workshop	Interviews & Field Visits	Prioritization Session	Discussion & Next Steps	Action Plan With CMU	Findings Publication

| 1-2 months | 7-10 day mission (full Task Team) | | | | | 1-2 months |

| | Day 1 | Day 2-4 | Day 4/5 | Day 5/6 | Day 7-10 | |

3–5 Months

Second, CityStrength is a qualitative assessment that uses a broad brush in order to identify a set of priority actions and investments for more detailed analysis. As such, there is a rationale for quickly moving from the large scale engagement to the more focused areas that will require a longer timeline for in-depth analysis. A rapid assessment allows cities to move towards the implementation of activities faster.

Initiating the Process

However, in some cases, it may be more effective to implement the diagnostic incrementally over a longer period of time to ensure that there is sufficient opportunity for relationship building, knowledge sharing related to resilience, broad stakeholder buy-in to the process, and support for the ultimate recommendations. Moreover, the size of the city (population and physical extent), degree of decentralized decision-making, and institutional capacity and complexity may make it difficult to conduct all the required interviews and field visits within a single Task Team mission.

Using an *incremental* approach, the diagnostic can be spread over a period of 6-9 months or longer (Figure 6). The phasing is amended to allow for two full Task Team missions, as well as additional time (Stage 3b) for team members based locally to do follow-up interviews and data collection. Due to the mix of specialists on the Task Team, it may be necessary to conduct the Prioritization Session over videoconferencing to accommodate different locations.

Figure 5: Illustrative Incremental Approach Timeline

Stage 1	Stage 2	Stage 3 (a)	Stage 3 (b)	Stage 4	Stage 5		
Pre-diagnostic Review	Launch Workshop	Interviews & Field Visits	Cont'd Interviews & Data Collection	Prioritization Session	Discussion & Next Steps	Action Plan With CMU	Findings Publication
1-2 months	5 day mission (Task Team)	1-2 months	1-2 days	2-3 day mission (Task Team)			1 month
	Day 1 / Day 2-5	(Country Team)	(Possibly VC)	Days 1 -2 / Day 3			

6–9 Months

The decision on the type of approach to use – rapid or incremental – should be made jointly by the Task Team Leader, World Bank management, and the City Focal Point. Figure 6 provides guidance on items to take into consideration when deciding between the two approaches. However, every city context is unique, and the choice of approach will be influenced by many factors, including time and resources.

Figure 6: Guidance on Selection of Rapid or Incremental Approach	
Rapid approach suggested if...	**Incremental approach suggested if...**
• There is an existing relationship between the World Bank and the local government • A PMU from an on-going operation can support logistics and data collection • The city has a population of less than 2 million residents • Local government has medium to high institutional capacity • Local leadership (i.e., the mayor or equivalent) has strong decision-making ability • Less than 8 Sectoral Modules will be included	• The World Bank has limited experience working with the city • The city has a population of more than 2 million residents or a physical condition that make it difficult to conduct field visits and interviews in multiple locations • Local government has low capacity and/or limited data availability • Local leadership (i.e., the mayor or equivalent) has limited decision-making ability • More than 8 Sectoral Modules will be included

Initiating the Process

In summary, the main advantage of the *rapid* approach is to reduce the time commitment needed for city stakeholders and sectoral experts and to move quickly from diagnosis to follow-up engagement. However, the tradeoff is that the number of sectors included in the diagnostic process should be limited to no more than 8. The main advantage of the *incremental* approach is that ample time is provided for fostering ownership of the process and consensus building among stakeholder groups. Moreover, in the *incremental* approach, it is possible to take a fully comprehensive view of resilience by implementing all 14 sectoral modules. The tradeoff is that the *incremental* approach is more human and financial resource intensive.

Form the CityStrength Team

CityStrength is an opportunity to bring a multi-sectoral team of specialists to a city client and deliver recommendations that cut across disciplines and traditional silos. To ensure close alignment with World Bank operations, it is recommended that the majority of Task Team members be World Bank staff rather than consultants. However, in some cases, it may be necessary to augment the Task Team

by contracting third party expertise.

The Task Team Leader will coordinate all CityStrength activities and be the main interlocutor with the client. In most cases, the Task Team Leader should be part of the country team and actively engaged in the country, if not in the specific city. It is very important that the Task Team Leader has a solid understanding of the local institutional context and history of World Bank engagement in the city.

To support the Task Team Leader, the Task Team should consist of at least one technical specialist for each of the sectors that will be included in the diagnostic. During the two pilot CityStrength implementations, the Task Team generally included two specialists from each sector – one from the country team (usually based in the country office) and one international specialist. This arrangement ensured that global best practices were integrated into locally feasible recommendations. It is also recommended that the Task Team include a member with strong facilitation skills for the Launch Workshop (Stage 2) and Prioritization Session (Stage 4). Figure 7 provides an overview of the Task Team formed for the implementation of CityStrength in Can Tho, Vietnam. In total, 14 team members participated in the implementation mission.

Figure 7: Task Team Composition from Can Tho, Vietnam CityStrength Implementation

Team Leaders and Urban Development
- Sr. Urban Specialist (Country Team based in Hanoi)
- Sr. Urban Specialist (CityStrength Coordinator)

Community and Social Protection
- Sr. Social Specialist (Global Team based in HQ)
- Sr. Social Specialist (Country Team based in Hanoi)

Disaster Risk Management
- Sr. DRM Specialist (South Asia Team based in HQ)
- DRM Specialist (Country Team based in Hanoi)

Energy and Solid Waste
- Lead Urban Specialist (Global Team based in HQ)

Municipal Finance
- Sr. Municipal Finance Specialist (IFC based in HQ)
- Operations Specialist (GFDRR based in HQ)

Transport
- Sr. Transport Specialist (Country Team based in Hanoi)
- Transport Specialist (Africa Team based in HQ)

Water and Sanitation
- Sr. Water and Sanitations Specialist (Country Team based in Hanoi)

Facilitation and Support
- Climate Change Adaptation Consultant (CSD team based in HQ)
- Urban Planning Consultant (CSD team based in HQ)

The technical specialists implementing the CityStrength Diagnostic will often need to evaluate and make decisions without perfect information. As such, the team needs to be comprised of experts with deep knowledge of sectoral issues, along with local and national professionals who have experience

working in the city. It may be quite challenging to find experienced World Bank specialists that are available for the specific dates selected for the implementation. In fact, it may require several iterations of team selection and scheduling of missions to accommodate all parties.

Why would World Bank staff want to participate in the implementation of the CityStrength Diagnostic? A challenge to forming a team of seasoned World Bank staff is that they are likely very busy working on their own portfolio of projects. CityStrength is an opportunity for technical staff to learn and explore how their sector contributes to overall urban resilience. It is also a chance to work across Global Practices with a finite and well-defined level of effort and deliverable. For staff who are part of the Country Team, participation in the diagnostic could also be an opportunity to engage with the counterpart on future activities.

In addition to the technical specialists who interface with the government counterparts during the CityStrength Diagnostic implementation, there are important Task Team members working behind the scenes. This includes, for example, staff and consultants conducting the desk review of available reports and studies, GIS and mapping support, administrative and logistical support for event planning, and information design for the findings publication.

Stage 1: Pre-Diagnostic Review

Stage 1 is a mix of desk-based analysis and field-based engagement. During Stage 1, the team reviews and synthesizes all relevant documentation, maps local stakeholders, prepares the full Task Team, and begins engaging with local leadership on the topic of urban resilience. The key outputs from this stage include a Briefing Note that captures the main findings of the desk review, a preliminary list of shocks and stresses in the city, a detailed stakeholder list, and materials for the Launch Workshop.

During the Pre-Diagnostic Review, the local government is introduced to the objectives and implementation steps of the CityStrength Diagnostic. Knowing what to expect allows the city departments and leadership to prepare relevant data, and articulate expectations for the diagnostic implementation. Becoming sensitized to the goals and objectives of CityStrength will enhance the local government's engagement in the process.

Stage 1 is typically conducted by a small sub-set of the Task Team, including the Task Team Leader and 1-2 technical specialists. The Briefing Note prepared during this stage is used as an input to the Launch Workshop and to prepare the full Task Team for the implementation of the diagnostic, some of whom may not have previous experience in the city.

Review Existing Studies, Reports, and Plans

An overview of urban characteristics, existing relevant policies, government's institutional arrangement, city maps and a raw list of shock and stress profiles constitutes the "bare bones" of the diagnostic background package. A review of all relevant studies, reports, or plans developed by the city, universities, donor agencies, or other development partners is conducted. Figure 8 provides a list of documents that should be sought out for inclusion in the Pre-Diagnostic Review. In some cases, it may be difficult to obtain copies of all the desired reference materials either because they are not publically available on the internet or because they are unpublished. In addition, some documents may be in the local language, requiring additional time and resources for translation.

Stage 1

Figure 8: Types of Studies, Reports, and Plans to Include in the Pre-Diagnostic Review	
CATEGORY	**DOCUMENT**
Institutional	• City Organigram • Policies/legislation regarding city management and responsibilities
Spatial Development	• City master plans • Infrastructure master plans (e.g. transport, water supply, energy, etc.) • City development strategies • Land use analyses
Human Development	• Poverty assessments • Studies of vulnerable groups • Relevant education and health services policies • Safety net program descriptions
Climate and Natural Disasters	• Vulnerability assessments • Climate change action plans • Damage and loss assessments • Post disaster needs assessments
Economic Development	• Capital Investment Plans • Municipal Budgets • Public Expenditure Reviews • Private Sector Development Strategies • Economic Growth Data
Development Agencies	• World Bank operations (relevant PADs, ICRs, and analytical work) • Development partner initiatives

After the initial screening of available plans and studies, the team meets with relevant city departments to review the list of documents for relevance and applicability to the city's current and planned activities. The team explores which documents are actually informing and guiding the city's work. The story of each document, including purpose and conditions under which it was produced (authors, collaborators and funders) and real-life application (which department used the document, when and for what purpose) is summarized in the Briefing Note.

A decision could be taken at this point to commission specific background studies or data collection initiatives depending on the context and availability of information. This is particularly relevant for cities with very limited baseline data across sectors. However, identification of specific knowledge gaps can also be one of the outcomes of the diagnostic. When the CityStrength Diagnostic becomes more widely used, there may be an opportunity to work with development partners and academia on a set of customized analytics that serve as inputs to the process.

Map the Stakeholders

During the implementation of the CityStrength Diagnostic, it is essential to identify and organize meetings with key officials at all relevant levels of government as well as other stakeholders such as NGOs, private sector associations, universities, etc. Inclusiveness is a key characteristic of a resilient city, and the diagnostic is an opportunity to strengthen connections that may be weak or non-existent among members of the community. Moreover, these stakeholders may play an important role in developing viable resilience building strategies and their ultimate implementation.

In order to identify the key stakeholders, the Task Team must develop a clear understanding of the political and institutional reality in the city. This may include regional and national stakeholders, as certain policies and actions may not be within the mandate of the local government and actions taken in the city may have consequences beyond its boundaries. Moreover, the shocks and stresses being experienced in the city may be connected to the actions of neighboring districts and regions. Finally, to capture and build on ongoing activities in the city and to learn from previous projects carried out, it is important to consult with development organizations and experts engaged locally.

The Team should provide a good summary of the city's political and institutional context, including responsibilities of local, regional/sub-national, and national government, as well as active donor agencies, research institutes and civil society groups. A comprehensive mapping of actors ensures that a technically suitable and diversified group of stakeholders is included in the diagnostic process.

Stage 1

Target stakeholders could include:

- Local leadership and technical departmental/committee staff;
- Representatives of regional resilience collaborations and/or central government initiatives;
- Local institutions (public utilities/service provides, planning agencies, public-private agencies providing household services, etc.);
- Private sector (chambers of commerce, industry groups, etc.);
- Civil society (local and international NGOs) and community groups;
- Schools, universities and research institutes; and
- Other multilateral and international organizations with ongoing activities in the city.

In addition to identifying relevant participants, the Pre-Diagnostic Review mapping should include key information about stakeholders' ongoing and planned activities related to each sector, as well as the relationship between the local government and different stakeholders in the city. Figure 9 provides a template for capturing information on stakeholders.

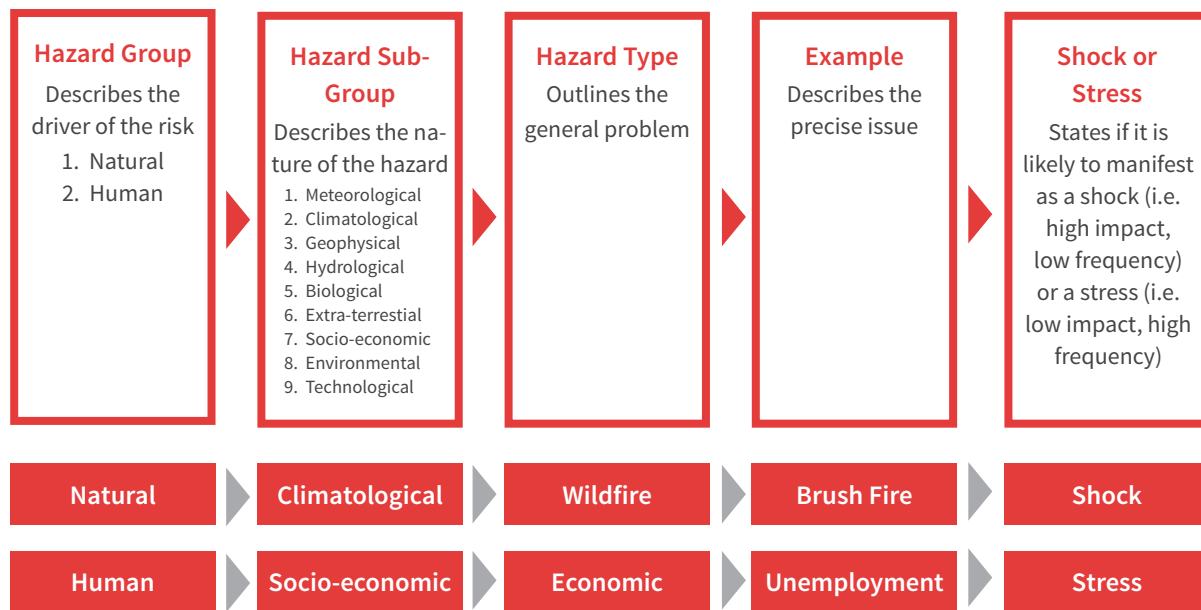**Figure 9:** Template for Mapping Stakeholders and Activities

Agency Name	Type of Entity	Expertise 1	Contact	Current Activities	Planned Activities	Activity Collaborators
Water and Sanitation Dept.	Local	Water and Sanitation; drainage	Ms. X	Developing city-wide sanitation plan	Expanding piped sewerage networks into new district	Dept. of Construction
Climate Institute	Academia	Climate Change; natural resource mgmt	Mr. Y	Modeling regional climate change Impacts	Study on historical levels of subsidence	Climate Change Coordination Office

Identify Preliminary Shocks and Stresses

Generally speaking, a *shock* is a single unpredictable event and a *stress* is an ongoing hardship that a community experiences every day. The CityStrength Diagnostic methodology includes a framework for classifying shocks and stresses (Figure 10); a total of 96 unique shocks and stresses that could occur in cities have been identified and are listed in Resource 1.

The purpose of the framework is to help city stakeholders explore the range of shocks and stresses that could inhibit the city from achieving its goals. The framework is intended to facilitate a high-level discussion regarding the likelihood of particular shocks and stresses. Consideration of the shocks and stresses from a vulnerability perspective, including current city actions to prepare for and mitigate the potential impact of shocks or to reduce stresses, will take place later in the process.

Figure 10: Framework for Classifying Shocks and Stresses

Hazard Group Describes the driver of the risk 1. Natural 2. Human	**Hazard Sub-Group** Describes the nature of the hazard 1. Meteorological 2. Climatological 3. Geophysical 4. Hydrological 5. Biological 6. Extra-terrestrial 7. Socio-economic 8. Environmental 9. Technological	**Hazard Type** Outlines the general problem	**Example** Describes the precise issue	**Shock or Stress** States if it is likely to manifest as a shock (i.e. high impact, low frequency) or a stress (i.e. low impact, high frequency)
Natural	Climatological	Wildfire	Brush Fire	Shock
Human	Socio-economic	Economic	Unemployment	Stress

'Natural' is disaggregated into: geophysical, hydrological, meteorological, climatological, biological, and extra-terrestrial. This is consistent with widely accepted disaster risk reduction hazard classifications used by organizations such as the Centre for Research on the Epidemiology of Disasters. 'Human' is disaggregated into: socio-economic, political, and environmental issues. 'Climate Change' could be considered as a third hazard group placed at the end of the classification. Teams are asked to first consider the shocks and stresses that the city currently faces, and then contemplate how these might change as a result of climate change. However, it is important to note that climate change is just one dynamic factor and other issues such as rapid urbanization and demographic change may also compound or create shocks.

Consulting with the City Focal Point, city departments, research institutes and other expert groups, as appropriate, the Task Team identifies a preliminary list of shocks and stresses exhibited in the city. This preliminary list will be used during the Launch Workshop, at which time a broader set of

Stage 1

Stage 1

stakeholders will be able to comment on and confirm the set of shocks and stress that should be used during the diagnostic.

Weighing and prioritizing shocks and stresses is a challenging process. The CityStrength Diagnostic uses an approach that mixes perceptions of risk with available data. The "facts" available in any existing vulnerability assessments and sectoral studies are presented to local stakeholders, but their perceptions of which shocks and stresses are most important can be skewed by recent events or personal experiences.

Figure 11 shows the draft list of shocks and stresses identified during Stage 1 of the CityStrength pilots in Can Tho and Addis Ababa versus the final agreed set of shocks and stresses at the conclusion of the process.

Figure 11: **Evolution of Shocks and Stresses from Pre-Diagnostic Review to Final List**

PILOT CITY	SHOCKS	STRESSES
List of Shocks and Stress Identified during the Pre-Diagnostic Review		
Can Tho	• Flooding • Draught and saline intrusion • High temperatures • Storms	• Rapid urbanization • Encroachment on channels • Conflicting water usage
Addis Ababa	• Flooding and landslides • Fire • Earthquake	• Sprawling growth • Housing shortage/informality • Water scarcity • Unemployment
Final List of Shocks and Stresses		
Can Tho	• Flooding • Subsidence	• Uncontrolled urbanization • Insufficient sanitation
Addis Ababa	• Flooding • Fire • Earthquake	• Unprecedented Urban growth • Water Scarcity • Unemployment and Social Vulnerability

Prepare the Briefing Note

The purpose of the Briefing Note is to pull together and synthesize all the available information regarding the sectors covered in the CityStrength Diagnostic as well as important institutional information to provide the Task Team with a solid understanding of the current situation in the city before they begin the field work component of the diagnostic. The Briefing Note will serve as a reference for the team as they embark on the Launch Workshop and follow-up interviews with city stakeholders. The Briefing Note needs to strike a balance between comprehensiveness and brevity. The challenge is deciding which pieces of information are essential for the Task Team members to know while also providing a coherent overview.

At a minimum, the Briefing Note should contain the following information:

- Listing of documents available and included in the review;
- Demographic and service delivery snapshots and trends;
- Institutional structure of the local government;
- Key findings of relevant studies and plans, highlighting the actual usage of these document by city departments to inform policy and projects;
- Preliminary list of shocks and stresses, including the rationale for their selection; and
- An overview of all relevant stakeholders in the city, ongoing activities and future plans.

The Briefing Note and library of documents are shared with the full Task Team as early as possible in the process. It is not assumed that the Briefing Note alone is sufficient to fully prepare technical specialists who are not familiar with the city, rather it is intended to serve as a guide so that the specialists are aware of the full library of resources available to them for further, more detailed review. It is the individual specialist's responsibility to make sure that he or she is adequately prepared to participate in the diagnostic.

In addition to the Briefing Note, any relevant maps or geo-referenced data that could enable the Task Team to better understand spatial issues in the city should be collected. Figure 12 provides a long list of useful maps for the diagnostic.

Stage 1

Stage 1

Figure 12: Useful Maps

TYPE	ATTRIBUTES
City Baseline Map	City boundaries and sub-municipal boundaries (e.g., districts, wards)
City Baseline Map	Topography: elevation, water bodies
City Baseline Map	Major roads
City Baseline Map	Major infrastructure: water supply, sanitation and sewerage, roads, highways, bridges, ports, power supply, among others
City Baseline Map	Natural elements, mangrove, hills, rivers, plantations, among others
City Socio-economic Map	Incomes
City Socio-economic Map	Densities
City Socio-economic Map	Land use designations
City Socio-economic Map	Economic activities including commercial zones, central business districts, hotels, and tourist facilities
City Socio-economic Map	Industrial areas including ports, industrial zones, and factories
City Socio-economic Map	Major community buildings, religious buildings, and historic/cultural assets
City Socio-economic Map	Social services infrastructure, including schools, hospitals, and clinics
City Socio-economic Map	Informal development areas
City Hazard Profile Map	Vulnerability and risk
City Hazard Profile Map	Affected areas
City Hazard Profile Map	Housing destroyed and damaged
City Hazard Profile Map	Infrastructure and services damaged
City Hazard Profile Map	Economic impact
City Hazard Profile Map	Hazard mitigation infrastructure, including location of sea walls, dikes, retention ponds, etc.
City Future Growth Map	Changes in the overall city's boundaries
City Future Growth Map	Planned investments
City Future Growth Map	Changes in land use designations
City Future Growth Map	Projected changes to population densities and economic activity
City Future Growth Map	Projected changes in location of vulnerable populations
City Future Growth Map	Changes in intensity, frequency, and location of hazards based on hazard modeling

Train the Task Team

In addition to reviewing this guidebook, Task Team members may require training on the CityStrength Diagnostic and the concepts underpinning urban resilience prior to engaging with local stakeholders. This can be done through a combination of group meetings, presentations, and one-on-one explanations. Based on the pilot experiences, the learning process among the team may require multiple modes of knowledge transfer. It may be challenging to conduct trainings with the full Task Team, and, therefore, necessary to conduct multiple trainings or meetings with smaller sub-groups.

Organizing a brown bag lunch (BBL) or other session in the country office is also an opportunity to train the specialists participating in the implementation as well as inform others about the initiative.

Stage 1

Stage 2: Launch Workshop

Stage 2 has multiple objectives – to 'officially' launch the CityStrength Diagnostic process in the city, to explain the concept of urban resilience, to learn about the city's goals and objectives, to confirm the initial findings from Stage 1, to introduce the multi-sectoral World Bank team, and to engage with a broad set of stakeholders.

Invite Workshop Participants

Since the Launch Workshop should facilitate mutual information sharing, it is structured to include a relatively large number of participants. It will be important to work closely with the City Focal Point to identify and invite relevant stakeholders to the workshop. It is also crucial to get the approval of the Mayor and receive support in disseminating the invitations. The City Focal Point could also support the logistical arrangements and preparations for the workshop and could advise on cultural and political customs.

Depending on the local context and existing cooperation between different stakeholder groups, the following list of stakeholders might be taken into consideration:

- Mayor and Mayor's office;
- Technical staff such as departmental directors, urban planners, sectoral managers etc;
- Civil society (community representatives, NGOs);
- Private sector (banks, private companies, service providers);
- Academia/research;
- Other tiers of government (regional/national); and
- Development organizations/donors active in the city.

As a qualitative, interview-based diagnostic, participation by knowledgeable technical staff and city leadership is essential to its success. If important stakeholders are not able to attend, the Task Team should make a strong effort to meet with them at a later time. All Task Team members should be prepared to provide a short preview of the CityStrength Diagnostic process during the one-on-one meetings.

On the World Bank side, all Task Team members should attend the Launch Workshop. In addition, if possible, a representative from the County Management Unit should open the workshop alongside a leader from the local government. Ideally, this would be the Country Director and the Mayor.

Stage 2

Prepare Workshop Materials

Preparation for the Launch Workshop is largely done in parallel with the Pre-Diagnostic Review. Specifically, the Briefing Note is the key input to the World Bank's presentations, the draft list of invitees, the preliminary list of shocks and stresses, and content for group activities. Figure 13 outlines the basic sections of the Launch Workshop, and can serve as a guide for the materials that will need to be prepared.

There are several presentations for which standard content has been prepared, including the *Overview of Workshop*, *Overview of Urban Resilience*, and the *Introduction to the CityStrength Diagnostic*. Examples used in these base presentations should be customized to the local context with case studies that may resonate better with participants. A template presentation is also available for *Overview of the Pre-Diagnostic Findings* segment of the workshop, however, this will require significant customization based on the content of the Briefing Note.

A group exercise on the topic of perceived shocks and stresses is recommended, the objective of which is to identify those that are a priority for inclusion in the diagnostic. It is also an opportunity for diverse stakeholders to exchange views on risks that could inhibit the city from achieving its goals. Resource 2 provides guidance on organizing and facilitating the group exercise.

Conduct the Workshop

The Launch Workshop is a half-day event that is designed to engage city stakeholders and World Bank specialists in a dialogue related to urban resilience. The facility selected for the workshop should be large enough to accommodate 50-80 participants with multiple round tables for group exercises and discussion. In both pilot implementations of the diagnostic, the Launch Workshop was conducted in a hotel conference center.

It is crucial to understand the cultural context of the city while designing the workshop agenda, including facilitation of discussions, timing of the workshop (i.e. start time in the morning, lunch break etc.), and finding the right balance between plenary presentations and breakout group activities. In all cases, ample time should be provided for discussion between presentations so as to promote the participation of all stakeholders.

Figure 13: Workshop Modules

MODULE	COMPONENT	PRESENTER(S)	OBJECTIVE
Welcome & Introduction	Welcome	Country Director/ Program Leader and Mayor or other senior official	• Explain the broader context of the workshop • Clarify the objectives of the workshop • Demonstrate the commitment of city leadership
	Overview of Workshop	Task Team Leader and City Focal Point	
Identifying City Achievements, Plans and Goals	Overview of City Plans and Development Goals	City Official	• Share relevant city plans and projects • Discuss and confirm the city's long-term goals
Understanding the CityStrength Diagnostic	Overview of Urban Resilience	Task Team Leader or CityStrength Coordinator	• Explain the concept of urban resilience • Highlight the benefits of enhancing urban resilience for the city • Explain the CityStrength Diagnostic process
	Introduction to the CityStrength Diagnostic	Task Team Leader or CityStrength Coordinator	
Confirming the Findings of the Pre-Diagnostic Review	Overview of the Pre-Diagnostic Findings	Task Team Member	• Share and discuss the main findings from existing studies, plans, and interviews with city departments • Share the preliminary list of shocks and stresses identified during Stage 1
Exploring Shocks and Stresses in the City	Facilitated breakout group discussions on perceived shocks and stresses in the city	Task Team	• Share and discuss perceived shocks and stresses in the city that should be included in the CSD • Reach consensus on primary shocks and stresses
Next Steps	Conclusions & Planning for Stage 3	Task Team Leader and City Focal Point	• Explain the next steps, including field visits and interviews • Clarify the role of city stakeholders throughout the process

Stage 2

Stage 3: Interviews and Field Visits

The objective of Stage 3 is to collect additional information on the performance of urban system through interviews with relevant stakeholders and field visits to targeted areas in the city.

Participate in Field Visits

The selection of sites for field visits in the city should be decided jointly by the World Bank and local government staff. The decision should be informed by the shocks and stresses identified, the sectors selected for inclusion in the diagnostic, city development plans, and issues raised during the Launch Workshop. The objective is to gain a shared understanding of risks in the city by visiting locations that could be considered hotspots of vulnerability (existing and projected) and provide a good representation of sectoral challenges and achievements.

The field visit itinerary could be defined through a cross-sectoral group discussion or a mapping exercise (Resource 3). Depending on the number of participants present, the mapping exercise could either be carried out in plenary or breakout group mode. The base maps upon which participants will provide input could be skeletal (i.e. simply the road network and major landmarks) or fully populated (i.e. all major infrastructure networks are shown), depending on the availability and quality of digitized maps in the city. If the former, substantial time will need to be allocated to schematically populating the base map using the questions provided in the exercise description. In all cases, for the exercise to be a success, technical staff from relevant local government agencies must participate.

Figure 14: Exercises in Can Tho, Vietnam and Addis Ababa, Ethiopia

The timing of the field visits will depend on the local context, including the distance between sites, the number of people participating, and the scheduling of interviews and focus groups. For example, in the Can Tho pilot the field visit included all Task Team members as well as staff from a Project Management Unit, had a duration of approximately 4 hours, and took place the day following the Launch Workshop. However, in Addis Ababa, the Task Team conducted the field visits in two groups to accommodate the simultaneous scheduling of interviews with stakeholders. In addition, the two groups planned distinct itineraries due to the distance between sites and traffic congestion. It was determined that this would be the most efficient approach given the local context. In both pilots, there were topics that arose during interviews with local stakeholders that motivated World Bank specialists to conduct additional visits to specific locations.

In addition to gaining a shared understanding of the city, the field visits are an opportunity to delve into sectoral issues with counterparts in advance of the more formal interviews and focus group meetings. There is often a significant amount of time spent in transit between sites. Moreover, it is an opportunity for cross-sectoral learning and awareness building for both the World Bank team and technical staff from the city government.

Conduct Interviews on Sectoral Issues

While the summary of information in the Briefing Note (Stage 1) and discussions during the Launch Workshop (Stage 2) provide the foundation for understanding the city's development trends and exposure to different shocks and stresses, the Sectoral Guiding Questions (see Resources 4-17) provide the framework for the more detailed evaluation of the resilience of individual sectors.

The Guiding Questions were developed based on a review of 40 relevant tools, frameworks, and methodologies, resulting in a database of over 600 possible questions or indicators. This was then filtered, revised, and amended. CityStrength is a qualitative assessment, and, as such, the Guiding Questions are intended to support seasoned technical experts in a dialogue with local stakeholders. They are not intended to be used as a checklist or tool for a desk-based study. Depending on the specific city context, some questions may not be relevant or additional questions may need to be added. The augmentation of the questions will depend on the judgment of the World Bank specialist.

Each set of Guiding Questions is organized by topics specific to the sector and includes a description of why the question is relevant to evaluating urban resilience. The Task Team members are provided with a worksheet template to facilitate the collection of information to respond to the questions. The responses provided in the worksheet are used as an input to the Prioritization Session (Stage 4) as well as the publication produced after implementation to capture the findings of the diagnostic in the city.

Some of the Guiding Questions can be addressed with information garnered from the Pre-Diagnostic Review (Stage 1) and the Launch Workshop (Stage 2), but the majority of the responses will come from or be confirmed by the one-on-one interviews, focus groups discussions, and field visits during this stage of the diagnostic. As such, scheduling meetings with relevant officials, technical staff, CSOs, and other stakeholders is critical, and each World Bank specialist should be pro-active in communicating to the Task Team Leader and/or local support the list of people with whom he or she would like to meet. It is preferable to meet with local officials and technical staff in their offices where they have all the materials that may be useful for the diagnostic readily available.

In addition to one-one-one interviews between World Bank and counterpart staff on a specific sector, it is recommended that the Task Team organizes group interviews or focus group discussions that include 2-3 local government departments and 2-3 World Bank sector specialists. This format can support cross-sectoral discussion and may initiate cross-departmental understanding and collaboration in the local government. For example, in the Can Tho pilot, a series of group interviews was conducted using a café style format in which 4 discussion tables were happening concurrently and rotated in 45 minute intervals. The Vice Chairwoman of Can Tho considered this activity one of the most fruitful components of the diagnostic because she observed how department heads had inconsistent, and sometimes conflicting, understandings about the planning and operation of some vital systems in the city.

Stage 3

Figure 15: Summary of Sectoral Guiding Questions

MODULE TOPIC	# OF GUIDING QUESTIONS
Community & Social Protection	21
Disaster Risk Management	18
Education	12
Energy	26
Environment	14
Health	13
Informational & Communications Technology	17
Local Economy	12
Logistics & Supply Chains	14
Municipal Finance	18
Solid Waste Management	18
Transport	18
Urban Development	22
Water & Sanitation	15
TOTAL	238

Organizing the field visits and interviews can be a very difficult task, involving travel planning, calls to multiple stakeholders, interpreters, and last minute rescheduling. If possible, administrative support should be requested from the Country Office to centralize this set of tasks with someone who is familiar with the city and stakeholders, and fluent in the local language.

Stage 3

Stage 4: Prioritization

The objective of Stage 4 is to prioritize actions and investments to enhance resilience in the city. This is done using multiple "lenses" to qualitatively identify measures that the participating specialists recommend as the most important for the city leaders to consider.

Assess Resilience through Multiple Lenses

The prioritization process uses a number of lenses to facilitate the analysis of the sectoral findings and to support the identification of priority actions and investments that would enhance the overall resilience of the city. *Actions* are soft measures such as capacity building, institution strengthening, or regulatory improvements, while *investments* are hard measures such as construction of infrastructure or establishment of a subsidy system.

The lenses are first used by the technical specialists to create the short-list of recommendations related to their respective sectors. They are used *sequentially* as the diagnostic process progresses; starting with Lens 1 and ending with Lens 4. As such, the worksheet for Lens 4 asks each technical specialist to list recommendations for the sector and then rate how well the recommendation aligns with local goals and objectives.

When the technical specialists come together for the Prioritization Session, they come prepared with the completed worksheets related to each of the four lenses. At this point, the lenses are used *iteratively* to look more holistically at the city's level of resilience to defined shocks and stresses and to define priority actions and investments that will have the most benefit in terms of enhancing resilience while also move forward important development initiatives.

It is recommended that the Task Team uses all of the lenses described below to arrive at final recommendations. They have been designed to ensure that multiple aspects of city-wide resilience are taken into consideration. However, there is flexibility in terms of how the lenses are discussed during the Prioritization Session.

Stage 4

Lens 1 – Shock and Stress Assessment

The objective of Lens 1 is to help understand the potential impact of significant shocks and stresses in the city, and particularly which people and assets are <u>directly</u> in danger. The rationale is that people and assets under imminent threat should be considered a high priority for investment or other actions.

In Lens 1, the technical specialists apply the list of shocks and stresses that emerged from the Pre-Diagnostic Review (Stage 1) and Launch Workshop (Stage 2) to the specific sector that is being evaluated. Shocks are assessed using a traditional risk assessment process in which risk is considered as a factor of *likelihood* and *intensity* of the shock, the sector's level of *exposure* to the shock, and any underlying vulnerabilities exacerbating the impact (e.g. social or physical fragilities). It is difficult to apply a traditional risk assessment process to stresses, however, because they are often ongoing, making consideration of likelihood unnecessary. In addition, other aspects such as trends (whether the situation is improving or deteriorating) need to be considered. Therefore, the worksheet for Lens 1 is composed of two parts—the first is focused on shocks and the second on stresses. Upon completion of the Lens 1 worksheets, it is expected that the technical specialist will have identified specific communities, socio-economic groups, and/or assets that are at high risk, and hence should be considered a priority for action in the sector.

Lens 2 – Dependencies and Interdependencies

The objective of Lens 2 is to improve understanding of dependencies and interdependencies within urban services and systems that can cause cascading disruption or failure, or compound existing vulnerabilities. Interdependencies have become a growing phenomenon across infrastructure sectors as they are not only a point of potential vulnerability but may also compound existing vulnerabilities and carry these vulnerabilities across multiple infrastructure sectors. For example, failure in the electricity system can have cascading impacts on multiple sectors by bringing electric powered equipment to a halt, including ground water pumping stations, overhead transportation lines, and communications cell towers.

The worksheets for Lens 2 ask sector experts to consider:

     a. Whether their sector might be under additional pressure if another sector were to be disrupted (horizontal assessment); and

     b. Whether other sectors might be under additional pressure if their sector were to be disrupted (vertical assessment).

When all the sector experts have completed this exercise, a full outlook of city sector interdependencies will exist. An interdependency matrix (Resource 23) will be prepared by the Task Team Leader for discussion and confirmation during the Prioritization Session. Once sector relationships are better understood, the sector experts can go back to Lens 1, exploring major sector vulnerabilities (to shocks and stresses) and potential implications to the wider urban system.

Lens 3 – Holistic Resilience

The objective of Lens 3 is to bring together the information from the sector evaluations, and think holistically (rather than sectorally) about the city's resilience in order to identify critical gaps or areas of weakness. To facilitate the cross-sectoral discussion and evaluation of priority actions and investments that will enhance overall resilience of the city, there are two options for Lens 3. Teams are welcome to use both approaches, but it is not required.

OPTION 1: QUALITIES OF RESILIENCE. In Option 1, technical specialists are asked to rate how well their sector reflects each of the qualities of resilience—Robust, Redundant, Reflective, Coordinated, and Inclusive—and provide a justification for the rating (Resource 20). This is a qualitative rating based on the specialist's experience and information collected as part of the diagnostic. The Task Team Leader collates these ratings into a matrix for discussion during the Prioritization Session (Resource 24). The matrix will provide a cross-sectoral snapshot of how the city is performing in relation to the five qualities of resilience. For example, it could reveal that the city rates quite well in terms of robustness across most sectors (i.e., infrastructure is well-conceived, constructed and managed), but is weak in terms of coordination (i.e., knowledge is not shared, planning is not collaborative and strategic, and decision-making is not based on investments that are mutually supportive towards a common outcome). It is the discussion around the score, rather than the score itself, that will catalyze the conversation among specialists and enable critical reflection leading to the ultimate set of recommendations made by the Team to the city leadership.

OPTION 2: CITY RESILIENCE FRAMEWORK. Option 2 uses the City Resilience Framework (CRF), developed by Arup International, to rate how well their sector contributes to four dimensions of resilience at the city level— health and wellbeing; economy and society; leadership and strategy; and systems and services. The CRF aims to form the basis for a common understanding of urban resilience and a 'baseline' for what matters most for making cities more resilient.

The CRF indicators have been integrated into the Sectoral Guiding Questions to facilitate the use of this option. For each of the CRF indicators included in a specific sector's guiding questions, the relevant technical specialist is asked to provide a rating of how well the sector performs (Resource

21). This is a qualitative rating based on the specialist's experience and information collected as part of the diagnostic. The Task Team Leader collates these ratings into a CRF matrix for discussion during the Prioritization Session (Resource 25). Presented within the CRF, the ratings will provide a cross-sectoral snapshot of how the city is performing in relation to the four dimensions of resilience described above. The CRF is not only useful for identifying weaknesses, but also strengths within the city that can be built upon. Another benefit of the CRF is that it can be used to link the city into a global discussion on resilience (i.e., the 100 Resilient Cities Challenge also uses the CRF).

Lens 4 – Alignment with Local Goals

The objective of Lens 4 is to help align the recommended actions and investments with local goals and objectives. Inclusion of this lens in the diagnostic is important for multiple reasons, including scarcity of local resources, stakeholder ownership and support, and long-term sustainability of resilience efforts. The lens reflects the assertion that resilience is not an end state, but rather an attribute that better enables a city to achieve its development goals.

The worksheet for Lens 4 asks the technical specialist to list the city's official goals, objectives, or aspirations as stated in government planning documents such as comprehensive plans or 5-year plans. This portion of the worksheet could be completed as a Task Team after the Launch Workshop (Stage 2), during which the local government is asked to make a formal presentation of the city's goals. It then asks the specialists to list sector-specific goals. These could be gleaned from master plans, investment plans, or stakeholder interviews.

It is within the Lens 4 worksheet that technical specialists are asked to provide their short-list of recommended actions and investments to enhance resilience within the sector. For each recommendation, the specialist must rate how well-aligned it is with the local government's goals and objectives. This process provides an opportunity for reflection – Are any of the recommendations contrary to the goals? Is there a way to bring the recommendations into better alignment with the goals? Are all the recommendations focused on enhancing resilience?

Bringing the Lenses Together

Lens 1 and 2, if considered together, help in determining the consequence of the most significant shocks and stresses. They capture both direct (Lens 1) and indirect impacts as a result of interdependencies between sectors and the potential for cascading failures (Lens 2). Alone, however, they would lean towards a perpetuation of the 'predict and prevent' paradigm that underpins disaster risk reduction, and does not account for unknown shocks and stresses or accept that it is not necessarily possible to determine the way in which they will play out.

Stage 4

These lenses are counter-balanced by Lens 3, which recognizes the city as a complex system and integrates future uncertainty. Lens 3 brings together information from the sectoral assessments to identify key gaps or weaknesses that need to be addressed to enhance citywide resilience in a holistic way. The opportunity is to align this with the overall development Goals and Objectives (Lens 4), whilst ensuring that the most significant risks (or threats) have been considered (Lens 1 and 2).

Prioritize Actions and Investments

Task Team members should submit the completed worksheets for Lens 1-4 prior to the Prioritization Session so that there is ample time for synthesizing the information and populating cross-sectoral matrices in advance.

TIMING
The Prioritization Session takes place after all the one-one-one interviews, group discussions, and field visits are conducted. With the rapid approach, it would be a 3-4 hour session organized for the day prior to the wrap-up session with city leadership. With the incremental approach, it would be a full day event occurring at least a week before the wrap-up session with city leadership.

PARTICIPANTS AND ROLES
All Task Team members must participate in the Prioritization Session. Sectoral recommendations submitted in writing with the completed worksheets will likely evolve and transform during the session, as such, it is paramount that the experts who contributed to the sectoral work are present to discuss and debate the final set of recommendations.

In some contexts, it may be possible to invite technical staff from the local government to participate in the Prioritization Session. Their input would benefit the process by providing additional insights on issues, feedback on preliminary recommendations, and ideas for increasing the feasibility of proposed actions and investments.

The CityStrength Coordinator, Task Team Leader, or a professional facilitator will guide the prioritization process. It is important that the facilitator is an unbiased, enabler of cross-sectoral dialogue so that all technical specialists feel that there is a level playing field for sharing ideas.

It is helpful to identify an official note taker prior to commencing the session. The facilitator may use large note pads or white boards to help organize suggestions and concepts, but there should be someone taking detailed notes in addition. This will be helpful in preparing for the wrap-up session with city leadership, drafting of the aide memoire, and the development of the publication of findings.

Step 1: Review and Consensus on Shocks and Stresses

Agree on the top 3 shocks and 3 stresses facing the city.

The Pre-Diagnostic Review (Stage 1) resulted in a list of preliminary shocks and stresses. This list was used during the Launch Workshop (Stage 2) to catalyze discussion among city stakeholders about their perceptions of shocks and stresses in the city, and resulted in a revised list. The Task Team is now asked to evaluate this list based on their sectoral expertise, experience, and information learned and observed during Stage 3. Has an important shock or stress been omitted? Is a shock or stress being overstated? Is there a shock or stress that should be tentatively included on the list, but which requires additional analysis? Finally, if there are more than 3 shocks and 3 stresses facing the city, is it possible to bundle some of them together?

Step 2: Review and Consensus on People or Assets at High Risk

Identify the specific communities, socio-economic groups, and/or assets that are at high risk in the city.

On a sector by sector basis, each technical specialist has identified specific communities, groups, and/or assets that are in direct danger from shocks and stresses. Prior to the Prioritization Session, the facilitator will combine the content provided by each specialist on the Lens 1 worksheets into a table or cards that can be used for clustering on a wall or white board. Each specialist will present their analysis and provide clarification if needed. Are the sectoral findings consistent? Are there specific areas of the city that could be considered hot spots? If the list of key shocks and stresses was revised in Step 1, does it impact the composition of people or assets at high risk?

Step 3: Review and Consensus on City Goals

Agree on the primary city and sectoral goals.

Using the worksheet from Lens 4, the group reviews and confirms the city's formal development goals. In most cases, this will have been presented by a city official during the Launch Workshop (Stage 2). Each technical specialist is given the opportunity to share any sector-specific goals that he or she considers significant for the prioritization process.

Step 4: Sharing and Clustering of Sectoral Recommendations

Organize the sectoral recommendations into clusters according to the themes.

This step also utilizes the worksheet from Lens 4. Prior to the session, the Task Team Leader will collect the sectoral recommendations and put them on to individual sheets or cards. Each card should list a specific recommendation and denote from which sector it came and if it is an action or an investment. Each technical specialist is asked to present their sector's recommendations. Once all sectors have been presented, and any questions or clarifications addressed, the group will cluster the recommendations on a wall or white board. Topics around which the cards could be clustered include:

- Proposed actions (institutional strengthening, capacity building, data collection, regulatory reforms, etc.)
- Proposed investments (new infrastructure, rehabilitation of infrastructure, safety net systems, new programs, etc.)
- Measures to address specific shocks or stresses
- Measures to protect specific communities, groups, or assets
- Short-term versus medium-term measures

At this point, it is not necessary to consolidate or remove specific recommendations. That will happen in Step 7. However, if there is early consensus to consolidate, remove, or revise, the group is free to do so.

Step 5: Review of the Interdependency Matrix

Identify key interdependencies among sectors – citywide or in specific geographic locations.

Prior to the session, the Task Team Leader populates an Interdependency Matrix based on the content of the Lens 2 worksheets submitted by the technical specialists. The matrix is color-coded to indicate in red sectors with significant interdependence (i.e., sectors in which damage from a shock or stress would significantly impact another sector), in yellow the sectors that have moderate interdependence, and in green the sectors with little or no interdependence. This matrix is distributed to the group for discussion. Does this full outlook of city sector interdependencies change your diagnosis of the specific communities, socio-economic groups, and/or assets that are at high risk? Does it compel you to revise or augment your sectoral recommendations?

Step 6: Review of the Holistic City Resilience Matrix

Identify critical gaps or areas of weakness in regard to overall city resilience.

Prior to the session, the Task Team Leader populates the Holistic City Resilience Matrix (using either Option 1—*Qualities of Resilience* or Option 2—*City Resilience Framework* described earlier). This matrix is distributed to the group for discussion. Does the matrix reveal critical gaps or areas of weakness in regard to overall city resilience? Does it compel you to revise or augment your sectoral recommendations?

Step 7: Revisit the Sectoral Recommendations

Revise and re-cluster recommendations from Step 3, and identify any new overarching recommendations.

In Steps 5 and 6, the technical specialists are invited to revise their sectoral recommendations based on the outcome of the interdependency analysis and holistic look at city resilience. In this step, the group is asked to revisit the conclusion of Step 3 and refine any overarching recommendations based on the insights that emerged from Steps 5 and 6. To make the set of recommendations easily digestible by local stakeholders, it is recommended that the group develop 1 or 2 overarching recommendations followed by up to 5 actions and 5 investments.

Step 8: Calibrate the Recommended Actions and Investments

Review the consolidated list of recommendations for alignment with local goals from Step 3.

In the final step, the group assesses the alignment between the consolidated list of recommendations and local goals from Step 3. Similar to the exercise completed in Lens 4 on a sectoral basis, this juncture offers an opportunity for reflection. Are any of the recommendations contrary to the goals? Is there a way to bring the recommendations into better alignment with the goals? Are all the recommendations focused on enhancing resilience?

Stage 5: Next Steps

The objective of Stage 5 is to discuss the findings of the diagnostic with local leadership, share recommendations, and agree on next steps. Prior to sharing the draft recommendations with the counterpart, World Bank management may want to be briefed. The Task Team Leader should confer with the CMU early in the diagnostic process to ensure that ample time for briefing is allocated if necessary. The time between the Prioritization Session and the wrap-up meeting with city leadership may be quite short, and, therefore, the Task Team Leader and CMU should agree in advance on the timing.

Wrap-up Meeting with City Leadership

Depending on the local context, the wrap-up meeting may be with a small group of city officials or with the same large set of stakeholders who participated in the Launch Workshop. The format and size will inform the type of materials that need to be prepared in advance. For a small scale gathering, the Task Team should prepare talking points to share in hard copy. For a larger event, it may be more appropriate to prepare a PowerPoint presentation. For example, in the Addis Ababa pilot, the wrap-up meeting consisted of the Mayor and the Deputy Mayor while in the Can Tho pilot, the wrap-up meeting was organized in a workshop format and included the Chairman, Vice-Chairwoman, all heads of departments, and representatives from select ministries.

An aide memoire should be prepared capturing the main findings of the diagnostic, recommendations for priority actions and investments, and agreed next steps. Importantly, the aide memoire should reflect input and feedback from the wrap-up meetings and highlight any data gaps that could significantly alter the recommendations. Depending on Bank management norms, the aide memoire should be delivered to the city within 1 week after the wrap-up meeting.

Make the Findings Public

After agreeing on priorities and next steps, the Task Team prepares a brief publication highlighting the findings of the CityStrength Diagnostic, incorporating direction and feedback from local stakeholders, as well as additional research and verification, as applicable. This could be used by the local government to facilitate communication with a broad set of internal and external stakeholders. Ultimately, the local government decides if a publication should be prepared.

The purpose of the publication is to document and make public the resilience building priorities

agreed with local leadership during the implementation of the diagnostic. To effectively communicate the findings to a broad audience, it is recommended that the publication be relatively short (max 50 pages), rich with graphics such as maps, infographics, and pictures, and use simple, accessible language. It is also recommended that the publication be translated into the local language and disseminated through local media channels. In Can Tho, for example, the dissemination of the publication was supported by the production of a video highlighting the impact of the city's chronic flooding on residents. The publication, video, and article were made available in Vietnamese. Figure 16 provides a suggested outline for the content of the publication.

Figure 16: Content of the CityStrength Diagnostic Findings Publication	
SECTION	**CONTENT**
Note to the Reader	Presents the objective of CityStrength Diagnostic and any relevant background on its implementation in the city such as dates and participants.
Letter from the Mayor	Highlights the rationale for implementing the CityStrength Diagnostic in the city and demonstrates commitment to enhancing urban resilience
Executive Summary	Provides a summary of the main shocks and stresses facing the city and recommended priority actions and investment
Overview of Urban Resilience	Defines the concept of urban resilience and why it is a critical issue for the city
Overview of the CityStrength Diagnostic	Describes the objective of the CityStrength Diagnostic and its 5 stages
Description of the city	Provides key socio-economic, geographic, climatic and service delivery information. Presents the city's goals and objectives for development
Shocks and Stresses in the City	Describes the main shocks and stresses that could inhibit the city from reaching its development goals
Findings of the CityStrength Diagnostic	Provides snapshots of each sector included in the diagnostic, including their performance relative to the qualities of resilience, recent support from development partners, and recommendations for improvement
Recommendations	Presents the recommended actions and investments for enhancing the city's resilience
Immediate Measures	Presents a sub-set of short term and/or low cost resilience enhancing measures that the city can start implementing immediately
Resources	List all of the studies, reports, and plans reviewed as part of the diagnostic

The Task Team Leader will take the lead in preparing the first draft of the publication based on several inputs, including: the final aide memoire, the responses to the Sectoral Guiding Questions, the completed and refined lens worksheets, the notes from the Prioritization Session, and information collected during the Pre-Diagnostic Review. The first draft is circulated to the Task Team, and it is the responsibility of all team members to provide comments and revisions to ensure that the publication accurately reflects the diagnostic process and outcomes.

Given that the publication will be a public statement of the Bank's recommendation for the city, it is recommended that the draft document be put through a peer review process. Once approved, it should be sent to the counterpart for final review and approval.

Set the Path for Future Engagement

The CityStrength Diagnostic is not an end, it is a beginning. In parallel to the preparation of the findings publication, the Task Team continues a dialogue with the client city on how the World Bank or other development partners could support the recommended actions and investments. Depending on the nature of the recommendations, follow-up support may be guided by the Task Team Leader or other technical specialists who participated in the diagnostic, and include activities such as studies and surveys to fill data gaps, feasibility studies for critical infrastructure or programs, technical assistance, or a financing operation.

As an example, the engagement in Can Tho, subsequent to the CityStrength Diagnostic, includes the preparation of a $250 million financing operation—the Can Tho Urban Development and Resilience Project. This operation will support flood protection in the urban core, improved stormwater drainage and sanitation, transport improvements to help guide urbanization to higher elevation areas of the city, and urban management capacity building. In addition to the operation, the World Bank is pursuing trust fund resources to help the city establish an open data initiative and study logistics and supply chain dynamics in the metropolitan region.

Resource 1:
Categorization of Shocks and Stresses

Hazard Group: **Natural**   Key: ⚡ **Shock**   ☀ **Stress**

HAZARD SUB-GROUP	HAZARD TYPE & EXAMPLE	GUIDING QUESTION	SHOCK/STRESS
Meteorological	Extreme Temperature (High) Ex: Heat Wave	Has the city suffered fatalities due to heatwave?	⚡
Meteorological	Extreme Temperature (low) Ex: Cold Wave	Has the city suffered fatalities due to extreme winter weather?	⚡
Meteorological	Mid-latitude (Extratropical) Storms Ex: Winterstorms (including snow, blizzards, hail and severe winter weather)	Has the city experienced severe windstorms?	⚡
Meteorological	Mid-latitude (Extratropical) Storms Ex: Tornadoes	Has the city experienced tornedos?	⚡
Meteorological	Mid-latitude (Extratropical) Storms Ex: Sandstorms	Has the city experienced sandstorms?	⚡
Meteorological	Tropical Storms Ex: Cyclines/Hurricanes/Typhoons	Has the city experienced cyclones/hurricanes/typhoons?	⚡
Meteorological	Tropical Storms Ex: Coastal/Storm Surges	Has the city experienced coastal/storm surges?	⚡
Meteorological	Tropical Storms Ex: Severe Winds, Severe Rain and Flooding, Landslides	Has the city experienced severe winds, severe rain and flooding, landslides?	⚡
Meteorological	Electrical Storm Ex: Severe Lightning/thunderstorm; Derecho	Has the city experienced severe lightning/thunderstorm?	⚡
Climatological	Wildfire Ex: Bush/Brush Fire	Has the city or region experienced bush/brush fires?	⚡
Climatological	Wildfire Ex: Forest Fire	Has the city or region experienced forest fires?	⚡

Climatological	Wildfire Ex: Scrub/Grassland Fire	Has the city or region experienced scrub/grassland fires?	⚡
Climatological	Drought Ex: Drought	Has the city experienced drought?	⚡ ❄
Climatological	Glacial lake outburst Ex: Glacial lake outburst	Has the city experienced glacial lake outburst?	⚡
Geophysical	Earthquake Ex: Earthquake, ground movement	Is the city located on or near fault lines? Has the city experienced earthquakes? When and at what magnitude?	⚡
Geophysical	Earthquake Ex: Liquefaction	Has the city experienced liquefaction?	⚡
Geophysical	Earthquake Ex: Tsunami	Has the city experienced a tsunami?	⚡
Geophysical	Mass Movement Ex: Avalanche	Is the city situated in a mountainous area with seasonal snow?	⚡
Geophysical	Mass Movement Ex: Debris Flow	Is the city situated on valley floor with surroundings slopes steeper than 25 degrees and consisting of loose sediment, soil, or weathered rock?	⚡
Geophysical	Mass Movement Ex: Mudflow	Is the city situated in a mountainous area with heavy seasonal rains?	⚡
Geophysical	Mass Movement Ex: Landslide	Are any parts of the city's physical structures on slopes situated on unstable ground?	⚡
Geophysical	Mass Movement Ex: Rockfall	Is any of the city's infrastructure or buildings positioned below a slope/cliff?	⚡
Geophysical	Volcano Ex: Lava flows (and crater)	Is the city located in the vicinity of an active volcano?	⚡
Geophysical	Volcano Ex: Pyroclastic flows	Is the city located in the vicinity of an active volcano?	⚡
Geophysical	Volcano Ex: Volcanic explosions–tephra and rock	Is the city located in the vicinity of an active volcano?	⚡
Geophysical	Volcano Ex: Volcanic ash	Is the city located in the vicinity of an active volcano?	⚡

59

Geophysical	Volcano Ex: Volcanic gases	Is the city located in the vicinity of an active volcano?	⚡
Geophysical	Volcano Ex: Lahar	Is the city located in the vicinity of an active volcano?	⚡
Hydrological	Flood Ex: Flash Flood	Has the city experienced flash flooding?	⚡
Hydrological	Flood Ex: Ice Jam Flood	Are part of the city located near rivers that freeze over winter?	⚡
Hydrological	Flood Ex: Fluvial Flood	Are parts of the city located in river floodplains?	⚡ ❋
Hydrological	Flood Ex: Groundwater Flood	Is the city located on a shallow water table or lluvial deposits?	⚡ ❋
Hydrological	Flood Ex: Pluvial Flood	Has the city experienced flash rainwater flood or extreme precipitation?	⚡
Hydrological	Flood Ex: Coastal Flood	Is the city located along a coast?	⚡ ❋
Hydrological	Wave Action Ex: Rogue Wave, Selche	Has the city experienced rouge wave, seiche?	⚡
Biological (Health)	Human Diseases Ex: Epidemic and Pandemic Bacterial Infectious Diseases (e.g. Pan Flu)	Have occurrences of bacterial infections (e.g., bone and joint, staphylococcus, pneumonia, tuberculosis etc.) increased rapidly in the last 3-5 years?	⚡
Biological (Health)	Human Diseases Ex: Epidemic and Pandemic Parasitic/fungal Infectious Diseases	Have occurrences of parasitic infections (e.g., hookworm) increased rapidly in the last 3-5 years?	⚡
Biological (Health)	Human Diseases Ex: Epidemic and Pandemic Viral Infectious Diseases	Have occurrences of viral infections (e.g., HIV, hepatitis, rabies etc.) increased rapidly in the last 3-5 years?	⚡
Biological (Health)	Animal Disease Ex: Zoonotic	Have occurrences of zoonotic infectious diseases increased rapidly in the last 3-5 years?	⚡
Biological (Health)	Animal Disease Ex: Non-zoonotic	Have occurrences of non-zoonotic diseases increased rapidly in the last 3-5 years?	⚡

Biological (Health)	Animal Disease Ex: Insect Infestation	Have occurrences of insect infestation increased rapidly in the last 3-5 years?	⚡
Extra-terrestrial	Space Weather Ex: Energy and Telecommunications Blackout	Does the city frequently suffer from power outages/ surges and/or telecommunications blackout?	⚡

Hazard Group: **Human**

HAZARD SUB-GROUP	HAZARD TYPE & EXAMPLE	GUIDING QUESTION	SHOCK/ STRESS
Political	Social Crisis Ex: Energy Crisis, Oil/Fuel Shortage	Is the city dependent on imported energy supply?	⚡ ✳
Political	Social Crisis Ex: Civil Liberties and Democracy	Do citizens have freedom of expression in politics, religion etc.? Does the city government communicate effectively with citizens?	✳
Political	Malicious Attacks Ex: Terrorist Attacks	Are there antagonisms in the society that could spark terrorist attacks? Are there international (political) antagonisms that could cause terrorism in the city?	⚡
Political	Malicious Attacks Ex: Terrorist Attacks on Infrastructure	Does the city hold infrastructure of critical national importance? Has the city ever experienced an attack on its infrastructure?	⚡
Political	Malicious Attacks Ex: Terrorist attacks on people - Chemical, Biological, Radioactive (CBR)	Are there antagonisms in the society that could spark terrorist attacks? Does the city have large and unprotected chemical\radioactive substance reserves?	⚡
Political	Malicious Attacks Ex: Terrorist attacks on people - Massacre	Has the city experienced isolated violent attacks on crowds of people?	⚡
Political	Political Ex: Weak rule of law	Do the city enforce regulations and laws?	✳
Political	Political Ex: War	Is there history of organized, country-wide violence? Is the city located in a country/region with political instability?	⚡

Political	Political Ex: Political Conflict	Has the city experience anti-government protests?	
Political	Political Ex: Corruption	Is there a significant amount of corruption at the city level and/or recurrent media allegations of corruption?	
Political	Political Ex: Poor Government Communication/Silos	Is the government's communication structure integrated across departments, emergency units and levels of leadership?	
Political	Political Ex: Poor Government Planning, land-use and Densification	Is city strategy and investment undertaken holistically? Are parts of the city connected, with access to essential services? Is land-use planning undertaken logically and holistically?	
Political	Governance Infrastructure Breakdown Ex: Governing System Breakdown	Are public employees unionized or have a history of participating in strikes?	
Political	Governance Infrastructure Breakdown Ex: Emergency Service Breakdown	Is there a history of communication or coordination problems between police, fire department, and emergency medical services?	
Political	Governance Infrastructure Breakdown Ex: Public Safety Service Breakdown	Is the city or regions police force institutionally sound and adequately funded?	
Socioeconomic	Social Crisis Ex: Housing Crisis	Is there a high housing deficit in the city? Have housing prices been rising sharply or volatile during the last decade?	
Socioeconomic	Social Crisis Ex: Food Crisis (including Famine)	Is the city overly dependent on one source of food supply?	
Socioeconomic	Social Crisis Ex: Congestion	Does the city have the services and service capacity to meet its current and predicted population?	
Socioeconomic	Social Crisis Ex: Social Conflict	Is there a history of social tensions in the city?	

Socioeconomic	Social Crisis Ex: Poverty and Inequality	Are the city's poverty and inequality levels higher than the national average?	
Socioeconomic	Social Crisis Ex: Crime	Is the city's crime rate higher than the national average?	
Socioeconomic	Social Crisis Ex: Drug-use	Has the city experienced a rapid increase in substance abuse cases in the last 3-5 years?	
Socioeconomic	Social Crisis Ex: Interpersonal Violence	Has the city experienced a rapid increase in interpersonal violence in the last 3-5 years?	
Socioeconomic	Social Crisis Ex: Suicide	Has the city experienced a rapid increase in suicide cases in the last 3-5 years?	
Socioeconomic	Economic Ex: Rapid population growth/decline	Has the city experienced a rapid increase/decline in population in the last 3-5 years?	
Socioeconomic	Economic Ex: Business Discontinuity	Are a large number of businesses or industries dependent on geographically concentrated utilities? Are private sector activities highly concentrated in one area of the city?	
Socioeconomic	Economic Ex: Excessive Unemployment	Does the city or region suffer from high unemployment? Has this changed considerably in the last 3-5 years?	
Socioeconomic	Cultural Crisis Ex: Destruction of Cultural Heritages	Does the city have a large amount of cultural heritage assets? Has city's cultural heritage ever suffered from deliberate damage/destruction?	
Socioeconomic	Socio-economic Infrastructure Breakdown Ex: Major Industrial Accident	Does the city have industrial uses? Are industrial facilities properly maintained?	
Socioeconomic	Socio-economic Infrastructure Breakdown Ex: Health Care Service Breakdown	Are health facilities in the city in poor condition or extended beyond service capacity? Are health care providers unionized or likely to strike?	
Socioeconomic	Socio-economic Infrastructure Breakdown Ex: Education Service Breakdown	Are education facilities in the city in poor condition or extended beyond service capacity? Are there sufficient educators in the city?	

Socioeconomic	Socio-economic Infrastructure Breakdown Ex: Financial System Breakdown	Do most city residents use the formal banking system?	
Environmental	Social Crisis Ex: Water Crisis	Is the city located in a water-constrained region? Is there a water supply deficit in the city or region? Is a high proportion of city residents dependent on non-piped water suppliers?	
Environmental	Environmental Destruction Ex: Destruction of Natural Environment	Does the city suffer from rapid environmental degradation caused by uncontrolled growth and pollution?	
Technological	Industrial Accident Ex: Chemical Spill	Does the city have industry that uses large quantities of chemicals?	
Technological	Industrial Accident Ex: Collapse	Does the city have building codes specific to industrial uses? Are they enforced?	
Technological	Industrial Accident Ex: Explosion	Does the city have industry with explosive materials (e.g., grain dust, aerosol cans etc.)?	
Technological	Industrial Accident Ex: Gas Leak	Does the city have landfills, incinerators and aging pipes that carry hazardous gases?	
Technological	Industrial Accident Ex: Oil Spill	Are there oil refineries or other such industrial uses in the vicinity of the city?	
Technological	Industrial Accident Ex: Poisoning	Does the city have industry that produces large quantities of toxic products/waste?	
Technological	Industrial Accident Ex: Radiation	Are there nuclear plans/nuclear fueled industries in the vicinity of the city?	
Technological	Non-industrial Accident Ex: Building Collapse	Are building standards enforced?	
Technological	Non-industrial Accident Ex: Infrastructure Collapse	Does the city have an asset management system for large scale infrastructure?	

Technological	Non-industrial Accident Ex: Explosion	Does the city have a natural gas distribution network? Are furnace or boiler systems a common heating mechanism in residential, commercial, or civic building?	
Technological	Non-industrial Accident Ex: Fire	Does the city have building construction practices that are sensitive to fire (e.g., uncommon use of fire resistant materials)? Is firewall insulation a common construction practice in the city? Does the city have overcrowded residential areas?	
Technological	Non-industrial Accident Ex: Transport Accident	Are traffic safety laws and regulations commonly complied with in the city?	
Technological	Basic Infrastructure Breakdown Ex: Water Infrastructure Breakdown	Does the city regularly perform maintenance of sewage pipes, dams, pumping stations, water treatment facilities etc.?	
Technological	Basic Infrastructure Breakdown Ex: Energy Infrastructure Breakdown	Does the city frequently suffer from power outages or surges? Does the city regularly perform maintenance of sub-stations, transmission systems etc.?	
Technological	Basic Infrastructure Breakdown Ex: Solid Waste Management System Breakdown	Does the city have a functional waste collection and disposal system?	
Technological	Basic Infrastructure Breakdown Ex: Communication Infrastructure Breakdown	Are the city's postal services, telecommunication networks, television, and radio station transmission centers at risk of disruption?	
Technological	Basic Infrastructure Breakdown Ex: Transport Breakdown	Is the city regularly maintaining its transit system, trains, buses etc.?	
Technological	Basic Infrastructure Breakdown Ex: Transport Service	Is there affordable public transport connecting all parts of the city?	
Technological	Socio-economic Infrastructure Breakdown Ex: Cyber Security	Is the city heavily reliant on ICT infrastructure?	
Technological	Socio-economic Infrastructure Breakdown Ex: Business Logistics System Breakdown	Are primary industries or sectors dependent on port or air logistics?	

Resource 2:

Launch Workshop Group
Exercise Description

The **objective** of the exercise is to give workshop participants the opportunity to discuss the findings of the Pre-Diagnostic Review, including and the preliminary list of primary shocks and stresses in a small group format.

DESCRIPTION

The participants will break into four diverse groups. If there are multiple participants from the same city department or organization, they are asked to join separate tables. Each group will have a facilitator and a note taker to capture the discussion.

The first task of the group facilitator is to appoint a group rapporteur who will summarize the key outcomes of the group discussion at the end of the exercise. Ideally, the rapporteur should not be a member of the Task Team.

Three hand-outs are provided to the participants: (1) a summary of the Pre-Diagnostic Review findings; (2) a sheet that defines shocks and stresses; and (3) a worksheet for placing each identified shock within a matrix of *impact* versus *frequency*.

STEPS

01 | **Hand-out 1: Discuss the findings of the Pre-Diagnostic Review**
(15 minutes)

- Do you disagree with the findings?
- Is there any crucial information that is missing?

02 | **Hand-outs 2 and 3: Discuss priority shocks and stresses**
(30 minutes)

- Do you agree with the shocks and stresses identified in the Pre-Diagnostic Review?
- Are there any shocks and stresses that are missing?
- Are there specific groups in the city that are more impacted by these shocks and stresses than the general public?
- How would you rate each shock in terms of *impact* and *frequency*?

03 | **Report back** (5 minutes per group)

Each group reports back on the main conclusions of their discussions. Participants from other groups are given the opportunity to ask clarifying questions.

04 | **Synthesis**

The facilitator guides the participants toward a board consensus on the shocks and stresses facing the city, and summarizes any disputed content from the Pre-Diagnostic Review that requires follow-up analysis by the Task Team.

Resource 3:

Mapping Exercise Description

The **objective** of the group exercise is to better understand the spatial implications of shocks and stresses in the city and to identify vulnerability hotspots. The exercise will help identify priority locations for Task Team site visits.

DESCRIPTION

A facilitator will support the discussions and guide participants through the exercise. The exercise will be carried out using a poster-size administrative map of the city. If up-to-date physical baseline maps are available, these can be used to quicken the pace of the exercise. However, it is important to review the location of major infrastructure or systems to ensure that participants have a shared understanding. The Task Team should take photos of the completed maps when the exercise is complete.

01 | **Create the socio-economic and physical baseline (30 min.)**
Indicate on the map (using markers/arrow stickers/post-its):

a. **Infrastructure**
- Where are the power utilities located?
- Where are the major public transport hubs located?
- Where in the city are communication assets located?
- Where does the water supply originate?
- What parts of the city are connected to the sewerage system?'

b. **Land Use**
- Where are the green spaces of the city located?
- Where in the city does agriculture take place?
- Where are the major commercial centers?

- Where is the city expanding outside formal administrative boundaries?

c. Socio-economic

- Where do the poorest people live?
- Where do the wealthiest people live?
- What parts of the city are the most densely populated?
- What part of the city is impacted the most by crime?
- What part of the city are you most proud of?

02 | **Discuss trends (20 min.)**
Indicate on the map (using markers/arrow stickers/post-its):

- Where has recent urban growth taken place?
- Which areas are densifying?
- Where is urban development expected to occur over the next 5-10 years?
- What demographic shifts are taking place and how will they impact the spatial vulnerability of the city?

03 | **Identify the hotspots (30 min.)**
Indicate on the map (using markers/arrow stickers/post-its):

a. Shocks and Stresses

- [Prepare questions based on the shocks and stresses identified in Pre-diagnostic Review. Amend the list based on the outcome of discussions during the Launch Workshop.]
- What parts of the city are most impacted by [shock]?
- What parts of the city are most vulnerable to [stress]?
- How have communities and businesses coped with these events in the past?

b. Hotspots:

- What areas in the city present multi-layered vulnerabilities and could therefore be identified as hotspots (in terms of spatial sensitivity and exposure to the identified shocks and stresses and the resulting implications for the socio-economic and physical aspects of the city)?
- Which are the priority hotspots?
- Will these hotspots become even more vulnerable in the future?

04 | **Identify sites for the CityStrength field visits (20 min.)**
Based on the completed map, as well as outcomes of the Launch Workshop, which locations should the Task Team visit?

Resource 4:

Guiding Questions on
URBAN DEVELOPMENT
(required)

In a resilient city, physical and socio-economic planning processes are well-coordinated, legally enforced, inclusive, and cross-sectoral. Key stakeholders are involved to align plans with sector priorities and to ensure that the interests of all societal groups are taken into consideration (*coordinated and inclusive*). Coordination between departments and other agencies enables the use of existing knowledge and data across the city to better understand current and future vulnerabilities (*reflective*). Urban planning and development ensures a holistic and long-term approach to urban growth, factoring in potential shocks and stresses and encouraging proactive mitigation measures (*robust*). Multiple strategies are in place to ensure that primary urban development goals can be achieved in the face of changing demographics, urbanization rates, or economic shifts (*redundant*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Does the city's planning department draw on expertise and knowledge of the private sector, research institutions and the civil society for development of land-use plans? Which sectors and departments within the city collaborate during development and/ or reviewing of such plans? [Lens 3 – CRF 10 and 11]**	Coordinated	A collaborative planning process informed by specialized knowledge and expertise can enhance the applicability, coordination, and quality of land-use plans. By including different stakeholders in the planning process the city engenders ownership of the plan.
Regulations: **Is there a regulatory framework in place to manage urban growth and reduce risks associated with uncontrolled growth? Are the regulations effective and enforceable?**	Robust	Enforced planning regulations can help prevent unauthorized development in the city and thereby protect the environment, residents' health and the overall urban ecosystem.

Institutional Capacity: **Does the city have transparent and predictable procedures for public/ stakeholder participation during planning processes? How is participation amongst vulnerable groups in the society (e.g. women, illiterate, informal etc.) encouraged? [Lens 3 – CRF 11]**	Inclusive	Transparent and predictable participation procedures boost confidence and trust in the planning process. Participation is facilitated with clear rules and context-appropriate engagement platforms. Vulnerable groups may need customized engagement channels to participate in decision-making.
Regulations: **Are land use policies and planning regulations for housing and development infrastructure informed by projected natural, climate and man-made risks? How well enforced are risk–sensitive land use regulations, building codes, and health and safety codes across all development zones and building types (e.g. health and safety codes for settlements neighboring industrial sites)? [Lens 3 – CRF 7]**	Reflective; Robust	Risk-based land use policies and regulations for natural, climate and man-made risks should be integrated in land use planning to reduce exposure.
Planning: **Does the city's planning department make use of digital tools for analyzing and visualizing geo-referenced data (e.g., public assets, natural resources, traffic corridors, etc.) [Lens 3 – CRF 12]**	Reflective	Digital tools with geo-referencing capabilities facilitate strategic spatial planning by identifying location-specific correlations and inter-dependencies, including known vulnerable areas.
Planning: **Is urban planning/future development guided by a city strategy? If so, what are the main elements of the strategy and how do they influence spatial development in the city? [Lens 3 – CRF 12]**	Robust	Urban planning which is aligned with the city's development goals is reliable and supportive of those goals.
Planning: **Are multiple strategies are in place to ensure that primary urban development goals can be achieved in the face of changing demographics, urbanization rates, or economic shifts?**	Redundant	To address the unpredictable nature of urban evolution, city strategies should be flexible enough to accommodate multiple scenarios.

Vulnerability: **Which areas within the city, and specific infrastructure, buildings and populations have the highest exposure to natural and climate related hazards? [Lens 3 – CRF 7]**	**Reflective**	Identification of vulnerable hot-spots facilitates the prioritization of disaster preparedness investments and actions.
Planning: **Is the city's rate of population growth accommodated in its master/land-use plans and other planning instruments (i.e. sufficient area for new housing developments)? Is the city growing at the expense of protected areas and urban green spaces/recreational areas? [Lens 3 – CRF 12]**	**Reflective**	Spatial planning relies on population projections and future service demand estimates for preserving sufficient land for each function. Uncontrolled urban growth often encroaches on the city's green areas and can jeopardize its ecosystem.
Planning: **How well are disaster risk assessments (including climate related risk) and environmental impact assessments incorporated into all relevant local development planning on a consistent basis? [Lens 3 – CRF 12]**	**Coordinated**	Risk assessment and land suitability analysis should provide the basis for land use planning to avoid development in high-risk areas and/or environmental degradation.
Planning: **Does the city have a disaster risk management plan, climate change mitigation and adaptation plan? What percentage of actions identified in these plans have been/are being implemented?**	**Reflective**	Risk management, climate change mitigation, and adaptation plans help identify investment priorities that are in line with the city's development strategy. The existence and implementation of these plans are a good indication of how well the city is using data on natural hazards to inform decision-making.
Planning: **In case of a disaster event, does the city have a post event recovery plan? [Lens 3 – CRF 8]**	**Robust**	Recovery plans help the city identify possible funding sources, procedures for effectively initiating the recovery process and risk-reductions to consider during rebuilding.

Asset Management: **Does the city have an inventory of publically owned land, buildings, and infrastructure? If so, is the inventory regularly updated?**	Reflective	Public asset management is important for determining asset value, budgeting operating costs and maintenance, and evaluating asset performance on a regular basis. Public assets can also be used to strategically guide growth to areas of the city with less risk exposure.
Informality: **Are urban upgrading programs ongoing in slum areas?**	Inclusive	Urban upgrading projects can be used to achieve greater equity in infrastructure and service accessibility and thereby reduce vulnerability among low-income groups in the city.
Informality: **What percentage of the population lives in informal or temporary settlements? What percentage of the population is "floating"?** **[Lens 3 – CRF 1]**	Robust	A large proportion of informal settlements in a city usually coincides with large poverty levels. People living in informal settlements often suffer from tenant-insecurity, environmental health problems, overcrowding and greater exposure to risks.
Informality: **Do informal settlements have access to basic services at affordable prices? [Lens 3 – CRF 1]**	Inclusive	Informal settlements are often un-served by public services, which means that residents are forced to buy alternative services at a high price or engage in practices that may endanger the environment or themselves.
Informality: **What is the level of exposure of urban poor settlements to climate and natural hazards, health and safety hazards, etc.? Are informal settlements a risk to the balance of the urban ecosystem?**	Inclusive	Informal settlers often occupy high-risk areas of the city, posing a risk to the urban ecosystem and themselves.

Informality: **Does the city have procedures for dealing with settlements at immediate risk? [Lens 3 – CRF 1]**	**Inclusive**	Clear resettlement procedures facilitate making choices about which residents need to be moved swiftly and which can wait for a long-term solution to be designed.
Vulnerability: **What was the observed vulnerability of infrastructure and buildings in past natural disasters (informal buildings, historic buildings, new and formal developments)?**	**Reflective**	Destruction during previous disasters may help to predict future vulnerability of urban infrastructure and buildings.
Vulnerability: **Are there ongoing formal and informal developments that are posing risks to the city's population and/or balance of the urban ecosystem?**	**Reflective**	Rapid urbanization, both formal and informal, can put pressure on urban services and the urban ecosystem.
Housing: **What percentage of the city's housing is informal and/or poor construction quality? [Lens 3 – CRF 1]**	**Reflective**	Informal settlements are particularly vulnerable to natural disaster due to the precarious sites they occupy, and the poor quality housing construction.
Cultural Heritage: **Is cultural and religious heritage vulnerable to the consequences of climate change, natural disasters and deterioration due to lack of maintenance? [Lens 3 – CRF 4]**	**Reflective**	Cultural and religious heritage, in form of tradition knowledge/ skills and/or symbolically rich built environment, can be used to mitigate impacts of natural disasters (e.g., building on stilts in coastal areas), but can also offer psycho-social and spiritual support during disaster recovery phase.

Resource 5:

Guiding Questions on
DISASTER RISK MANAGEMENT
(required)

In a resilient city, the disaster risk management system combines a well-functioning and inclusive disaster preparedness and emergency response mechanism with effective disaster prevention infrastructure (*robust, redundant and inclusive*). Such a mechanism and infrastructure is based on an integrated citywide risk assessment and is developed to prepare for, limit, and recover from expected shocks (*reflective*). In a resilient city, risk information is a necessary foundational element for institutional decision making across sectors (*coordinated*) and in particular for budget and strategic decisions for territorial planning and management of the built environment (*reflective*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Does the city have a policy and legislative framework that mandates the establishment of a DRM structure and functions for carrying out risk management activities?**	**Robust**	A policy and legislative framework that mandates the establishment of a DRM structure allows for legally binding assignment of roles and responsibilities that gives weight to DRM activities and increases accountability of assigned DRM actors.
Institutional Capacity: **How many of the identified risk reduction and preparedness programs are already being implemented? Is there a system of program monitoring and evaluation? [Lens 3 – CRF 10]**	**Robust; Reflective**	The ability to implement risk reduction strategies and disaster preparedness programs shows that a city is able to manage risks. Risk reduction monitoring is one way the city can evaluate the effectiveness of selected strategies.

Institutional Capacity: Is there a single parent agency in the city with mandate and capacity to coordinate all DRM activities, including risk identification, reduction, preparedness and post-disaster recovery? If yes, does this agency have sufficient financial, technical, and human resources to lead contingency planning? [Lens 3 – CRF 10]	**Coordinated**	Coordination of DRM activities allows for better management of knowledge and resources (both human and financial) amongst relevant actors. The financial, technical and human capacity of potential coordination body should be evaluated regularly to understand whether it is well positioned to lead contingency planning.
Institutional Capacity: Have DRM considerations been formally mainstreamed into all city departments? Is risk reduction clearly reflected in the departments' mandates, work plans, and staff job descriptions? Are there systems for evaluation and accountability? Does the city's principal DRM agency carry out training/capacity building activities for departmental leaders/technical staff on DRM? [Lens 3 – CRF 10]	**Coordinated; Reflective**	All departments in the city should be able to manage risks within their areas of responsibility. Appropriate DRM mainstreaming means that risk reduction is incorporated into the everyday functions of the department and responsibilities of the staff. Systems of evaluation and accountability ensure that the departments' DRM activities are monitored and objectives adequately met. The city's DRM agency regularly shares its expertise and knowledge about hazards with other departments so that they can incorporate new findings into their work programs.
Risk Identification: Are specific groups or assets highly exposed to risk? What programs are in place to reduce their vulnerability?	**Inclusive**	Poor and vulnerable groups are often more vulnerable to natural disasters due to the location of their home (i.e., river banks, steep mountainsides) and the poor quality of construction materials.

Finance: **What are the funding sources for DRM? To what extent is the funding discretionary at the local level? To what degree are funding sources and DRM activities coordinated across agencies? [Lens 3 – CRF 6]**	**Robust; Coordinated**	Predictable funding sources allow for continuous operation of DRM activities. When a city has discretionary control over funding for DRM, it achieves better alignment between risk reduction investments and development strategies. Where human resources and financing for risk reduction is limited, coordination of actors helps improve efficiency, targeting and flexibility of risk reduction programs.
Risk Identification: **Has any natural disaster and climate risk assessment and modeling been conducted by the city? If so, at what level (i.e., hazard, exposure at risk, loss) and at what geographical scale is the assessment/ modeling performed? Is the assessment/ modelling sector specific or integrated? How often are the risk assessments updated (annually, biannually…)? [Lens 3 – CRF 7]**	**Reflective**	Risk assessments identify the city's current and future vulnerabilities by examining historical data and/ or future climate scenarios through modeling. The geographical scale of the modeling and analytical level of the risk assessment indicates the robustness of information that informs the decision-making process. Sector-specific modeling/ assessment tends to have a higher granularity while cross-sectoral assessments are more integrated and holistic. The relevance of risk assessments depends on them being regularly updated to appropriately reflect levels of vulnerability and exposure.
Planning: **How well are local government risk assessments and risk management plans coordinated with, and supportive of, risk assessments and risk management plans from neighboring local authorities, state or provincial governments?**	**Coordinated**	Impacts of natural and man-made hazards are not confined to administrative boundaries. For the sake optimizing mitigation efforts, risk assessments and risk management strategies should be coordinated across city boundaries and different levels of government.

Planning: **Does the city have a Risk Reduction Plan (e.g. per sector or cross-sectorial plan)? If so, is the plan coordinated with relevant development plans, resource allocations and programmed activities? Are climate change projections considered in the Risk Reduction Plan? [Lens 3 – CRF 7]**	**Coordinated; Reflective**	In order to achieve uptake, Risk Reduction Plans should be coordinated with existing development plans, resource allocations and programmed activities. Risk Reduction Plans that are based on climate change projections can anticipate tomorrow's threats and adapt to these before they occur.
Planning: **Does the city have a Contingency Plan for natural hazards, and related environmental and technological hazards and risks? Does the plan identify roles and responsibilities, resources, information processes, and operation arrangements for anticipating and solving problems during a crisis? Is the plan regularly updated and exercised? [Lens 3 – CRF 8]**	**Coordinated; Reflective**	Although contingency plans are designed for rare and unusual events, they need to assign roles and responsibilities, and include procedures for preventing and mitigating potentially catastrophic consequences of an undesired event. To make sure that the plan remains relevant, procedures need to be regularly exercised and roles and responsibilities updated to reflect new conditions.
Preparedness: **Who in the government declares an emergency (city, regional, and national levels)? What criteria are used to evaluate whether a declaration should be made? [Lens 3 – CRF 10]**	**Robust**	Having a procedure with clear criteria for declaring an emergency makes the city´s emergency response reliable and transparent. Since being in an emergency state can change how a city government rules and administers its functions, it is important that a state of emergency can only be declared to increase effectiveness of emergency response.

Risk Awareness: Does the city have a local database on disaster scenarios, key responses and preparation steps concerning hazards? Does the city have asset and risk maps of the city? If so, are the database and/or asset and risk maps easily available and communicated to different levels of government, residents, private sector, civil society, etc.? Are the database and/or asset and risk maps generated collaboratively (e.g. through participatory mapping initiatives)? [Lens 3 – CRF 12]	**Reflective; Inclusive**	An emergency database containing information on potential scenarios, key responses and preparation steps is essential for preparing the public for events and ensuring efficient response when they occur. Publicly available asset and risk maps allow the government and other vested actors to evaluate potential exposure of their assets to each type of hazard. Participatory mapping of assets and risks brings the knowledge and perspectives of local communities to decision-makers. It is a culturally and socially sensitive form of mapping that result in higher granularity of spatial information.
Preparedness: In the event of a disaster, can disaster response agencies procure and contract goods and services effectively? Are key resources for effective response, such as emergency supplies, emergency shelters, identified evacuation routes and contingency plans available at all times?	**Robust; Redundant**	Effectiveness of response is determined by responders' availability of key resources and ability to acquire additional goods and services in a timely fashion.
Recovery: Does the city have standard procedures to assess post-disaster damages and losses?	**Reflective**	Procedures for assessing damages and losses indicate that the city has the ability to monitor and evaluate the impact of an event, which influences decisions regarding reconstruction and risk reduction investments.
Recovery: Does the city have a post event Recovery Plan for hazards?	**Robust**	A post event Recovery Plan is important for ensuring quick recovery of functions.

Preparedness: **Does the city have early warning systems? Has the system ever failed to provide early warning during a disaster? Has the city initiated or implemented public campaigns on disaster risk? Does the city offer training to citizens (schools etc.) on disaster behavior and preparedness?**	**Robust**	Early warning systems are essential to facilitating public safety during a disaster event by giving residents time to evacuate or protect themselves before impact. Public campaigns on disaster risk allow for widespread spread of knowledge and information about potential risks and effective response methods. Emergency preparedness and response training can be an effective way of raising risk awareness and ensuring that citizens are responding appropriately during an event.
Financial Protection: **Does the local government have a risk financing/insurance program in place?**	**Redundant**	A risk financing/insurance program enables the city to transfer some of the risks of financial losses during disaster events to the private sector. Financial protection mechanisms create financial buffers by avoiding additional strains to the municipal budget during disaster events.
Financial Protection: **To what extent do home-owners, private sector, etc. have access and make use of insurance coverage for catastrophic events? [Lens 3 – CRF 1]**	**Redundant**	Accessibility and usage of insurance coverage amongst home-owners and the private sectors acts as an incentive to invest in asset improvement and upgrading, making assets more robust to withstand future disturbances.

Resource 6:

Guiding Questions on
**COMMUNITY AND
SOCIAL PROTECTION**
(required)

In a resilient city, residents, including vulnerable groups, are given equal and fair access to basic services (*inclusive*). Support structures, such as safety net programs, target all vulnerable segments of the society and effectively deliver their services under any given scenario (*robust and coordinated*). All residents have equal opportunity to engage in the formal economy and have sufficient capacity to deal with and bounce back from shocks and stresses (*redundant and inclusive*). Decision-making and planning is inclusive and reflects community priorities and needs (inclusive and reflective). A resilient city creates opportunities for a thriving civil society that supports the representation of society, including a fair and effective crime prevention and justice systems (*robust*).

GUIDING QUESTION	QUALITY	EXPLANATION
Access: **Do all segments of the population have access to basic services (transportation, water, sanitation, energy) and social services (education, healthcare, and community facilities) at an affordable price?** **[Lens 3 - CRF 1 and 3]**	Inclusive	Equitable provision of basic services is essential for minimizing human vulnerabilities. Once basic needs are met, people can construct buffers for overcoming unforeseen disturbances. When governments are not able to provide affordable basic services, the poor often end up paying for high price alternatives.
Community Awareness & Participation: **Does a free press and media channels exist in the city? Are there other mechanisms for public dialogue?**	Inclusive	Free press contributes to improved governance and social development by highlighting public concerns and thereby encouraging government accountability and transparency.

Access: **Does the city have a high income inequality and high unemployment rate? Are vulnerable groups and minorities excluded from public life, the workforce, education etc.? Are there existing efforts to increase the agency of marginalized groups? [Lens 3 – CRF 2]**	**Inclusive**	Income equity, low unemployment and acceptance of diversity are common characteristics of cohesive societies, where interactions between individual members and the government are based on trust and support, and there is a strong focus on the common good.
Institutional Capacity: **What kind of social service programs exist in the city? Who is responsible for planning and delivering them? If there are multiple agencies, are they coordinated?**	**Coordinated; Robust**	Having designated social service agencies in the city is important for improving the conditions of the poor and vulnerable, and alleviating structural unemployment. Examples of support provided by social services are assistance programs focusing on food, health, child-care and electricity access. Coordination among social services is important for avoiding assistance overlaps and gaps.
Institutional Capacity: **Is there systematic collection and updating of socio-economic baseline data (gender disaggregated), including information on vulnerable groups? Are the national civil registries, poverty and vulnerabilities databases integrated into DRM management information systems?**	**Reflective**	A socio-economic baseline helps monitor social development in the city and allows for targeted social protection of vulnerable groups. During disaster response, vulnerability targeting can be facilitated by disaster response databases being linked to existing civil registries, poverty databases, or social protection databases.
Institutional Capacity: **Does the city have the capacity to adjust and/ or increase the provision of basic services in line with rapid changes in the population, resulting from rural to urban migration, influx of refugees, etc.?**	**Robust**	Proactive management of core services and well-maintained service systems are better able to accommodate abnormal demand, withstand unusual pressures and continue functioning during hard times.

Institutional Capacity: Does the city monitor social conflicts between different groups in the city? Are there programs to tackle causes of social tensions (e.g. income inequality, discrimination, social exclusion etc.)? [Lens 3 – CRF 4]	**Reflective**	Understanding the causes of social conflicts help mediate and prevent them from escalating.
Finance: What are the funding sources for social programs and services? To what extent is the funding discretionary at the local level? To what degree are funding sources and programming coordinated across agencies? [Lens 3 – CRF 6]	**Coordinated; Robust**	Targeted planning and implementation of social programs relies on predictable and reliable funding sources. When the city has the discretionary control of social funding, it can be held accountable for maintaining a correlation between development goals and distribution of funding. Where human resources and financing for social services are limited, coordination helps improve efficiency, targeting and flexibility of both ordinary and exceptional social service programming.
Community Awareness & Participation: Do effective civil society organizations exist in the city? Are they seen as legitimate, cooperate with each other and the city government, and have high participation? [Lens 3 – CRF 4]	**Inclusive**	Civil society organizations can help coordinate public actions and effectively channels citizens' demands towards the government. The efficiency and targeting of government programs can be improved by the government dealing with organized citizen groups rather than individuals.
Community Awareness & Participation: Do communities play a role in analysis, planning, and decision-making for disaster/climate risk reduction or recovery? [Lens 3 – CRF 4 and 11]	**Inclusive**	By contextualizing risks, community members can help identify a wide range of correlated vulnerabilities, risk reduction or recovery methods that are most desirable for those affected.

Safety Nets: Are there social protection programs for the poor, disabled and otherwise vulnerable groups in the society? What risks do they cover? Is an appropriate combination of beneficiary targeting applied (e.g. geographic, poverty-based, self and community-based)? Do regular social protection programs include vulnerability to disaster and climate change impacts in the beneficiary selection criteria?	Redundant	Social protection programs are meant to buffer risks that affect individual households, communities, regions or nations, so that vulnerable groups can escape both transient and chronic poverty during hard times. Effective social protection programs are based on an understanding of how different risks, including those related to climate change, may affect future livelihoods and well-being of individuals and communities.
Safety Nets: Is there a post-disaster beneficiary system in place that can verify beneficiary identities, track beneficiaries and verify payments? Is the system user-friendly (multi-lingual if needed), socially and culturally sensitive? Does it include effective grievance mechanisms that citizens are aware of and have access to?	Robust	The design of a post-disaster beneficiary system determines how effective it is in reaching the individual and groups most affected by a shock/disaster.
Community Awareness & Participation: To what extent does the government include community participation in local development decision-making? Are there mechanisms to ensure that all segments of the affected population can and do participate? [Lens 3 – CRF 4]	Inclusive	Through participation, affected communities can help identify vulnerabilities and localized risk reduction strategies that build on strengths and capabilities of communities. Inclusive decision-making can be achieved through design of culturally and socially sensitive participation platforms.
Community Awareness & Participation: Are local hazard trends, preparation steps and key responses communicated regularly to the population? Are local communities taught how to respond to a range of disasters or shocks? [Lens 3 – CRF 11]	Reflective	Community awareness of potential risks and knowledge of key responses helps increase safety and effectiveness of disaster response.

Community Awareness & Participation: Does the city maintain data on extreme events, key responses and preparation steps concerning hazards? Is the database accessible for everyone? Can everyone contribute to make or update the database? Is the database updated on a regular basis? Is there any scenario planning that takes place? [Lens 3 – CRF 12]	Reflective	A hazard database can be used to make informed decisions about future risk reduction interventions. In order to understand a variety of area uses/values at risk and learn from past responses, participatory mapping can add depth to the information provided in the database.
Empowerment & Capacity Building: What informal risk management strategies do communities make use of? Are these strategies understood/researched and, where appropriate, supported? To what extent do communities drive decision-making in disaster recovery programs?	Reflective	Communities often develop strategies for dealing with risks and everyday stresses that are embedded in wider livelihood strategies. Understanding the lived experiences and identifying co-benefits of coping strategies is important for evaluating which autonomous adaptation efforts to support.
Empowerment & Capacity Building: To what extent does the local government provide training in risk reduction for local officials and community leaders? Are there community-level disaster risk management committees or similar entities? [Lens 3 – CRF 11]	Coordinated	Community leaders are important channels for increasing public awareness on risk reduction. Community members are often the first respondents in a disaster and can be even more effective if they are organized and coordinated with other emergency response agencies.
Livelihood Protection & Enhancement: Are efforts made to support diversification of household income sources and livelihoods? Is healthy risk-taking behavior for livelihood enhancements encouraged for the sake of strengthening the household's adaptive ability? [Lens 3 – CRF 6]	Redundant	Diversification of income sources and livelihoods increases resilience in face of single-industry impacts. Knowing that safety nets exist can allow households to take initiatives that incur some risks, but potentially diversify incomes sources and create higher returns.

Gender: **To what extent do women participate in the formal economy? To what extent to women participate in decision-making at household and community levels?**	**Inclusive; Redundant**	Gender equality in the formal economy allows women to escape economic dependency on men and become autonomous members of their societies. Having two sources of household income is also a way of diversifying this income. Women often place higher emphasis on welfare related goals than men, which is why their role in household and community level-decision making is important.
Gender: **To what extent do women participate/lead community level disaster and climate risk management efforts (before and/or after disasters)?**	**Inclusive**	In many societies, women are disproportionately vulnerable to the impacts of extreme events. Their contribution to the design and implementation of risk management efforts is important for choosing strategies that ensure their needs are met.
Crime and Violence: **To what extent does the city have transparent measures and systems to deter crime? Do policing measures and systems to create a safe and secure city? [Lens 3 – CRF 5]**	**Robust; Inclusive**	A comprehensive and contextually appropriate approach to law enforcement facilitates the reduction and prevention of crime and corruption in a city. By instituting a transparent justice system based on ethical principles, cities can uphold the rule of law and promote citizenship in daily life. These norms are critical to maintaining order during times of stress. Well planned and resourced law enforcement facilitates peaceful recovery, and ensures a healthy population by reducing crime-related injury, fatality and stress.

Resource 7:

Guiding Questions on
Education

(Optional Sectoral Module)

In a resilient city, the education system strives for complete coverage by removing structural barriers to school enrollment (*inclusive*). Capacity management and planning of new facilities is grounded in demographic estimates, and the city's formal and informal growth patterns (*reflective and coordinated*). During disasters, there is an emphasis on continuity of education through adequate emergency preparedness and back-up systems (*redundant*). Schools previously exposed to shocks are retrofitted to better withstand future impacts, and new facilities are built in low-risk areas according to appropriate safety measures (*robust and reflective*). Contextualized risk information is integrated into the school curriculum encouraging pupils to engage in local risk reduction.

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: Who manages the education facilities and services in the city, including primary and secondary schools, vocational training centers and institutions of higher education? If there are multiple education agencies, are they well-coordinated in terms of management, development planning, and emergency response?	**Coordinated**	Close coordination among education providers facilitates complete coverage, planning for future demand, and emergency preparedness.
Access: Does the city have programs for maximizing enrollment in primary and secondary schools, especially among poor and vulnerable groups, through scholarships, transportation assistance, free lunch programs, etc. [Lens 3 – CRF 4]	**Inclusive**	Assistance programs which address barriers to school enrollment among poor and vulnerable groups help identify and reverse structural weaknesses in the education system.

Finance: **What are the funding sources for education facilities and services? To what extent is the funding discretionary at the local level? To what degree are funding sources and uses coordinated across agencies? [Lens 3 – CRF 6]**	**Robust; Coordinated**	An education system that strives for complete coverage and continuous operation relies on sustained and predictable funding. When a city has discretionary control over funding for education, it can be held accountable for achieving a pre-determined educational standard and coverage with the available funding. Where human resources and financing for education services are limited, coordination helps improve efficiency, targeting and flexibility of both ordinary education services and exceptional programming.
Finance: **Is contingency financing available for education facilities and services? [Lens 3 – CRF 8]**	**Redundant**	A contingency fund enables the continuity of education services in the event of unexpected disruption caused by external impacts, such as natural disasters, or human induced shocks, such as labor union strikes. A contingency fund can also help overcome sudden increase in demand for education services as caused by migration.
Access: **Do all segments of the population have access to primary and secondary education? Is primary and secondary education financially accessible to all groups in the city? [Lens 3 – CRF 1]**	**Inclusive**	In an inclusive education system, children from all socio-economic backgrounds, religions, abilities etc., have access to appropriate primary and secondary education. Access to education fosters students' participation in the labor market and, thereby supports social mobility and enhanced resilience to economic shocks. An inclusive education system is the cornerstone of a cohesive and just society.

Planning: Does the city have the capacity to adjust and/or increase provision of education services in line with projected and sudden population growth, accelerated by rural to urban migration, influx of refugees etc.?	Reflective	Reflective capacity management of schools requires regular service demand estimates to be made based on demographic changes (e.g., type of education needed). Inability to adjust to unexpected increase or changes in demand can lead to shortages in the education system and disruptions in the school year.
Planning: Have spatial patterns in the city shifted recently? Are there residential areas in the city, either formal or informal, that do not have education facilities available in the vicinity? Are informal settlements incorporated into demand estimates for planning of new education facilities? [Lens 3 – CRF 1]	Reflective; Inclusive	Monitoring the city's growth patterns, both formal and informal, allows for informed capacity management and appropriate siting of education facilities. Incorporating informal settlements into demand estimates for planning of education facilities is essential for encouraging social inclusion of poor and marginal groups.
Facilities: How have education facilities been impacted by past disasters and are they vulnerable to the consequences of climate change? Were the past impacts concentrated in specific locations? Have these disruptions and future risk projections informed improvements and substantial changes to the placement and/or (re)construction of facilities?	Robust; Reflective	Keeping a track of past events and anticipating potential future impacts helps the city identify vulnerable access routes, facility design faults and vulnerable locations for placement of new education facilities. Based on these evaluations, the city can make strategic maintenance and capital investments to improve school safety.
System Continuity: Is the probability that education facilities will remain operational in post-disaster situations assessed? Do shocks and stresses regularly create disruptions in the school calendar? How many days per year are schools out of session due to shocks and stresses? Is there a backup plan to ensure that school operations continue?	Robust	Education facilities that can remain operational in post-disaster situations are considered robust. Assessing the probability of education discontinuity according to disaster levels and types helps plan back-up/temporary facilities.

Facilities: Are there adequate resources and appropriate incentives for school maintenance and repair? To what degree do local governments or other levels of government have special programs in place to regularly assess schools for maintenance, compliance with building codes, general safety, weather-related risks etc.? [Lens 3 – CRF 8]	Robust	Facilities constructed according to appropriate building codes and safety measurements, which are additionally well-maintained, will generally better withstand disaster impacts. Regular evaluation of safety and disaster preparedness in schools allows for identification of maintenance needs and appropriate level of government intervention.
Preparedness: To what degree do local schools and colleges include courses, education, or training on disaster awareness and risk reduction (including climate-related risks) as part of the educational curriculum? [Lens 3 – CRF 11]	Reflective	Including knowledge about disaster risks into regular school curriculum fosters risk awareness and engagement of pupils in local risk reduction. Risk reduction education offered by local education institutions can be particularly useful due to its contextualization.
Preparedness: How prepared are the education facilities (back-up education material, trained staff, etc.) for emergency situations? Do all schools have preparedness plans? How often are regular disaster preparedness drills undertaken in schools?	Robust	A high level of emergency preparedness helps ensure continuity of education activities during a disaster event. In order to avoid prolonged disruptions in the school year and promote school safety, schools should develop preparedness plans and regularly perform drills, so that staff and pupils are familiar with appropriate emergency procedures.

Resource 8:
Guiding Questions on
Energy
(Optional Sectoral Module)

In a resilient city, the energy system offers a secure supply of power that ensures the continuity of services in the event of disruptions (*robust*). It has spare capacity to provide power to the city under any circumstances, especially to ensure continuity to the functioning of critical infrastructure like hospitals and government buildings (*redundant*). The planning for and design of energy infrastructure is informed by an integrated risk assessment taking major shocks and stresses into consideration (*reflectiveness*). A resilient energy system provides access to electricity to all societal groups, and embraces both centralized and decentralized approaches as appropriate (*inclusive and redundant*). Management of the energy system, including decisions regarding distribution and pricing, is inclusive of local departments and stakeholders (*coordinated and inclusive*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Who manages the city's energy planning? What is the city's degree of influence/control over power utilities? Do power utilities have collaboration channels in place for emergency situation (e.g., agreement on sharing excess demand, etc.)? [Lens 3 – CRF 10]**	Coordinated	**Close coordination among utilities and between utilities and the city can improve planning and accelerate response in case of disruption. Ability to exercise influence/control over power utilities helps the city ensure continuous supply to critical systems.**
Institutional Capacity: **Does the city have updated data on energy consumption across sectors?**	Reflective	**Maintaining an overview of energy consumption across sectors allows the city to manage health and environmental impacts of energy use.**

Regulatory Framework: **Is there a regulatory framework in place to reduce risks in the energy system, and potential cascading impacts (e.g., loss of economic productivity, disruption of critical services such as hospitals, etc.) [Lens 3 – CRF 8]**	**Robust**	**A regulatory framework for the city's energy system can be used to mitigate climate, and other risks, by making sure these are integrated into infrastructure updates and new design requirements. To better manage risks to the city's energy system, regulations can require diversification of energy generation and supply, as well as establishment of back-up generating systems for critical services.**
Finance: **What are the funding sources for the energy system and is the supply of energy financially sustainable (i.e., does it achieve cost recovery)? [Lens 3 – CRF 6]**	**Robust**	**A financially healthy energy sector with diverse and reliable sources of funding helps to ensure continuity in service provision. Cost recovery in the power sector implies a sustainable management, where revenues from electricity sales recover operational expenses at the very minimum.**
Finance: **Is contingency financing available for energy supply infrastructure and service delivery? [Lens 3 – CRF 8]**	**Redundant**	**A contingency fund covers unexpected damages to energy infrastructure/facilities, accommodates sudden demand increase and/or changes in energy prices.**
Planning: **Do building and zoning codes prevent the siting of critical energy infrastructure in hazard exposed areas? Are the building and zoning codes enforced? Are new developments obliged to integrate power supply in their design? [Lens 3 – CRF 7]**	**Robust**	**Enforced zoning codes help prevent siting of critical infrastructure in exposed areas, thus avoiding service disruption in the event of a disaster. New developments should consider the conditions of the area's energy supply to avoid overload, incorporate power supply as part of the design, and smart technologies for reducing consumption.**

93

Planning: How has the city's energy infrastructure and equipment been impacted by past disasters? Has this experience informed design and siting of new infrastructure and equipment?	Reflective	Past experiences can help cities understand vulnerabilities and strong points in their energy system, as well as the effects that specific events can have on the city's energy system.
Planning: Have previous disruptions informed improvements in technology and substantial changes in the energy system (e.g. flood-proofing of substations, undergrounding critical overhead lines, replacement of wood poles with steel, equipping grids with smart grid capabilities, etc.)?	Reflective	Technologies that promote equipment robustness can be used to prevent disruptions during disaster events. Knowledge about system vulnerabilities can be used to make improvements to avoid repeating previous failures.
Planning: Does the city have contingency plans for major failures within the energy sector? [Lens 3 – CRF 8]	Robust	Contingency plans help utilities and the city prepare equipment and procedures for when disasters occur, which helps accelerate the response and minimize the impact.
Access: Is there a mismatch between energy demand and energy supply? How much excess capacity is there in the city's energy supply?	Redundant	Excess capacity can prove useful when a portion of the energy system is impacted by a hazard, but could also represent inefficiencies in the energy system. Regular monitoring of energy consumption can reduce these inefficiencies while making sure the energy system can provide continuous services during disaster events.
Access: Do all areas of the city and all socio-economic segments of the population have 24-hour access to electricity? Are there areas in the city that are more vulnerable than others to power blackouts? [Lens 3 – CRF 11]	Inclusive	Lack of electricity can have adverse impacts on other sectors (health, manufacture, etc.). Efforts should focus on providing predictable electricity access to all populations in the city, as well as prioritizing critical infrastructure, such as hospitals, public-transportation, etc.

Generation: Is the city's energy supply diversified in terms of type (e.g., coal, solar, hydro) and source (private, public, imported)? How are different system types distributed across the city? Who is the main provider? Does the city have control over main energy sources? Are there rules and incentives in place to encourage distributed generation?	**Redundant**	An energy sector with diverse technology and sources is better equipped to address disruptions in energy supply. Reliable and distributed energy supply has a better chance of providing sustained, uninterrupted electricity if a localized disaster occurs.
Generation: Is the city's energy supply vulnerable to price shocks and political instability? What percentage of the city's energy supply is dependent on foreign fuels?	**Robust**	Economic and political changes can impact fuel supply and therefore electricity generation. This includes changes within the country or at an international level, especially if the city heavily relies on foreign fuel imports.
Generation: Could climate change or known natural hazards affect the balance of different types of energy generation assets? In what way and where?	**Robust**	Calculating the potential impacts of future weather events allows the city to prepare and avoid over-reliance on energy generation assets vulnerable to climate change, such as hydropower.
Generation: Do businesses, industries, residences, and key energy consumers (e.g. hospitals, fire stations, shelters, etc.) have back-up energy generator capacity with fuel/battery storage in the event of a power outage? What is the proportion of commercial / residential / institutional buildings served by own energy generation? [Lens 3 – CRF 6]	**Redundant**	Own energy generation or back up generation can be critical for facilities that rely on electricity to deliver basic services. Minimum levels of services need to be maintained in case of power outages. This serves as additional capacity for the energy system.
Demand: Will the anticipated effects of climate change have a significant impact on local energy demand (e.g. increased demand for heating/cooling)? Have future demand changes been incorporated into energy system design?	**Reflective**	Ability to assess the impacts of climate change on energy demand allows the city to adapt the design of its energy system, including use of new infrastructure, sources and technologies, to best accommodate future demand.

Demand: Does the city promote energy reduction among industrial, commercial, or residential consumers by means of education, community training and awareness raising campaigns? Has the city made any efforts to increase energy efficiency in public buildings?	Reflective	Successful energy reduction programs can lessen the pressure on limited energy sources, something that is particularly important in face of increasing number of energy consumers. Energy retrofitting of public infrastructure and buildings is an opportunity for cities to increase durability and resiliency of its assets.
Transmission & Distribution: Does the city know its total transmission and distribution losses and the reasons for these (e.g. inefficiency, theft and pilferage, etc.)? Are there any efforts/strategies for limiting losses from the transmission and distribution systems?	Reflective	Transmission and distribution losses are unavoidable, but keeping them to a minimum can have considerable effects on demand and costs. Transmission and distribution losses create demand for excess capacity that would otherwise not be needed.
Distribution (natural gas): Is the city's gas distribution done through piping or by using gas trucks to deliver tanks/ charge stationary tanks? What proportion of gas user accounts is currently exposed to hazards? To what degree of hazard intensity can the gas provision in the city remain functional?	Robust	Since gas itself can be a hazard, knowledge about a city's gas distribution helps identify vulnerabilities. It is useful to identify the degree of hazard events that can disrupt gas supply and how many people such a disturbance will affect.
Distribution (fuel): What proportion of major fuel distribution stations in the city are exposed to hazards? To what degree of hazard intensity can the major fuel distribution stations in the city remain functional?	Robust	Evaluating the level of stations' exposure helps assess fuel accessibility during disaster events. In case of prolonged events, it is useful to know which fuel distribution facilities can continue to function, as well as the coverage that can be achieved with these. Lack of fuel can have cascading impacts on functions which depend on fuel for mobility (e.g., ambulances, fire trucks etc.)

Demand: Do utilities have authority and capacity for demand side management (e.g. load shedding, financial incentives, etc.)?	Robust	Demand side management can help reduce demand during peak hours and reduce the need for investments in networks and/or power plants for meeting peak demands.
Vulnerability: What proportion of electrical assets is exposed to hazards? To what degree of hazard intensity can the electricity provision in the city remain functional? What proportion of electrical energy user accounts is exposed to hazards? [Lens 3 – CRF 7]	Robust	In case of prolonged events, it is useful to know the total capacity of facilities that can continue to function, as well as the coverage that can be achieved with these. To increase reliability of electricity supply, exposure of electrical user accounts should be minimized.
Safety: Does the city provide electrical safety recommendations to it citizens, both regarding risky household wiring and illegal connection to distribution networks?	Robust	Making citizens aware of electrical safety procedures is important for ensuring their well-being and maintaining undisturbed distribution channels.
Distribution: Could climate change or known natural hazards affect the performance of energy distribution networks (e.g. robustness of power-lines)? In what way and where?	Robust	If the effects of repeated weather events can be predicted, the city can improve the design of distribution systems to better withstand their impacts.
Distribution (fuel): Does the city have its own network of gas station and mobile fueling trucks to bypass the retail liquid fuels market in case of supply chain breakdown?	Redundant	Sustained fuel availability is required for mobilizing aid and providing basic transportation options.
Distribution: Is the design of the power distribution network compartmentalized enough to deal with faults on the line? Can the utilities isolate critical parts of the network and keep these running despite failure in other parts of the network?	Robust	A compartmentalized network helps ensure continuous supply despite failure in one part of the network. Compartmentalization also provides more time for response.

Resource 9:

Guiding Questions on
Environment
(Optional Sectoral Module)

In a resilient city, environmental considerations are effectively mainstreamed into sectoral plans, programs and investments (*coordinated*). Stability of the urban ecosystem is maintained through guided growth and implementation of environmental regulations (*robust*). Environmental protection agencies monitor changes to the environment are able to take early action to prevent environmental degradation (*reflective*). In a resilient city, natural resources and ecosystems are managed as public goods, including beyond municipal boundaries, and are used to buffer impacts of shocks and stresses (*robust and coordinated*). Accessibility and knowledge about effective use of ecosystem services is encouraged among the poor as a means of reducing food scarcity and improving livelihood options (*redundant and inclusive*).

GUIDING QUESTION	QUALITY	EXPLANATATION
Institutional Capacity: **Who manages and protects the environment, natural resources and ecosystem services*** **in the city? If there are several agencies, are they well-coordinated in terms of management, environmental planning and implementation of environmental requirements? With which agency/ department does the main responsibility lie?** **[Lens 3 – CRF 10]**	**Coordinated**	**Close coordination among agencies responsible for environmental protection facilitates better management of natural resources and ecosystem services, exchange of data and information, environmental planning and enforcement of environmental regulations. Having a responsible agency for environmental protection allows for better coordination of activities and accountability.**

Institutional Capacity: Have environmental considerations been formally mainstreamed into relevant city departments? Are there systems for evaluation and accountability? [Lens 3 – CRF 12]	Coordinated; Reflective	Efficient planning of environmental assets relies on alignment of environmental concern with the plans, programs and actions of institutions that drive sectoral development in the city. Systems for evaluation and accountability help ensure that departments meet predetermined environmental objectives and learn lessons for improving their environmental performance.
Institutional Capacity: Does the city have baseline data about the environment? Does the city regularly assess and monitor land use changes and other development activities impacting the environment? [Lens 3 – CRF 12]	Reflective	Cities that have environmental baseline data and regularly monitor changes to the environment are able take early action to prevent environmental deterioration.
Finance: What are the funding sources for environment and nature management? To what degree are funding sources and uses coordinated across agencies?	Robust; Coordinated	Reliable funding allows for sustained and up-to-date environmental and nature resource management. Coordination among agencies (both public and private) helps improve environmental planning and implementation of environmental regulations.
Finance: Does the city have an environmental contingency fund set aside to clean up and restore the environment after man-made (e.g. pollution; hazardous waste etc.) and natural disasters? [Lens 3 – CRF 8]	Redundant	An environmental contingency fund covers unexpected release of hazardous materials into the environment and impacts of natural disasters on the environment (unless these natural disasters are adequately covered by other funds). A contingency fund could also help overcome sudden changes in demand for environmental control and management due to rapid urbanization.

Planning: Is environmental planning and environmental management coordinated with urban planning? Do land use plans indicate where development is permissible and where it would be damaging for the environment? Are land use plans enforced? [Lens 3 – CRF 12]	Coordinated; Reflective	Integrated environmental and urban planning facilitates consistent land use development. For effective environmental protection, land use plans must include legally binding indications on where development is (not) permissible. Effective environmental protection depends on the protection of environmental zones outlined in land use plans and enforcement of zoning laws.
Planning: Are there environmental licensing requirements for new developments? Who manages and approves environmental licenses for new development in the city? [Lens 3 – CRF 7]	Robust	License requirements are put into place to make sure that a specific activity, especially construction, is consistent with the intended land use – as defined in the area's zoning plan, and development on sensitive/at risk land is being prevented.
Planning: How well integrated are the city's disaster risk management policies, strategies and implementation plans into existing environmental development, natural resources, and ecosystems management plans?	Coordinated	Disasters can have significant impacts on natural resources and their effective management. Natural resources and ecosystems can also be used to help manage the impacts of disasters (e.g., water retention ponds, mangroves, etc.).
Urban Growth: Have the city's settlement patterns shifted recently? Do new settlements pose threats to the environment and the balance of the urban ecosystem? Are the new settlements vulnerable to natural hazards and adverse climate change impacts?	Robust	Land use change, from natural vegetation to built-up areas, is often the main cause of environmental degradation and loss of biodiversity. New developments can disrupt the balance of the urban ecosystem and exacerbate impacts of natural disasters.

Regional: Are there any regional environmental problems that impact livability in the city (i.e. air pollution, pollution of rivers and coastal areas, etc.)? Are there any urban activities that have environmental impacts beyond the city's administrative boundaries (e.g., ecological disruption and resource depletion)? To what extent are the environmental management strategies coordinated across administrative boundaries?	Coordinated	Environmental impacts are rarely contained within administrative boundaries – pollution from the outside can affect life in the city and pollutions/natural resource depletion within the city can have regional consequences. Local and regional governments need to collaborate with governments beyond their own administrative boundaries to effectively manage environmental effects.
Accessibility: Are all residents able to use and benefit from the city's natural resources, ecosystem services, and recreation areas? Does the city have programs for improving accessibility and knowledge about effective use of ecosystem services for all segments of the population? [Lens 3 – CRF 1]	Inclusive	Equal access to the city's natural resources, ecosystem services, and recreation areas is a prerequisite for social cohesion and equal opportunity. Accessibility and knowledge about effective use of ecosystem services (e.g. agriculture, fisheries and/or water accessibility) can be a method for reducing food scarcity and improving livelihood options among the poor.
Institutional Capacity: Does the city staff participate in regular training and knowledge-sharing events about environmental challenges, and how these relate to climate change?	Robust	Climate change has numerous impacts on the environment (e.g., increasing occurrence and severity of floods, droughts and forest fires; sea level rise; heat waves) - depending on the region. City staff that regularly draw upon the expertise of in-house environmental agencies and/or external experts are better able identify appropriate coping strategies to deal with current and future environmental challenges within their own departments.

Participation: **To what degree do civil society organizations and citizens participate in the restoration, protection, and sustainable management of ecosystems services? [Lens 3 – CRF 5]**	Inclusive	In many cities, uncontrolled urban growth and encroachment has a deteriorating effect on the environment. When restoration, protection and management of ecosystem services is done in consultation with affected communities and civil society groups, solutions are more robust because they include the nuanced needs of affected communities and the general public.
Participation: **To what degree does the private sector participate in the development of environmental, natural resources and ecosystems management plans in the city?**	Inclusive	A city's environmental planning, natural resource and ecosystem management is more robust when it includes the economic dependencies (e.g., natural resources that are necessary for current industries) and environmental risks (e.g., pollution) of the private sector.

* Ecosystem services are all natural processes that humans benefit from – including provision of food and water; regulation of floods, diseases etc., and recreation (WRI, 2005).

Resource 10:

Guiding Questions on
Health

(Optional Sectoral Module)

In a resilient city, the health care system is responsive to the changing health risks in its service area (*reflective*). It has excess capacity and is able to accommodate both projected and sudden increases in demand (*redundant*). Faced with a shock or stress, the health care system is able to provide emergency health relief to affected communities while continuing to offer basic health services to the entire population (*robust, redundant, and coordinated*). Within a resilient health care system, basic health care services are affordable and accessible to all segments of the population (*inclusive*). In a resilient city, the burden on health care is lessened through structural improvement in living conditions which removes underlying health risks.

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: Who manages the health care facilities and services in the city, including hospitals, clinics, community health centers, and other health service delivery points? If there are multiple providers, are they well-coordinated in terms of management, development planning, and emergency response? [Lens 3 – CRF 10]	Coordinated	Close coordination among health service providers facilitates planning for future demand, and accelerates emergency response and targeted distribution of medical staff and equipment.
Institutional Capacity: Does the city have programs for minimizing public health risks through structural improvements in housing, transportation, energy systems, water supply and sanitation? [Lens 3 – CRF 1]	Robust	Removing imminent health risks caused by poor living conditions and inaccessibility to basic services allows residents to think beyond basic vulnerabilities and start developing coping strategies for potential disturbances.

Institutional Capacity: Does the city have a disease surveillance system that monitors changes in health risks, including climate-sensitive risks? Can the surveillance system provide early warnings about potential health disasters? [Lens 3 – CRF 12]	Reflective	Disease surveillance systems are essential public health platforms for monitoring and preparing for changes in health risks. Incorporating climate-sensitive health risks into public health surveillance systems allows for identification of appropriate intervention and adaptation to these risks. Public health surveillance systems can be used to trigger early warning systems.
Finance: What are the funding sources for health care facilities and services? To what extent is the funding discretionary at the local level? To what degree are funding sources and uses coordinated across agencies? [Lens 3 – CRF 6]	Robust; Coordinated	A health care system that strives for complete coverage and continuous operation relies on sustained and predictable funding. When a local government has discretionary control over funding for health, it can be held accountable for achieving pre-determined health standards and coverage (number of hospitals beds) with the available funding. Where human resources and financing for health services are limited, coordination among agencies (both public and private) helps improve coverage, efficiency and targeting of both ordinary health services and emergency response.
Finance: Is contingency financing available for health care facilities and services? [Lens 3 – CRF 8]	Redundant	A contingency fund covers unexpected disruptions in the health system as caused by external factors such as health service demand increase due to an epidemic outbreak or disaster event. A contingency fund can also help overcome sudden changes in demand as caused by urban immigration.

Access: Do all segments of the population have access to basic health services? Are basic health services financially accessible to all groups? [Lens 3 – CRF 1]	Inclusive	Exposure to diseases is exacerbated by the presence of multiple vulnerabilities (e.g., poverty, lack of self-care skills, etc.). Access to basic health services is essential for improving the health status of vulnerable groups. Ability to provide affordable health services to all groups in the city prevents health care costs from becoming another driver of poverty and exclusion.
Nutrition: Does the city have programs to help the poor and otherwise vulnerable residents avoid malnutrition and poor diet during food crises? In case of food crisis, does the city have spare food resources to provide nutritious and healthy food to all segments of the population? [Lens 3 – CRF 3]	Robust; Redundant	Negative coping strategies that poor and vulnerable households adopt to overcome food shortages (e.g., reducing the amount of food eaten, eating less nutritious food, etc.) can have deteriorating impacts on their health. Food crises can be avoided through adaptive programs aimed at improving accessibility to secure food sources, and shifting to sufficiently nutritious types of food. During a food crisis, cities which have spare capacity to provide nutritious and healthy food to all segments of the population avoid nutritional deficiencies among the populations that have no alternative to the negative coping mechanisms.
Facilities: Are existing health care facilities located in disaster prone areas and/or vulnerable to the consequences of climate change? If yes, are there plans to retrofit existing exposed health facilities? Are new facilities built in safe areas or designed to be resilient to the hazards that are relevant for the areas in which they are built? [Lens 3 – CRF 7]	Robust	Health care facilities play a key role in emergency response and therefore need to be located in safe areas. For the purpose of reducing impacts of potential disasters, exposed health facilities should be appropriately retrofitted.

System Continuity: How prepared is the health system for emergency situations? Do all hospitals have emergency preparedness plans? [Lens 3 – CRF 8]	Robust	A few ways that a health system can be better prepared for disasters is by training the staff to handle emergency situations and warehousing of relief material, such as medicine, equipment and machinery, in protected areas.
Planning: Does the city have the capacity to adjust and/or increase the provision of basic health services in line with projected and sudden population growth, accelerated by rural to urban migration, influx of refugees etc.?	Reflective	Capacity management of health facilities requires regular service demand estimates to be made based on demographic changes (e.g., type of services needed to accommodate their health needs). Ability to adjust/scale up the provision of basic health services according to changes in the population and/or during emergencies is essential for ensuring public safety and well-being of all residents.
Facilities: Are all the relevant types of health services available in the city? Are any vital services missing (e.g. specializations, operating theatres, etc.)? If necessary, is there an agreement for patient transfer to facilities that offer these services?	Robust; Coordinated	An effective health system has a diverse set of health services which reflect current and projected medical needs of residents. Cities missing vital functions in their health system should safeguard their population by collaborating with health institutions that provide such services.
System Continuity: Is the probability that health facilities will remain operational in post-disaster situations assessed? If yes, does the assessment include information about hospital capacity and proportion of healthcare beds exposed according to hazard intensity?	Reflective	For the purpose of preparing backup equipment, it is useful to know the total capacity of facilities that can continue to function after a disaster, as well as the coverage that can be achieved with these.

System Continuity:
If a major health facility in the city has been impaired, does the system have the flexibility for the patient demand to be absorbed by other facilities? If accessibility to health facilities is compromised, are there alternative modes of health service delivery?

Redundant

Preparation of backup systems for damaged facilities with disrupted/limited health services is essential for continued provision of health services during a disaster, when they are needed the most.

Resource 11:

Guiding Questions on
Information and Communication
Technology
(Optional Sectoral Module)

In a resilient city, the ICT industry is used strategically to guide economic growth, develop competitive industries and create jobs. The local government actively deploys ICT to improve public service delivery/accessibility, participation in decision-making, transparency and accountability (*inclusive*). A resilient ICT system continues to operate despite power outage or other disruptions (*robust and redundant*). The ICT networks and infrastructure is regularly assessed for level of vulnerability and capacity to deal with identified shocks (*reflective*). During disasters, sufficient funding is available for establishment of emergency communication centers and increased third-party communication services (*coordinated*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: Are key ICT service providers well-coordinated in terms of management, planning, and emergency response? [Lens 3 – CRF 10]	**Coordinated**	**Coordination among ICT service providers facilitates collaborative management of risks, rapid response during technology and infrastructure breakdown, as well as planning for future demand.**
Institutional Capacity: Does the city have programs/strategies for improving public service delivery, participation, transparency and accountability by use of ICT?	**Robust**	**Local governments can use ICT to improve public service delivery/ accessibility, participation in decision-making, transparency and accountability (i.e. facilitating citizen feedback to governments and service providers).**

Institutional Capacity: Does the city have a development strategy, and legal and regulatory framework for the ICT industry? [Lens 3 – CRF 9]	Robust	Cities that have a development strategy for the ICT sector are transparent about their objectives for the industry. A strong legal and regulatory framework creates confidence in the industry and helps manage risks for industry stakeholders, enabling the city to better leverage private sector involvement in ICT infrastructure development.
Institutional Capacity: Does the city's emergency/contingency planning incorporate use of communication and information management systems? [Lens 3 – CRF 9]	Robust	Emergency management information systems consolidate information about emergencies from different stakeholders and provide real-time information to responders. In an emergency situation, they are needed to ensure that emergency responders get information in time to respond appropriately.
Institutional Capacity: Does the city have access to or generate its own data on the built environment, and natural and man-made threats to the city? Is this information made available to the general public and the private sector? Are risk maps of the city generated collaboratively (i.e. through open mapping programs)? [Lens 3 – CRF 7]	Reflective; Inclusive	Ability to generate or access asset and hazard data allows the city to evaluate risk exposure. Having insight into risk information allows the general public and private sector to determine appropriate measures for minimizing own vulnerability to risks. Participatory mapping allows perceived vulnerabilities of affected communities to be channeled through to decision-makers via risk maps.
Preparedness: Does the city have an emergency operations center (EOC) and/or an emergency communication system? [Lens 3 – CRF 9]	Robust	Emergency management and response can be significantly facilitated with an EOC and/or emergency communication system for central control of respondents.

Institutional Capacity: Does the city have a surveillance system that monitors changes in major risks, including climate-sensitive risks (e.g. weather forecasting)? If yes, is the system linked to all the concerned departments/agencies? Can the surveillance system provide early warnings (communication and response) about potential disasters? If yes, what percentages of inhabitants are covered by early warning systems? [Lens 3 – CRF 7]	Reflective; Robust	Regular monitoring of changes in risks, including those affected by climate change, allows for identification of appropriate mitigation measures. For effective use of risk information, the surveillance system needs to be linked to concerned department/agencies. Surveillance systems that are able to disseminate disaster information in a timely manner can also act as early warning systems. Public safety is enhanced if all residents are informed early about potential hazards.
Finance: What are the funding sources for local government information management systems, communication services and applications? Do all city departments have funding available for upgrading their ICT? [Lens 3 – CRF 6]	Robust	Predictable funding for ICT investments and upgrading can be used to support local government management and service functions across departments.
Finance: To what degree is funding available for maintenance of ICT networks and infrastructure? [Lens 3 – CRF 8]	Robust	Availability of reliable funding for regular maintenance of ICT networks and infrastructure prevents degradation and ensures their continuous operation.
Finance: Does the city have funds set aside to support emergency communication, including increase in communication personnel, third-party system support etc., in the event of a disaster? [Lens 3 – CRF 8]	Redundant	In case of a disaster, the city's emergency communications centers should be able to engage additional service lines or/and additional emergency communications personnel to respond to the increasing demand. Third-party emergency communications services (e.g. cellular carrier's SMS network) may also need additional resources to operate at an adequate level.

System Continuity: What proportion of communication assets (e.g. telephone networks, etc.) and communication user accounts is exposed to hazards? To what degree of hazard intensity can the communication services in the city remain functional? [Lens 3 – CRF 7]	Robust	Knowing the level of exposure to communication assets and user accounts per hazard type and intensity allows the city to identify communication system requirements for sustained communication during disaster events. In case of prolonged events, it is useful to know the total capacity of communication assets and services that can continue to function, as well as the coverage that can be achieved with these.
System Continuity: Does the local government have strategies for reducing exposure to ICT networks and infrastructure during disasters?	Robust	Placement of telecommunication cables underground (where technically possible) and central telecommunication offices in hazard free areas are some ways in which the government can reduce exposure to city's ICT networks and infrastructure, and thereby ensure continuity of telecommunication services during disasters.
System Continuity: Are the city's cell towers equipped with back-up power options? To what extent is communication infrastructure in the city coupled with electric grid infrastructure?	Redundant	To minimize impacts of power outages on telecommunication services, city's cell towers should have back-up power (e.g., generators, solar-powered battery banks, etc.). Decoupling of communication infrastructure from electric grid infrastructure can help prevent cascading impacts from failure in the electric grid.
System Continuity: Are alternative modes of information management and public communication explored for emergency situations? [Lens 3 – CRF 9]	Redundant	In case of disruptions in regular communication systems, the city will need to deploy alternative communication channels to communicate time-critical information to residents.

Access: Does the city know the level of telecommunications connectivity among its population (e.g. % of population with access to telephone, broadband etc.)? Does the city have programs to scale up affordable access to ICT services and applications - including for women, disabled citizens, and disadvantaged communities?	**Reflective; Inclusive**	Connectivity mapping allows for introduction of targeted programs for scaling up access to ICT services among specific populations, industries and/or areas of the city. Improved ICT connectivity has a positive impact on economic growth, competitiveness, poverty reduction and accountability. Scaling up of affordable ICT services among the poor helps them access essential public (e.g., health and education) and private (e.g., market information) services.
Demand: Does the city have a demand facilitation strategy for increasing use of ICT services and applications? Does the city have programs/strategies to support ICT innovation across the economy – with a focus on job creation?	**Robust**	Awareness of the benefits of ICT can help increase demand of such services and applications. ICT can be used to develop competitive industries, accelerate growth, and promote job creation, notably for women and youth. An enabling environment for ICT innovation can be created through policy enablers and ICT training.
System Continuity: What proportion of government ICT applications and infrastructure critical to government continuity is exposed to hazards? (Exclude the applications and data which are routinely backed up and processable at a remote site in case of emergency.)	**Robust**	Identifying ICT applications and infrastructure that can cause discontinuity in government operation allows for improvement or replacement of high risk services for services with high reliability.

Resource 12:

Guiding Questions on
Local Economy
(Optional Sectoral Module)

In a resilient city, the local economy is diverse and youth unemployment is low (*redundant and inclusive*). The city consciously uses infrastructure investments to steer and encourage economic growth (*reflective and coordinated*). The city invests in education, introduces employment policies and technical assistance programs to promote growth and a strong local economy. In a resilient city, the local government is capable of analyzing regional economic trends, and making necessary policy and industry adjustments to improve the local economy's overall shock-resistance (*reflective and robust*).

GUIDING QUESTION	QUALITY	EXPLANATION
Growth: **Is the economic region's growth rate high relative to the national growth rate?**	Robust	Regions experiencing long periods of lower economic growth than the national growth rate are under chronic economic distress. However, pre-shock growth rates higher than the national growth rate indicate that a region is less likely to be resilient (have capacity to resist shocks).
Planning: **Does the city government understand how economic shocks are likely to affect city residents and city finances? [Lens 3 – CRF 6]**	Reflective	Ability to project the impacts of economic shocks allows the city to plan targeted financial support for those residents and segments of the economy likely to suffer most from these shocks.

Planning: Does the city (or the region of which it is a part [2]) have the ability to understand the nature of the regional economy (its export base and clusters related to it, its industrial structure, its susceptibility to shock) and to anticipate shocks? Is the city involved in region-wide economic planning? [Lens 3 – CRF 6]	Reflective	The city's ability to analyze regional economic trends enables it to make necessary adjustments (e.g., change economic policies, update industrial structure, make investments to diversify the economy etc.) to improve the local economy's overall shock-resistance. Since local economies are interconnected with regional trends, the city should play a proactive role in planning for regional economic growth and stability.
Institutional Capacity: Does the region have in place institutions, policies and programs that can be effective in promoting economic growth? [Lens 3 – CRF 2 and 6]	Robust	Cities that invest in institutions, policies and programs that can be effective in promoting economic growth create stronger local economies. Examples include: (1) An education system that adequately prepares students for workforce participation; (2) A workforce training system keyed to the specific needs of the region's economy; (3) Firm technical assistance programs that provide advice and assistance to small and medium sized firms; and (4) Programs stimulating entrepreneurship and innovation.
Municipal Finance: Does the city government have the ability to start work immediately on scheduled infrastructure projects or borrow to finance local infrastructure projects that can be started quickly in order to employ people in the region and inject income into the local economy?	Redundant	Public works infrastructure spending, as a means of providing construction and related employment, is a proven short-term method that cities can deploy to mitigate the impacts of an economic shock.

117

Municipal Finance: Does the city have a "rainy day" budget fund and/or budget surpluses sufficient to protect its finances over the period of the shock? [Lens 3 – CRF 6]	**Redundant**	A rainy day fund and/or general fund surplus can cushion the effects of anticipated economic shocks – depending on the magnitude of the economic shocks and the surplus funds available.
Municipal Finance: Do intergovernmental revenues from national and intermediate (if any) levels of government automatically increase if local own-source revenues decline or do they automatically decrease (as would be the case in most tax sharing schemes), thus exacerbating city budgetary problems?	**Redundant**	The conditions of intergovernmental transfers determines whether these can be used as back-up during own source revenue decline.
Enabling Environment: Does the economic region have in place an infrastructure system that promotes economic growth? Is the city consciously steering economic growth through strategic infrastructure investments?	**Robust**	Roads, electricity, ports, railways and ICT are the major types of infrastructure necessary for promoting economic growth. Cities which are able to consciously use infrastructure investments for steering economic growth add predictability and reliability to the local economy.
Enabling Environment: Does the local government have a strategy for reducing income inequality in its functional economic area? [Lens 3 – CRF 2]	**Robust**	Income inequality has a negative effect on loss of jobs during economic shocks as well as the time it takes for the economy to recover after a shock.
Private Sector: To what extent is the area's economy diversified? Does the economic region have many export industries?	**Redundant**	Areas with more diversified economies are more likely to be resilient to chronic economic distress and employment shocks. Regions with many export industries are more resilient to employment downturns.

Safety Nets: **Is there an adequate social safety net in place to cushion the adverse effect of an economic shock on city residents who experience unemployment and income losses as a consequence of the shock?**	**Redundant**	**Social safety nets are local governments´ back-up systems for protecting vulnerable groups from falling into poverty during economic shocks when there is an increased demand for financial support among the population. Social safety nets can also be used during times of economic stability to reduce poverty levels and vulnerability.**
Private Sector: **Does the region specialize in durable manufacturing?**	**Redundant**	**Regions that specialize in durable manufacturing are likely to be resilient to shocks related to national or international economic downturns.**

---

2   Economic resilience is viewed in terms of the functional economic area defined by the city's labor market which is often a larger geographic than its jurisdiction. The city forms part of a regional economy that is defined by this functional area "over which a shock exercises its effect.

Resource 13:

Guiding Questions on
Logistics and Supply Chain
(Optional Sectoral Module)

In a resilient city, the logistics and supply chains system provides efficient and effective movement of goods ensuring continuous and profitable operation of companies. It has the ability to track, monitor and adjust supply chain patterns to avoid potential problems (*reflective*). In case of disruptions, the logistics system is able to recover the movement of freight rapidly (*robust*). Assessments of vulnerabilities and needs of urban logistics are performed in consultation with the private sector (*coordinated*). The assessments are integrated into city planning and inform investments in the city's transport, freight and communication infrastructure (*coordinated and redundant*). In a resilient city, the business develops and shares continuity plans that recognize known shocks and respond potential climate related risks (*inclusive and robust*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Who manages the freight transport infrastructure, nodes and services in the city, including roads, highways, rail, intermodal facilities, ports, and airports? Are they well-coordinated in terms of management, development planning, and emergency response?**	Coordinated	**Close coordination among freight transportation providers facilitates planning for future demand, and accelerates re-routing during disruptions and informs security improvements.**
Planning: **Does the city have a freight plan? Is freight planning integrated with other urban development plans? [Lens 3 – CRF 12]**	Coordinated	**City freight plans are the prerequisite for successful, large-scale urban freight solutions. Integration of freight planning into overall urban planning facilitates collaborative and strategic urban development that is compatible with the logistics needs of the city.**

Planning: **How has the urban logistics system (e.g., general physical and specific freight infrastructure) been impacted by past disasters? Were the impacts concentrated in specific locations? Have these disruptions informed improvements and substantial changes in the logistics system?**	Reflective	Monitoring of physical and freight infrastructure disruption during previous disasters helps identify vulnerable locations and operational weaknesses within the logistics system. Keeping track of such vulnerabilities helps a city make strategic (maintenance) investments for improving the reliability of city infrastructure used for movement of freight.
Planning: **Has the city conducted a vulnerability assessment of the freight transportation network and evaluated how potential failures may impact supply chain users? Have alternative freight paths been identified for each type of hazard? [Lens 3 – CRF 7]**	Reflective; Redundant	Vulnerability assessment of the freight transportation network and projections of disruption impacts can provide the city the economic basis for evaluating the profitability of investing in new freight transportation network.
Planning: **Does the city have an overview of the major supply chain users that rely on the city´s logistics system? Are the supply chain users classified based on their role in the supply chain (e.g. importers, exporters, local, regional)? Is there an understanding on how the major players use the city´s transport networks and specific freight infrastructure? [Lens 3 – CRF 8]**	Inclusive; Coordinated	A mapping of major supply chain users and their preferred supply routes allows the city to prioritize maintenance/investments in freight corridors according to the needs of users and their impact on the local economy.
Planning: **Is there a freight origin & destination matrix? Who is responsible of keeping it up to date? How often is updated? [Lens 3 – CRF 12]**	Reflective	A freight origin & destination matrix allows for planning of optimal logistics flows. Sound logistics planning depends on reliable and updated information on local, regional and international freight and should be performed by agencies best positioned to acquire and analyze freight information.
Communication: **How are private logistics operators notified of changing conditions in the logistics system? How often are critical information and communication systems tested?**	Reflective; Robust	Regular freight system updates allows private logistics operators to adjust their operations and avoid instability in logistic flows.

Finance: **Is there a budget to develop multi-stakeholder collaborations on logistics continuity planning? Does this budget include conducting large scale multi-stakeholder simulations of the urban freight system? [Lens 3 – CRF 8 and 10]**	Robust	Growth of supply lines, stiffer competition, customer demands for lower costs and political instability make companies vulnerable to high impact/low probability events. Availability of financial resources for multi-stakeholder collaboration and joint simulations of the urban freight system allows for improved risk-information sharing and logistics continuity planning.
Communication: **Are there regular meetings with the private sector to review the performance of the city´s logistics system? Is the private sector consulted during the development a city freight plan/strategy?**	Reflective; Inclusive	Regular evaluation of the performance of the city's logistics system allows the city to determine the extent to which infrastructure upgrades and investments are needed to improve their efficiency. For the purpose of being responsive to the needs of major supply chain users, the city freight plans should be developed in consultation with the private sector.
Communication: **Is there regular communication with the operators of critical freight nodes that support the import/export to the city major economic sectors?**	Coordinated	Cities that are in regular communication with critical freight nodes are able to assess threats to these nodes and re-route their export/imports channels. Cities that regularly experience disruptions in their supply chain routes suffer from large logistics costs and potential disinvestment.
Communication: **Does the city support the development of emergency communication protocols and mechanisms for sharing information about disruptions between transport sector and freight infrastructure operators? Can supply chain users quickly access information on the status of the logistic system? [Lens 3 – CRF 9]**	Coordinated	Emergency communication protocols and pre-established mechanisms for sharing information during a disruption facilitates a coordinated response and recovery among freight transport and infrastructure operators. Timely information about disruptions to the logistic system helps supply chain users to quickly respond and adapt to the new situation.

Response Capabilities: Are there metrics used to monitor the capacity of critical freight nodes and links of the freight system (e.g. containers moved per day)? Are there target metrics or goals that need to be achieved after a disruption (e.g. 80% of container movements after three days)	Reflective	Ability to monitor freight system capacity allows logistics operators to adjust capacity in each freight network according to real demand. Setting target metrics or goals for recovery of freight system after disruptions can help regain confidence in the logistics operators.
Response Capabilities: Are there priorities on how to give access to critical freight nodes to various supply chains on the event of a disruption? Is there a chain of command clearly established to enforce these priorities on the critical freight corridors? [Lens 3 – CRF 8]	Robust; Coordinated	Assessment of the importance of various supply chains allows for a pre-defined prioritization that can be executed during limited flow of logistics. A clear identification of roles and responsibilities for enforcing prioritization of freight transportation allows for maintenance of vital economic functions.
Response Capabilities: Does the city have enough authority to temporarily change freight regulations or control freight infrastructure? Are city officials properly trained on these capabilities?	Robust	Authority to temporarily adjust freight regulations or control freight infrastructure enables the city to keep vital freight flowing despite disruptions in the freight system. City officials must be capable to exercise this authority in a responsible and targeted manner to gain stability in critical supply chains.

Resource 14:

Guiding Questions on
Municipal Finance
(Optional Sectoral Module)

In a resilient city, the municipal finance system is able to withstand large-scale shocks to revenues or unforeseen needed expenditures through reserving and flexible budget reallocation mechanisms (*robust and redundant*). Budget planning, management, and policymaking are based on actual performance data, including information on damage and loss from previous shocks or stresses (*reflective*). A resilient city has a municipal finance system that has sufficient autonomy to manage its resources and coordinates across departments to ensure spending leads to results towards the city's priorities (*coordinated*). It creates a stable and informed investment environment that allows for the involvement of diverse actors and supports an inclusive approach to budgeting, ensuring that the allocation of city resources reflects community priorities (*inclusive*).

GUIDING QUESTION	QUALITY	EXPLANATION
Revenues: **What percentage of total city revenues are own-source revenues? What are the principal sources of this income (e.g., property taxes, fees, etc.)?**	Redundant	**Share of own-source revenues indicate the extent to which a local government is able to sustain its own operational and capitals costs. Diversification of own-source revenues can help mitigate exposure to single-revenue fluctuations.**
Expenditures: **Do city government agencies have access to funding within the city's budget or from other sub-national, national, or other sources to invest in reducing the vulnerability of their assets and operations to shocks and stresses?**	Robust	**Enhancing resilience requires strategic capital investments and predictable funding for operations and maintenance of critical infrastructure.**

Revenues: What percentage of total city revenues comes from other sources, including external donors?	Redundant	Heavy reliance on external sources for city revenues exposes the city's finances to revenue unpredictability. Therefore, external sources should not fund large parts of municipal budgets for extended periods of time.
Revenues: What percentage of total city revenues and taxes come from transfers from other levels of government? Are they linked to performance? Which sources have mandated uses? Which are more discretionary in nature?	Redundant	Share of own own-source revenues suggests level of local government autonomy in public budgeting and financial management. Transfers from other levels of government are often given with conditions, which may not reflect the highest spending priorities of the local government.
Expenditures: Is the municipal budget clearly separated into operating and capital budgets? If so, what are the amounts spent on each? If not, how is the budget structured?	Robust	Because capital expenditures often extend beyond a single accounting year they should be managed separately from the annual operating budget. This separation ensures that capital expenditures are not subject to the volatility of operating budgets.
Expenditures: How aligned is the city's budget with municipal development plans or articulated priorities?	Coordinated	A budget which reflects the city's development plans and priorities helps meet the identified needs.
Expenditures: To what extent does the city engage in a transparent and participatory capital investment planning (CIP) process? If the city does have a CIP process, does capital investment spending consider the existence of shocks and stresses or require review of disaster, climate, or other risks?	Inclusive; Robust	Cities that have a transparent and participatory CIP process determine the merits of a capital investment based on collective community needs/priorities and the resources available. By mainstreaming risk management considerations into CIP, cities can make informed infrastructure investments to enhance the city's resilience to future shocks.

Expenditures: **Are there specific budget allocations for the maintenance of critical infrastructure (i.e., primary transport linkages, water mains and pumping stations, power generation, etc)?**	**Robust**	**Predictable funding for preventive maintenance improves the duration and reliability of critical infrastructure. Maintenance helps cities achieve safety and cost-effectiveness for their infrastructure investments by avoiding preventable failures.**
Expenditures: **Are resources available for contingency planning and emergency preparedness?**	**Robust**	**Local governments that reserve funding for contingency planning and emergency preparedness in annual budgets are better able to design policies, plans and procedural guidelines to mitigate the impacts of shocks.**
Expenditures: **Are resources available for emergency response?**	**Robust**	**Local governments that reserve funding for emergency response are able to direct resources where needed during an event. Resources reserved for emergency response can also be used to improve coordination and organization between responding units (e.g., police, fire department, etc.)**
Expenditures: **Does the city have a way to procure goods and services legally, effectively, and efficiently in the event of an emergency? How did the city obtain goods and services in previous hazard events?**	**Robust**	**Effective and efficient emergency response depends on availability of critical goods and services. Partnership agreements and simple procurement mechanisms can facilitate the city to quickly obtain emergency response essentials.**
Balance Sheet: **Are public assets covered by insurance?**	**Robust**	**Insuring public assets is one way cities can share risks of value loss in the event of disasters.**

Expenditures: Has the city government established a reserve fund for responding to shocks and stresses? Does the city government have access to other sub-national or national level reserve funds in the case of shocks and stresses?	Redundant	Cities that have a contingency fund have a financial back-up system that enables them to continue providing critical functions and services during emergency events. Access to other sub-national or national level reserve funds can provide alternative emergency back-up.
Balance Sheet: Does the city use credit or debt financing? If so, what kinds of investments does the city finance through credit and debt?	Redundant	Debt and credit financing is used by cities to finance large infrastructure projects that the city cannot cover through annual revenues. Using the right balance of credit and debt financing can help enhance the city's fiscal sustainability.
Balance Sheet: If the city has debt, what is the current level and composition of debt? How has the debt level changed over the last few years? Is there a debt ceiling? What kinds of shocks would make debt payments unaffordable? What would happen if the city were unable to make its debt payments?	Robust	The city's ability to manage debt historically demonstrates the extent to which the city is able to absorb shocks while continuing to cover its liabilities.
Balance Sheet: Does the city government identify and manage a list/database of its publically owned assets, such as land, buildings, and roads?	Reflective	Public asset management is important for identifying public assets, determining asset value, budgeting operating costs and maintenance, and evaluating asset performance on a regular basis. Effective asset management can inform CIP processes by integrating the total cost of assets for local governments, including maintenance over the useful life of the assets, and not just the initial capital cost needed for construction.

Balance Sheet: In the event of a severe stress or shock, what contingent liabilities does the city face (e.g. cash transfers to affected residents, provision of food and shelter, etc.).	Robust	Cities with many contingent liabilities can experience fiscal instability during disaster events if the contingencies are unbudgeted or unaccounted for.
Cash Management: What is the city's liquidity management strategy? How does the city manage gaps in revenue and expenditure during the year? Has the city faced stresses on its liquidity in the past? What were they caused by? How did the city deal with them?	Robust	A robust liquidity management strategy ensures that the city reserves sufficient amount of its annual revenues to meet requirements for expenditures.

Resource 15:

Guiding Questions on
Solid Waste Management
(Optional Sectoral Module)

In a resilient city, the solid waste system offers affordable collection services to all residents, irrespective of their tenure status (*inclusive*). Regulations for waste collection, disposal and treatment, especially of hazardous waste, are enforced to protect human health and safety, and the environment (*robust*). Performance of waste facilities and collection services are regularly evaluated and the recorded (and potential future) vulnerabilities during shocks and stresses inform maintenance and upgrading decisions (*reflective*). After a disaster event, the city has resources and procedures for dealing with large quantities of debris and/or cleanup of hazardous waste (*redundant and coordinated*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Who manages the waste collection services in the city, including municipal, industrial, electronic, and construction waste? If there are several agencies, are they well-coordinated in terms of management, planning, and emergency response?**	**Coordinated**	**Close coordination among solid waste service providers facilities planning for future demand, and accelerates re-routing and treatment of excess or hazardous waste after a disaster event.**
Capacity: **If a processing/disposal facility fails, how long can the collection continue without waste piling up on the collection points? [Lens 3 – CRF 8]**	**Robust; Redundant**	**The ability of the city's waste management system to absorb regular waste production despite failure in one processing/disposal facility is indicative of the systems robustness or need for alternative facilities.**

Finance: **What are the funding sources for waste collection, treatment and storage, and to what extent does each mode achieve cost recovery? [Lens 3 – CRF 6]**	**Robust**	**Waste management systems that strive for complete coverage and continuous operation require sustained and reliable funding. Cost recovery within the solid waste sector implies sustainable management, where revenues from waste collection recover operational expenses, at the very minimum.**
Finance: **Does the city have funds set aside to cover waste collection and disposal in the event of a disaster? [Lens 3 – CRF 8]**	**Redundant**	**A contingency fund covers unexpected disruptions in the solid waste management system, accommodates sudden demand increases and changes in regular financing flow. Waste contingency funds are also used for cleanup of hazardous waste after industrial accidents, and damage to solid waste facilities**
Planning: **Do current waste management systems cover all areas of the city, including informal and low income neighborhoods, in an equitable manner? If no, are there plans for expanding solid waste services for all segments of the urban population? [Lens 3 – CRF 8]**	**Inclusive**	**An equitable waste management system is characterized by coverage to all residential areas of the city (irrespective of formality), as well as service quality and affordability. Extending waste collection services to all residents, irrespective of their tenure status, is an important element of environmental protection.**
System Continuity: **Does the city have an emergency disposal site (or otherwise an agreement with a nearby facility) to dispose all excessive amounts of waste that its system cannot handle?**	**Redundant**	**Disaster events can leave large amounts of debris and waste behind. Approved sites allow the city to quickly dispose of excess waste after a disaster.**

Planning: Does the city monitor and gather data on the performance of the solid waste system? Are informal settlements incorporated into demand estimates? [Lens 3 – CRF 12]	Reflective	Monitoring the city's current and estimated growth, both formal and informal, allows for improved capacity management and targeted collection in new development areas. Recognition of informal settlements during solid waste demand estimates allows for more inclusive and accurate planning of services.
Planning: Are any waste facilities located in high risk areas? How have the facilities been impacted by past disasters? Have previous disruptions informed improvements and substantial changes in the system? [Lens 3 – CRF 7]	Robust; Reflective	Monitoring performance of key waste facilities during previous disaster events allows the city to identify vulnerabilities and make necessary maintenance/upgrading investments to improve the overall robustness of the city's waste management system.
Connectivity: Does the city ensure that solid waste does not block drainage, and contaminate waterways or wetlands? Are major storm drains across the city equipped with trash removal grates? [Lens 3 – CRF 7]	Robust	The city can help prevent waste blocking drainage and contaminating the environment by providing affordable collection services to all areas of the city and penalizing those that inappropriately dispose waste. Grated stormwater drains allow for easy removal of debris that would otherwise clog drains.
Capacity: Does the city have a waste reduction strategy and implementation system? Does the city promote waste reduction at the household and industry level by means of formal education, community training/awareness raising campaigns and government incentives?	Robust	Successful waste reduction at both the household and industry level can lessen the pressure on the waste system and reduce the public resources that go into managing waste. Waste reduction is particularly important in face of growing population and economic activity.

Capacity: In the event of exceeded capacity or disaster, are alternative service providers with adequate equipment and trained staff readily available? Does the city have a process in place to accelerate the contracting process with private entities to undertake waste collection and disposal of large quantities of waste? [Lens 3 – CRF 8]	Redundant	A city which has identified alternative waste service providers and contracting processes in place for outsourcing waste management activities is effectively able to handle sudden increases in service demand.
Safety & Health: Does the city have a fire management plan for its collection and disposal sites? Does the city require leachate and landfill gas collection and treatment systems to screen for hazardous waste and be constructed with explosion proof-equipment?	Robust	Because waste can be combustible, waste collection and disposal sites should have procedures for reducing risk of fires and containing potential fire impacts. Collection and appropriate handling of leachate and landfill gas prevents landfill explosions and contamination of groundwater with toxic chemicals.
Safety & Health: Does the city have regulations for treatment and disposal of hazardous industrial waste? Are the regulations enforced?	Robust	Regulations for treatment and disposal of hazardous are necessary for protection of human health and the environment. Enforcement of protective regulations ensures that the responsibility of safe treatment and disposal hazardous waste lies with industries that produce such waste.
Safety & Health: Does the city have a separate collection and treatment system for medical and infectious waste? Is the waste disposed in a sanitary waste disposal facility (sanitary landfill or a waste to energy facility) that is operational? Are the regulations for separation of hazardous waste enforced?	Robust	In order to limit exposure to contaminants and infectious diseases medical waste must be managed according to rigorous public safety regulations. This requires the city to enforce its own medical waste regulations and to have an operational sanitary waste disposal facility for appropriate treatment of medical waste.

Capacity: Does the current capacity of the waste system meet existing and projected demand?	Robust	Being able to manage current and projected quantities of waste is essential for avoiding the environmental consequences of non-collection and inappropriate disposal.
Safety & Health: Does the city have programs to improve safety and health of waste workers and waste pickers (i.e. education about hazardous and explosive waste, provision of protection equipment etc.)? [Lens 3 – CRF 11]	Reflective; Inclusive	Waste pickers face many risks to their health and safety to their exposure to heavy and sharp materials, hazardous and infectious waste and smoke from dump sites. Awareness regarding these risks and access to protective equipment helps reduce injuries and infections among waste pickers.
System Continuity: Is the collection system able to continue to operate in event of extreme weather (e.g. heavy snow, storm/flooding, heavy winds)? Is accessibility on major roads maintained? Are the collection trucks enclosed?	Robust	Extreme weather can disrupt waste collection. Ability to continue collecting waste during severe weather events depends on the design of collection trucks, ability to use main roads and/or re-route when necessary.
System Continuity: Does the waste management department have emergency fuel storage to handle extended shortages? Are the waste facilities equipped with backup generators to keep critical equipment in service during power outage (eg: leachate pumps, gas collection systems)? [Lens 3 – CRF 8]	Redundant	Emergency fuel storage can support continued waste management during extended power shortages. Backup generators can keep critical waste equipment in service to avoid leachate and gas spills during power outage.

Resource 16:
Guiding Questions on
Transportation
(Optional Sectoral Module)

In a resilient city, the transport system offers multiple modes of transport to its users to ensure the continuity of mobility in the event of disruptions, and to ensure access to transportation for all population groups (*robust and inclusive*). It takes a flexible approach and proactive coordination with other agencies to be able to divert user traffic to different modes of transport based on changing conditions (*redundant and coordinated*). In a resilient city, the planning for and investments in the transport sector are based on an assessment of past and shocks and stresses and are closely aligned with other departmental plans and overall key priorities of the city (*reflective*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: **Who manages the transport infrastructure and services in the city, including roads, highways, buses, taxis, rail, metro, ports, and airports? Are they well-coordinated in terms of management, development planning, and emergency response?**	Coordinated	**Close coordination among transportation providers facilitates planning for future demand, and accelerates re-routing and evacuation during emergencies.**
Planning: **Does the city monitor and gather data on transport system performance? Does the city have adequate data/tools/methods for monitoring performance? [Lens 3 – CRF 12]**	Reflective	**Performance monitoring allows the city to keep a track of system vulnerabilities and make strategic maintenance investments to improve the overall robustness of the city's transportation system. Availability of adequate monitoring tools/methods is a prerequisite to regular performance assessments.**

Finance: What are the funding sources for transport infrastructure and to what extent does each mode achieve cost recovery? [Lens 3 – CRF 6]	Robust	Cost recovery in the transportation sector implies sustainable management, where revenues from tickets sale for each mode recover operational expenses, at the very minimum.
Finance: Is contingency financing available for transportation infrastructure and services? [Lens 3 – CRF 6]	Redundant	A contingency fund covers unexpected disruptions in the transportation system, and accommodates sudden demand increases and changes in regular financing flow.
Planning: Is transportation planning integrated with other urban development plans? [Lens 3 – CRF 12]	Coordinated	Integrated transportation and urban planning facilitates consistent land use development and efficiency, promotes access and better coordination of housing and jobs.
Planning: Do transport development plans and regulations include risk analysis? [Lens 3 – CRF 7]	Robust	Risk assessment and land suitability analysis should provide the basis for transport planning to avoid development in high-risk areas, including induced development.
Planning: How are the anticipated effects of climate change likely to impact the city's transport system and have these changes been incorporated in planning efforts? What data/tools/methods are used to make evaluations regarding climate change impacts on the city's transport system?	Reflective	Incorporation of climate change projections in transportation planning helps the city make smart investments in climate-proofed infrastructure and maintenance, thereby helping to prevent major losses due to climate change. Availability of adequate climate projection tools and modelling equipment is needed to evaluate potential impact of climate change on transportation infrastructure and services.

Planning: How prepared is the transport system for emergency situations (e.g., warehousing and positioning of relief material, emergency drills for transportation staff, etc.)? [Lens 3 – CRF 8 and 9]	Robust	Availability of equipment and verified emergency response procedures and routes helps increases transportation safety and effectiveness of emergency response.
Modality & Capacity: Does the current capacity of the transport system meet existing and projected demand? What is the modal split? [Lens 3 – CRF 9]	Robust; Redundant	In cities where transportation demand exceeds infrastructure capacity, there are limits to residents' mobility. This can be exacerbated in a disaster event. Excess capacity can prove useful when sudden increases in demand or shifts in transportation modes occur, but can also represent inefficiencies in the transportation system.
Modality & Capacity: If a mode has been impaired, does the system have the flexibility for the demand to be absorbed by other modes? [Lens 3 – CRF 9]	Redundant	The ability to shift demand to alternative modes is one way to ensure functionality of the transport system during shock.
Modality & Capacity: Have mobility patterns shifted recently? Is there a trend in modal splits that might stress the system (such as increasing demand of vehicles on road networks)? [Lens 3 – CRF 9]	Reflective	Monitoring mobility patterns helps transportation agencies respond to changing demand in each modality, and make necessary adjustments to prepare for rapid mass evacuation.
Modality & Capacity: Within the regional context, what are the main access points and flow links to the city's transport system (including passengers, freight, etc)? Do they have excess capacity or alternative routes?	Redundant	Access points and flow links to the city's transportation systems are important for maintaining city's civil and economic functioning. For the purpose of avoiding blockages in the system, excess capacity and alternative routes should be provided in the event of failure or surges in demand.

Modality & Capacity: Are all areas of the city and socio-economic segments of the population covered by the system in an equitable manner? Is it financially accessible for all groups? [Lens 3 – CRF 1]	Inclusive	An inclusive transportation system is characterized by a wide coverage of the city, as well as good service quality and affordability.
Modality & Capacity: What alternative commuting strategies (e.g., delay of non-essential work tasks, use of alternative work locations, telecommuting, etc.) are in place in response to an emergency event?	Redundant	Flexibility in the commuting system allows for continuation of economic activities during an emergency event.
System Continuity: How has the transport system (infrastructure and services) been impacted by chronic stresses and/or disaster impacts in the past? Are the impacts of chronic stresses concentrated in specific areas of the city? Are some transport modes more fragile to disruptions than others?	Robust	Destruction of transportation infrastructure and disruption of services during previous disasters helps identify vulnerable locations and operational weaknesses within the transportation system.
System Continuity: Are there events/periods in the year that disrupt commuters from getting to work? Are there ever any disruptions in key logistics flows?	Robust	The economic competitiveness of a city depends on its ability to ensure continuous transportation of goods and people.
Interdependencies: What are the interdependencies between transportation and other city infrastructure and services such as energy, drainage, ICT, etc? How could disruptions in the transportation network impact the continuity of other services and vice versa?	Robust	Interdependencies between the transportation and other urban systems can cause cascading failures unless such interdependencies are secured through back-up or re-routing.
Communication: How are transportation system users informed of changing conditions? [Lens 3 – CRF 9 and 11]	Reflective	Same-time monitoring of mobility allows re-routing of excess demand to parts of the system which have capacity, and a timely communication of these changes to users.

Resource 17:

Guiding Questions on
Water and Sanitation
(Optional Sectoral Module)

In a resilient city, potable water and sanitation services are accessible to all segments of the population (*inclusive*). Water and sanitation infrastructure is planned with a holistic approach taking into account social, economic, and environmental risks and vulnerabilities (*robust* and *reflective*). Planning for and investment in the sanitation and water systems is driven by demand and supply data, participatory engagement, and is based on cross-departmental collaborations that support coordination with existing urban development plans and priorities (*coordinated* and *inclusive*). In a resilient city, there is sufficient human and technical capacity to ensure sustainable operation, maintenance and financial management of water and sanitation infrastructure and services (*redundant*).

GUIDING QUESTION	QUALITY	EXPLANATION
Institutional Capacity: Who manages the water, sanitation and drainage systems in the city? Are all providers of the same service well-coordinated in terms of management, development planning, and emergency response?	Coordinated	Close coordination among water, sanitation and drainage utilities can facilitate planning for future demand and accelerate response in case of disruption.
Capacity: If a water supply and wastewater collection system fails, how quickly is priority water supplied and sanitation network repaired and reconstructed after shock and stress events? [Lens 3 – CRF 8]	Robust	Monitoring the duration of previous water and sanitation service disruptions allows the city to evaluate overall vulnerability of the city and identify effectiveness gaps in current emergency response procedures.

Finance: What are the funding sources for water, sanitation and drainage infrastructure? To what extent is the funding discretionary at the local level? To what degree are funding sources and uses coordinated across agencies that provide water, sanitation and drainage infrastructure and services? [Lens 3 – CRF 6]	Robust	Water, sanitation and drainage systems that strive for complete coverage and continuous operation rely on sustained and predictable funding. When a city has discretionary control over funding for such utilities, it can be held accountable for achieving a pre-determined service standard and coverage in line with available funding. Coordination across agencies helps identify coverage gaps, improve alignment of trunk and local infrastructure and facilitate spending efficiency.
Finance: Is contingency financing available for water, sanitation and drainage infrastructure and services? [Lens 3 – CRF 8]	Redundant	A contingency fund covers unexpected disruptions in the water, sanitation and drainage systems, accommodates sudden demand increases and changes in regular financing flow.
Planning: Does the city have an overview of all water, sanitation and drainage infrastructure in the city, including capacity levels, design specifics, number and location of key facilities? Is planning for disasters, shocks, or stresses incorporated into the regular water, sanitation, and drainage infrastructure planning process?	Reflective; Coordinated	Overview of key facilities and their capacity levels allows the city to evaluate service accessibility and determine investment needs based on future demand estimates. Monitoring performance of key facilities and infrastructure allows the city to identify vulnerabilities and make maintenance/upgrading investments to improve the overall robustness of the city's water, sanitation and drainage systems.
Planning: Do sewage and water pipeline networks cover all areas of the city, including informal and low income neighborhoods? If no, are there plans for expanding sewage and water pipeline networks into these areas of the city? [Lens 3 – CRF 1]	Inclusive	Inclusive water, sanitation and drainage systems are characterized by equal coverage to all built-up areas of the city, service quality and affordability.

Planning: Does the current capacity of water supply and sanitation services meet existing and projected demand? Are informal settlements incorporated into water and sanitation service demand estimates? [Lens 3 – CRF 1]	Robust; Inclusive	Robust capacity management ensures that increases in demand are absorbed without causing service disruptions for existing consumers. Recognition of informal settlements in water and sanitation service demand estimates allows for more inclusive and accurate planning of services.
Supply & Quality: Are water and sanitation services in the city mostly supplied from modern treatment works through pipeline water and sewage networks, or through other systems? (e.g., on-site sanitation facilities, private boreholes, open wells or similar sources)? Do other systems serve as primary or back-up modes? What percentage of water samples in a year comply with national potable water quality standards? What percentage of the sewage reaches a treatment plant?	Robust; Redundant	Modern treatment works and distribution of drinking and wastewater through pipeline networks helps ensure water purification before and after it reaches the consumer. Proportion of pipe network versus other supply systems is indicative of the city's ability manage and ensure water and sanitation service quality. Where majority of water and sewage networks are owned and regulated by the local government, it is easier to monitor and ensure appropriate water treatment.
System Continuity: If a water and sanitation network has been impaired, do the systems have the flexibility for the demand to be absorbed by alternate water supply and wastewater collection modes?	Redundant	Flexibility in the water supply and wastewater collection systems entails existence of more than one service provider capable of absorbing excess demand created by the beak down in the regular distribution/collection system. Alternative water supply systems include rainwater catchment, purchasing of bottled water, etc. There are also a number of alternative on-site wastewater collection and treatment systems for individual and shared usage.

Capacity: What is the annual average of daily number of hours of continuous water supply per household? Which areas of the city are most affected by the disruption to water and sanitation services?	Robust	Frequency of water supply discontinuity per household indicates the level of water scarcity in the city's overall water supply and reliability of this service. Assessment of disruption to water and sanitation services per area of the city helps identify vulnerable areas which are in need of back-up/temporary water and sewage systems.
Capacity: Is the city's drainage system currently able to cope with seasonal increase in rain/stormwater? How are the anticipated effects of climate change likely to impact the city's drainage systems and have these predictions been incorporated in planning and design efforts? For example, are design parameters for estimating reservoir size, dam configuration, spillway capacity, and highest flood levels reviewed in view of changing climate patterns, and rainfall intensities and durations? [Lens 3 – CRF 8]	Robust; Reflective	Experience of current seasonal rain/stormwater variations and forecasted impacts of climate change on rainfall levels should inform the design of the city's drainage system. Climate change projections allow the city to improve the design and capacity of existing drainage and water retention infrastructure, as well as make necessary flood protection investments to accommodate changes in rainfall patterns.
Facilities: Are principal components of the city's water and sanitation systems (e.g., water intake structures, water treatment plants, conveyance systems, storage systems, distribution network, sewage treatment works) located in in disaster prone areas? If yes, are there plans to retrofit existing exposed facilities so that impacts of potential disasters may be reduced? Are new facilities built in safe areas or designed to be resilient to the hazards that are relevant for the areas in which they are built? [Lens 3 – CRF 8]	Robust; Reflective	Historic disaster monitoring and climate change projections allows the city to make improvements to existing water and sanitation facilities to mitigate impacts of potential hazards, and make informed decisions about new facility sites based on levels of exposure.

Facilities: Does the city regularly maintain and repair its water and sewage infrastructure? What volume of potable water is lost from distribution channels per year? What volume of wastewater is leaked into the environment per year? [Lens 3 – CRF 8]	**Robust**	Preventive maintenance of water and sewage infrastructure improves the duration and reliability of infrastructure. Regular maintenance of water distribution and wastewater collection prevents costly leakages of potable water and wastewater into the environment. Untreated wastewater discharge can have devastating impacts on the environment and health of affected populations.
System Continuity: Is the probability that water and sanitation will remain operational in post-disaster situations assessed? If yes, does the assessment include information about what proportion of water and sanitation user accounts is exposed to each hazard?	**Reflective**	Assessment of water and sewage networks' probability of continued operation informs the planning of back-up systems for water supply and wastewater collection. Assessment of the number of people affected by such disruptions allows the city estimate costs for keeping minimum levels of services available.
System Continuity: Has the city identified strategic locations (such as health centers, shelters) or other areas requiring rapid assistance with supplies of bottled water, water tankering or water treatment kits? Is the access water supply available for all of those locations/functions?	**Redundant**	Identification of strategic facilities that cannot operate without water, such as hospitals and shelters, should be prioritized during planning of back up water supply. Minimum levels of water supply needs to be maintained to facilities whose operation is essential for the safety of city residents.

Resource 18:

Prioritization Lens 1

PART A - SHOCK ASSESSMENT

Shocks – What are the primary shocks that could affect the city? Where appropriate, specify the area(s) that could be affected.

SHOCK	INTENSITY	FREQUENCY	LOCATIONS AFFECTED	RELATED SHOCKS (at the same time or in succession – e.g. Earthquake-Tsunami)
Example: Coastal Flooding	*High*	*4 of the last 5 years brought major flooding*	*Whole of the Bay area*	
1.				
2.				
3.				

Exposure – **For your sector**, what might the shock affect? Outline the people, functions or assets that could be disrupted.

SHOCK	HUMAN/SOCIO-ECONOMIC (people, communities or social functions which might be disrupted)	PHYSICAL ASSETS (assets within your sector which may be exposed)
Example: Coastal Flooding	*10,000 residents live in the bay area who rely on the water company for main supply*	*The water treatment works are situated within the bay area as well as the desalination plant - the desalination plant was closed for 7 days after last years' flooding*
1.		
2.		
3.		

Vulnerability – For assets identified as exposed to the shock, please identify whether any exhibit particular strengths or weaknesses – Why? (For example, this could be due to a lack of planning and preparedness or physical weakness of an asset.)

SHOCK	HUMAN (any exposed people, communities or functions particularly vulnerable and <u>why</u>)	PHYSICAL ASSETS – are any of the identified assets particularly vulnerable?
Example: Coastal Flooding	*Emergency plans in place & city awareness campaigns with Bay area focus (when water may be unsafe & what to do). Helpline for outages.*	*The treatment works have flood barriers, pumping systems and diversion channels - never been impacted. The desalination plant flood barriers failed last year.*
1.		
2.		
3.		

Direct Consequences and Actions – <u>**In relation to your sector:**</u> Do any of the risks described above constitute an immediate threat to people or assets in the city? Describe potential scenarios below with recommended mitigation measures.

PART B - STRESS ASSESSMENT

Stresses – What main stresses currently affect the city? Who do they affect? Are they getting better or worse?

STRESS	LOCATIONS AFFECTED	CURRENT SITUATION	PROJECTION
Example: Water access / scarcity	*Poorer communities in South Bay informal settlement*	*Lack of secure access for over 5,000 people*	*Improving as more public connection infrastructure is completed (25% red. last 5 years)*
1.			
2.			
3.			

Sector Impact – How does this stress impact upon the operation of your sector?

STRESS	DIRECT	INDIRECT
Example: Water access / scarcity	*This is directly related to the water sector. There is requirement to address this*	
1.		
2.		
3.		

Compound Risk – Consider which shocks identified in Part A might compound this stress upon your sector (and vice versa).

STRESS	SHOCKS	IMPACT OF SHOCKS ON STRESS / IMPACTS OF STRESS ON SHOCKS
Example: Water access / scarcity	*Coast flooding, seismic activity*	*There may be short-term water loss after these shocks. If water is already scarce, relief may be impacted*
1.		
2.		
3.		

Actions –Are there any actions <u>**your sector needs to undertake**</u> in order to reduce direct or potential indirect impacts?

TO ADDRESS IMMEDIATE STRESS	TO ADDRESS POTENTIAL STRESS / SHOCK COMPOUND ISSUES

Resource 19:
Prioritization Lens 2

PART A - IMPACT FROM OTHER SECTORS

If any other urban sector were to be damaged or impacted by a shock or stress, how might this impact your sector? Review horizontally. Leave blank if no impact. When completed, highlight areas of significant impact in red.

SECTOR	Communities and Social Protection	Disaster Risk Management	Education	Energy	Environment	Health	ICT
SECTOR DESCRIPTION	Equal and fair access to basic services; Social cohesion; Awareness; Support for vulnerable groups	Preparation; Response mechanism; Disaster prevention infrastructure	Complete coverage (offered to all citizens); Continuous operation of education facilities	Secure supply of power; Continuity of services in the event of disruption	Environmental protection; Stability of the urban ecosystem	Emergency health relief; and Basic health services provided to the entire population	Helps guide economic growth; Ensures ICT public service delivery / accessibility
IMPACT FOR YOUR SECTOR							

Local Economy	Logistics and Supply Chains	Municipal Finance	Solid Waste	Transport	Urban	Water and Sanitation
Local economy is diverse and youth unemployment is low	Efficient movement of goods -continuous and profitable operation	Withstands shocks to revenues or unforeseen municipal costs	Collection, disposal and treatment, especially of hazardous waste	Transport access for all population groups; Continuity in the event of disruption	Physical and socio-economic planning processes; Long-term approach to urban growth	Water and sanitation services are accessible to all segments of the population
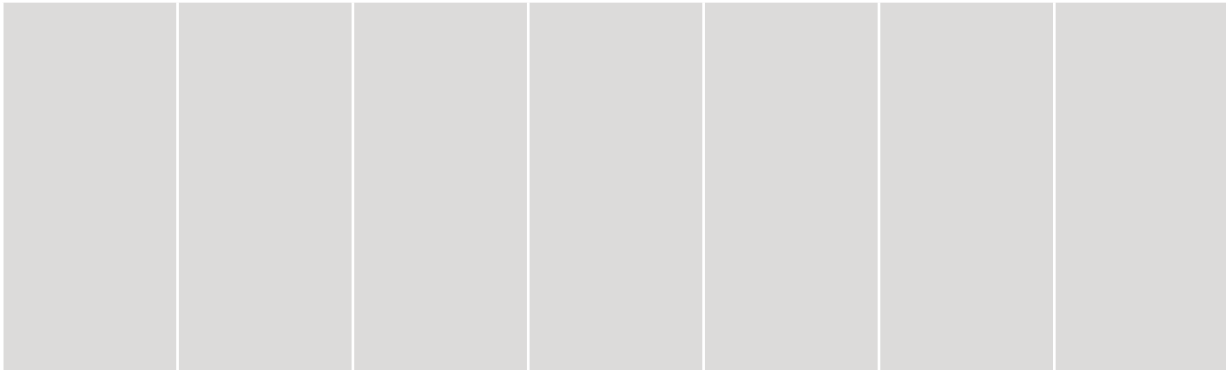
PART B – IMPACTS FROM YOUR SECTOR

If your sector were to be damaged or impacted by a shock or stress, how might this impact the other sectors?   Review vertically. Leave blank if no impact. When completed, highlight areas of significant impact in red.

SECTOR	SECTOR DESCRIPTION	IMPACT OF YOUR SECTOR DISRUPTION ON THE OTHER SECTORS
Communities and Social Protection	Equal and fair access to basic services; Social cohesion, Awareness; Support for vulnerable groups	
Disaster Risk Management	Preparation; Response mechanism; Disaster prevention infrastructure	
Education	Complete coverage (offered to all citizens); Continuous operation of education facilities	
Energy	Secure supply of power; Continuity of services in the event of disruption	
Environment	Environmental protection; Stability of the urban ecosystem	
Health	Emergency health relief; and Basic health services provided to the entire population	
ICT	Helps guide economic growth; Ensures ICT public service delivery / accessibility	
Local Economy	Local economy is diverse and youth unemployment is low	
Logistics and Supply Chains	Efficient movement of goods -continuous and profitable operation	
Municipal Finance	Withstands shocks to revenues or unforeseen municipal costs	

	Solid Waste Management	Collection, disposal and treatment, especially of hazardous waste	
	Transport	Transport access for all population groups; Continuity in the event of disruption	
	Urban Development	Physical and socio-economic planning processes; Long-term approach to urban growth	
	Water and Sanitation	Water and sanitation services are accessible to all segments of the population	

Resource 20:
Prioritization Lens 3—Option 1

QUALITIES OF RESILIENCE

Please complete the worksheet from the perspective of the sector you are covering in the CityStrength Diagnostic. Please use the completed Guiding Questions to rate how well your sector exhibits each of the characteristics of resilience using the following scale: 5 = the sector fully exhibits this characteristic; 3 = the sector partially exhibits this characteristic; or 1 = the sector does not exhibit this characteristic at all or only in a minor way. Please provide a short justification for the rating.

RESILIENCE CHARACTERISTIC	RATING	BRIEF JUSTIFICATION FOR RATING
Robust Robust systems include well-conceived, constructed and managed physical assets, so that they can withstand the impacts of hazard events without significant damage or loss of function. Robust design anticipates potential failures in systems, making provision to ensure failure is predictable, safe, and not disproportionate to the cause. Overreliance on a single asset, cascading failure and design thresholds that might lead to catastrophic collapse if exceeded are actively avoided. An important aspect of robustness is proper operations and maintenance to ensure that systems are functioning properly.		
Redundant A redundant network or system has a belt and braces approach which includes spare capacity or back-up to accommodate disruption, extreme pressures or surges in demand. Providing diverse ways of achieving a given need or fulfilling a particular function is a means to achieving a redundant system. If one service channel gets disrupted, another can be used.		

RESILIENCE CHARACTERISTIC	RATING	BRIEF JUSTIFICATION FOR RATING
Coordinated Coordination between city systems and agencies means that knowledge is shared, planning is collaborative and strategic, and decision-making is based on investments that are mutually supportive towards a common outcome. Exchange of information between systems enables them to function collectively and respond rapidly through feedback loops occurring throughout the city.		
Reflective Resilient urban systems examine, learn, and evolve based on their past experiences and new information, modifying standards or norms based on emerging evidence rather than seeking permanent solutions based on the status quo. As a result, people and institutions examine and systematically learn from their past experiences, and leverage this learning to inform future decision-making.		
Inclusive Being inclusive recognizes that risk is perceived differently by different stakeholders and that shocks and stresses affect the most vulnerable the most. An inclusive approach contributes to a sense of shared ownership or joint vision to build a resilient city. This can be achieved through consultation and engagement with a wide range of stakeholders, including the most vulnerable groups, to ensure that systems are more resilient by considering a wider range of vulnerabilities, risk management capacities, and localized information. Equity in access to infrastructure and services underpins social cohesion and opportunity.		

RESOURCE 21:
PRIORITIZATION LENS 3—OPTION 2

CITY RESILIENCE FRAMEWORK

This lens uses the City Resilience Framework.[3] It comprises 12 key indicators that describe attributes of a resilient city within four categories: the health and wellbeing of individuals (people); urban systems and services (place); economy and society (organization); and, finally, leadership and strategy (knowledge). It aims to form the basis for a common understanding of urban resilience and a 'baseline' for what matters most for making cities more resilient.

Please complete the worksheet from the perspective of the sector/topic you are covering in the CityStrength Diagnostic. For each of the 12 indicators, the first box provides a definition of the indicator, the second lists sub-indicators that could provide a quantitative measure of how well the city system performs. In the third box, please rate the indicator using the following scale: 5=the city almost fully achieves this indicator; 3=the city partially achieves this indicator; or 1=the city does not achieve this indicator at all or in a minor way. In addition, provide a short rationale for the rating. The Sectoral Guiding Questions are keyed to the sub-indicators presented here to facilitate your completion of this worksheet. Only provide ratings for indicators that are highlighted for your sector within the Sectoral Guiding Questions.

---

3   The City Resilience Framework was developed by Arup in conjunction with the Rockefeller Foundation. This document is based on the City Resilience Framework that was released at the World Urban Forum in Medellin in April 2014 (http://publications.arup.com/Publications/C/City_Resilience_Framework.aspx), and contains additional information provided by Arup in June 2015 on sub-indicators.

Integrated development planning

Minimal human vulnerability

Empowered stakeholders

Livelihoods & employment

Effective leadership & management

Safeguards to human life & health

Leadership and strategy

Health & wellbeing

Reliable mobility & communications

Collective identity & mutual support

Infrastructure & environment

Economy & society

Continuity of critical services

Social stability & security

Reduced physical exposure

Finance including contingency funds

© ARUP 2015

Health and Wellbeing (People)

INDICATOR 1: MINIMAL HUMAN VULNERABILITY

This relates to the extent to which everyone's basic needs are met.

Description: Resilient cities are able to provide the basic physiological needs of the population, including adequate provision of food, water, sanitation, energy and shelter. Minimizing human vulnerabilities involves providing a standard of living that goes beyond mere survival. Evidence from cities suggests that the affordability of these services, particularly for vulnerable groups, is also critical to ensuring the whole population has daily access, including during times of disruption. Chronic failure to provide these services can cause strain on other aspects of the city's functioning, including environmental pressures, economic stagnation, and social unrest. While a basic level of wellbeing also allows people to deal with unforeseen circumstances such as shock events.

The focus of this indicator is on providing an adequate and dependable supply of essential services to a city's whole population every day, including during times of disruption, to ensure everyone's basic needs are met.

Sub-indicators:

1.1 Safe and affordable housing for all city residents.

1.2 Adequate and affordable energy supply for all.

1.3 Inclusive access to an adequate supply of safe drinking water.

1.4 Effective (safe, reliable and affordable) sanitation provided to all areas of the city.

1.5 Sufficient and affordable food supplies for all.

Rating:	Rating and rationale for rating:
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

INDICATOR 2: DIVERSE LIVELIHOODS AND EMPLOYMENT

This is facilitated by access to finance, ability to accrue savings, skills training, business support, and social welfare.

Description: Diverse livelihood opportunities and support mechanisms allow citizens to proactively respond to changing conditions within their city without undermining their wellbeing. Access to finance, skills training and business support enables individuals to pursue a range of options to secure the critical assets necessary to meet their basic needs. Long-term, secure livelihoods allow people to accrue personal savings that will support their development, as well as their survival during times of crisis.

Mechanisms through which diverse livelihood and employment opportunities can be generated include training and skills development, microfinance, incentive and innovation programs, as well as a living wage. Financial resources for business development and incentives for innovation allow individuals to seek diverse employment options during times of economic constraint or change. Contingency measures, such as insurance and social welfare, contribute to supporting households through challenging circumstances.

An inclusive approach to livelihoods ensures that all citizens in a city have unrestricted access to legitimate occupations, regardless of race, ethnicity, gender or sexual orientation. A range of diverse (redundant) small, medium and large businesses in different economic sectors helps people to access job opportunities, even during challenging macro-economic circumstances. In the long term, microfinance, savings, training, business support and social welfare form a safety net that enables people to be flexible during times of stress.

Sub-indicators:

2.1 Inclusive labor policies and standards, with an effective welfare system for low income groups.

2.2 Relevant skills and training with effective mechanisms for matching skills to the current and emerging employment marketplace

2.3 Dynamic local business development and innovation - thriving, adaptable and inclusive local business environment.

2.4 Supportive financing mechanisms - inclusive and resourceful finance mechanisms to enable businesses to adapt to changing circumstances and put in place contingencies for shock events).

2.5 Diverse protection of livelihoods following a shock - resourceful and inclusive measures to support businesses and workers following a shock

Rating: 5= almost fully achieves 3= partially achieves 1= minimally achieves	**Rating and rationale for rating:**

INDICTOR 3: ADEQUATE SAFEGUARDS TO HUMAN LIFE AND HEALTH

This relies on integrated health facilities and services, and responsive emergency services.

Description: Health systems are critical to the day-today prevention of illness and the spread of disease, as well as protecting the population during emergencies. They comprise a diverse suite of practices and infrastructure, which help to maintain public health and treat chronic and acute health problems.

Health services encompass a variety of practices, including: education; epidemiological surveillance; vaccination; and provision of healthcare services. These are focused on ensuring both physical and mental health. Accessible and affordable day-to-day individual healthcare, as well as appropriate population-based interventions (i.e. targeted at the community or city level), are key features of a functioning city health system. Measures to address injuries and addiction are also important to reduce the burden of ill-health in urban settings. Effective, inclusive and well-prepared medical staff and procedures ensure that all individuals have access to health services before, as well as during, emergencies.

In order to achieve the above, appropriate health infrastructure is critical. Reflective learning and future planning ensure that public health practices – such as prevention through education – are appropriate for the social and physical context of a given city. Services or facilities that target vulnerable groups ensure that preventive and responsive strategies are inclusive and able to reach the entire population. In emergencies, a diverse network of medical practitioners and facilities throughout the city ensures the availability of additional resources (redundancy) that can be deployed immediately wherever they are needed.

Responsive emergency services (police, fire, ambulance) are in place, with surge capacity to support peak demand during a crisis. Additional, well-trained and resourced emergency response capacity exists for shock events (e.g. search and rescue and relief).

Sub-indicators:

3.1 Robust public health systems - robust monitoring and mitigation of public health risks.

3.2 Adequate and inclusive access to quality general healthcare.

3.3 Emergency medical resources - adequately resourced emergency medical services.

3.4 Effective, adequately resourced emergency response services.

Rating:	Rating and rationale for rating:
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

Economy & Society (Organisation)

INDICTOR 4: COLLECTIVE IDENTITY AND COMMUNITY SUPPORT

This is observed as active community engagement, strong social networks and social integration.

Description: Communities that are active, appropriately supported by the city government and well-connected with one another contribute to the bottom-up creation of a city with a strong identity and culture. This enables individuals, communities and the city government to trust and support each other, and face unforeseen circumstances together without civil unrest or violence.

Creating cohesive cities has both social and physical dimensions. Reinforcing local identity and culture contributes to positive relationships between individuals while reinforcing their collective ability to improve the environment where they live, work, create and play. These relationships are supported by a number of practices, including social networks and community organizations, artistic expression and the preservation of cultural heritage, including religion, language and traditions. Ideally, these practices are underpinned by spatial interventions that shape the places where communities develop and connect. Provision of communal facilities, public spaces and physical accessibility can help to strengthen community cohesion and avoid isolation.

Inclusivity is promoted by community participation. For example: processes that encourage civic engagement in planning and decision-making processes. Social practices are reinforced by physical interventions that foster resourcefulness and integration, such as the provision of communal meeting places; and the development of mixed neighborhoods that offer a range of housing opportunities to different social/ income groups.

Sub-indicators:

4.1 Local community support - cohesive social structures providing support at individual, household and local community level.

4.2 Cohesive, harmonized communities across the city.

4.3 Strong, cohesive local identity and culture, in which all citizens feel a sense of belonging in the city

4.4 Actively engaged citizens - citizens actively engage, express opinion and participate within society.

Rating:	Rating and rationale for rating:
5= almost fully achieves 3= partially achieves 1= minimally achieves	

INDICATOR 5: COMPREHENSIVE SECURITY AND RULE OF LAW

This includes law enforcement, fair justice, and prevention of crime and corruption.

Description: A comprehensive and contextually appropriate approach to law enforcement facilitates the reduction and prevention of crime and corruption in a city. By instituting a transparent justice system based on ethical principles, cities can uphold the rule of law and promote citizenship in daily life. These norms are critical to maintaining order during times of stress. Well planned and resourced law enforcement facilitates peaceful recovery, and ensures a healthy population by reducing crime-related injury, fatality and stress.

An integrated approach to law enforcement combines deterrents with effective policing, emergency capacity, a transparent judicial system, and measures to reduce corruption. An effective judicial system promotes civic education as a preventive measure, as well as responsive action through fair justice. Sufficiently resourced policing practices that promote safety and security are a feature of daily life in a resilient city, and continue during times of unrest. Trust and transparency are identified as key attributes of policing, which can be achieved by reducing corruption and by involving other relevant actors in law enforcement, such as community leaders. Trust in city authorities and legal institutions is achieved by appropriate enforcement of laws and avoiding discrimination or violence in law enforcement.

Laws are upheld by resourceful and responsive systems of policing, which actively involve city agencies, businesses and civil society. Social stability and security is also facilitated by inclusive public space design, which helps to avoid creating places where crime may proliferate, while maximizing the safety and security of individuals.

Sub-indicators:

5.1 Effective systems to deter crime - integrated, collaborative and resourceful mechanisms

5.2 Proactive corruption prevention - fair and transparent systems to fight corruption and promote justice.

5.3 Competent policing - effective policing measures and systems for a safe and secure city.

5.4 Accessible criminal and civil justice - effective, affordable, impartial and accessible mechanisms to promote justice and resolve civil disputes.

Rating:	Rating and rationale for rating:
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

INDICATOR 6: SUSTAINABLE ECONOMY

This is observed in sound management of city finances, diverse revenue streams, and the ability to attract business investment, allocate capital, and build emergency funds.

Description: A robust economic system is critical to sustaining the investment that a city needs to maintain its infrastructure and provide for its communities. It helps to create contingency funds that both the private and public sectors can use to respond to emergencies and unforeseen events. As a result, cities are better able to respond to changing economic conditions and pursue long-term prosperity.

A sustainable city economy is developed by aligning fiscal procedures in government, and the ability of the private sector to function despite shocks and stresses. A careful structuring of city budgets will consider the availability of funds to regularly invest in infrastructure and to respond to emergencies. This is supported by a robust revenue base, supplemented by the city's ability to attract inward investment.

The private sector has a complementary responsibility to develop business continuity plans to ensure that businesses can also function during, and recover from, emergencies. City government can contribute to the sustainability of private economic activities by empowering different sectors within the economy and strengthening trade relationships beyond the city.

Redundancy (diversity) and resourcefulness are identified as key qualities for a healthy city economy. A diverse economy can absorb the impacts of sector-based shocks without major impact on the city's revenue streams. Resilient cities are also resourceful, optimizing revenues and expenditures, and leveraging funds from non-government and business sources where appropriate. For example: public-private partnerships, direct investment and grant funding.

Sub-indicators:

6.1 Well-managed public finances - adequate public finances and sound fiscal management.

6.2 Comprehensive (resourceful, reflective and flexible) business continuity planning across both public and private sectors.

6.3 Diverse economic base - robust, flexible and diverse local economy.

6.4 Attractive business environment - diverse and resourceful investments within the city, driven by a strong urban brand and economic and social environment.

6.5 Strong integration with regional and global economies - strong integration between the city's economy and wider economic systems.

Rating:	**Rating and rationale for rating:**
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

Urban Systems & Services (Place)

INDICATOR 7: REDUCED EXPOSURE AND FRAGILITY

This relies on a comprehensive understanding of the hazards and risks to which a city is exposed that informs the development of integrated strategies to physically protect the city combining sound environmental stewardship, robust design and maintenance of man-made infrastructure, and enforcement of appropriate building codes and regulations.

Description: Conservation of environmental assets preserves the natural protection afforded to cities by ecosystems. Among other things, this might include the absorption of tidal surges by coastal wetlands or fluvial flooding by upstream woodlands. The protective function of infrastructure relies on appropriate design and construction. This is as important for homes, offices and other day-to-day infrastructure as it is for specific defenses, like flood barriers. Working together, both natural and man-made assets help to improve protection against severe conditions, avoiding injury, damage or loss.

Ecosystems and built infrastructure designed as integrated urban systems effectively contribute to reducing physical exposure and vulnerability. For example: river basins, forests, drains and sewers all play a role in protecting cities from flooding. In coastal areas, for example, robustness can be better achieved by using natural wetlands and man-made dykes as part of an integrated approach to coastal flooding.

A resilient city values ecosystem services and has in place robust environmental policies to protect ecosystems in situ. In resilient cities, man-made infrastructure and buildings are well-conceived, well-constructed and safeguarded against known hazards. Building codes and standards promote long-term robustness, flexibility to adapt in the future and safe failure mechanisms in the event of a shock. Cities in seismic zones can be better prepared for earthquakes by updating and enforcing building codes on the basis of reflective learning and new understanding of future conditions.

Sub-indicators:

7.1 Comprehensive hazard and exposure mapping - robust systems in place to map the city's exposure and vulnerability to hazards based on current data.

7.2 Appropriate codes, standards and enforcement - building and infrastructure codes and standards are forward looking, appropriate to local context and risk profiles, and enforced

7.3 Effectively managed protective ecosystems - well-developed understanding and acknowledgement of the role of ecosystems in providing physical protection to the city.

7.4 Robust protective infrastructure - integrated, forward-looking and robust network of protective infrastructure that reduces vulnerability and exposure of citizens and critical assets.

Rating:	Rating and rationale for rating:
5= almost fully achieves 3= partially achieves 1= minimally achieves	

INDICATOR 8: EFFECTIVE PROVISION OF CRITICAL SERVICES

This results from active management and maintenance of ecosystems, and from diversity of provision, redundant capacity, and adequate maintenance of essential utility services, combined with robust contingency planning.

Description: Ecosystems and infrastructure both provide critical services to urban populations. However, these services depend on more than just the presence of assets; their quality and performance are only maintained through proactive management. During times of stress, some ecosystem services and infrastructure become central to the city functioning. Well-maintained systems are better able to accommodate abnormal demand, withstand unusual pressures and continue functioning. Well-established management practices create enhanced knowledge of system components, so that infrastructure managers are better prepared to restore disrupted services.

Educating communities and businesses is essential to ensuring that ecosystem services of importance to urban populations – such as natural drainage capacity and flood defenses – remain robust and are not undermined by careless or unwise actions, such as natural resource extraction or destruction of coastal dunes and mangroves. The management of man-made infrastructure includes frequent monitoring together with regular plans for upgrade and renewal. Demand management is critical in the continuity of critical services, ensuring that neither built nor natural systems are overloaded, and can maintain sufficient redundancy to absorb surges in demand. A resilient city also implements continuity plans to ensure that infrastructure managers are ready to maintain service provision and avoid disruption during extreme events.

Active management of ecosystem services and infrastructure ensures long-term robustness and flexibility in changing conditions. For example: through monitoring and maintenance programs. Reflective approaches may use intelligent technologies and education to monitor the integrity of assets and disseminate alerts in the event of declining performance.

Sub-indicators:

8.1 Effective stewardship of ecosystems - robust mechanisms in place to maintain and enhance the ecosystem services that benefit city residents.

8.2 Flexible infrastructure - critical services within the city are supported by diverse and robust infrastructure, which has been appropriately planned and delivered.

8.3 Retained spare capacity - minimized demand on critical infrastructure through the resourceful and flexible use of key resources.

8.4 Diligent maintenance and continuity - robust monitoring, maintenance and renewal of essential utility infrastructure, with effective contingency planning.

8.5 Adequate continuity for critical assets and services - resourceful, reflective and flexible continuity plans to maintain utility services to critical assets during emergency situations.

Rating:	Rating and rationale for rating:
5= almost fully achieves 3= partially achieves 1= minimally achieves	

INDICATOR 9: RELIABLE MOBILITY AND COMMUNICATIONS

This is enabled by diverse and affordable multi-modal transport systems and information and communication technology (ICT) networks, and contingency planning.

Description: Reliable communications and mobility create daily connectivity between places, people and services. This fosters a positive environment for everyday working and living, builds social cohesion, and also supports rapid mass evacuation and widespread communication during emergencies.

A combination of transport links and the provision of information and communication technology (ICT) are fundamental to connectivity in contemporary cities. Transport links enable physical mobility and should be characterized by a wide coverage of the city, as well as good service quality and affordability. Good infrastructure capacity, safety and efficiency are essential for the effective operation of transport networks. Business logistics and freight infrastructure are an important consideration to support the city's economic functioning.

Communication technologies are also critical for a city's connectivity. These include a diverse range of technologies, such as radio networks, internet and mobile phone services, as well as specific channels such as social media. The availability of reliable and inclusive forms of communication is critical to disseminate information during emergencies – particularly to the most vulnerable residents of a city, such as the poor and the elderly.

Inclusive multi-modal transport networks allow safe and affordable travel between all neighborhoods and key facilities across the city. Multi-modal systems incorporate redundancy and flexibility by providing alternative options in the event of failure or surges in demand. Robust and redundant ICT services enable safe communication and access to information, including coordination of emergency services.

Sub-indicators:

9.1 Diverse, affordable and integrated transport networks, providing flexible travel around the city for all.

9.2 Effective transport operation and maintenance - Effective management of the city's transport network to provide quality, safe transport.

9.3 Reliable communications technology - effective and reliable communication systems that are accessible by all.

9.4 Secure technology networks - robust, effective mechanisms in place to protect the information and operational technology systems on which the city is dependent.

Rating:	Rating and rationale for rating:
5= almost fully achieves 3= partially achieves 1= minimally achieves	

Leadership & Strategy (Knowledge)

INDICATOR 10: EFFECTIVE LEADERSHIP AND MANAGEMENT

This is enabled by trusted individuals, multi-stakeholder consultation, evidence-based decision-making and disaster risk reduction activities.

Description: Clear and purposeful leadership promotes trust, unity and a shared understanding of a city's trajectory. Leadership is a key ingredient in encouraging individuals and communities to take action during challenging times. A committed city government that takes decisions on the basis of sound evidence enables a city to thrive from day to day, and to respond to shocks and stresses.

Cross-sector collaboration that challenges 'siloed' approaches in government is critical to effective decision-making. Multi-stakeholder alignment and consultations with communities, including the private sector, are measures that support relevant and effective decision-making. Evidence gathered in cities suggests that effective city governments are given the necessary power to make decisions at local level. Integrated, multi-stakeholder decision-making is also supported by coordinated practices and procedures, such as emergency management structures and response plans.

Inclusive governments recognize the importance of grassroots knowledge to help them understand local challenges, and they value the research and innovation that universities and businesses can contribute to solve city problems. By forging cross-sector relationships, resilient cities are better able to coordinate people and access private resources and support during times of need. Integration and resourcefulness are essential to emergency coordination and capacity-building, enabling appropriate and timely government responses.

Sub-indicators:

10.1 Appropriate (transparent, inclusive and integrated) government decision-making and leadership

10.2 Effective coordination with other government bodies - integrated and flexible communication and collaboration between city, state and national government, both daily and during times of shock or stress.

10.3 Proactive multi-stakeholder collaboration - inclusive and constructive collaboration between all actors involved in city decision-making.

10.4 Comprehensive hazard monitoring and risk assessment - effective systems to monitor potential hazards and assess risk.

10.5 Comprehensive emergency management - city leadership that has sufficient capacity and flexibility to effectively manage emergencies.

Rating:	Rating and rationale for rating:
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

INDICATOR 11: EMPOWERED STAKEHOLDERS

This is underpinned by education for all, and relies on access to up-to-date information and knowledge to enable people and organizations to take appropriate action.

Description: Education is a fundamental part of human development. Basic skills such as literacy and numeracy help citizens to communicate, express themselves and find livelihood opportunities. These skills are invaluable against many of the stresses a city faces.

Inclusive provision of education and information also enables citizens to protect themselves in emergency situations. For example, in many cities that are vulnerable to seismic activity, television and radio stations automatically switch to deliver official earthquake information following an event, which alerts the public to risks and precautionary measures. Individuals and communities that know what to do during unexpected events are invaluable assets to a city. The provision of early warnings and access to education, information and knowledge empowers citizens and gives them the tools to take appropriate decisions in the face of shocks and stresses. As a consequence, urban stakeholders are better positioned to act, learn, and adapt.

It is imperative that the decision-makers in the city effectively engage with the wider population, discussing plans and actions. Multiple and well-used channels of communication help to make this process effective. In addition, resilient cities ensure that information shared with their citizens can be understood, communicating in an accessible and inclusive fashion.

Sub-indicators:

11.1 Adequate (affordable, quality) education for all.

11.2 Widespread community awareness and preparedness - inclusive efforts to build public   awareness of risks.

11.3 Effective mechanisms for communities to engage with the city government - inclusive, integrated and transparent mechanisms for communication and coordination between the city government and citizens.

Rating:	**Rating and rationale for rating:**
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	

INDICATOR 12: INTEGRATED DEVELOPMENT PLANNING

This is indicated by the presence of a vision, an integrated development strategy, and plans that are regularly reviewed and updated by cross-departmental groups.

Description: Development plans and land use regulations are instruments that cities use to coordinate and control urban development and guide future investments. The creation and implementation of plans and regulations ensures that individual projects and programs are aligned and sufficiently address uncertainty. Integrated plans create a formalized framework to deal with multidisciplinary issues, such as climate change, disaster risk reduction or emergency response.

A critical aspect of delivering a comprehensive development and planning framework is the presence of a city vision. The development of a shared and integrated city vision requires understanding of and alignment between the motivations of different stakeholders involved in designing and implementing projects in the city. This, in turn, requires ongoing processes of communication and coordination at all stages of planning. A vision should be underpinned by appropriate evidence and acceptance of uncertainty, and delivered via policy and regulations. Land use plans should be permanently enforced and regularly updated. Preparation of plans relies on collecting up-to-date and relevant data, as well as the ongoing monitoring of urban trends.

The implementation of integrated strategies and plans ensures that different projects and programs across a city are aligned, mutually-supportive, reflective of past experience and resourceful in the face of future uncertainty. These processes should be truly inclusive, incorporating consultations with residents and others who will experience their effects.

Sub-indicators:

12.1 Comprehensive city monitoring and data management - regular monitoring and analysis of relevant data undertaken to inform city planning and strategies.

12.2 Consultative planning process - transparent and inclusive process to develop planning policies and strategies.

12.3 Appropriate land use and zoning - integrated and flexible land use and zoning plans that ensure appropriate development of the city.

Rating:	Rating and rationale for rating:
5= almost fully achieves	
3= partially achieves	
1= minimally achieves	
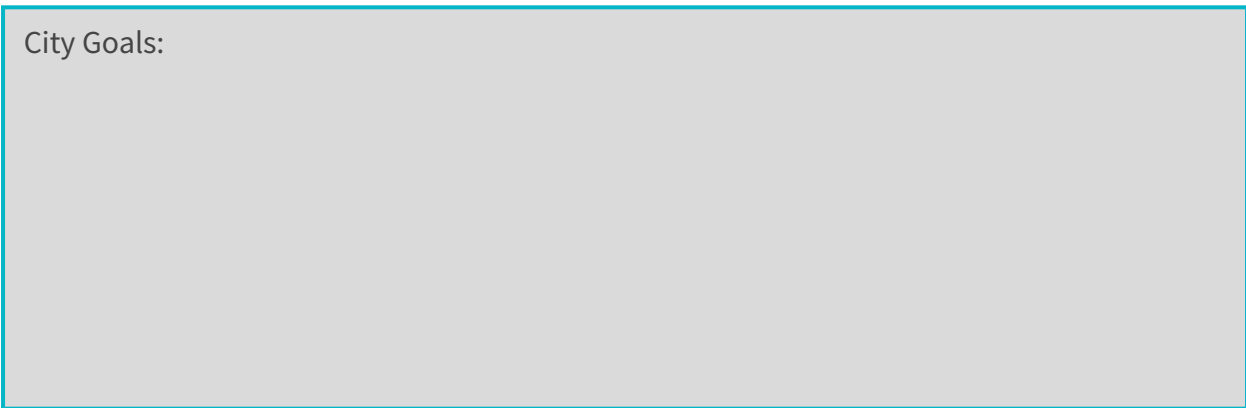
RESOURCE 22:
PRIORITIZATION LENS 4

City-level Goals and Objective

What are the city's official goals, objectives, or aspirations as stated in government planning documents (e.g., comprehensive plans, 5-year plans, etc.)?
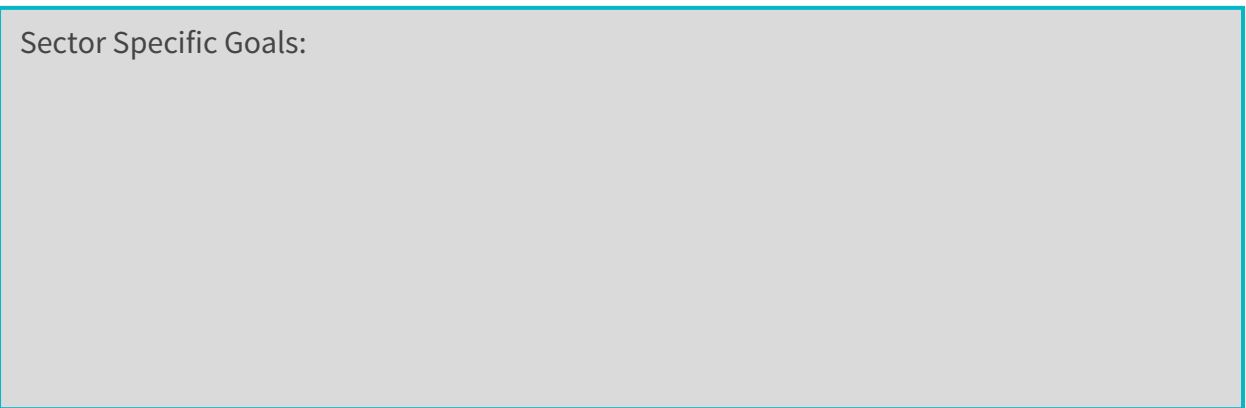
City Goals:

Sectoral Goals and Objectives

What are the official goals, objectives, or aspirations as stated in sectoral planning documents (e.g., master plans, etc.)?

Sector Specific Goals:

Alignment between Proposals and the City's Goals

What are your recommended actions and investments for the sector? How do they relate to the city's goals and objectives? How do they relate to sectoral goals and objectives? Try not to exceed a total of 5 recommendations.

Action or Investment	Description	Relationship to Goals and Objectives 1 = not aligned 3 = somewhat aligned 5 = fully aligned
1.		
2.		
3.		
4.		
5.		

RESOURCE 23:
INTERDEPENDENCY MATRIX

	Community and Social Protection	Disaster Risk Management	Education	Energy	Environment	Health
Community and Social Protection						
Disaster Risk Management						
Education						
Energy						
Environment						
Health						
ICT						
Local Economy						
Logistics and Supply Chains						
Municipal Finance						
Solid Waste Management						
Transport						
Urban Development						
Water and Sanitation						

The Interdependency Matrix is populated using the completed worksheet from Lens 2. The table should be edited to omit the sectors not included in the implementation of the diagnostic in a specific city. Sectors with significant interdependencies are highlighted in red. Sectors with moderate interdependencies are highlights in yellow. And, sectors with no interdependencies are left blank.

ICT	Local Economy	Logistics and Supply Chains	Municipal Finance	Solid Waste	Transport	Urban	Water and Sanitation

RESOURCE 24:
HOLISTIC RESILIENCE MATRIX – OPTION 1

The Holistic Resilience Matrix – Option 1 is populated using the completed worksheet from Lens 3 – Option 1. The table should be edited to omit the sectors not included in the implementation of the diagnostic in a specific city. Rating scale: 5 = the sector fully exhibits this quality; 3 = the sector partially exhibits this quality; or 1 = the sector does not exhibit this quality.

	Robust	Redundant
Community and Social Protection		
Disaster Risk Management		
Education		
Energy		
Environment		
Health		
ICT		
Local Economy		
Logistics and Supply Chains		
Municipal Finance		
Solid Waste Management		
Transport		

Reflective	Coordinated	Inclusive

RESOURCE 25:
HOLISTIC RESILIENCE MATRIX – OPTION 2

The Holistic Resilience Matrix – Option2 is populated using the completed worksheets from Lens 3 – Option 2. The table should be edited to omit the sectors not included in the implementation of the diagnostic in a specific city. Rating scale: 5=the city almost fully achieves this indicator; 3=the city partially achieves this indicator; or 1=the city does not achieve this indicator at all or in a minor way.

	(1) Minimal human vulnerability	(2) Diverse livelihoods and employment	(3) Adequate safeguards to human life and health	(4) Collective identity and community support	(5) Comprehensive security and rule of law
Community and Social Protection					
DRM					
Education					
Energy					
Environment					
Health					
ICT					
Local Economy					
Logistics and Supply Chains					
Municipal Finance					
Solid Waste Management					
Transport					
Urban Development					
Water and Sanitation					

(6) Sustainable economy	(7) Reduced exposure and fragility	(8) Effective provision of critical services	(9) Reliable mobility and	(10) Effective leadership and management	(11) Empowered stakeholders	(12) Integrated development planning

REFERENCES

Alcamo, Joseph. 2003. Ecosystems and human well-being: A framework for assessment. Washington, DC: Island Press.

Arup, RPA, and Siemens. 2012. Toolkit for Resilient Cities. London.

Asian Development Bank. 2013. Increasing climate change resilience of urban water infrastructure: Based on a case study from Wuhan City, People's Republic of China. Manila: Asian Development Bank.

Baker, Judy. 2012. Climate Change, Disaster Risk, and the Urban Poor: Cities Building Resilience for a Changing World. Washington, DC: World Bank.

Benson, Charlotte and Edward J. Clay. 2004. Understanding the economic and financial impacts of natural disasters. Washington, DC: World Bank.

Bertelsmann Stiftung. 2013. Cohesion Radar Measuring Common Ground: An international Comparison of Social Cohesion.

Bhamra, Ran, Samir Daniab and Kevin Burnarda. 2011. Resilience: The concept, a literature review and future directions. International Journal of Production Research, 5375-5393.

Blanco, Edgar. 2014. Urban Freight and Port Cities, World Bank Concept Note. Unpublished.

Brugmann, Jeb. 2012. Financing the Resilient City. Environment and Urbanization vol. 24 no. 1 215-232.

Brundtland Commission (World Commission on Environment and Development). 1987. Our Common Future. Oxford: Oxford University Press.

CARRI (Community and Regional Resilience Institute). 2013. Definitions of Community Resilience: An Analysis. Oak Ridge, TN: CARRI.

Center for the Protection of National Infrastructure. 2006. Telecommunications Resilience Good Practice Guide, Version 4.

City of New York. 2013. A Stronger, More Resilient New York.

Comfort, L. K., A. Boin, and C. C, Demchak. 2010. Resilience: Exploring the Concept and Its Meanings, in Designing Resilience - Preparing for Extreme Events. Pittsburg: University of Pittsburgh Press.

DfID. 2005. Disaster Risk Reduction, a Development Concern. London: DfID.

DfID. 2011. Defining Disaster Resilience: A DfID Approach Paper. London: DfID.

Dobbs, Richard. 2011. Urban World: Mapping the Economic Power of Cities. New York: McKinsey Global Institute.

Durand-Lasserve, Alain. 2006, March 1. "Informal Settlements and the Millennium Development Goals: Global Policy Debates on Property Ownership and Security of Tenure." Global Urban Development Magazine.

Elliott, D., Swartz, E. and Herbane, B. 1999. Just waiting for the next big bang: business continuity planning in the UK finance sector. Journal of Applied Management Studies, 8 (1), pp. 43-60. (1999)

Environmental Services Association UK. 2014. Reducing Fire Risks at Waste Management Sites. Draft fire control guidance.

FAO. 2014. Nutrition and Resilience: Strengthening the links between resilience and nutrition in food and agriculture. Rome: FAO.

Farvacque-Vitkovic, Catherine and Mihaly Kopanyi. 2014. Municipal Finances: A Handbook for Local Governments. Washington, DC: World Bank.

Freckleton, Derek, et al. 2012. Evaluation of Transportation Network Resiliency with Consideration for Disaster Magnitude. Presented at Transportation Research Board Meeting.

GFDRR. 2009a. Guidance Notes on Safer School Construction. Washington, DC: GFDRR.

GFDRR. 2009b. Guidance Note for Integration of Disaster Risk Reduction in World Bank Health Sector Projects. Washington, DC: GFDRR.

Graham, Stephen. 2010. Disrupted Cities: When Infrastructure Fails. New York: Routledge.

Hallegatte, Stephane, Colin Green, Robert Nicholls, and Jan Corfee-Morlot. 2013. Future Flood Losses in Major Coastal Cities. Nature Climate Change 3.9: 802-06. Nature Publishing Group, 18 Aug. 2013.

Hallegatte, Stephane. Resilience in Cities: WDR Framework and Implementation Challenges. PowerPoint presentation. SDN Forum 2013: Paving the Path Toward Resilience in Cities. Washington, DC. 28 February 2013.

Ibish, Hussein. 2012. Was the Arab Spring Worth It? Foreign Policy Magazine. 18 June, 2012.

Inter-American Development Bank. 2012. Emerging and Sustainable Cities Initiative Methodological Guide, First Edition. Washington, D.C: World Bank.

Inter-American Development Bank. 2014. Emerging and Sustainable Cities Initiative Methodological Guide, Second Edition. Washington, D.C: World Bank.

International Institute for Environment and Development (IIED). 2011. Environmental Mainstreaming Diagnostic.

International Telecommunication Union. 2014. Resilient pathways: The adaptation of the ICT sector to climate change.

Islamic Republic of Pakistan. 2011. 2011 Pakistan Floods: Preliminary Damage and Needs Assessment. With technical support from the Asian Development Bank and World Bank. Washington, DC: GFDRR

Jha, Abhas Kumar, Robin Bloch, and Jessica Lamond. 2012. Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century. Washington, D.C.: World Bank.

Jha, Abhas Kumar, Todd W. Miner, and Zuzana Stanton-Geddes. 2013. Building Urban Resilience: Principles, Tools, and Practice. Washington, D.C.: World Bank.

Kaganova, Olga. 2011. Guidebook on Capital Investment Planning for Local Governments. Washington, DC: World Bank.

Kelly, Tim and Carlo Maria Rossotto. 2012. Broadband Strategies Handbook. Washington, DC: World Bank.

Kopp, Andreas and Rachel Block. 2013. Turning the right corner ensuring development through a low carbon transport sector. Washington, DC: World Bank.

Krishna, Anirudh and Geoff Prewitt. 2002. How are Civil Society Organizations Important for Development?, in a. Krishna, C. Wiesen, G. Prewitt and B. Sobhan, Changing Policy and Practice from Below: Community Experiences in Poverty Reduction. Durham, NC: Duke University Press.

Massachusetts Institute of Technology Center for Transportation and Logistics. 2008. Development of a State Wide Freight System Resiliency Plan.

Nagurney, Anna. 2011. Building Resilience into Fragile Transportation Networks in an Era of Increasing Disasters. Presented at Transportation Research Board Meeting.

Norris, Pippa. 2008. The Role of the Free Press in Promoting Democratization, Good Governance and Human Development, in Section 2 of Media Matters: Perspectives on Advancing Governance and Development, ed. M. Harvey, Global Forum for Media Development, Internews Europe, pp.66-75

OECD, 2014. Fragile States 2014 Domestic Revenue Mobilisation in Fragile States. Paris: OECD.

Ove Arup & Partners International Limited. 2014. City Resilience Framework. London.

Polackova, Hana. 1999. Contingent Government Liabilities: A Hidden Fiscal Risk. Finance & Development: A quarterly magazine of the IMF. Washington, DC: International Monetary Fund.

Prasad, Neeraj. 2009. Climate Resilient Cities: A Primer on Reducing Vulnerabilities to Disasters. Washington, DC: World Bank.

Republic of Kenya. 2012. Kenya Post-Disaster Needs Assessment 2008-2011 Drought. With technical support from the European Union, United Nations, and World Bank. Washington, DC: GFDRR

Rodrigue, Jean-Paul and Claude Comtois. 2013. The geography of transport systems. 3rd Edition. London: Routledge.

Rumbaitis del Rio, Cristina, and Rosie Sjögren. 2014. Scaling up Urban Climate Change Resilience: Challenges and Opportunities for Catalytic Donor Collaboration. Meeting document. Bellagio: Rockefeller Foundation.

Sayers, Paul, et al. 2013. Flood Risk Management: A Strategic Approach. Paris, UNESCO.

Shah, Fatima, and Federica Ranghieri. 2011. A workbook on planning for urban resilience in the face of disasters adapting experiences from Vietnam cities to other cities. Washington, D.C.: World Bank.

Sheffi, Yossi and James B. Rice Jr. 2005. A supply chain view of the resilient enterprise. MIT Sloan Management Review.

Sitathan, Tony. 2003. Singapore's economy: SARS gloom and doom. Asia Times Online, 23 May 2003.

State University of New Jersey. 2013. Combining Community Resiliency and Energy Efficiency Retrofits: The Rutgers Center for Green Building with the Energy Efficient Buildings Hub.

Sudmeier-Rieux, Karen and Neville Ash. 2009. Environmental Guidance Note for Disaster Risk Reduction: Healthy Ecosystems for Human Security, Revised Edition. Gland, Switzerland: IUCN

Swiss Reinsurance Company. 2013. Mind the Risk: A global ranking of cities under threat from natural disasters. Zurich, Switzerland: Swiss Reinsurance Company.

Ta, Chilan, Anne V. Goodchild, and Kelly Pitera. 2009. Structuring a Definition of Resilience for the Freight Transportation System. Transportation Research Record: Journal of the Transportation Research Board.

UNEP. 2013. Health and Safety Guidelines for Waste Pickers in South Sudan.

UN Habitat. 2013. State of the World's Cities 2012/2013: Prosperity of Cities. United Nations Human Settlements Programme. Nairobi: UN Habitat.

UN Habitat. 2013. City Resilience Profiling Tool (CRPT) 'Lite'. Sample Version, November 2013. Unpublished.

UNICEF. 2006. State of the World's Children 2007. New York, NY: UNICEF.

UNISDR. 2005. Hyogo Framework for 2005-2015: Building the Resilience of Nations and Communities to Disasters. Geneva: UNISDR.

UNISDR. 2008. Linking Disaster Risk Reduction and Poverty Reduction. Geneva: UNISDR.

UNISDR. 2009. Terminology on Disaster Risk Reduction. Geneva: UNISDR.

UNISDR. 2011. A practical guide to Local HFA: Local Self-Assessment of Progress in Disaster Risk Reduction First Cycle (2011-2013). Geneva: UNISDR.

UNISDR. 2013. Global Assessment Report on Disaster Risk Reduction 2013. Geneva: UNISDR.

UNISDR. 2013. Heritage and Resilience: Issues and Opportunities for Reducing Disaster Risks. Geneva: UNISDR.

UNISDR. 2014. Disaster Resilience Scorecard for Cities. Developed by IBM and AECOM.

URBACT. 2010. Cities and the Economic Crisis: A survey on the impact of the economic crisis and the responses of URBACT II cities. European Programme for Sustainable Urban Development.

USAID. 2014. USAID Fact Sheet on Typhoon Haiyan/Yolanda in Philippines. Issued April 21, 2014. Accessed online.

US Environmental Protection Agency. 2013. Incident Waste Decision Support Tool (I-WASTE) v. 6.3. Research Triangle Park, NC: U.S. Environmental Protection Agency Office of Research and Development National Homeland Security Research Center Decontamination and Consequence Management Division.

Victoria Transport Policy Institute. 2014. Evaluating Transportation Resilience.

Wolman, Harold. 2014. Economic Shocks and Urban Resilience Background Note. Prepared for the Resilient Cities Program at the World Bank. Unpublished.

Wolman, Harold. 2014. Questions on Economic Resilience for the CityStrength Diagnostic. Prepared for the Resilient Cities Program at the World Bank. Unpublished.

World Bank. 2008. World Development Report 2009: Reshaping Economic Geography. Washington, DC: World Bank.

World Bank. 2009a. Systems of Cities: Harnessing Urbanization for Growth and Poverty Alleviation. Washington, DC: World Bank.

World Bank. 2009b. Metodología para Evaluaciones Rápidas y Planes de Acción para la Administración Pública a nivel de Gobiernos Subnacionales. Washington, DC: World Bank

World Bank. 2010a. Natural Hazards, Unnatural Disasters: the economics of effective prevention. Washington, DC: World Bank.

World Bank. 2010b. Cities and Climate Change an Urgent Agenda. Washington, D.C.: World Bank.

World Bank. 2010c. Hands-on Energy Adaptation Toolkit. Washington, DC: World Bank.

World Bank. 2010d. Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects. Washington, DC: World Bank.

World Bank. 2010e. Making Transport Climate Resilient: Country Report Ethiopia. Washington, DC: World Bank.

World Bank. 2011a. World Development Report 2011: Conflict, Security and Development. Washington, D.C: World Bank.

World Bank. 2011b. Crime and Violence in Central America: A Development Challenge. Washington, D.C.: World Bank.

World Bank. 2011c. Resilient Cities: Multi-hazard City Risk Index Methodology Report. Washington, D.C.: World Bank.

World Bank. 2011d. Social Resilience and Climate Change Operational Toolkit. Washington, DC: World Bank.

World Bank. 2011e. Guide to Climate Change Adaptation in Cities. Washington, DC: World Bank.

World Bank. 2012a. Urban Risk Assessments: An Approach for Understanding Disaster and Climate Risk in Cities. Washington, DC: World Bank.

World Bank. 2012b. Information and Communication Technology (ICT) for greater development impact: World Bank Group strategy for ICT. Washington, DC: World Bank.

World Bank. 2013a. World Development Report 2014: Risk and Opportunity: Managing Risk for Development. Washington, DC: World Bank.

World Bank. 2013b. Building Resilience to Disaster and Climate Change through Social Protection. Washington, DC: World Bank.

World Bank. 2014a. Climate and Disaster Resilience - The Role for Community-Driven Development. Washington, DC: World Bank.

World Bank. 2014b. Open Data for Resilience Field Guide. Washington, DC: World Bank

World Bank. 2014c. Municipal Finance Self-Assessment.

World Business Council for Sustainable Development. 2014. Building a Resilient Power Sector.

World Economic Forum. 2013. Global Risk Report 2013. Geneva: World Economic Forum.

World Health Organization. Climate Change Adaptation to Protect Human Health Program. Accessed at http://www.who.int/globalchange/projects/adaptation/en/.

Zolli, Andrew. 2012. Learning to Bounce Back. The New York Times. 2 Nov 2012.