

THE CONCEPT OF RESILIENCE: EMERGENCE, EVOLUTION AND OPERATIONALITY

An Urban Resilience Guideline

Daniel Lewis

 SKL International
AFFILIATED TO THE SWEDISH ASSOCIATION OF LOCAL AUTHORITIES AND REGIONS

RESLOG

Resilience in Local Governance

Local Governance and Migration Series



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SKL International has been operating in Turkey for over twenty years with the Turkish-Swedish Municipal Partnerships Network Project (TUSENET), Turkish-Swedish Partnership for Local Governance (TUSELOG) and ongoing Resilience in Local Governance Project (RESLOG-Turkey). In this scope, SKL International supports municipalities and municipal unions in Turkey and also contributes to the establishment of permanent relations and cooperation between the local governments in these two countries.

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**Turkish Union
of Municipalities**



**Çukurova Union
of Municipalities**



**Marmara Union
of Municipalities**



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We express our sincere thanks to the Pilot Municipalities for their dedication in this process.

ÇUKUROVA REGION

Adana Metropolitan Municipality

Hatay Metropolitan Municipality

Mezitli Municipality

Reyhanlı Municipality

Sarıçam Municipality

Seyhan Municipality

MARMARA REGION

Bursa Metropolitan Municipality

Orhangazi Municipality

Osmangazi Municipality

Sultanbeyli Municipality

Şişli Municipality

Zeytinburnu Municipality

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PROJECT INTRODUCTION

Resilience in Local Governance Project (RESLOG)

The local governments of Turkey and Lebanon have been impacted by the unexpected and massive wave of migration resulting from the Syrian civil war. As a result, it has become necessary to strengthen the resilience* of local governments in accordance with the principles of peace and inclusiveness.

RESLOG (Resilience in Local Governance) 2018-2020, is a project implemented in these two countries which have been impacted by the Syrian Migration Crisis, with the initiative of the Swedish Association of Local Authorities and Regions (SALAR), financed by the Swedish Association of Local Authorities and Regions (SALAR) and funded by the Swedish Government. RESLOG Turkey is conducted with the cooperation and project partnership of the Swedish Association of Local Authorities and Regions and Union of Municipalities of Turkey, Marmara Union of Municipalities and Çukurova Union of Municipalities. In total, 12 pilot municipalities from Marmara and Çukurova regions are included in the Project. RESLOG is a pioneer in the prioritisation of the involvement of regional municipal unions in strengthening local governance.

The Project is a part of the efforts of local governments and local government organizations in the face of intense, rapid and unexpected migration. In this regard, RESLOG Turkey aims to contribute to national migration policies that reflect local realities and needs, to strengthen inter-municipal learning and support structures through regional associations, and to improve holistic planning and governance at municipal level.

(*) Resilience is the ability to withstand destructive effects and return life to normal. Resilience is defined as the ability of a substance or system to return to its original form and position after a problem or deformation.

INTRODUCTION

M. Sinan Özden

Resilience in Local Governance Project
National Project Manager

RESLOG-Turkey gives a significant importance to the development of an information base for local governments. For almost 10 years, since the beginning of the migration flow from Syria to Turkey, Turkish municipalities have been working to meet humanitarian needs while making great efforts to keep prosperity and develop cities in the face of this unexpected and massive population increase. Municipalities are praised and considered successful in the international arena.

We believe that this experience should be recorded and shared. Throughout this process, our municipalities have sought the right answer to many questions on the practical issues. For this reason, we organized “Local Governance and Migration Meetings” consisting of 12 meetings and also prepared a book titled “Local Governance and Migration” including the meeting series and their outputs to provide a discussion platform on innovative topics and an information base for municipalities to facilitate their participation during their intensive efforts.

The Union of Municipalities of the Marmara Region, which has been conducting highly competent work for strengthening the information base on local governance, hosts our meetings held every two months.

I hope that after the completion of the RESLOG Project, these meetings and publications facilitating the access to information in Turkey and on the other hand, aiming to save and disseminate the information produced in the municipalities will be continued as a tradition with the contribution of both our municipalities and municipal unions.

FOREWORD

Local Governance and Migration Series

Gül Tuçaltan, PhD

RESLOG Turkey Project
National Project Coordinator

In the last decade, local governments in Turkey had to produce immediate solutions for ever increasing urban and social problems. The first test of local governments was to welcome a fragile population forced to reside in another country and to ensure the local coordination for humanitarian aid services. In this process, as a natural consequence, the immigrants and refugees with different language and culture have become a part of the labor market and everyday life. This has made municipalities the main actors of two challenging issues: infrastructure planning for the growing population and identification of the services needed to live together with different cultures and ensure and maintain social cohesion. However, limited financial resources, personnel inadequacies, national migration policies focusing on strategies at the central administration level rather than local governments' needs in the fields of migration and urbanization, and uncertainties related to the ongoing migration crisis (for example, Turkey cannot predict whether there will be a new mass migration in the near future or not) limited municipal efforts.

In brief, international mass migration and the Syrian refugee crisis have resulted in fundamental demographic, social, cultural and ecological changes in urban areas and also created the need for reviewing the issues involving urbanization, infrastructure, municipal service delivery and urban planning. In order to manage these multilayered and complex processes and respond to migration-related urban problems, our municipalities need new knowledge, skills and implementation tools enabling them to understand their working area and to produce innovative solutions with limited resources within this area. The traditional tools and understanding related to urban planning are no longer sufficient to understand, handle and change this unstable situation.

At this point, this series produced within the RESLOG-Turkey Project “information base development activities” is designed to address these exact needs of the municipalities. RESLOG-Turkey Local Governance and Migration Series consists of 12 original publications comprising of migration, urban planning and local governance and aiming to blend the existing knowledge in these fields with the new approaches that may affect the perspective and practices of local decision-makers in a positive way.

The publications focus on three main areas. In other words, this series includes three groups of books. The first group of books includes Turkey’s experiences related to migration, basic concepts about migration and local governance, existing approaches and the false information in these fields. Regarding the refugee crisis, in this group, we provide financial problems encountered in municipalities in the provision of inclusive services, resource management models for these problems, alternative funding sources; the difficulties faced by the municipalities in their practices related to migrants and refugees within the scope of human rights and the legal framework and information on administrative jurisdiction, supervision and the regulations of other institutions. This group also comprises books about data collection for the identification of spatial, social and economic changes (such as housing, infrastructure, health, education, open green spaces, etc.) in municipalities affected by migration and development by mapping; urban profiling (which is an effective tool for spatial and urban planning), and the development of concrete and feasible solutions for the improvement of municipal services. The issues addressed in this group of books also outline the interventions and practices of municipalities in the field of migration and local governance and identify their fields of work.

The second group of Local Governance and Migration books aims to introduce new approaches and intervention tools related to local governance around the world and in Turkey. In this group, we provide information to our municipalities on governance of diversity for the construction of fair and egalitarian municipalities comprising all social groups; preparation of the migration master plans ensuring municipalities to be resilient, prepared and cautious against the ongoing

or potential effects of migration, and the resilience approach which can be integrated into all stages and fields of local governance, addressing the recovery and transformation process of urban systems after difficulties and destructive experiences.

The third group of books focuses on practical experiences of the municipalities in Turkey. In this sense, we share municipalities' successful local practices in the field of migration, and regarding the inclusive service provision, despite the increasing population, potential financial limitations and personnel inadequacies, good practices related to humanitarian aid, urban planning and infrastructure management, benefiting from the potential created by migration, and development of alternative financing. The authors of these publications are the municipalities themselves. Thus, this group of RESLOG-Turkey Local Governance and Migration books, in supporting the mechanism for municipalities to produce and disseminate knowledge in their fields of work, aims to reach a broader target in addition to experience and information exchange.

This approach I summarized above was developed following the in-depth meetings with the relevant units within the project partners namely Turkish, Marmara and Çukurova Union of Municipalities, the problem and needs analysis conducted in pilot municipalities under the Project, and the interviews with experts carrying out both professional and academic activities in the field. In particular, I express my sincere thanks to Mrs. Merve Ağca, expert in the Union of Municipalities of the Marmara Region, Center for Migration Policies, for her valuable contributions in the process of identifying themes and for our long-term exchange of ideas.

As the RESLOG-Turkey team we believe that the Local Governance and Migration publications will contribute to the development of the intellectual and practical basis necessary for the local decision making and planning mechanisms which are the pre-requisite of inclusive and peaceful service delivery. We hope that our publications will shed light on municipalities in adopting their approaches for addressing the issue of migration from the urban perspective.

A. AIM and SCOPE of the Guideline

1. AIMS OF THE GUIDELINE

The primary aim of this guideline is to provide a better understanding of the theory and practice of urban resilience strategies and programmes for municipalities in Turkey. A secondary aim is to provide guidance on initiating and maintaining commitment to resilience-based urban development in Turkish cities. Finally, the guideline aims to introduce resources to assist Turkish municipalities.

2. SCOPE OF THE GUIDELINE

The guideline will draw on international experience as it has evolved in recent decades. First in defining what urban resilience is (Chapter B) and exploring three key factors that have shaped and informed current practice in diverse municipalities globally. Namely:

- The reality that historically urbanization has been and can be a major driver of both positive and negative outcomes for human settlements globally, however this section establishes a clear link between urbanization and the accumulation of risk (Chapter C.1);
- The historical transition from emergency-based disaster management, to the risk reduction approach still evident in many countries, (Chapter C.2) to more leading edge thinking on integrated resilience building (Chapter C.3) with examples of different definitions and methods from several sources of both theory and practice (Chapter C.4). These sections review the trajectory of both local and international thinking and action from early emergency response through more sophisticated and sustainable resilient urban development; and,
- The increasing understanding in many towns and cities that their urban centers function as integrated systems and consequently that the management of resilient urban development must therefore also be; integrated and trans-departmental, ensuring all stakeholders and decision makers are fully engaged, and that action planning within a resilience framework forms an integral part of long term urban

about reducing risk? It's expensive isn't it? And so on, until reaching the question of 'resilient to what and how?'

There are options. Today there are hundreds of options ranging from: simply starting the discussion; sometimes framed within a set of norms such as those defined in the Sendai Framework for Disaster Risk Reduction¹; to more scientific approaches framed within the commitments of states to the climate agendas set by the United Nations; to even more complex specialized approaches to: infrastructure, mobility, public space, housing, public buildings, finance and insurance, etc. Or to a variety of threat sectors ranging from earthquakes to climate extremes; economic vulnerability to traffic accidents; political and social crises to cyber-security; all contributing to this plethora of options tabled with leaders in national and local government, business and public sector organizations; civil society and 'communities'.

It's complex (and complicated) clearly.

Resilience: "The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management." (See footnote 2)

The starting point in developing this guideline is derived from² the 2016 United Nations Office for Disaster Risk Reduction (UNDRR) definition of the term 'resilience' adapted to an urban context, and where the term 'hazards' encompasses an 'all-hazard' meaning. In this manner, we consider any form of shock or stress that has a negative impact on the urban system.

This all-hazard approach is particularly important when determining resilient urban development strategies in human settlements affected

1 The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015. See: https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

2 Annex 1: UN General Assembly A/71/644 "Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction", December 2016, pp 16-24



by human-induced hazards such as mass-migration, conflict, economic stress or shocks, technical hazards, and social crises whether slow or rapid onset in addition to their exposure to ‘natural’ or terrestrial hazards. So, with a slight modification and without diminishing the definition set by the (UNDRR), a more robust definition for the purposes of this guideline will be:

“Urban Resilience”: The measurable capacity of any urban system to absorb and recover quickly from the impact of any plausible hazard and maintain continuity of its functions.

This definition is explored in detail below and is essential to establish baselines for all future urban development planning that seeks to protect the lives and assets of its citizens and answer the key questions “Can a city become resilient?” and, “If so, to what and how?”

A note on terminology

As an introduction to terminology used throughout this guideline, it’s important to take note that many of the terms used throughout are used elsewhere with different or altered meaning. For example, the term ‘resilience’ within the communities of practice that use it, has multiple definitions depending on which organization is applying it. Nevertheless, the basic principles of urban systems: ‘absorbing’ shocks and stresses; ‘rebounding’ to an improved state; and ‘maintaining (or preserving) continuity’ of physical, social, and economic functions of cities are more or less constants. Similarly definitions of terms such as ‘disaster’, ‘risk’, ‘hazard’, etc. have been debated without full consensus for decades. For the purpose of this publication, the definitions of terms are drawn from the 2016 UNDRR report to the UN General Assembly, aligning indicators and terminology with the 2015 Sendai Framework for Disaster Risk Reduction.

C. EVOLUTION OF URBAN RESILIENCE THEORY AND PRACTICE

The emergence of modern practice related to making cities more resilient has its roots in two historical events namely; the rapid urbanization that took place globally from the 1950s and, the transformation

from emergency response systems common in most countries, to programming that sought to reduce or manage risk to people and assets in human settlements. Both of these were processes that played out wherever people concentrated in towns and cities throughout the world, and both of these were critical factors driving new approaches to risk management. It wasn't until the mid-2000's that early thinking emerged exploring the concepts of urban resilience. These modern concepts are being adapted and applied to cities that in some cases have been urbanizing for centuries.

1. URBANIZATION AND RISK

The convergence of urbanization and risk is complex, but not necessarily complicated. "Risk" is simply a factor of exposure to some form of hazard, and the vulnerability of humans and their assets to that hazard. "Urbanization" is the process of densifying human settlement patterns to meet increasing demand for urban services. However, the location, size, shape, and functions of cities today are in large part, due to the manner in which they "urbanized" over time simultaneously accumulating a wide array of risk.

A short history of global urbanization

There are four critical era's that affected urbanization throughout history, and at each stage risk factors multiplied more or less mirroring rates of urbanization. Namely,

- Pre-industrial to 1760:

Historically human settlements offered a degree of safety and security within or adjacent to the ramparts defending territorial rulers. The greatest urban risks during these pre-industrial times were incursions by hostile forces and disease brought on by lack of sanitation; but the advantages of relative safety and a degree of economic activity through trading were positive trade-offs attracting and keeping inhabitants in place. In time, these settlements evolved and grew; drawing in more people, diversifying urban services and economies, and eventually creating elements of urban infrastructure appropriate for the era. In general, however, this 'growth' was less planned and more 'organic' in



design and vestiges of these medieval cities can be found throughout the “old world” today.

As medieval cities expanded however, so too did the range of hazards and risk. Lack of sanitation generated health risk, dense wooden structures generated fire risk, overcrowding created slums, and poverty spawned social unrest. For example, the first wave of pandemics began in Asia and rapidly spread to European cities between 1331-1353 AD and would continue well into the 18th Century killing hundreds of millions of people; mostly in urban areas where viral transmissions were rapid and extremely deadly.

With the exception of the limited number of cities and small rural villages, rates of urbanization however, were low and the global economy remained one almost solely dependent on production and trade in agricultural products. Nevertheless, in these settled areas, fire, disease, poverty and social unrest were the main urban risks facing their inhabitants.

- 1760 – 1840 Industrial revolution;

With the rapid industrialization of cities beginning first in Britain in the mid-1700’s then spreading to Europe, North America and elsewhere, these risk factors multiplied. As cities densified to provide cheap housing for thousands of in-migrating workers, fires became the primary risk and hundreds of cities were partially or fully destroyed over the millennia. The fire hazards were many – from the deliberate burning of cities during war, to the cheap wooden structures with coal or wood cooking and heating, to massive coal fired steam engines, to the foundries and iron making cauldrons - all were the sources of many of the great fires that affected urban areas around the world. Additionally, as there were few restrictions on the manner in which cities were industrialized, both poverty and disease continued to escalate risk. In spite of these hazards, cities continued growing and the rates of urbanization driven by the ballooning economies of the industrial revolution continued to increase. By the mid-1800’s industrial growth had stabilized and a period of stagnant urbanization continued until the end of the Second World War.

- 1946 - 1973 - post WW2;

In spite of the rapid growth of cities throughout the industrializing world, by the turn of the 20th century, still only 10% of the global population lived in urban areas, and these were predominantly in Europe, the Americas, and some Asian cities. However, this would change rapidly over the next century with the turning point for most countries (including Turkey) around 1950 when rates of urbanization began doubling throughout the world. At that time, 25% of the Turkish population lived in cities; 34 years later it doubled to roughly 50%; and 32 years later had trebled to 75%.³ This pattern is similar to the trajectory of global average urbanized population until the mid-1980's when Turkey's urban population surpassed the global average.

As cities grew, so too did the diversification of their economies. This created multiple waves of in-migration bringing new skills in new sectors and further driving urbanization rates higher. Service industries emerged to meet the needs of a more diversified population; construction economies were booming as housing, infrastructure, commercial and public buildings were being built; ever-increasing demand for commodities bolstered already robust market economies, and as the economies grew, the financial sector arose to manage the flow of capital in and out of cities. However, each of these emerging sectors brought their own set of risk factors.

From 1950 urban patterns begin to shift rapidly. In North America, the post-WW2 era was characterized by the expansion of urban boundaries and the development of vast tracts of sub-urban space. Low-density housing estates sprawled across the rural landscapes surrounding comparatively small urban cores, with thousands of kilometers of road and service infrastructure built to realize the suburban dream of a house, an automobile, and all the modern conveniences necessary for a 'happy life'. This form of automobile/real estate driven urbanization spread and continued until the mid-1970's when in the aftermath of the 1973 oil crisis the global economy stagnated, and the world began to search for better, more efficient ways to consume energy. From financial bubbles and hyper-inflation, pollution and disease, poorly regulated

3 World Bank: "Rise of the Anatolian Tigers, Turkey Urbanization Review", 2015, p.1



construction and industry, and urban sprawl driven by inflated land markets, more and more people and urban assets are exposed to new risk elements.

2000 - to date

By the turn of the 21st Century, the impact of the mid-1970's oil crisis catalyzed the development of more efficient use of oil and initiated new thinking on the use of renewable energy; and more importantly, raised global awareness on issues related to the use of hydrocarbons, in particular pollution and related health impacts. Around the same time, the global scientific community also began observing anomalies in global weather patterns sparking debates which continue today pitting scientists and activists against the global oil and gas producers. This period also marked the beginnings of the world's dependence on new technologies, not least of which is the exposure of alternate sources of information through the internet; global communication accessible by anyone; and hundreds of new collaborations producing ever more data on everything - and everyone.

Much of the world is now urbanized with Africa and parts of Asia rapidly catching up. Since 2007 for the first time in history, 50% of the world's population lived in urban areas. This represented an increase in the global population from around 1 billion people with less than 20% of them in cities, in 1800 to an estimated 7.7 billion people with 55% of them in cities today - an almost 800% increase in just over 200 years.

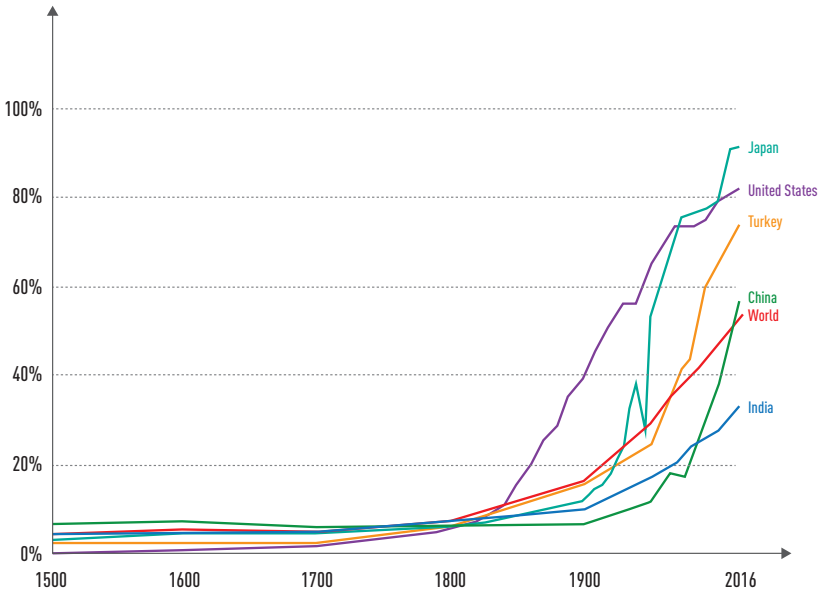
In spite of new technologies, increased capacities of people and institutions and promising rates of poverty alleviation, risk profiles continue to grow. Urban centers large and small are exposed to 21st Century risks from; the increased frequency and severity of meteorological hazards; cyber-related crime; access to clean water; asymmetric or 4th Generation warfare; global economic failures; mass-migration; as well as inherent accumulated risks from natural hazards.

As the following graphics illustrate, the progression of urbanization rates and the economic losses due to disasters are virtually mirrored with damage and loss curves running parallel to urbanization curves.

4 Adapted from: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420). New York: United Nations.

Urbanization over the past 500 years

Share of the total population living in urban areas. Urban areas are based on national definitions and may vary by country.



Source: OWID based on UN World Urbanization Prospects and historical sources (see Sources)

Figure 1: Urbanization over the past 500 years⁵

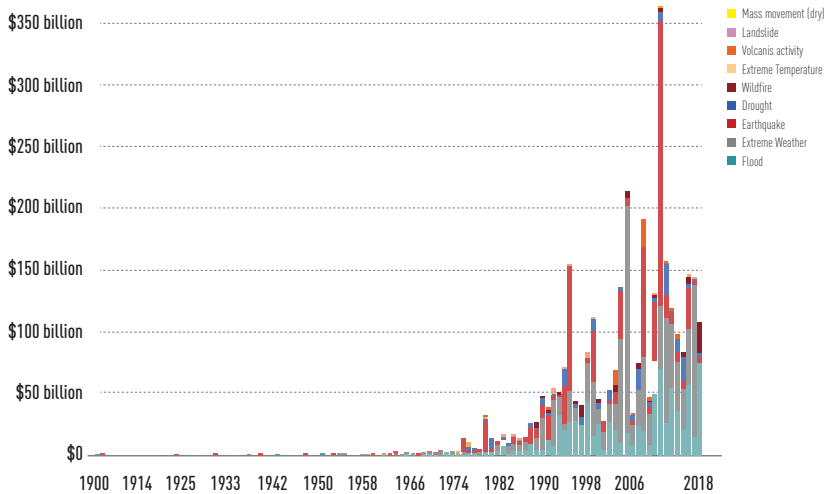
This graphic illustrates the 4 eras of urbanization globally and in a few select countries noted above with striking shifts taking place during: the industrial revolution; the end of the Second World War; and again, during the 1970s where in many countries urban populations were doubling within decades.

⁵ UN World Urbanization Prospects 2018, United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420). New York: United Nations. Source: <https://ourworldindata.org/urbanization>



Economic damage by natural disaster type

Global economic damage from natural disasters, differentiated by disaster category and measured in US\$ per year.



Source: EMDAT (2019): OFDA/CRED International Disaster Database, Universite catholique de Louvain-Brussels-Belgium OurWorldInData.org/natural-disasters • CC BY

Figure 2: Economic loss to natural disasters⁶



A key indicator for understanding risk is the economic cost of suffering the impacts of various hazards. This graphic illustrates economic loss as a result of a wide array of disasters. Considering the previous graphic which tracks the concentration of people in urban areas, the direct link between urbanization and risk is quite clear.

6 EMDAT 2019: OFDA/CRED International database, Source: <https://ourworldindata.org/grapher/economic-damage-from-natural-disasters>

As noted in the World Development Report 2009 - Reshaping Economic Geography; no country has grown to middle-income status without urbanization, and none has grown to high income status without vibrant cities.

However, it is important to recognize that if managed strategically, the process of urbanization can bring about positive dividends as well as those associated with risk. It is this principle that is the foundation for “planning out risk and building in resilience” and safeguarding the people and assets in cities around the world today.

2. From emergency response to risk reduction and resilience:

It takes almost 50 years for the world to move from emergency response to recognition of inherent risk and risk reduction thinking to see ‘resilience’ as a desired state for the world’s cities.

While in the history of human settlements there has always been risk to people and their assets from exposure to both terrestrial and human driven hazards, it wasn’t until the early 1960s that a more global recognition of the need for strategic risk reduction measures could benefit towns and cities that were exposed and at risk.

The first serious academic work on disaster risk reduction began in the early 1970’s, however it’s beginning at the Disaster Research Center (DRC) established initially at the University of Ohio in 1963, followed the engagement of the United Nations General Assembly in disaster relief in response to the Buin-Zara earthquake of September 1962 in Iran.⁷

The foundation for much of the study was the recognition by early academics that in general, national and sub-national government

⁷ See: UN General Assembly Resolution A/RES/1753 (XVII) of 5 October 1962: “Measures to be adopted in connexion (sic) to the earthquake in Iran”



priorities related to disasters were focused on the creation and maintenance of disaster/emergency response and relief capacity. They found that more often than not, the institutions mandated to respond to critical events were isolated from the institutions and stakeholders who built and governed the towns and cities where people were exposed. In general, those institutions were situated with direct reporting lines to the Heads of State in their countries, and the entire response systems functioned at a national scale. Many countries even charged their military with this responsibility and local police, fire and civil defense institutions were excluded or made subservient in the event of a disaster. In any case, most of these disaster response agencies were well funded, and often had unlimited discretionary budgets once a 'State of Emergency' had been declared and were often not motivated to decentralize capacity or funding to institutions at sub-national levels. This approach also characterized actions taken on the global scale.

Internationally, as early as 1971 the (then) UN Secretary General, U Thant; recognizing the increasing scale of damage caused by natural disasters, and recalling multiple separate resolutions endorsing humanitarian relief efforts by the UN and its partners, endorsed Resolution⁸ 2816 (XXVI) establishing a permanent office, led by the Disaster Relief Coordinator reporting directly to the Secretary General. The mission of the United Nations Disaster Relief Office' (UNDRO) was to: mobilise, direct and coordinate the relief activities of the various organisations of the United Nations system in response to a request for disaster assistance from a stricken State, and also to co-ordinate such assistance from the United Nations with that made available by other sources of aid; and to promote the study, prevention, control and prediction of natural disasters, including the collection and dissemination of information concerning technological developments, and to assist in providing advice to governments on pre-disaster planning. However, given the number and scale of requests for assistance following disasters, scant time was devoted to the latter mandates, especially those related to 'prevention, control and prediction of natural disasters; and the limitation of 'pre-disaster planning' to 'preparation'.

⁸ UN GA Resolution 2816 (XXVI), 14 December, 1971

Nevertheless, in most countries and cities, it wasn't until the late 1970's when the practical application of 'risk reduction' began in many parts of the world. It was however a remedial development practice. In other words, areas of risk and vulnerability were 'discovered' after they'd been built, serviced and inhabited. Most often as a result of some disaster large or small that caused injury, death or destruction, and therefore exposed vulnerabilities. Subsequently, a process of retrofitting risk reduction measures into existing vulnerable areas would be contemplated and (sometimes) implemented. However, this approach was expensive and prohibitive in many cases, and it often took these critical events to provoke change. This approach sadly, still remains a latent defect element in most of the world's cities today in spite of major advances in theory and practice focused on risk reduction and resilience building in towns and cities.

In the meantime, as noted above, those towns and cities were being built and expanding, often with relatively little attention to the vulnerability of their inhabitants to risks associated with seismic, flooding, landslides, and severe weather events. Various drivers of urban expansion [including development by expedience to meet urgent demand, or for financial or political gain] as noted above, forced people to live (and work) in cities or neighborhoods at risk from these and other hazards. In virtually all cities some level of risk is a constant. Even where the risk from natural hazards is limited, certain forms of risk, for example those generated outside of the urban environment associated with: Global systems (climate, environment, sea level rise, global economy, etc.); Societal contexts (psychological, economic, cultural, etc.); and Specific systems (large scale bulk infrastructure, fauna, water, etc.) are inherent risks and will impact urban systems in some manner.

Almost 20 years after the establishment of the UNDRO, the UN General Assembly passed yet another resolution taking note of the increasing awareness of both inherent risk and the accumulating scale of damage from natural disasters, establishing the 1990's as the International Decade for Natural Disaster Reduction (IDNDR)⁹. This

⁹ UN General Assembly Resolution 44/236 22 December 1989, p. 161



was the first international instrument that focused the efforts of the UN and its Member States on international cooperation supporting risk reduction measures to be developed and implemented in countries exposed to specific natural hazards. As its response, the UN Secretary General was instructed to appoint a High-Level Council, a Scientific and Technical Committee, and a Secretariat to promote public awareness, devise support programmes and fill knowledge gaps, and to provide substantive support and coordinate the activities of each body respectively throughout the IDNDR. This was the foundation institution acting in coordination with UNDRRO but with a separate mandate; that eventually became the Secretariat for the UN International Strategy for Disaster (Risk) Reduction, better known as UNISDR, and latterly as the UN Office for Disaster Risk Reduction (UNDRR).

Following the 1993 Hokkaido earthquake, Japan long a leader both in experiencing the damage due to earthquakes and subsequent tsunamis, as well as the construction of disaster defense mechanisms to protect life and property, led the global agenda for risk reduction. In mid-1994, recognizing the scale of loss and damage due to natural disasters throughout the world, and as part of the mid-term review of the IDNDR, the UNISDR convened the First World Conference on Natural Disasters hosted in Yokohama, Japan. Its outcome, the Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation and the first Plan of Action and follow up for commitments by States was adopted by the UN general Assembly later that year. The 10 Principles of the Yokohama Strategy touch on hitherto undeclared commitments by States to a range of action including: strong political commitment to implementing risk assessments, ensuring preparedness and prevention mechanisms are built in to development agendas thereby reducing the need for relief; creating and enhancing early warning systems; facilitating participatory planning for risk reduction; international cooperation for knowledge transfer; ensuring environmental protection and understanding the imperative of poverty reduction in the prevention and mitigation of disasters. Over the next 20 years, Japan would host 2 more follow up world conferences, coincidentally preceded by major earthquake disasters in that country¹⁰, and the massive Indian Ocean Earthquake

10 The 1995 Great Hanshin Earthquake in Kobe, and the 2011 Tohoku Earthquake and tsunami near Sendai.

and tsunami only weeks prior to the Second World Conference on Disaster Reduction held in Kobe City in 2015.

In 2005, reflecting on the outcomes of IDNDR, Member States debated and eventually endorsed the Hyogo Framework for Action: Building the Resilience of Nations and Communities to Natural Disasters (HFA), more detailed and robust than the Yokohama Strategy. The HFA also uses the term ‘resilience’ for the first time. It set 5 Priority Actions for Member States, and in Priority Action 1 mentions also for the first time, the importance of ‘local’ action. It is significant that while the past set of commitments from Yokohama focus on ‘principles’, the HFA is more focused on action. In spite of its title, the HFA also widens the scope of disasters from simply ‘natural’ disasters to: *“Disaster risks related to changing social, economic, environmental conditions and land use, and the impact of hazards associated with geological events, weather, water, climate variability and climate change, are addressed in sector development planning and programmes as well as in post-disaster situations.”* as articulated in Priority Action 4.

Together with its partners, the Secretariat of the UNISDR set out to develop substantive guidelines to support States efforts to implement the Priority Actions. Notable among these Priorities was for the first time recognition that in general, major disasters affect people in cities and towns, and while the negotiations remained in the hands of national government there was an effort made to support local authorities.

The first of several municipal focused tools promoted by the UNISDR was the Local Government Self Assessment Tool (LGSAT). Based on a set of “Ten Essentials” aligned with the 5 Priority Actions, and structured for local governments, the LGSAT could be used by local governments and/or partners to, among other things; set their agenda for disaster risk reduction, foster dialogue and political commitment at all levels to the agenda, draw stakeholders into collaborative planning, and prioritize key infrastructure such as schools and hospitals. These Ten Essentials formed the foundation for the launch of the Making Cities Resilient Campaign in 2010 following and during some of the worst disasters in recorded history including the massive earthquakes in the regions around Port au Prince, Haiti, and Tacloban, Chile in 2010; followed by the 2011 Christchurch, New Zealand and Sendai



Ten Essentials for City Resilience:

Essential One: Organise for Disaster Resilience

Essential Two: Identify, Understand and Use Current and Future Risk Scenarios

Essential Three: Strengthen Financial Capacity for Resilience

Essential Four: Pursue Resilient Urban Development and Design

Essential Five: Safeguard Natural Buffers to Enhance Ecosystems' Protective Functions

Essential Six: Strengthen Institutional Capacity for Resilience

Essential Seven: Understand and Strengthen Societal Capacity for Resilience

Essential Eight: Increase Infrastructure Resilience

Essential Nine: Ensure Effective Disaster Response

Essential Ten: Expedite Recovery and Build Back Better

earthquakes and tsunamis, all of which recorded death and destruction in those towns and cities.

With the launch of the Making Cities Resilient Campaign, a new interest in defining what that actually meant for local governments, aid and donor organizations, national governments, academia and multi-lateral agencies began.

3. The emergence of 'resilience' as a concept applicable to human settlements

It was clear that the concept of a resilient city was one that caught the attention of municipal leaders throughout the world. By 2015, close to 3,000 city governments and dozens of national governments had associated themselves with the Campaign, and while the LGSAT had done its job stimulating the conversation and forging political commitments, it was by no means a methodology for justifying the investments required to achieve resilience.

More was needed, and various universities, private sector organizations, NGOs and other technical agencies set out to design and apply a wide array of tools and guidance to support the increasing demand by town and city administrations for assistance in achieving their resilience agendas.

The years 2015 - 2016 were also a period where an unprecedented series of international conferences produced commitments to sustainable development. Starting with the Third World Conference on Disaster Risk Reduction in Sendai, the World Humanitarian Summit in Istanbul, the Third International Conference on Financing for Development in Addis Ababa, The Sustainable Development Goals from New York, the Conference of Parties in Paris, and finally in 2016 the Third International Conference on Housing and Human Settlements (Habitat III) in Quito all took place, all saw commitments from Member States to building a better world for all, and all make mention of the importance of building resilience to whatever threats humanity faces. However, as much as the world has focused on building more resilience in its cities; demand for expertise is far higher than the small community of practice currently supplies.

Over 200 years the population of the planet has increased from around 1 billion to over 7.7 billion people. Today over 54% of those live in cities¹¹ that have been built in areas that may be subject to a wide and increasing range of risk. Historically methods governments have employed to address risk have evolved from a fatalistic perspective where emergency response and relief were priorities to programs that sought to reduce inherent risk, to strategies for better understanding, preventing or mitigating risk. The leading thinkers today however are looking at the process of urbanization as a mechanism for “planning out risk, and building in resilience” over the longer term, in the towns and cities of the world, and increasingly this is becoming a new development paradigm. Common throughout the majority of approaches is a focus on cities as urban systems.

4. Multiple definitions, multiple approaches - Case Studies

The tendencies for multiple versions of resilience are perhaps obvious when an understanding of the source is revealed. For example; donor policies and funding practice, insurance industry, and infrastructure

¹¹ See footnote 4 above, re: UN DESA World Urbanization Prospects, 2018



development companies adapt and modify the definition of resilience to protect investment; NGO's to leverage funding for longer term gain; the UN to link to the extensive post-2015 sustainable development agendas.

However, it is also clear that there is significant value in the advocacy outcomes of less rigorous and subjective methodologies that drive political commitment to increasing resilience of countries and cities at risk - and ALL countries and cities face risk at some level. Some examples of different approaches to urban resilience available to all cities and towns are:

a) LGSAT: The UNISDR '10 Essentials': underpin the Local Government Self-Assessment Tool, and the more recent Resilience Scorecard¹² updated and re-affirmed during the Third World Conference on Disaster Risk Reduction held in Sendai, Japan in March 2015; they are examples of a voluntary 'self-diagnostics' of conditions considered necessary to build risk reduction measures and increase resilience. Several private sector organizations have adapted this to their work as well. Nevertheless, the 10 Essentials also form the foundation for UNISDR's global 'Making Cities Resilient Campaign' now numbering well over 4,300 city partners and illustrating the value of a focused urban advocacy initiative, and the increasing demand for solutions.

There are hundreds of examples of cities using the UNISDR Local Government Self-Assessment Tool, and the Resilience Scorecard developed by AECOM and IBM. Both of these tools are useful diagnostic resources that stimulate discussion, dialogue and planning.

One example of using the LGSAT for resilience building is a group of small towns in New South Wales, Australia¹³ that suffered regular periods of drought and flooding. As in many case studies, the LGSAT

12 The Resilience Scorecard tools containing Reference Notes and Excel worksheets for both preliminary and details assessments, are available for download at: <https://www.unisdr.org/campaign/resilientcities/toolkit/article/disaster-resilience-scorecard-for-cities>

13 For the full case study see: (<https://www.emergency.nsw.gov.au/Pages/emergency-management/local-government/nsw-critical-infrastructure-resilience-strategy/appendix-b-case-studies/resilient-asset-management-provide.aspx>)

was adapted to conditions in these towns, and the assessment process focused on critical flood mitigation infrastructure. The priority hazards were contamination of raw water sources from overflow of off stream floodwater storage and uncontrolled flooding of two of the towns in the region; and recurrent loss/damage to river-crossings in the third town.

The New South Wales Office of Emergency Management used the LGSAT approach to design a Resilient Asset Management Strategy that focused on three sets of action namely:

Resilience Priority 1: Partnerships

Recognizing the need to ensure all stakeholders participate in defining the key impacts of increasing flood hazards, the programme established key partnerships with government, cross sector stakeholders, and local communities.



Figure 3: Layers of government partners

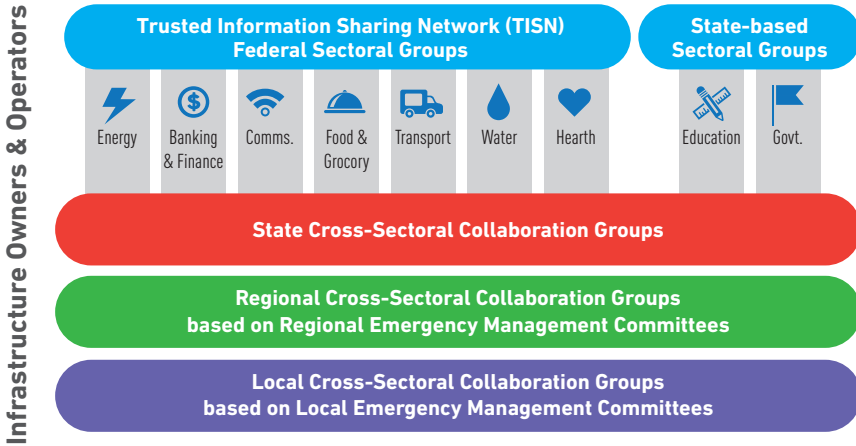


Figure 4: Cross sectoral stakeholders

Resilience Priority 2: Prepare

Understanding that while flood, drought and water supply risks were the priority areas for these three towns, the programme also recognized that they were not the only risks to critical infrastructure in the region. They therefore adopted an “all-hazard” approach that included mitigating and planning for emergencies resulting from natural (e.g. bushfire, storms, and floods), technological (e.g. cyberattack) and malicious (e.g. sabotage or terrorism) hazards. Their rationale was that by adopting an all hazards approach they could put the focus on the consequences of infrastructure disruption (e.g. loss of amenity to people, businesses and community), rather than the cause of the disruption¹⁴.

Resilience Priority 3: Provide

Accepting that no critical infrastructure is completely impervious to the impacts of applicable hazard(s), the goal of this priority is to minimize interruptions to the service and maximize rapid recovery from outages. To do this, “Local Governments must manage their

¹⁴ Adapted from <https://www.emergency.nsw.gov.au/Pages/emergency-management/local-government/nsw-critical-infrastructure-resilience-strategy/resilience-priority-two-prepare/all-hazards-approach.aspx>

assets effectively, be able to assess and determine criticality, understand the interconnectedness and interdependency of their assets and rapidly assess damage when an event occurs to reinstate service as quickly as possible.” The Programme therefore provided support to the following 4 action points:

- Interconnectedness and Interdependencies: Understanding the stakeholders and decision-making hierarchy;
- Infrastructure Resilience: Asset Management; Understanding the place of critical infrastructure in a multi-hazard environment, and addressing priority risk;
- Integrated Planning and Reporting: Ensuring all stakeholders are engaged and informed;
- Organisational Resilience: Ensuring continuity of decision-making functions and institutional business processes.

This programme was designed, planned and implemented using the LGSAT as a tool to analyze and organize information, data, stakeholders, finance and operations to reduce risk and enhance the resilience of these towns to the priority risk identified for each town.

b) Community Resilience: From a completely different perspective, organisations such as the International Federation of Red Cross and Red Crescent Societies (IFRC/RC) look at resilience from the perspective of ‘communities’. Over a decade ago, in 2008, the IFRC/RC published its first “Framework for Community Safety and Resilience”¹⁵. The Framework provided the National Red Cross and Red Crescent Societies with an approach to build projects and enhance and adapt activities they were already carrying out. It was updated in 2014, with the objective of establishing “a foundation on which all IFRC/RC programmes, projects, interventions and actions, across the contexts, which contribute to the strengthening of resilient communities can be created, developed and sustained”¹⁶.

The overarching framework guiding the work of the IFRC/RC globally and within its national Associations, is aligned with the key principles of the Sendai Framework for Disaster Risk Reduction as follows:

15 <https://www.ifrc.org/Global/Case%20studies/Disasters/cs-framework-community-en.pdf>

16 *ibid*



The IFRC/RC Framework for Community Safety and Resilience¹⁷:

Three Key Elements	Five Cross Cutting Components
Risk-informed humanitarian response.	Risk assessment and identification and the establishment of community-based early warning and prediction.
Country-specific mitigation, prevention and adaptation activities.	Community-based disaster preparedness.
Sector-based programming to build across the disaster management spectrum.	Advocacy, education and awareness-raising. Activities
	A strong auxiliary relationship with local and national governments
	Partnerships with international, governmental, non-governmental and community-based organizations.

Zooming in to the scale of ‘community’; and within the aims of the above framework, the IFRC focuses its work on building resilience in certain organizational and spatial levels; most of which are small villages, but occasionally with diverse groups in urban settings such as refugees, or displaced populations¹⁸.

An example also drawn from Australia, was in response to the continuing vulnerability of asylum seekers making it to Brisbane with the support of the Australian Red Cross Society’s Brisbane Office. It found post facto, four risk factors exacerbating the vulnerability of the refugee community:

17 Adapted from: <https://www.rcrc-resilience-southeastasia.org/document/a-framework-for-community-safety-and-resilience-in-the-face-of-disaster-risk-2008/>

18 See: <https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2018/06/DRR-in-Action-Case-Studies-FULL-Final-v2-1.pdf>

Specific needs of at-risk groups are often ignored and poorly prepared for in disaster risk management policy and practice - asylum seekers are at high risk of being heavily impacted by disasters due to:

1. Reduced financial capacity, including support networks;
2. Poor levels of health and wellbeing;
3. Limited or no connections into the community, and
4. A low understanding of hazard profiles in their areas.

Within the 'Framework' approach, the local office undertook a community education process with over 900 people attending and supported a high-risk group to develop their own understanding of their risks, to take their own action to make themselves safer, and to participate in official decision-making about prevention and response to risks. There were positive wellbeing effects of asylum seekers being able to contribute and participate in their host/haven country and success was measured through positive shifts in knowledge in the following areas:

1. Knowing who to call in an emergency (pre-session 51%, post session 89%),
2. Knowing what hazards might affect them (pre-session 35%, post session, 89%),
3. Knowing which radio service to turn to for information (3.5% pre-session, post session 91%), and
4. Knowing how develop a household plan and kit (pre-session 3.5%, post session 80%).

This approach, while focused solely on a discreet community within an urban area, is one that seeks resilience through empowerment.

c) CityStrength Diagnostic: The World Bank Group developed "CityStrength¹⁹" as a diagnostic and planning tool to design resilience based urban planning, development and finance. The tool is designed as a five-stage process undertaken with the support of a team of experts, that goes beyond the diagnostic process to include action planning, finance and technical assistance.

19 The World Bank, October 2017 "Brief: The CityStrength Diagnostic Promoting Urban Resilience", see: <https://www.worldbank.org/en/topic/urbandevelopment/brief/citystrength>



Stages of the CityStrength Diagnostic

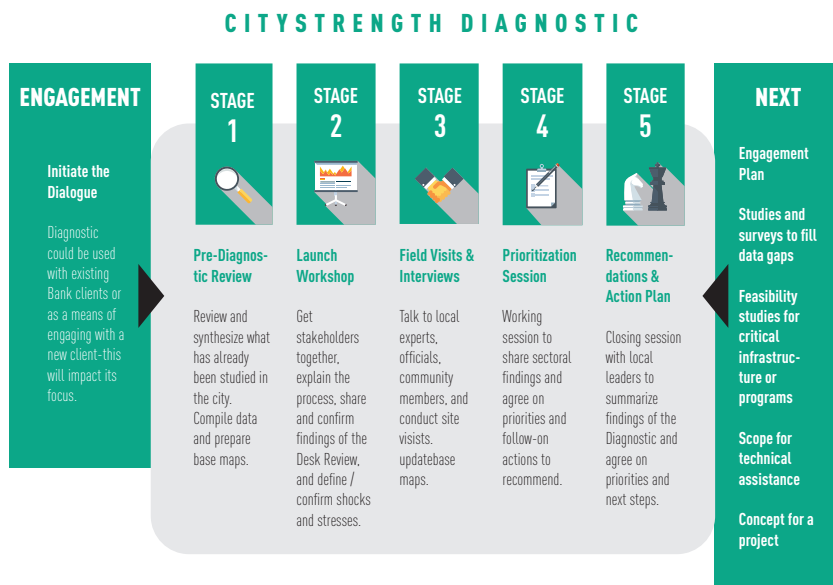


Figure 5: CityStrength Diagnostic Stages²⁰

An example of the application of the City Strength Diagnostic in Addis Ababa where the city faced potential shocks and stresses related to its unprecedented rapid urbanization including urban flooding, fire, earthquakes, water scarcity, unemployment and social vulnerability²¹.

Undertaken in partnership with local government, technical advisors and other stakeholders, the World Bank team worked through the ‘Diagnostic’ to identify priorities for investment and appropriate areas for action to help build resilience in the city. Their findings in summary are:

²⁰ The World Bank, October 2017 “Brief: The CityStrength Diagnostic Promoting Urban Resilience”, see: <https://www.worldbank.org/en/topic/urbandevelopment/brief/citystrength>

²¹ See: <https://www.worldbank.org/en/topic/urbandevelopment/publication/addis-ababa-ethiopia-enhancing-urban-resilience>

Priority actions include:

- Addressing unprecedented urban growth by quickly focusing on the implementation of the new Integrated Development Plan for the city,
- Establishing a disaster risk management and climate change adaptation coordination unit under the Mayor to strengthen, promote, and mainstream risk management initiatives across municipal agencies,
- Addressing localized flooding due to surface water run-off by developing a storm water drainage master plan and supporting the Addis Ababa City Roads Authority (AACRA) in assuming its new mandate to manage drainage in the city,
- Performing an extensive study of the most vulnerable groups with special attention to existing social service programs and access to housing and inform a possible integrated strategy to address the needs of the different vulnerable groups,
- Strengthening citizen engagement efforts using disaster risk management and climate change adaptation as a point of entry.

Priority investments include:

- Addressing water scarcity by focusing on improved efficiency and protection of the existing supply system and exploration of additional water sources,
- Piloting urban densification using a transit-oriented development and integrated municipal management approach,
- Better managing river catchments and related network of secondary drainage, stabilizing eroding river banks and preventing encroachment in flood-prone areas,
- Upgrading drainage on the ring road, expanding stormwater drainage systems in low-lying areas of the city, and installing water retention ponds,
- Upgrading and expanding existing electricity substations,
- Introducing an effectively targeted, productive safety net to support vulnerable groups and households impacted by shocks.

The City of Addis Ababa have requested support from the World Bank and other development partners in preparing and implementing two major activities related to building resilience: a \$300 million project on



urban land use and transport, and a \$550 million project on urban safety nets. In addition, a national-level urban-wide risk assessment is planned to better address at-risk communities, buildings and infrastructure, and promote planning and investments that contribute to resilience-building in the future.

d) City Resilience Framework and Index: The Rockefeller Foundation financed the initial USD 100 million contribution to the 100 Resilient Cities Initiative and although the methodology isn't necessarily fixed, a clear strategy to undertake a diagnostic to inform action planning, leveraging investment, and generating direct and co-benefits of resilience based urban development is well integrated in all 100 partner city strategies. Working with Arup's City Resilience Framework and Index²², which builds upon a framework of 4 dimensions of resilience namely; People, Organisation, Place and Knowledge - as well as 12 resilience goals and 52 detailed indicators, the 100 Resilient Cities programme is now complete. However, it's partner cities continue with implementation where they have sufficient information and resources to proceed. What remains is the diagnostic and planning tools developed by Arup. Thus far Arup and local partners engaged with stakeholders from city government; private sector; and civil society in six of the 100 Resilient Cities partner cities globally²³: Cali, Colombia; Cape Town, South Africa; Concepción, Chile; New Orleans, United States; Semarang, Indonesia; and Surat, India. In total, 86 interviews, 35 focus group discussions and nine workshops were carried out, collecting data from 450 consultees across the six cities.

The primary aim of the CRF/CRI is a logical framework for diagnosing and measuring resilience in the cities they are working. This approach provides a baseline for planning, by identifying key (or recurrent) shocks and stresses and the various 'factors' that exacerbate or mitigate them. The research was centered on the following five queries conducted by a range of international and local consultees:

22 See: <https://www.arup.com/perspectives/publications/research/section/city-resilience-index>

23 Research Report Volume 2, Fieldwork Data Analysis: <https://www.arup.com/projects/city-resilience-index>

- A. What does urban resilience mean to different stakeholders?
 - 1. What do different actors require from the city, both physical and nonphysical, in terms of what the city does?
 - 2. What are the ways in which shocks and stresses materialise in cities around the world today?

- B. How is urban resilience achieved by different stakeholders?
 - 1. What do urban actors perceive as being the factors which prevent disruption or enable rapid recovery of urban functions during times of shock or stress?
 - 2. And of these, which are the priority or critical factors? Are they physical or non- physical?

- C. How is urban resilience being measured?
 - 1. What are the tools, metrics or approaches that are currently being used by cities to measure urban resilience?

- D. How do stakeholder dynamics influence resilience outcomes?
 - 1. Who has control and / or influence over factors that contribute to resilience? Who wins? Who loses?

An example of this hierarchy of vulnerability to shocks and stresses, and the factors that result or influence that vulnerability is in Cape Town, South Africa.

The key findings of the diagnostic research reveal that, from the perspective of stakeholders in Cape Town, fires and floods, normally considered shocks due to their sudden impacts are, in this case considered stresses. This is due to the recurrent nature of the hazards, particularly as they apply in areas designated during the apartheid era for poor, non-white urban residents. This legacy remains as the majority of poor Capetonians live in extremely dense, low-lying areas of the city such as the Cape Flats. Secondly, social stresses factored by bad urban planning including discriminatory segregation during apartheid, constant exposure to fires and flooding as noted above, and poverty is a widespread sense of fear and lack of social cohesion which manifests in violent crime, depression, withdrawal from society and drug and alcohol abuse.



The consensus of business and government consultees is that the local government needs to develop a shared vision and plan for densification of the city; bringing economic opportunity closer to people in need and concentrate investment in key development corridors. Additionally, the city should ensure better management of critical infrastructure, and better distribution of services including energy and water to ensure equitable access to these resources across the city.

These are but a few of the dozens of new initiatives that have emerged in the past few years; all of which focus on outcomes that are intended in some manner to increase resilience in cities, towns and other human settlements. For additional reference and case studies, UN Habitat’s “Trends in Urban Resilience (2017)” details over 30 agencies, donors, networks and private sector organizations engaged with or supporting urban resilience programming globally²⁴.

However, considering the timelines for urban transformation; the capital investments required to finance sustainable change; the nature and pace of urbanization patterns; the politics and practice at all levels of urban organization; critical decision making demands the absence of ambiguity, and the commitment of decades. To achieve this, new systemic approaches are needed to gather and organize information and inform decision makers.

D. THE URBAN SYSTEM - An approach to improving decision-making

1. Defining the urban system²⁵:

The history of urbanization and the evolution of the concepts of urban resilience are based on the understanding that cities succeed and/or fail as systems. An earthquake or a flood not only destroys the physical and

24 UN Habitat, Urban Resilience Programme: “Trends in Urban Resilience 2017”, Chapter 4, pp 45-84

25 All graphics (Figures 6-11) in Chapter D used with permission of UN Habitat, City Resilience Profiling Programme

human assets of cities, they damage social infrastructure, economies, and urban ecology, and disrupt transport, energy, commerce, and institutions of governance to name only a few. All of these and more are elements of urban systems that characterise all cities. These are dynamic systems that change as the cities urbanize, and with deliberate, strategic and well-planned development can be built to better withstand and recover from the impacts of disasters from any (or multiple) hazards.

The key starting point for developing integrated urban resilience strategy is the recognition that all human settlements are ‘systems’; and the universal dimensions of all urban systems are:

- **Functional:** All human settlements are developed to provide certain functions. These range from the simple presence of a market in a small village somewhere, to the multiple interweaved functions and flows of larger towns and cities;
- **Organizational:** All human settlements are composed of, and ‘governed’ by associations of human beings. From individuals, to informal community groups, to formal corporate structures, and government at multiple levels, the organizational element of all human settlements contains its stakeholders and articulates their decision-making capacities;
- **Physical:** All human settlements contain a built environment; from its housing and public buildings, to its infrastructure and public space.
- **Spatial:** All human settlements are located somewhere on the planet with spatial characteristics generally unique to that town, city or village. In general, these characteristics are organized; and,
- **Dynamic:** All urban systems are continually evolving. Driven by multiple factors and often reactive rather than responsive; villages, towns and cities change with time.

Graphically the urban system can be depicted as below.

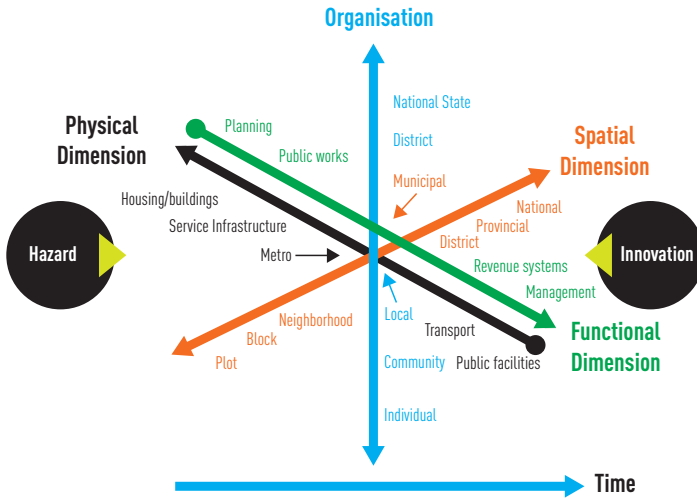


Figure 6: Universal Urban System Model

Each of the above dimensions are represented as one axis. Fixing any one axis and moving the others allows a process for analysing the resilience of the system at various scales. However, the most practical assessment is done by fixing the spatial scale, and moving the other axes to identify specific characteristics, and test their resilience at a scale that begins at the smallest spatial unit, and can be expanded to the municipal scale, and beyond.

For the purposes of baseline planning, the “Time” scale is also frozen during the period the diagnostic process is undertaken.

While the above dimensions are common to all cities, not all cities are the same. It is imperative that local governments understand their urban system, with its unique attributes which can be measured and mapped in terms of its resilience to the impacts of any shock or stress; the “Hazard” arrow above. By understanding the interdependencies, the organizational mandates of stakeholders, the flows and functions that make the city run, and the geographic characteristics of each part of the city, and setting a baseline for future development, the goal of making the city resilient is achievable in time, represented by the “Innovation” arrow in the graphic.

2. Using the Urban System Model (USM)

Regardless of the methodology used to create resilient urban development, the USM provides a useful framework for recording and analyzing the vulnerabilities of the entire town, village or city, and setting a baseline for future governance, planning, financing and development. A series of iterative processes can be undertaken to:

a) Know your city:

Most all urban resilience planning begins with a process of articulating the key characteristics of the city. These normally include size, location, geography etc., and the following chart suggests key categories of what might be called the “City ID”:

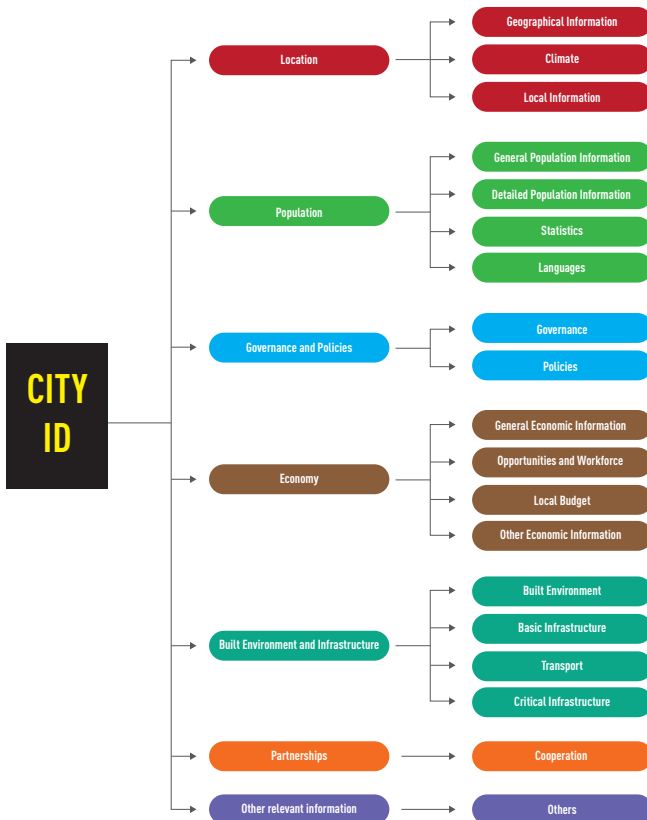


Figure 7: City ID



The primary value in this exercise is to compile information that during the diagnostic exercise will be influenced by the range of hazards the city might face. As detailed as possible information on the composition of aspects of the city within this framework will prove useful both as an exercise in familiarization among stakeholders, and as the foundation for future planning. The USM axes provide a structure that allows aggregation of the City ID data under the primary dimensions of: Physical, Functional, Organizational and Spatial.

b) Understanding risk:

In all cities, the development of a hazard/risk profile is essential in planning for any possible or plausible hazards the city could experience. In adopting an ‘all hazard’ approach and developing some frame of reference for analyzing vulnerability of the urban system, a comprehensive risk atlas is a useful point of reference. One example of how this can be represented in terms of ‘plausible hazards’ can be drawn from the following illustration.



Figure 8: The Hazard Wheel

Not all might apply, and not all potential hazards are listed; however the premise is that a comprehensive mapping at appropriate spatial scales throughout the city is an integral element of developing a resilience-based plan of action.

c) **Analyzing risk:**

At each scale, and for each hazard there are key considerations in assessing and determining risk. The current approach to determining risk is that it is a product of hazard, vulnerability and exposure. **Disaster** risk is expressed as; the likelihood of loss of life, injury or destruction and damage; **Vulnerability** is the physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards; and **Exposure** is the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. While simplistic, this is a useful frame of reference for compiling a comprehensive ‘Urban Risk Atlas’ or a spatial distribution of risk/vulnerability for the entire city.

However, it’s important to understand that risks are not isolated or independent and should not be isolated from concurrent or cascading impacts of a critical event and there are key considerations in ensuring a comprehensive understanding of risk. The first is the assessment of physical, functional and organizational gaps or weaknesses in line with the USM dimensions. The second is the interdependency of those dimensions as they are impacted by specific hazard events; and the third is the interlinked consequences of a hazard, or concurrent or cascading impacts. For example, analysis of vulnerability to a flood, would consider the concurrent impacts from environmental hazards such as water/soil contamination; and Technological hazards such as failure of infrastructure, as well as cascading Social hazards such as health impacts. One tool useful for determining risk is the Quick Risk Estimation Tool developed by UNISDR and Deloitte²⁶. The QRE is essentially an Excel based data entry tool that produces a ‘Risk Summary’ and ‘Vulnerability Report’ that can inform an Urban Risk Atlas.

²⁶ The QRE is available for download at the following URL: <https://www.unisdr.org/campaign/resilientcities/toolkit/article/quick-risk-estimation-qre>



d) Map decision makers and other stakeholders:

Understanding that risk factors for towns and cities are not all governed by decision-making at one level, a first step in developing a practical and implementable resilience strategy is mapping the institutions and individuals who are mandated to make decisions as a basis for negotiating the commitments of all decision-making bodies. The purpose: to ensure national and local governments provide firstly, enabling policy and institutional mandates for assessing and improving the resilience of cities to multi-hazard impacts, including those related to climate change, and secondly improving the basis upon which decision making in urban planning, development and governance are made. These actors define the ‘Organizational Dimension’ of the USM where a ‘stakeholder’ is any individual, organization, group or community who is involved in, or affected by, a given decision or process at the city level. A useful classification of stakeholders could be:

- **Government Entities:** sub-local, local, supra-local (e.g., region, district, province) and national government entities or departments;
- **Private Sector Entities:** for-profit enterprises, companies or businesses (e.g., service providers, industry, commerce, financial and private research institutions), from the local to the international level;
- **Civil Society Entities:** civil society organizations (e.g., neighborhood and cultural associations, indigenous groups, charitable and local non-governmental organizations), traditional and community leaders and councils, amongst others;
- **Other Major Institutions:** national and international non-governmental organizations, foundations and financial institutions, multilateral organizations (e.g., United Nations), international government unions (e.g., European Union) and other intergovernmental associations or communities (e.g., African Union), amongst others.

The level of engagement of different stakeholders with the local government regarding the decision-making process is categorized as follows:

- **No data available or does not inform:** no data regarding the engagement level is accessible or the local government is not informed by the responsible entity of the decision-making process.
- **Informs:** the stakeholder only passes on information to the local government.

- **Consults:** the stakeholder takes into account the local government’s ideas before making a decision.
- **Partners:** the stakeholder works closely with the local government and decision-making responsibilities are shared. This could be the case, for example, of a private water-supplier not informing the local government of major changes in its water distribution in the city, or decision makers located outside of the city system, for example national or sub-national governments on policy or budget issues.

This framework for stakeholder mapping is useful to determine: Who is making decisions?; Who should be making decisions and isn’t?; and, Who is not participating or contributing to decision making that should be? In this manner, and with information derived through the risk assessment process described above, decision making on resilience based urban development is less ambiguous, more transparent, and better ‘owned’ by all parties leading to stronger commitment to future plans. A schematic that might be useful in mapping decision making processes and stakeholders is as follows:

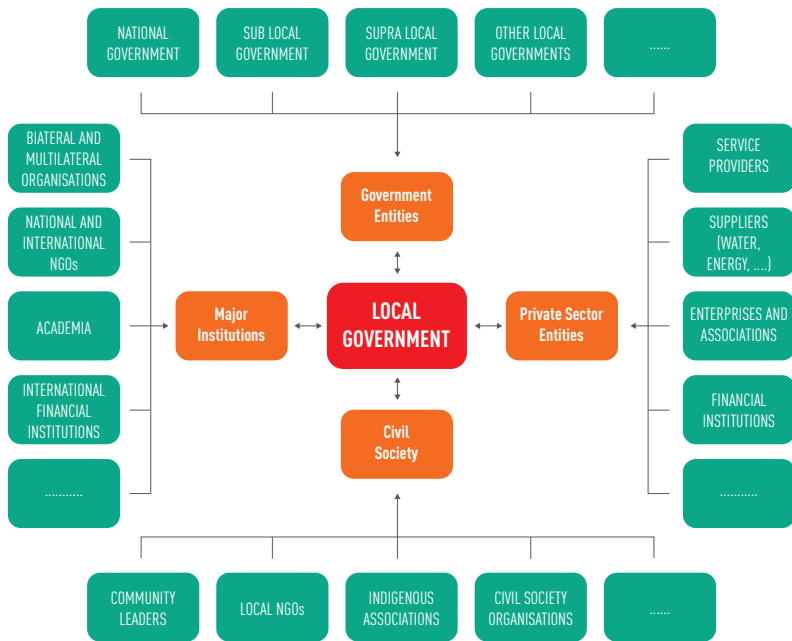


Figure 9: Stakeholder Mapping Diagram



Ultimately, investments in urban development are costly, and decisions are often made without due consideration or for expedience. These in general, can result in future repercussions that can undermine resilience. Using a schematic such as the one above, helps in identifying barriers and gaps in the decision-making process, improves transparency and removes ambiguity. It is also helpful when understanding interdependence of action planning, tracing decision making to its source and determining who needs to decide what to mitigate risk and foster resilience.

e) Planning for the future:

Using the definition set out in Chapter B: WHAT IS URBAN RESILIENCE?:

“Urban Resilience: The measurable capacity of any urban system to absorb and recover quickly from the impact of any plausible hazard and maintain continuity of its functions”.

Unpacking the definition helps in terms of setting goals in the resilience strategy. The key words: **Measure; urban system; absorb and recover quickly; any plausible hazards; and, maintain continuity of functions** provide the starting points for setting these goals to achieve **Urban Resilience**.

Having defined “**any urban system**” by using a universal urban systems model, and outlining the means to “**measure**” resilience by building the risk atlas as discussed above, the questions: “Resilient to what, and how?” remain:

“**All plausible hazards**” - is meant to infer that an urban system is either resilient or not to any plausible hazard, shock or stress. However, it is important to have sufficient bases for prioritising and streamlining risk mitigation into planned urban development and resist the imperatives to focus solely on one potential risk area. This forms the new foundation principle that helps ensure that; sector-, hazard-, or theme-based resilience programming doesn’t drive the kind of asymmetric investment in urban development that prioritises one interest at the expense of another (often higher risk) requirement. An example would be the almost obsessive focus today with climate change mitigation and adaptation driving urban development in a city (and there are hundreds) that is highly exposed to more imminent and destructive

seismic, social/political and/or economic hazards. Similarly, certain proponents of urban resilience-based project investment focus solely on 'infrastructure' such as energy, communications, transport, etc where the capital investments required are extremely costly, and the potential project fees for these proponents are most profitable. Nevertheless, as noted in the section below on 'Financing Resilience', the climate investment capital currently available may be a useful starting point for broader risk situations.

Assessing the 'all-hazard' approach and creating a comprehensive risk atlas as noted above provides the basis for prioritising risk and vulnerability, avoiding asymmetric investment, and skewing the resilience strategy towards less imminent but more popular or profitable risk-based development.

The key determinants of resilience of the urban system are to: “**Absorb and recover quickly**” and “**maintain continuity of functions**”. They are not mutually exclusive conditions in an urban system. In fact, the urban system itself contains multiple sub-systems that can be both malleable and absorptive, or hardened and resistant in order to meet both conditions. However, they are different in the sense that the capacity of one element of an urban system such as a primary water distribution network for example, which is rigid and therefore must be resistant to the impact of an earthquake. It may maintain continuity by creating redundant water distribution points that are protected but inactive until the failure of the primary network, thereby satisfying both rapid recovery and continuity. However, the organization responsible for managing water distribution may not have redundancy and would have to rely on both the survival of the people, and access to their places of work – neither of which can reasonably be guaranteed in the event of the same earthquake, highlighting a potential 'Organizational' vulnerability. In summary, the resilience of the urban system is based on two factors, the ability of elements within the system to 'resist' shocks or stresses, and/or its capacity to 'absorb' those shocks and stresses; in each case ensuring 'continuity'.

These determinants are applicable to all critical elements of all cities. Assessing those critical urban elements (See Fig. 7 below) against the determinants of absorption capacity and continuity can provide a measure of resilience for each element and set a baseline for planning



to address weaknesses and gaps. Once compiled, an urban resilience profile or a snapshot of existing resilience capacity of the urban system is produced.

An illustration of a chart of critical infrastructure common in many cities can help identify key structural elements that will be at risk in the event of a disaster:

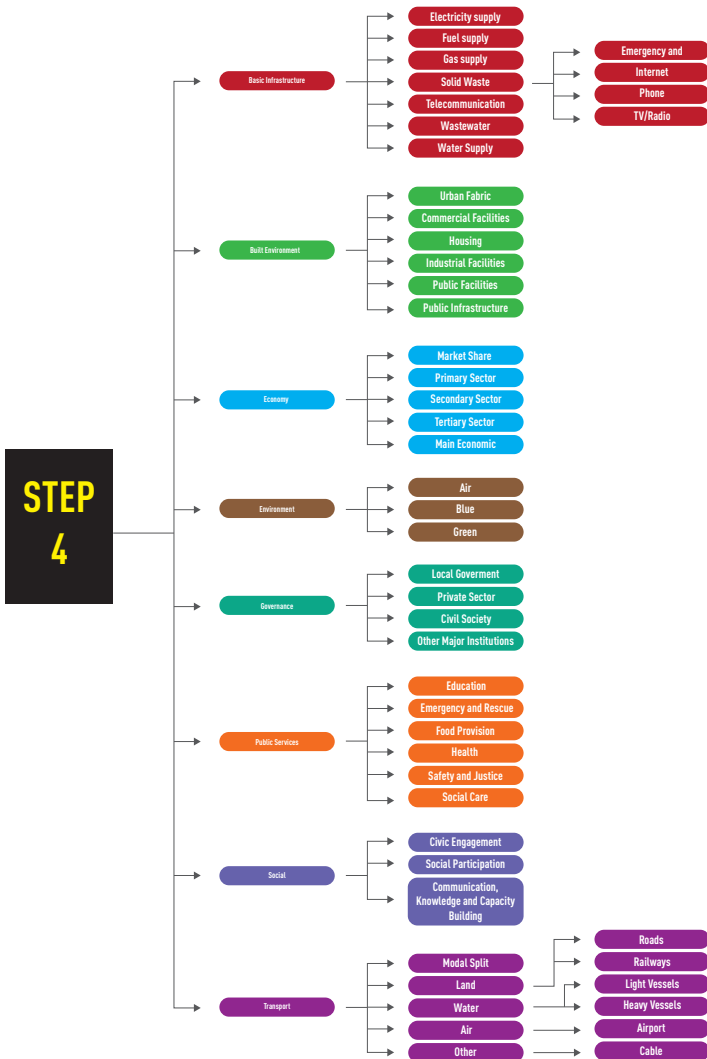


Figure 10: Chart of Critical Urban Elements

Each of the 8 primary elements in the above chart can be dis-aggregated into sector-based sub-elements of the urban system. In this example, there are a mix of physical and functional elements. However, the Chart of Critical Urban Elements while similar in all cities is not necessarily identical for each city. What is important is to ensure all critical elements are recorded as this will form the basis for the analysis of risk, the measure of resilience, and future action planning and programming.

Other characteristics further define what a resilient urban system is. In alignment with the Post-2015 Development Framework and recognising ‘resilience’ and ‘sustainability’ as two complementary paradigms of urban development that go beyond conventional approaches to ‘risk reduction’ and deliver forward-looking, long term development approaches to cities, encompassing the spatial, physical, functional and organisational dimensions of all human settlements. Using the USM approach recognises the complexities and unique values in cities, the inherent interdependencies of each part of the urban system, the potential impacts of hazards, and the roles of stakeholder’s engagement. The objective is supporting and informing local governments to ‘plan out risk and build in resilience’ by transforming the urban planning and design, development and management functions of local government.

Similarly, but more complex; the process of planning out risk and building in resilience in existing cities requires the same clarity of purpose, lack of ambiguity and commitment of time.

In all methodologies including the examples discussed in Chapter C, agencies, academics, and experts have defined the means of measuring the characteristics of resilient cities. For this guideline, these have been synthesised in 6 primary, measurable characteristics. The first three represent outcomes of the process of building a resilient system that is: persistent, adaptable and inclusive; the second describe the process itself which is: Integrated, reflexive and transformative. Each of these are broken down further below:

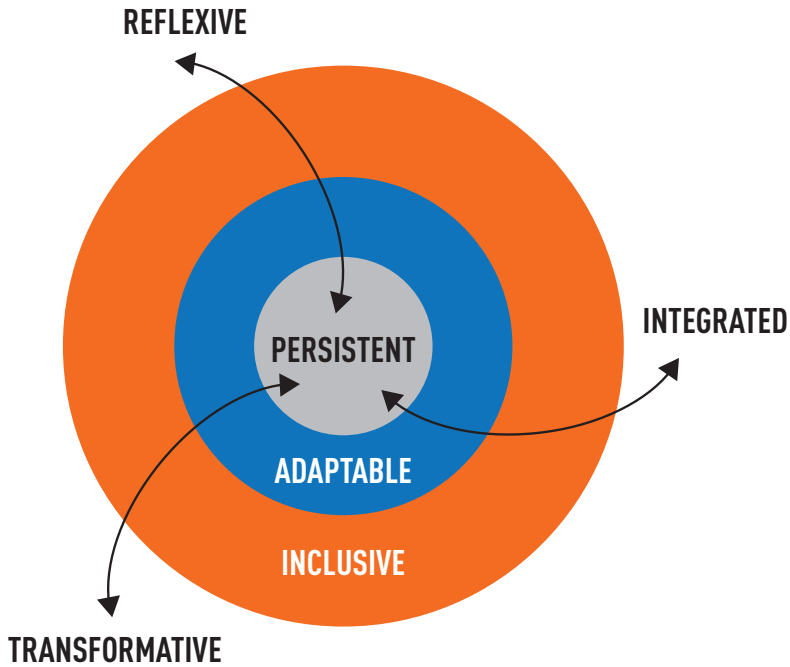


Figure 11: Characteristics of a Resilient City

f) Characteristics of a resilient urban system are:

PERSISTENT

A persistent city anticipates impacts in order to **prepare** itself for current and future shocks and stresses. It builds **robustness** by incorporating coping mechanisms to withstand disturbances and protect people and assets. It encourages **redundancy** in its networks by generating spare capacity and back-ups to maintain and restore basic services, ensuring **reliability** during and after disruption.

ADAPTABLE

An adaptable city considers not only foreseeable risks, but also accepts current and future uncertainty. Going beyond redundancy, it **diversifies** its services, functions and processes by establishing alternatives. It is

resourceful in its capacity to repurpose human, financial and physical capital. It pursues a **flexibility** that encourages it to **absorb**, adjust and evolve in the face of changing circumstances, dynamically responding by turning change into opportunity.

INCLUSIVE

An inclusive city **centres on people** by understanding that being resilient entails protecting each person from any negative impact. Recognising that vulnerable groups are among the most affected by hazards, it actively strives towards **social equity** and impartial human rights. It fosters **social cohesion** and empowers comprehensive and meaningful **participation** in all governance processes in order to develop resilience.

The process of building a resilient urban system is:

INTEGRATED

An integrated city appreciates that it is composed of and influenced by indivisible, interdependent and interacting systems. It combines and aligns many lenses to ensure input is holistic, coherent and mutually supportive towards a common cause. It enables a **transdisciplinary collaboration** that encourages open communication and facilitates strategic **coordination**. It supports the collective functioning of the city and guarantees far-reaching, positive and durable change.

REFLEXIVE

A reflexive city understands that its system and surroundings are continuously changing. It is aware that past trends have shaped current urban processes yet appreciates its potential to transform through shocks and stresses **over time**. It is reflective, conveying the capacity to learn from knowledge, past experiences and new information. It also **learns by doing** and installs mechanisms to iteratively **examine** progress as well as systematically **update** and improve structures.

TRANSFORMATIVE

A transformative city adopts a proactive approach to building resilience in order to generate **positive change**. It actively strives to alleviate and ultimately eradicate untenable circumstances. It fosters **ingenuity** and pursues **forward-looking, innovative** solutions that over time create



a system that is no longer prone to risk. A transformative city is **focused** and **goal-oriented** towards a shared vision of the resilient city.

These characteristics can be measured. Additionally, their value can be adjusted against any stress or shock; and weighed against compound or cascading impacts. Much (if not all) can be determined with data; removing uncertainty in results and leading to better informed decision making in urban planning, development and governance terms.

It takes time - but give it time...

g). Resilience Action Plan: Influencing urban planning, design and action

The diagnostic and analysis processes described above provide a baseline for planning future action. Knowing the city, analyzing its strengths and weaknesses, understanding who the decision makers are, and setting targets that meet the 6 characteristics of a resilient city, leads planners to identifying prioritized, fully-costed and scheduled action.

Identify Action: Action planning is nothing more than the process of building an inventory of intervention that can change the elements of the physical, functional and organizational dimensions of cities at any spatial scale. However virtually all action is inter-dependent or has interdependencies with other elements of the urban system. In developing an action point, it is critical to ensure what impact that will have on other actions and address each point of interdependence. Again, the urban systems model helps in determining what happens in other dimensions of the city when one element in one dimension is altered. For example, in the case of Australian towns affected by flooding (described above) the analysis of risk reveals the towns were exposed to flood, drought and water supply risks. However, the action planning to mitigate these (and other plausible hazards in the region) began with a process of participatory risk assessment, bringing stakeholders from government, the private sector and the public to enrich the analysis and plan more sustainable outcomes.

The starting point for them was ‘disruption to the infrastructure’ rather than focusing on the primary hazard, and the result of their

action planning process concluded that rather than one ‘action’, e.g. Upgrading the infrastructure to withstand floods. Rather, there were four integrated action points namely:

- Interconnectedness and Interdependencies: Understanding the stakeholders and decision-making hierarchy;
- Infrastructure Resilience: Asset Management; Understanding the place of critical infrastructure in a multi-hazard environment, and addressing priority risk;
- Integrated Planning and Reporting: Ensuring all stakeholders are engaged and informed;
- Organisational Resilience: Ensuring continuity of decision-making functions and institutional business processes

In this example, the regional authority and its partners used the LGSAT framework to analyze risk to their communities. Other lines of analysis for action planning might include:

- Where can urban design eliminate or minimize risk? Options for re-shaping or re-scaping the urban landscape might be expensive, but in the long term the return on investment might make it worthwhile.
- Which action points involve ‘hard-change’ or actual physical change to an urban asset such as infrastructure, hardening defensive measures, relocation, etc., or which require ‘soft-change’ interventions such as organizational, functional, normative (policy and regulation), or social mobilization.
- What is the return on investment? For each action or set of actions to ensure the safety of urban social, economic and physical assets as well as increasing potential for safe investment and capital, the upfront costs matter. In general, hard-change actions can be expensive, however as noted below in the Financing Resilience section, these costs are often recouped over time as the city becomes more interesting to investors. Alternatively, in general soft-change action, which is often equally important, is usually less costly in financial terms, but still takes time.
- How urgent is this action? Time is a crucial factor in many decision-making processes and depending on the exposure and vulnerability of the city, and the frequency of critical events, it may be the determining factor in selection and prioritizing actions for resilience.



Set Priorities: Urgency is one criterion for prioritizing action as noted above, however if the most urgent action is unrealistic in terms of cost, or large scale disruptions that require the relocation of people and other assets, then the priority has to be downgraded until conditions that allow either financial or social conditions are in place to meet that priority. Urgency, cost, consensus, funding, financing, investment, policy, regulation, capacity and expertise are all conditions that hinder or help prioritizing one set of actions over another. In another case described above, the City of Barcelona, faced with the threat of major disruptions in urban functions as the result of flooding, started their resilience based urban development with only two key actions. The first was ensuring the political commitment to building a city that no longer would suffer the consequences of power, water, transport, economic and social disruptions.

The second, and ultimately for them the most important was in the absence of any specific financing and limited contingency funding, was the decision to “do what they could with what they had”. In other words, they prioritized actions they could reasonably undertake with little or no resources, and hope that by doing so, the funding, finance and expertise would be drawn to their agenda. In time this proved to be the decision that would set Barcelona apart from other cities and attract the new investment required to achieve their goals. Among the first actions taken was the decision to create an interdepartmental ‘Resilience Board’ composed of representatives from all departments in the municipality. Its mission was to harmonize action-planning ensuring that all local government and civil society stakeholders planned, designed and ‘owned’ the action outcomes. The cost was minimal, but the impact today as the city continues to work collaboratively with infrastructure owners and operators, service supply companies including water, communications, energy, transport, police, social agencies, and other stakeholders in a far more efficient and cost-effective manner than before the 2007 floods.

Start: As the Barcelona case shows, the most important activity is to actually just start. Whether it is by focusing on efforts: to establish political and social commitment to a resilience agenda; organizing the departments of the local authority to work more collaboratively and in a trans-disciplinary manner; or undertaking a participatory resilience

profiling exercise, all of which have limited financial implications; or by beginning the process outlined above using the urban systems model. Cities other than Barcelona have benefitted from simply making the decision to start making their city more resilient accessing the resources, and using the tools, standards and international norms noted throughout this guideline.

3. Financing Resilience

Urban investment is driven by multiple interests. In Chapter C, it's clear that throughout the history of urbanization the consideration of accumulating risk was not the highest priority until quite recently. Investment in the industrial infrastructure during the 80-odd years of the Industrial Revolution for example, paid scant attention to the safety of the thousands of workers that came to the factories and foundries driving urban economies of the day. Later, during the 1970's and onward, urban growth was driven by real-estate economies expanding urban boundaries, gobbling up rural land, and creating huge sprawling cities that today are completely unsustainable. Even today, as primary resources are drying up, the single source economies of the mining, fishing, agricultural and forestry towns built in the 19th and 20th Century no longer have purpose, and their residents are seeking greener pastures in the larger towns and cities in their nations.

Cities that have survived and prospered have managed their continued urbanization by capturing investment in their ongoing development by consistently outperforming other cities. These investments bolster the functions, improve the built environment, and stimulate organizational performance which further fuels their economies and guarantees some form of continuity for business and commerce.

These phenomena can happen in all cities; however, those who have better managed risk and a clear strategy for future development based on the principles of resilience are more competitive in terms of attracting private capital for financing development.

Today, there are multiple options for making cities more attractive for investment, and several that can assist local governments to improve their prospects for the longer term. This section will focus on external



resources such as grants and loans rather than domestic (e.g. budgetary, municipal bonds, or other domestic strategies) support, that can help make cities safer and more resilient thereby more marketable for longer term private investment.

a) International aid:

Primarily targeting developing and (some) middle income countries, the multilateral organizations of the United Nations, The European Union, international NGO's provide expertise and some funding for projects that demonstrate new or innovations in urban development strategies. With the exception of towns and cities destroyed or damaged by disasters and war where the aid community can marshal funding for housing, infrastructure and public facilities, international aid generally focuses on technical assistance rather than capital investment. Outcomes often focus on policy change, knowledge transfer, and advocacy; all of which respond to demand from partner states and cities.

b) Investment banks²⁷:

The World Bank Group, including the Regional Development Banks provide a wide array of products that include: technical assistance, grants, insurance products, as well as soft and hard loans.

The International Bank for Reconstruction and Development (IBRD) for example can provide national clients in countries with recurrent risk with their "Development Policy Loan with Catastrophe Drawdown Option (DPL Cat DDO)" which is essentially a line of credit government clients can draw down in the immediate aftermath of some critical event. This facility is often backed by Catastrophe Bonds and Catastrophe Risk Insurance, derivatives and other instruments and is intended to cover losses from disaster events that include risks stemming from meteorological and geological events, and including pandemics, epidemics and other events affecting health issues like morbidity, mortality and longevity²⁸.

27 For a comprehensive overview of World Bank Group Disaster Financing support see: https://olc.worldbank.org/system/files/DRF-Four-Pager-web_0%282%29.pdf and, <https://olc.worldbank.org/system/files/Financial%20Protection%20Against%20Natural%20Disasters.pdf>

28 See: <https://treasury.worldbank.org/en/about/unit/treasury/ibrd-financial-products/disaster-risk-management#3>

The Global Facility for Disaster Reduction and Recovery (GFDRR) hosted by the World Bank within the Climate Change Cross-Cutting Solution Areas (CCSA) convenes development partners, provides grants and seed financing to enable the engagement with clients and the technical studies and knowledge solutions to help define the disaster risk management framework.

The Disaster Risk Financing and Insurance Program (DRFIP) in Finance and Markets Global Practices, leads the disaster risk finance dialogue with clients regarding the financial impact of natural disaster risks and helps countries design and implement comprehensive disaster risk financing strategies.

c) Multilateral Climate mitigation and adaptation funds:

By far the largest capital source for managing specific risk; multilateral climate mitigation and adaptation funding alone is targeted at scaling up from a floor of \$100 billion annually by 2020. While this target hasn't yet been met, the available and disbursed funding levels have been increasing since 2014. According to Heinrich Böll Stiftung (HBS)²⁹ "The global climate finance architecture is complex and always evolving. Funds flow through multilateral channels – both within and outside of the UNFCCC and Paris Agreement financial mechanisms – and increasingly through bilateral, as well as through regional and national climate change channels and funds." The HBS North America office monitors climate mitigation and adaptation funds from 23 multilateral or multi-donor national agencies totalling some \$US 30 billion in pledged resources, and these are simply a sampling of dozens of other sources.

While it is needless to say that in spite of this being the largest source of funding related to the risk from climate change, it barely touches the USD 1 trillion the worlds largest companies say is at risk from climate change³⁰. On the positive side however from a commercial point of view,

²⁹ See: <https://climatefundsupdate.org/publications/the-global-climate-finance-architecture-2018/>

³⁰ See: <https://unfccc.int/news/major-companies-face-usd-1-trillion-in-climate-risks>



the same companies estimate new business value through engagement in climate related development, to be in the order of USD 2.1 trillion.

The numbers are staggering, and present huge opportunities to finance resilience in cities. Jeb Brugmann, in his paper “Financing the Resilient City³¹” makes a compelling argument that climate funding can be used to finance resilience. Not simply direct finance, but to leverage some of that expected \$2.1 trillion in projected private sector returns. He argues further that urban risk reduction needs to be re-framed into an investment opportunity where up-front investment in risk reduction can increase financial performance of a property, area or urban system. In this manner, the reliability of investment returns is increased through a process of ‘resilience upgrading’ and the arguments for attracting investments much more clear. Seed funding through the various climate funds can start this process by financing smaller projects that are planned through the urban resilience strategy developed as suggested in the previous chapters.

E. GOING TO SCALE: FINDING RESOURCES

Other resources can be made available to ensure resilience-based urban development is successful. These include collective knowledge exchange for example, sharing experience and strategies developed in one city with others in the region, at national or international levels. Other strategies include engaging with any of several networks and associations that promote urban resilience, and yet others to engage with professional associations including planners, architects, engineers, surveyors, or even youth, arts, cultural and social science associations that exist in many countries. All of these provide insight, knowledge and a platform for common purpose.

31 Published in 2012 in: Environment and Urbanization, Volume 24-1 pp 215-232, by IIED and Sage Publications

1. Centers of excellence:

Cities that have experience initiating and delivering urban resilience programs can act as learning centers for those just starting or interested in building resilience in other cities. An example is the city of Barcelona in Spain. In 2007 following a period of unprecedented rainfall, the city was inundated, and essentially shut down for three full days before power was restored, transportation systems re-started, and cleanup could begin. It was this event that started the local government seriously considering how to build resilience in their city. Their journey to being an international center of excellence in terms of urban resilience took a decade before significant investment began in major infrastructure projects, spatial reorganization, organizational change, new expertise sought, and eventually reliable policy frameworks were developed. Today the work in Barcelona continues, and it has become an international showcase of how to plan out risk and build in resilience.

Many other cities are on the same trajectory including some in Turkey. Istanbul for example is one of the 100 Resilient Cities; and Gaziantep has fully engaged with the UNISDR's Making Cities Resilient Campaign and completed the LGSAT as a starting point for their resilience agenda. Others have also engaged but could draw knowledge from these two in time.

2. National and International Associations for Local Authorities.

a) United Cities and Local Governments (UCLG): UCLG is an umbrella organization of cities, local and regional governments and their associations with its members from over 140 of the 193 United Nations member states. Furthermore, UCLG has over 1000 cities across 95 countries as direct members and 112 Local Government Associations (LGAs) as members representing almost every existing LGA in the world. UCLG's principle goal is twofold, that is promoting the principles of decentralization of governance closest to the people, i.e. Local Authorities, and creating space on the global stage for the voices of local government. They provide policy and advocacy support as well as learning for their members.



b) ICLEI Local Governments for Sustainability: ICLEI is a global network of more than 1,750 local and regional governments committed to sustainable urban development. Active in 100+ countries, their mission is to influence sustainability policy and drive local action for low emission, nature-based, equitable, resilient and circular development. ICLEI serves its membership by facilitating peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

c) Council of European Municipalities and Regions (CEMR): CEMR is the oldest and broadest European association of local and regional governments. It is the only organisation that brings together the national associations of local and regional governments from 41 European countries and represents, through them, all levels of territories - local, intermediate and regional. It also represents its members as the European section of UCLG. Its platform is focused on two key areas namely:

- Influencing European policy as it pertains to municipalities and regions; and,
- Providing a forum for debate between local and regional governments.

d) Union of Municipality of Turkey (UMT): The Union of Municipality of Turkey (UMT) is a member of the Council of European Municipalities and Regions (CEMR). It also keeps the secretariat of the Turkish National Delegation to the Congress of Local and Regional Authorities of the Council of Europe.

All of the above networks provide knowledge, advocacy, and solidarity for individual local authorities, and while there are many others, the prospect of sustainable resilient urban development is common throughout.

3. International communities of practice:

a) Medellin Collaboration for Urban Resilience (MCUR): Launched during the World Urban Forum in Medellin, Colombia in 2014 the MCUR pledged the commitments of 10 international

agencies and organizations³² to work together where possible, to ensure complementarity when opportunities arise, and to share knowledge all in the common purpose to support cities around the world realize their resilience goals. Recognizing that cities are clearly emerging as the realm where risk-awareness and reduction are most immediately needed and working across 4,000 cities globally and leveraging more than US\$2 billion of existing annual funds, the Medellin Collaboration is committed to answering the challenge. While over time, there have been changes to the membership, the principle objectives remain, and a body of work is open to interested city partners. The MCUR published a “Local Governments Pocket Guide to Resilience³³” containing useful guidance and resources.

b) Global Alliance for Urban Crises (GAUC): GAUC is a multi-disciplinary, collaborative community of practice working to prevent, prepare for and effectively respond to humanitarian crises in urban settings. It is composed of over 70 representatives of; academia, built environment professionals, local governments, national governments, donors, humanitarian and development agencies, and civil society/grassroots organizations. Under its Charter³⁴ the Alliance focuses on 4 key knowledge products which include:

- Adapting Urban Tools: City profiling, joint analysis and adapting coordination mechanisms;
- Mobilising Urban Expertise: Working with existing networks and rosters of professionals to support local authorities;
- Managing Urban Displacement: contributing to the design of appropriate and cost-effective responses, with particular regard to protection of vulnerable people, shelter, basic services and infrastructure in areas of protracted urban displacement; and,
- Building Urban Resilience: Designing and implementing ‘resilient response and recovery’ protocols to ensure humanitarian support in post-crisis situations has the greatest positive long-term impact.

32 These included: UN Habitat, UNISDR, The World Bank Group, Global Facility for Disaster Reduction and Recovery, International Development Bank, The Rockefeller Foundation, 100 Resilient Cities, C40 Climate Leadership Group, ICLEI, and (latterly) Cities Alliance.

33 Available for download at: <http://urbanresiliencehub.org/medellin-collaboration>

34 See: Global Alliance for Urban Crises, “Urban Crises Charter, Adapting to an Urbanized World” 2014, See: <http://urbancrises.org/wp-content/uploads/2019/02/1.-Urban-Crises-Charter.pdf>



All of the above organizations and networks represent resources that can assist municipalities who are just starting to familiarize themselves with the concepts of building resilience in their city. Much of those resources are available online and accessible at the URL's noted in the footnotes above. There are many others, which include national associations who themselves are part of international communities of practice. In Turkey these include:

- Turkish Chamber of Urban Planners;
- Union of Chambers of Turkish Engineers and Architects;
- Association of Turkish Consulting Engineers and Architects;
- Turkish Social Sciences Association;
- Turkish Association of Geographers;

...to name a few that have local knowledge, are familiar with Turkish norms, laws and regulatory system, and can provide expertise in the diagnostic, planning and implementation of resilience building throughout Turkey.

F. THE TURKISH CONTEXT

As in other parts of the world, Turkey experienced unprecedented urbanization over the past 70 years. However, virtually no other countries matched the rate of urbanization that Turkey has seen. From roughly 25% of the population living in cities in 1950, today over 75% of Turkey's 81 million people live in cities throughout the country. According to the World Bank, in its 2015 publication "Rise of the Anatolian Tigers, Turkey Urbanization Review"³⁵ this process was enabled by a deliberate policy framework "...putting in place the public policies and regulatory elements to allow markets to work, yielding measurable economic and social gains, increasing per capita incomes, reducing poverty, scaling up the provision of housing, and achieving dramatic improvements in municipal service coverage." In other words, the Turkish government embraced the positive values urbanization could provide, and set in place a series of regulations, norms and fiscal and financial incentives that encouraged State and Local governments

35 See: <https://www.worldbank.org/en/country/turkey/publication/turkey-urbanization-reviews>

to advance urban development, meet national targets for access to services, increase housing supply, and open new markets for goods and services.

Turkey however, is vulnerable to a wide range of natural hazards; primarily risks associated with earthquakes and landslides, but increasingly from flooding and drought, which together with other impacts of a changing climate such as coastal inundation, sea level rise, extreme heat and wildfires will affect towns and cities throughout the country.

The latest earthquake risk map³⁶ (see below) published by AFAD in 2018 shows nearly 50% of the entire country is at high risk from seismic hazards, and the frequency of seismic events recorded over 23,000 for 2019 alone.

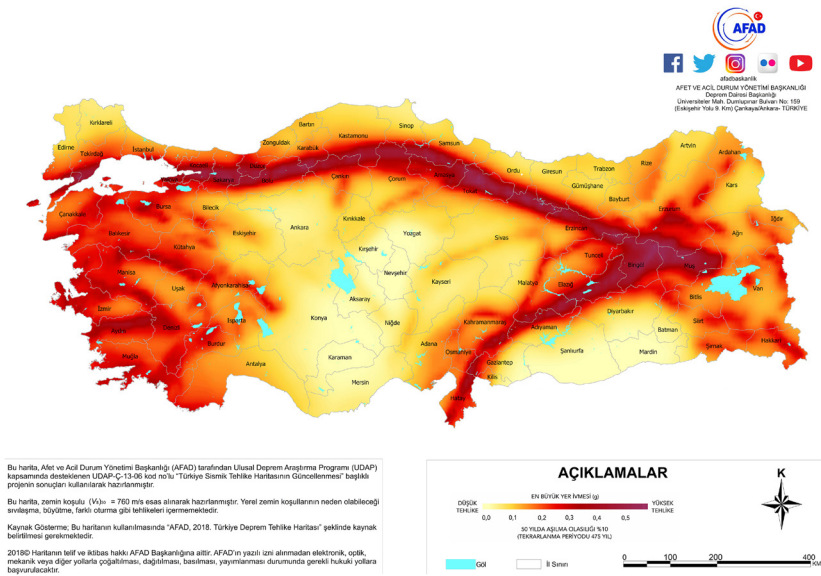


Figure 12: Earthquake Risk Map - Turkey³⁷

36 See: <https://deprem.afad.gov.tr/?sessionid=786E7CCDCD9F3BEEBC8C8F71311A308B?lang=en>

37 REPUBLIC OF TURKEY PRIME MINISTRY, Disaster & Emergency Management Authority, Presidential of Earthquake Department (AFAD), 2019



More recently, Turkey has become one of the world's largest refugee hosting countries, with close to 4 million refugees. 3.7 million are Syrians under its protection and distributed in dozens of towns and cities³⁸. While undoubtedly straining municipal systems, for the most part Turkey has taken the position of integrating refugees within their urban centers and limiting the construction of camps. It has also since 2016 opened opportunities for Syrians to work legally and some have acquired residency or even citizenship. While migration surges can represent significant risk factors for towns and cities and should be considered in any exercise on hazard/risk mapping, this topic is the subject of other SKL International reporting and while taking note, this Guideline will not emphasize migration surge impacts.

1. The history of DRR³⁹ in Turkey

As noted above, establishing the historical trajectory of disaster risk reduction and resilience globally from a purely reactive emergency response regime in most countries, to one that sought to reduce risk, and finally to consider resilience as a development target for human settlements is critical to understanding the state of the world's cities today in terms of their capacity to withstand and recover quickly from the impact of all hazards they may be exposed to.

In Turkey, this trajectory has its beginning in the late 1950's with the promulgation of new laws relating to disaster management including the first national earthquake zoning map and building code. These new norms built on the 1923 'Rules for Settlements in Istanbul', which by 1944 had evolved with a focus on response, post-disaster aid, and eventually the first Municipal Law 1580 (1930) regulating local governments. The period 1959-1999 saw the formalization of a specific government entity established by Law 7269 (1959) on 'Measures and Assistance Regarding Natural Disasters Affecting General Public Life' and creating the Ministry of Reconstruction and Settlement complete with the Civil Defense Law 7126 (1958). These

38 UNHCR Global Focus, 2020 Planning Summary – Turkey (December 2019), see: <http://reporting.unhcr.org/node/2544>

39 Source material derived from: Kerem Kuterdem's presentation to the 1st Meeting of the European Forum for Disaster Risk Reduction (EFDRR), in Gothenburg, Sweden in October 2010; and, other more recent sources including Çiğdem TETİK, from AFAD.

latter two laws with various amendments and with one notable addition of the establishment of the Development Law 3194 (1985) governing (primarily) urban development under the Ministry of Public Works and Settlements, governed the national structures related to disasters until the catastrophic Kocaeli and Düzce earthquakes of 1999.

As of 1999, the overall architecture of disaster related organizations in Turkey had become multi-layered; situated across 3 national Ministries with multiple sub-organizations under each. The massive earthquakes of August and November 1999 revealed fundamental weaknesses in the institutional arrangements at all levels in Turkey, notably revealing ineffectual coordination and communication; and multiple lines of authority undermining efficacy of the overall response.

As in many other countries, it was the aftermath of catastrophe that stimulated positive change in Turkey and an accelerated process of promulgation of new laws, decrees and regulations began culminating in the creation in 2009 of the National Disaster and Emergency Management Presidency (AFAD) under the direct authority of the Prime Minister.

One significant and somewhat controversial set of laws specifically addressing urban risk is the ‘Urban Regeneration Law’ formally known as The Law on the Regeneration of Areas under Disaster Risk, which was enacted in 2012 (Law No.6306, May 2012). “Urban regeneration is an important planning tool implemented by local and central governments in order to reduce to disaster risk and to design liveable environments for the citizens.” writes E. Candas et. al. in their paper ‘Understanding Urban Regeneration in Turkey, 2016’⁴⁰. The purpose of this law according to the authors is to “...define the procedures and principles on rehabilitation, clearance and renewal of risky areas and risky buildings in order to constitute healthy and safe housing and environment, which are convenient (sic) in terms of the

40 E. Candas, J. Flacke, T. Yomralioglu, “Understanding Urban Regeneration in Turkey”, The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLI-B4, 2016, p. 669 Sec: <https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLI-B4/669/2016/isprs-archives-XLI-B4-669-2016.pdf>



technical and artistic norms and standards.” However, the regulation permits mandated institutions to expropriate, confiscate and/or alter the type and place of property deemed at risk, or of risk to others, all of which have major implications on property rights. Urban regeneration as noted is an important and useful means of transforming cities for various purposes, and there are many alternatives to more equitable means of acquiring land, not least of which is land readjustment⁴¹.

2. Current policy and practice in Turkey

a) Ongoing Plans and Programs in Turkey

Critics have repeatedly made reference to the (lack of) quality control in terms of building safety throughout Turkey. However, as noted above the pace of urban growth in the country while raising the prosperity of its citizens, also out-paced the capacity of government and its subsidiary bodies to properly supervise and sanction developers and builders.

In his background paper “Obstacles in the adoption of international DRR policies: The case of Turkey⁴²” for the 2013 Global Assessment Report produced annually by UNDRR, Prof. Dr. Murat Balamir, writes extensively about the challenges of integrating disaster risk reduction in Turkish policy. These range from; for example, completely separate oversight on disaster and planning laws, to the prurient interests of various lobby groups pressuring for favorable access to public funds, to the laws that require developers and builders to employ private building inspectors to ‘self-certify’ compliance with building regulations, to the culture of entitlement arising from mandatory building insurance, among many other challenges and obstacles. The result is that while some residential building construction is under close scrutiny, many public buildings are not. The World Bank estimates fully one-third of all schools are at risk in the event of a major earthquake⁴³.

Nevertheless, the country continues to evolve new policy, legislation and regulation in some cases through domestic process and in others in partnership with external institutions. Some of these include:

41 For land readjustment tools and methodologies see: <https://gltm.net/land-management-and-planning/>

42 See: <https://www.preventionweb.net/english/hyogo/gar/2013/en/bgddocs/Balamir,%202012.pdf>

43 GFDRR Country Profile – Turkey, 2017 See: <https://www.gfdrr.org/en/turkey>

The World Bank Group:

The Global Facility for Disaster Reduction and Recovery (GFDRR) has been present and actively supporting urban risk reduction in Turkey since 2007. Together with the World Bank in this period, USD 251.2 million has been allocated and 10 projects completed or underway⁴⁴. The overall strategy responds to continued demand from the Government of Turkey to support:

- Scaling up the safer schools agenda through construction, retrofitting, or repurposing of disaster-resilient education facilities;
- Improving business continuity planning;
- Building an analytical foundation to inform disaster- and climate-risk decision-making across sectors;
- Supporting operationalization of the National Disaster Response Plan and National Disaster Risk Reduction Plan; and,
- Enhancing urban resilience and adaptation capacity to manage seismic and climate-related risks⁴⁵.

The United Nations:

The United Nations System in Turkey comprises 14 resident agencies: Food and Agriculture Organization (FAO), International Labour Organization (ILO), International Organization for Migration (IOM), United Nations Development Programme (UNDP), the UN Department of Safety and Security (UNDSS), United Nations Population Fund (UNFPA), United Nations High Commissioner for Refugees (UNHCR), United Nations Information Centre (UNIC), United Nations Children's Fund (UNICEF), United Nations Industrial Development Organization (UNIDO), UN Office for the Coordination of Humanitarian Affairs (OCHA), United Nations Volunteers (UNV), UN Women, World Food Programme (WFP) and World Health Organization (WHO). The Office of the High Commissioner for Human Rights (OHCHR) and the Department of Political Affairs (DPA), while non-resident, are also actively engaged with Turkey.

⁴⁴ *ibid.*

⁴⁵ For further analysis of flood and earthquake risk in Turkey by World Bank Group and GFDRR see also Earthquake and Flood Risk Map, Turkey (2015): <http://pubdocs.worldbank.org/en/415331483041895588/turkey.pdf>



The priorities within the UN Development Cooperation Strategy for Turkey identify four strategic areas of cooperation endorsed by both the Government of Turkey and the United Nations in Turkey namely: 1) Sustainable, Inclusive Growth and Development 2) Democratic Governance and Human Rights 3) Gender Equality and Women's Empowerment 4) Migration and International Protection. Under Strategic area 1) the UN Country Team have committed to supporting the Government of Turkey in its "...efforts to build the resilience of communities including their most vulnerable members and to ensure national preparedness in line with the Sendai Framework for Disaster Risk Reduction⁴⁶." To this end, several cities have engaged with the UNDRR Making Cities Resilient Campaign⁴⁷.

However, the largest UN programme in Turkey is that of the UN Refugee Agency. UNHCR reported in June 2019, its projected budget of close to USD 400 million. While only partially funded (22%) at the time, their remit in terms of the 4 million 'persons of interest' is also the largest of the UN family of programming in Turkey.

Additionally, the UN Office for the Coordination of Humanitarian Affairs (OCHA) coordinates the cross-border operations of a wide range of UN agencies, international, Turkish and Syrian NGOs based in Turkey and working in Syria or with migrants throughout Turkey and Jordan.

The European Union:

The European Commission through its Instrument for Pre-Accession Assistance (IPA) and under the EU Regional and urban development policy fund three key areas of support to the government. These include the Environment Operational Programme (EOP); the Transport Operational Programme; and the Regional Competitiveness Operational Programme (RCOP) in collaboration with the Ministries of: Environment and Forestry; Transport; and Science, Industry and

46 UN Development Cooperation Strategy for Turkey, p. 30. See: http://www.un.org.tr/wp-content/uploads/UNDCS-Final-2016_-1.pdf

47 The cities are: Antalya, Gaziantep, Istanbul, Izmir, Kocaeli and Yalova. See <https://www.unisdr.org/campaign/resilientcities/cities/turkey>

Technology. These are considered areas where Turkey needs to focus in terms of the pathways to accession with the EU in due course. These three programmes account for almost EUR 1.9 billion invested in their 2007-2013 cycle. The IPA II (2014-2020) will commit an additional €3.533 billion (not including the allocation for Cross-border Cooperation) in a range of continuing initiatives in Turkey⁴⁸.

Other initiatives of the EU/EC are delivered through support to projects and programmes delivered by the UN and World Bank as well as several International NGO's working primarily with migrants and refugees.

b) SKL International and RESLOG:

“Resilience in Local Governance” (RESLOG) is a Project (2018-2020), that aims to strengthen the capacity of local government systems by increasing resilience in accordance with the principles of peacefulness and inclusiveness in Turkey and Lebanon, two countries seriously affected by the Syrian Crisis. The RESLOG Project is carried out by the Swedish Local Authorities and Regions Association (SALAR), through its affiliate SKL-International.

RESLOG's Turkey component, RESLOG Turkey has the main goals:

- To strengthen inter-municipal learning and support structures through regional associations;
- To improve holistic planning and governance at municipal level; and,
- To improve national migration policies to reflect local realities and needs.

For achieving these goals, SKL International partners with the Union of Municipalities of Turkey; Marmara Municipalities Union and Çukurova Municipalities Union and supports local and regional authorities to address the presence of Syrian refugees in those regions.

48 See https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/turkey_en



For instance, Preparation of Migration Master Plans in the project partner municipalities is the main local level activity of the RESLOG project.

Migration Master Plans analyse the impact of international migration on a wide range of municipality service areas, including infrastructure, urban services, economic development and social cohesion. Then they offer gender and conflict sensitive solutions to the most influenced service areas.

In addition, RESLOG Turkey, through a multiplicity of publications addressing migration-related urban challenges, supports strengthening networks for knowledge production and experience exchange on migration, integration and resilience both locally, nationally and internationally.

This guideline is one of several publications produced by SKL International as part of the RESLOG Turkey project.

G. SUMMARY AND CONCLUSIONS

The loss of life, assets and functions of cities and towns affected by critical shocks; or even chronic stresses impacts more than their buildings and infrastructure. Today's connected world means we know more about the impact of hazards of all types, yet the demand for tools, approaches, and methodologies to overcome and build resilience continues to increase. Increasingly local governments are asking for more robust tools, guidelines, training, and technical support to better understand the urban systems they govern and reside in; to facilitate transformative processes that plan out risk and build in resilience; that make their cities more inclusive, safe, resilient and sustainable recognizing that it will take time, but will ensure a better and safer future for its citizens today and tomorrow. This is as true in Turkey as it is in the rest of the world.

The primary aim of this guideline is to provide a better understanding of the theory and practice of urban resilience strategies and programs for municipalities in Turkey. A secondary aim is to provide guidance

on initiating and maintaining commitment to resilience-based urban development in Turkish cities. Finally, the guideline aims to introduce resources to assist Turkish municipalities. In responding to these aims, the key messages throughout the guideline are:

1. All cities are exposed to varying levels of risk; some risk accumulated in the present but most inherent risk in cities is as a result of historical urbanization processes. Urbanization in the past century is no longer sustainable; has resulted in accumulated and intensified risk, and requires significant transformation to ensure inclusive, safe, resilient and sustainable urban settlements in the next century. In Turkey, the unprecedented rate of urbanization in the past decades has outpaced capacity of government to regulate sustainability and resilience, and in a country exposed to significant hazards risk levels have increased.

2. Cities and towns are complex systems; cities succeed or fail systemically under various, often cascading, hazard impacts, however they are systems that can be mapped and measured, and the process of mapping and measuring is one where all stakeholders can (and should) participate in. The primary universal dimensions of all human settlements are:

a. **Spatial Dimensions:** all human settlements are located geographically and generally organized in spatial units with boundaries that range from plots, to neighborhoods, municipal limits and beyond. These are useful scales for determining the influence of other dimensions in terms of exposure, vulnerability, and 'resilience' of the entire system.

b. **Organizational Dimensions:** the organizational dimensions of all human settlements are critical in understanding where and how decisions are made, and by whom. The smallest organizational unit is the individual, however any town or city is represented by other associations of people, whether they are government, business or professional, community or civil society, it is these associations that represent the stakeholders in making cities safer and more resilient. Sometimes, organizational change to adapt to new methodologies and approaches in urban development are required in order to ensure positive collaboration, more efficient programming, and better transparency and ownership of critical decisions.



c. **Physical Dimensions:** The built environment that rests on the spatial distribution of a town or city comprises the various typologies of private and public assets created to provide shelter, transport, energy, and social, economic or commercial services.

d. **Functional Dimensions:** All human settlements exist for a range of purposes. These are the urban functions that define every city's unique reasons to exist and thrive. Often described as dynamic 'flows' the functions of cities include the use of city assets for the movement of goods and services; the administrative and economic flows of decision makers; the use of markets, ports and commercial centers, and the transactional flows of people's daily lives.

e. **Time:** Human settlements are dynamic, they are constantly changing as they expand or contract spatially; new assets are built, or old ones demolished, new decision makers are introduced, and functions change. Understanding the system and how it can be deliberately influenced to increase resilience over time is a critical process to ensure urbanization or urban development processes produce positive resilience dividends and co-benefits for all stakeholders.

This universal urban systems-based approach is a means of gathering, organizing and understanding information about the city in a manner that eliminates ambiguity, and informs better, more efficient and transparent decision making, and planning and implementing long term resilience based urban development.

3. Any human settlement can become more resilient; to the shocks and stresses it is exposed to given methodical and deliberate implementation of strategic, resilience-based, and long-term urban development. The world is moving on from its historic pre-occupation with; accepting risk and providing response and relief, to new paradigms of development that seek to minimize the need for emergency response and relief. New tools are emerging to assist national and local governments in their efforts to develop more resilient cities and towns and regions. Tools that are more subjective and qualitative are useful in getting dialogue started, mapping stakeholders, and using international experience and frameworks to guide early planning. Other more rigorous tools delve deeper into the urban system and make the best

efforts at analyzing information and data to understand better the interdependencies that cascade crisis from one hazard event to many. Still others go beyond diagnostic exercises to attempt to influence urban design and planning in a manner that increases resilience over time. Most or all of these are in the public domain, some are referenced above, and other techniques are being developed and enhanced continuously.

However, in all cases whether the diagnostic is thematic based, for example those only addressing climate change, or seismic, or social risk; it is important to understand that without taking an ‘all-hazard’ approach to building resilience, asymmetric investment patterns skew development often sinking huge resources into one area of risk, at the expense of others that may be more imminent, higher risk, or simply forgotten. This undermines the definition of urban resilience upon which this guideline is based. That is:

Urban Resilience: “The measurable capacity of an urban system to absorb and recover quickly from the impact of any plausible hazard and maintain continuity of its functions.”

ABOUT THE AUTHOR

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Dan Lewis is currently a senior international consultant that has built his expertise based on 20 years working in the UN with wide experience in urban reconstruction, housing, finance, policy and strategic planning, at city, country, regional and global levels and in all social, environmental and economic contexts. He was responsible for developing UN Habitat's urban humanitarian and recovery policy and practice, and developed and maintained stewardship of large partner networks and communities of practice related to supporting local government's goals to build more resilient cities. His in-country international experience in Chile, South Africa, Somalia and Kosovo as well as his work in urban development and social housing programmes in Canada pre-date his global work leading UN Habitat's Disaster Management and Urban Resilience Programmes in dozens of countries around the world.



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