BUILDING REGULATORY CAPACITY ASSESSMENT

Level 1 – Initial Screening

THE WORLD BANK
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Global Facility for Disaster Reduction and Recovery

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Building Regulation for Resilience Program

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and

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1818 H Street NW
Washington, DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

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Overview

Urbanization is simultaneously a major driver of development, wealth creation and poverty reduction, as well as one of the most pressing challenges of the 21st century. Between 1990 and 2015, the urban extent occupied by cities in less developed countries increased by a factor of 3.5.[1] By 2050, up to 70 percent of people will be living in cities. Urbanization can and should be embraced as an opportunity to reduce poverty. The goal, however, can be realized only if current patterns are significantly transformed to guide urban growth in developing countries towards a more sustainable trajectory.

The New Urban Agenda agreed upon in Quito in October 2016 conveys a sense of urgency by seeking to harness the transformative force of urbanization and shape the future of cities. It focuses on four major priorities: national urban policies; more effective municipal finance; territorial planning and design capacity; and laws, institutions and systems of governance to enhance the rule of law. The Building Regulatory Capacity Assessment provides an important contribution to help cities and project managers working with development agencies to implement this last priority by offering a new resource to assess building and land use regulatory systems, and facilitate the collection of critical information about the building regulatory framework in any given city or country.

The Building Regulatory Capacity Assessment is comprised of the following "Level 1 - Initial Screening," designed for government officials and project managers undertaking rapid preliminary assessments. It provides an opportunity to initiate conversations with clients and relevant parties on strategies for achieving relevant development objectives. Level 1 is complemented by a "Level 2 - Detailed Exploration", which provides a set of guidelines for team members and contractors who are tasked with gathering and analyzing data and information about the building regulatory capacity of the target country, region or municipality. Overall, the Assessment identifies critical gaps, it provides the necessary information to develop a baseline for formulating technical assistance to clients, as well as drawing findings that can be used to determine areas for improvement and investment.

As UN-Habitat points out in the World Cities Report[2], effective regulatory frameworks based on accountability and clear implementation mechanisms are key "development-enablers that provide a solid forward-looking framework to guide urban development", thus emphasizing the role of regulations as a means to integrate a wide range of societal objectives ranging from building resilience to acute and chronic risks, climate change adaptation, promoting accessibility in the built environment, reducing CO2 emissions, preserving cultural assets and attracting investment.

As part of the Building Regulation for Resilience Program supported by the Global Facility for Disaster Reduction and Recovery,[3] we hope that this assessment tool will offer an effective resource for interventions within a wide range of urban development initiatives in cities of low and middle-income countries.

[1] Angel, 2016.
[2] "World Cities Report, Urbanization and Development, Emerging Futures," UN-Habitat, 2016.
[3] www.gfdrr.org

Chapter

01

Background

Buildings are an essential component of societies and economies, providing safe and healthy environments for people to live and work. They provide shelter from the elements, housing, as well as a space for education and work. They house critical infrastructure necessary to keep government and business in operation. In many countries, they represent a significant percentage of gross national product in terms of the resources needed for design, building materials, construction labor, functional use, operations and maintenance.

A comprehensive building regulatory framework facilitates the achievement of many social and economic objectives. Political and legal systems in many countries require that most buildings meet some minimum level of performance in terms of health, safety, welfare, energy efficiency, and accessibility. Components of the building regulatory framework, including enabling legislation, planning, building and fire regulation, and compliance mechanisms, function holistically to assure that a particular building, on a particular site, is able to achieve the minimum levels of performance.

Building regulatory frameworks also facilitate economic development and stability by establishing effective, efficient and reliable regulatory practices that incentivize economic investment. They do so by providing the market with a clear set of design and construction requirements and quality standards, which in turn minimizes barriers to trade and facilitates investor confidence. They also benefit education and training across the sector, from skilled craftspersons to engineers and design professionals. Having a comprehensive building regulatory framework is particularly important in low- and middle-income countries since construction industries in emerging markets are forecast to continue to grow at a much faster rate than in advanced economies. With reference to the Construction Inteligence Center Global 50, emerging markets accounted for more than half of the world's construction output for the first time ever in 2012 (at 2010 US$) and by 2020 it will have a 56% share.[4]

[4] "Global Construction Market Worth $10.3 Trillion in 2020 (50 Largest, Most Influential Markets)," Market Reports Store, 2015.

BOX 1.1 – Building Regulatory Framework

The term "building regulatory framework" refers to the complex set of laws, regulatory documents, compliance mechanisms, education and training requirements, product testing and certification, professional qualifications and licensing schemes that support a safe, sustainable and resilient built environment.

Consistent with the Building Regulation for Resilience report, the Building Regulatory Capacity Assessment identifies three basic components that form the core of any "building regulatory framework": a set of legal and administrative documents at the national and/or subnational level; a regulatory development and maintenance process and a set of implementation mechanisms at the local level.

The term "building regulatory framework" used in this document encompasses building and land use regulations since the siting, design, construction and maintenance of buildings are closely intertwined and cannot readily be treated as separate issues. This report places primary emphasis on building regulatory regimes with specific focus on the core implementation activities of building codes, plan reviews, inspection and compliance assurance.

Last, but not least, building regulatory frameworks help address emerging societal objectives. Historically, building regulation has focused primarily on the health and safety of occupants of buildings and on helping to reduce economic losses associated with a wide range and magnitude of hazards and disaster events. As disasters are becoming more frequent and intense, particularly as a result of climate change, building regulation must take into account additional measures to protect the increasing number of people at risk. In addition, building regulation is being used to address emerging societal objectives such as accessibility for all, affordability and resource efficiency. A well-designed and structured building regulatory framework provides the means to address such objectives holistically and comprehensively. Conversely, deficient building regulations can result in a vulnerable built environment that creates risk for structures and their occupants, which leads to higher exposure to natural and technological hazards and undermines the attainment of development objectives.

1.1– Assessment is Needed to Address Dysfunctional Building Regulatory Frameworks

Unfortunately, building regulatory frameworks are not always comprehensive or effective. In some cases, the appropriate legal and legislative foundations may be lacking. In others, the zoning, building and fire regulations needed to provide the necessary baseline building performance expectations for public safety and disaster resilience may present gaps, or may not be working in sync. Far too often, even if appropriate regulations and related technical documents are in place, the institutional infrastructure needed to implement the regulations and assure compliance during design, construction and in use, is incomplete or under-resourced. Further complicating the situation, the market may be lacking appropriate educational systems, expertise, insurance instruments and related components which can strengthen the overall framework.

1.2– The Building Regulatory Capacity Assessment

The Building Regulatory Capacity Assessment can be used as a tool to facilitate the collection of critical information about the building regulatory framework in a particular jurisdiction, identify where critical gaps exist, and develop a baseline for formulating technical assistance and training activities.

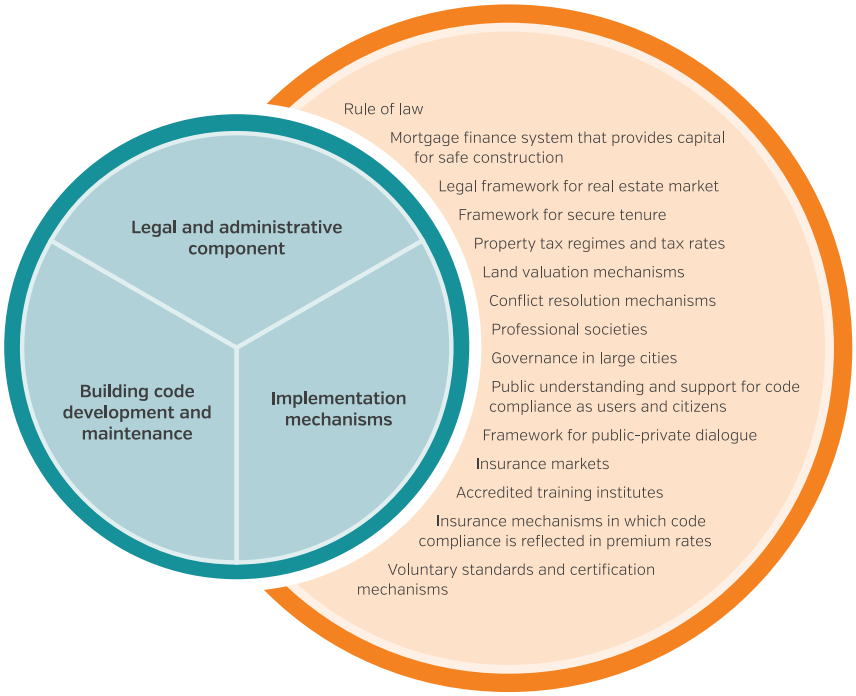
The Building Regulatory Capacity Assessment builds on the findings and recommendations provided in the Building Regulation for Resilience report[5] and aims to support project implementers in the definition of priority areas for intervention and project design for improving building regulatory efficiency and effectiveness across a wide range of development objectives, including hazard mitigation, energy efficiency, accessibility, cultural preservation, and disaster risk reduction.

The Building Regulatory Capacity Assessment focuses on three critical components of building regulatory frameworks:

A) Legal and Administrative
B) Development and Maintenance, and
C) Implementation

These components, are considered along with several support elements in a two-level evaluation: an Initial Screening (Level 1), which aims to quickly identify critical information and issues to inform initial project decisions, and a Detailed Exploration (Level 2), intended to be carried out by experts in policy and engineering, and disaster mitigation to develop strategies for the jurisdiction (see Figure 1.1).

Figure 1.1. Building Regulatory Components and Elements



Source: "Building Regulation for Resilience," World Bank, 2016.

[5] "Building Regulation for Resilience," World Bank, 2016.

Level 1 has been designed for project managers (task team leaders or TTLs for the World Bank) or others (e.g. government officials) undertaking preliminary assessments. Level 1 provides an opportunity to initiate conversations with clients and relevant parties on strategies for achieving relevant development objectives. This initial assessment will allow to quickly identify and gather existing information about framework components, as well as provide a preliminary assessment of the need to strengthen one or more components.

Level 2 is a more detailed set of guidelines for team members and contractors who will be tasked with gathering and assessing detailed data and information about the building regulatory capacity of the target country, region or municipality. Level 2 starts from the basic questions and information gathered through Level 1, and guides the regulatory capacity assessment into greater depth. Level 2 has been designed for project managers and their staff to help them identify in much greater detail the data and information needed to benchmark the existing building regulatory framework capacity and to recommend changes, across all three regulatory framework components.

Level 1 - Initial Screening describes:

- Why a building regulatory framework is important;
- How an effective building regulatory framework can be helpful in facilitating specific project objectives;
- A set of initial screening questions on the building regulatory framework currently in place for a particular client, and;
- Basic information to be collected about that framework.

The Level 1 assessment recognizes that project managers and equivalent decision-makers may not be experts in building regulatory frameworks. However, by identifying the key elements within each building regulatory component, it provides an initial baseline for determining the relative completeness of the building regulatory framework, and therefore its likelihood to enhance project objectives as is, or with enhancements in the core areas.

This Level 1 - Initial Screening can serve as a methodology to draw preliminary findings on the status of the building regulatory framework of concern. Such findings can be communicated to clients or relevant parties in the form of a set of recommendations and can contribute to the definition of specific project components and activities during the conceptual and design phases of a project.

Table 1.1. Objectives and Responsibilities for Level 1 and Level 2

	Objectives	Party Responsible
Level 1	Initial screening	Project manager/ non-regulatory expert
Level 2	Detailed exploration	Consultant/technical expert

Chapter
02

Why an Effective Building Regulatory Framework is Important

A building regulatory framework encompasses legislation and regulation that addresses land use planning, zoning, building and fire regulation; supporting infrastructure, including education and training of key actors; and market instruments, such as insurance. Building regulatory framework components function holistically to assure that a particular building, on a particular site, exposed to well-characterized hazards, is able to achieve the minimum levels of performance.

Comprehensive building regulatory frameworks are enablers. They enable safe, healthy, energy-efficient, accessible, and disaster resilient buildings by providing a robust socio-technical framework. The framework helps the market understand what is expected, provides tools for use by the market to deliver well-performing buildings, and provides the necessary oversight to help assure designs and constructed buildings meet societal expectations. The following are some ways in which building regulatory frameworks achieve this.

2.1– Establishes Minimum Standards for Acceptable Performance

In order to achieve uniformity in building performance relative to hazard resiliency, occupant safety, sanitation, energy efficiency, or related objectives, a set of minimum design, construction and maintenance standards is needed. Left solely to the market, there could be significant variation in the minimum level of building performance, within and between communities, over a wide range of building functions and occupancy. This can be seen in low-income countries, where there may be little or no regulation of informal settlements, as well as in high-income countries, where comprehensive compliance mechanisms and property insurance requirements may facilitate highly resilient buildings in some building types or jurisdictions, but be largely absent in others.

For such reasons, governments often find it necessary to intervene in the market to ensure certain minimum, uniform standards of health, safety and welfare across a country, region or municipality. As new global pressures and challenges emerge, such as climate change, accommodating increased urban densification, rapidly aging populations, and access for all within the built environment, a robust building regulatory framework and human capacity to support the framework is essential for identifying solutions for a more sustainable and resilient built environment.

2.2– Reduces Uncertainty, Facilitates Trade and Stimulates Economic Growth

Building regulations outline a common set of requirements for buildings to be constructed within, and sometimes between, jurisdictions. For most buildings, this allows a high degree of certainty in terms of factors such as acceptable methods and materials of design and construction, minimum building features and functions, and approval of designs. For the market, this means that operational efficiencies can be gained across the product certification and building design, construction and approval processes.

A building regulatory framework can also facilitate trade between jurisdictions, offering minimum performance and quality criteria and a clear path to approval of building products and materials. This has been exemplified by the EU Construction Products Directive (and now Regulation), which set out essential requirements for construction products in terms of function and performance, and led to common testing and labeling. This significantly reduced differences in how products were assessed between member states, and facilitated movement of products across borders, stimulating regional economic activity.

2.3– Addresses Challenges of Complex Information and Knowledge Gaps

Building regulation provides consumers and investors with confidence that all buildings of a similar type constructed within a jurisdiction are benchmarked against the same standards. This can serve to reduce uncertainty in real estate transactions and to help increase the value of real estate assets. For example, Japan, Peru and some other seismically risky countries use ‘earthquake-safe structure’ as a value-add feature in advertisement. The requirement for energy performance labeling of buildings within the EU Energy Performance of Buildings Directive (and now Regulation) is used to advertise energy efficient buildings as a value-add feature.

This role of providing knowledge and confidence is important, as it is difficult for some buyers and users of buildings to ascertain and understand some building characteristics. Purchasers, who are infrequent buyers, are not easily able to check that the building meets the qualities they beleave they are paying for and are often not even aware of what could go wrong. Also, users (such as tenants and workers) are often not in a position to fully assess building performance, as once a building is completed some aspects are concealed and impossible to inspect thoroughly. For investors, regulations reduce uncertainty about expected building performance across several

key performance indicators, including resiliency to hazard events, energy efficiency, comfort and accessibility. This can have a positive influence on stimulating the wider market.

2.4– Addresses Negative Externalities

One potential aspect that a market-based approach may not adequately address is spillover costs: the negative impacts experienced by people other than those directly engaged in a particular activity. In the absence of government intervention or other means of action, the responsible entity does not bear the full costs of the adverse effects and, therefore, has no incentive to mitigate or compensate for related outcomes. Other aspects of buildings that may have adverse effects include:

- Deficiencies in building safety, wherein damage to one building can impact surrounding buildings and people (e.g., via fire, collapse or natural hazard events);
- Incomplete sharing of liabilities across design professionals, contractors, operators;
- Adverse environmental impacts from emission of toxic substances resulting from fires and other events; and
- Adverse environmental impacts from energy use, where the price does not reflect the effects of greenhouse gas emissions or other pollution.

2.5– Helps Facilitate Appropriate Solutions

As a general rule, there is no 'one size fits all' solution for any of the numerous complex socio-technical challenges which exist within and between countries. A building regulatory framework designed for the USA, for example, is not likely to be directly applicable to a low- or middle-income country for a wide range of reasons, including legal structure, litigation environment, licensure of technical professionals, level of available technology, implicit level of acceptable risk and availability of risk transfer mechanisms, and education and training requirements for local crafts-persons.

A comprehensive building regulatory framework designed for a specific country will provide a robust socio-technical framework within which the country can identify and address physical, social, cultural and economic conditions and needs and can facilitate interactions between government institutions, the market and the public to deliver appropriate solutions. For example, a building regulatory framework can consider local building materials, technology and skills, as well as local climate conditions and natural hazard concerns, to deliver resilient, energy efficient and cost-effective designs.

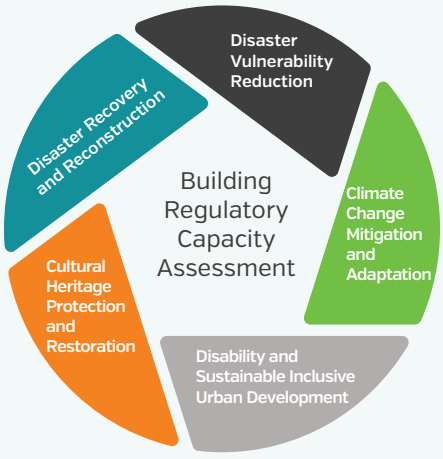
An appropriate building regulatory framework is one in which the required legal and social foundations are in place, appropriate regulatory instruments and enforcement mechanisms are designed and implemented to the educational, technological and resource capacity of the jurisdiction, and supporting regulatory infrastructure and market mechanisms (e.g., insurance) are operational and effective for that environment.

Chapter
03

How Can the Building Regulatory Capacity Assessment Be Applied?

The Building Regulatory Capacity Assessment assists project managers, government officials, and other interested and affected parties identify gaps in building regulatory framework. It is applicable to a wide range of project types, and can be implemented at various stages of assessment and planning (see Figure 3.1 below).

Figure 3.1 – Applicability of the Building Regulatory Capacity Assessment



3.1– Disaster Risk Mitigation and Vulnerability Reduction Programs

There is widespread understanding that it is significantly more cost-effective to mitigate risk before an event occurs, rather than to recover from a catastrophe. This does not mean implementing every possible risk reduction option, but to seek optimization of risk reduction measures as compared with unmitigated loss expectations.

Risk reduction strategies must take into consideration the balance between risk reduction opportunities and associated costs, as well as potential risks and associated losses. In general, risk reduction strategies must aim for the highest level of protection and safety that can be achieved with available resources. In many respects, building regulatory frameworks are mechanisms for optimizing societal risk reduction as associated with reducing risk in the built environment.

If an effective building regulatory framework is in place, natural and physical hazards are understood and addressed by relevant legislation and regulations, which together with market mechanisms, ensure that risks are mitigated to a socially and economically tolerable level.

Consider fire deaths in the USA over the past 40 years. In 1977, the number of deaths due to fire was about 7,400. By 2016, that figure had dropped to about 3,200.[6] Each year, the majority of deaths were in the home. While the type of predominant domestic housing construction stayed the same – lightweight timber framed buildings – the addition of home smoke alarms, changes to flammability requirements of furniture and bedding material, and a reduction in smoking by the US population led to a significant reduction in the number of home fire deaths. These relatively low-cost mitigation measures resulted in significantly reduced deaths and injuries due to fire, as well as lower death rates and healthcare costs associated with the reduction in smoking.

Consider also seismic risk reduction in Japan, as evidenced by changes to the Building Standard Law for seismic performance. For example, Figure 3.2[7] reflects the percentage of wooden buildings damaged by the 2016 Kumamoto Earthquake, for buildings constructed to the May 1981 version of the Building Standard Law, the version in place from May 1981 to June 2000, and after June 2000.

[6] "Fire Loss in the United States During 2015," Haynes, 2015.

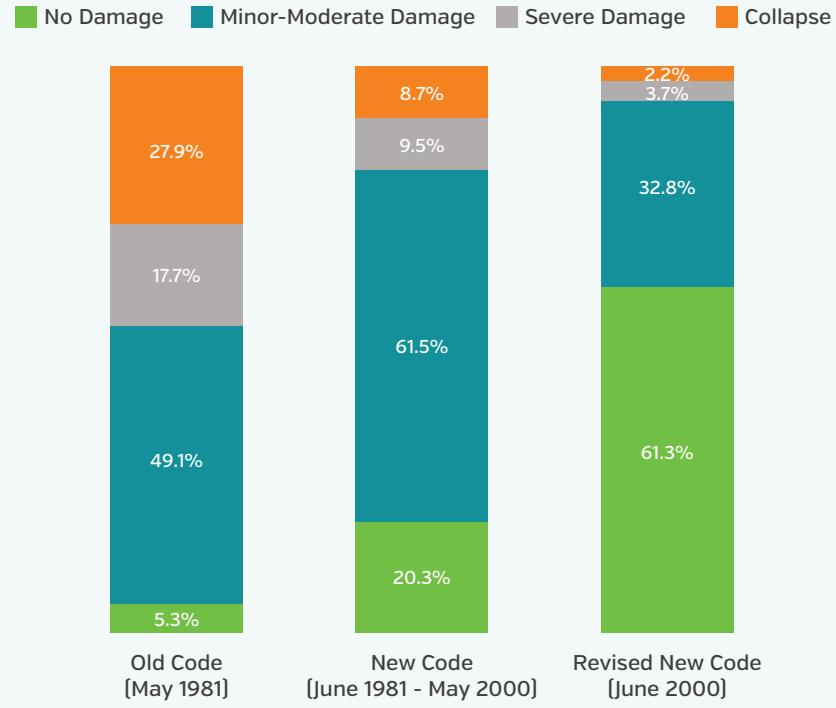
[7] Adapted from "Quick Report of the Field Survey on the Buildings Damage by the 2016 Kumamoto Earthquake," National Institute for Land and Infrastructure Management, Building Research Institute, 2016.

The data show a clear correlation between changes in the Building Standards Law, which covers seismic design and construction practice, and earthquake damage reduction. Similar trends have been illustrated in reports from other earthquakes in Japan as well.[8]

There are similar examples which reflect the potential for damage reduction due to regulatory changes in various articles and reports, including a

[8] "Building Codes and Tradeoffs for Earthquake Risk Reduction: Disaster Management for Housing, Proceedings," Maki and Hayashi, 2000.

Figure 3.2 – Damage of Wooden Structures in 2016 Kumamoto Earthquake



World Bank assessment on disaster risk reduction for schools.[9] Examples such as these provide a high level of confidence that similar and possibly higher levels of disaster risk and vulnerability reduction can be effected in low- and middle-income countries with enhanced building regulatory frameworks.

The Building Regulatory Capacity Assessment is a first step towards evaluating the ability of a building regulatory framework to meet such objectives, identifying areas for improvement, and indicating the extent to which risk and loss reduction can be achieved. This initial assessment of the three main components – (A) Legal and Administrative, B) Development and Maintenance and C) Implementation) – provides a baseline of the situation. Subsequently, a more detailed assessment can be carried out to include scenario analysis, benefit-cost analysis, and other related analyses to define where and how enhancements to the building regulatory framework can reduce disaster risk and vulnerability. Outcomes can then more completely inform investment options. While an opportunity for developing a project can occur at any level (A, B or C), a review of each component provides the most complete picture.

3.2– Disaster Recovery Projects

When a disaster occurs, a priority is naturally to help the country, region or municipality recover and return to some semblance of normalcy. There is also an opportunity to assess the factors that contributed to the catastrophe and implement measures that can reduce the probability for a similar event to reoccur in the future. In cases where catastrophes are linked to concentrated population groups, it is likely that gaps in the building regulatory framework contributed to the loss – perhaps in terms of where the buildings were sited, how the buildings were designed and constructed, or how the buildings were operated and maintained.

For example, in 2015, the Government of Jammu and Kashmir (GoJK), with financial support from the World Bank, commenced a recovery project[10] to restore and strengthen critical infrastructure such as schools, hospitals, fire stations and government administration buildings at district levels. A key feature of this project is not only restoring the original function, but to reconstruct with higher functional standards to strengthen disaster mitigation capacity at the state level. One area in which GoJK is seeking to enhance capacity is an implementation of building codes and land use regulation. A broad assessment of regulatory capacity is now under way to initiate critical discussions between public authorities and private professionals and develop targeted activities to achieve such objectives.

As in the example above, the Building Regulatory Capacity Assessment provides a helpful tool in identifying the extent to which the building regulatory framework, in particular its shortcomings or gaps, contributed to the loss, and more importantly, how reform can help reduce the potential for a similar loss to reoccur in the future. Regulatory reform undertaken in Japan (see earlier discussion) and the USA are evidence of how

[9] "Roadmap for Safer Schools," World Bank, 2016.

[10] Jhelum Tawi Flood Recovery Project, World Bank.

disasters triggered reforms that effectively reduced disaster risk. In the USA, significant earthquake losses in the first half of the 20th Century facilitated the implementation of the National Earthquake Hazard Reduction Program, which funded research that supported changes to earthquake design and regulation, with benefits observed in the 1994 Northridge earthquake and others since. In India, the 2001 Bhuj earthquake, which killed around 14,000 people, injured 167,000 and damaged or destroyed over 1.1 million homes, prompted an institutional reaction led by the government, which set up the Gujarat State Disaster Management Authority. The Authority was tasked with the responsibility to oversee the reconstruction program and promote long-term disaster mitigation. More broadly, the earthquake also led to key improvements at the national level, including a stronger focus on seismic safety in the national agenda and the introduction of new codes and improvements in building practices.[11]

The Building Regulatory Capacity Assessment also helps to identify other shortcomings that can contribute to disasters of a different type, the risk of which can also be mitigated through enhancements in the building regulatory framework. For example, investigation into a fire that led to a structural collapse of a building might illustrate problems with both fire and structural regulation and enforcement, and indicate that the potential exists for structural collapse from other hazards, such as earthquakes. Contributing factors could be the content of the building code, quality of materials and construction, capacity of the enforcement community, and lack of operatives with the necessary skills and an over-reliance on quality management or assurance systems.

3.3– Management of Accessible, Sustainable and Inclusive Urban Development

Globally, urban development is expanding rapidly as populations migrate to cities seeking better employment opportunities, access to medical care and other services, and increased safety. It is estimated that the pace of new construction in the next 20 years will lead to a doubling of building stocks in low- and middle-income countries and it is expected that between 2015 and 2050 the urban built-up area will increase by a factor of 3.7.[12] A strong building regulatory framework can be a highly effective tool for facilitating sustainable, inclusive, safe and resilient cities and communities.

Rapid urbanization and expansion can be difficult to manage, as the rate of growth can be faster than expected, the employment opportunities may not exist, and the social and physical infrastructure needed to support expansion may not yet be in place. With respect to the built environment, there can be a number of challenging issues: the population may be larger than the available formal housing capacity; informal construction may be occurring in hazardous locations, and the construction itself may be posing hazards to the community; mechanisms for control of formal construction may be out of sync with the types

[11] "Earthquake Safety in India: achievements, challenges and opportunities," Jain, 2016.

[12] Angel, 2016.

of buildings being constructed and the associated hazards (e.g., high-rise residential and office buildings being built under a framework which did not contemplate such buildings and the risks they pose to occupants if not adequately mitigated); and appropriate fire and emergency response capacity may not exist.

For example, a study undertaken in Nigeria related to building collapses[13] reviewed some 14 building collapses between 1990 and 2009, where more than 280 casualties were reported. It was found that several of the buildings were 'high-rise' and inadequate consideration of soil conditions and suitable regulations were contributing factors. In particular, it is stated that "the great incidence of building collapse in Lagos and Port-Harcourt indicate that the nature of the soil is very central and a culprit in the building collapses especially during the raining season when most of the collapse took place" (p42). Strengthening building regulatory capacity was identified as a necessary measure: "elimination of quackery[14] in building professions, ethical building delivery procedures, appropriate statutory building permit processing procedures, professional supervision of construction projects by competent manpower from clients and relevant government bodies, regular post-occupancy building assessment and enforcing Nigerian building code 2006."

In such contexts, the Building Regulatory Capacity Assessment can help identify these issues, and how a robust building regulatory framework can be used to help mitigate concerns. This is especially true at the outset of any master planning and management of urban expansion.

[13] Environmental Disasters and Management: Case Study of Building Collapse in Nigeria," Adeniran, 2013.

[14] The term 'quackery' is a colloquialism for a person with fraudulent or no qualifications.

3.4– Accessible and Inclusive Built Environment

The World Bank and the World Health Organization estimate that 15 percent of the world's population have some kind of disability, with 80 percent living in developing countries.[15] Effective implementation of building standards for accessibility and protection of persons with disabilities and the elderly requires policies and principles to be translated into actual changes in the configuration of the built environment. Implementation of policies for the inclusion and protection of persons with disabilities and the elderly depends significantly on the capacity and competence of building regulatory institutions.

The Building Regulatory Capacity Assessment can be used to investigate the legal foundations for accessibility requirements in buildings, such as Civil Rights legislation (e.g., the Americans with Disabilities Act (ADA)), and to facilitate guidance for design of buildings that accommodate people of all abilities to access, use and safely egress with dignity during normal and emergency situations (e.g., ADA Standards for Accessible Design).

3.5– Climate Change Adaptation

With the changing climate, many parts of the world are vulnerable to new or more extreme hazards

[15] "World Report on Disability," World Health Organization and World Bank, 2011.

than any time in recent history. Sea level rise is creating increased flood and storm surge risk. More intense storms, can result in considerable damage to buildings which are not designed for high winds, excessive moisture and related effects. Prolonged drought conditions, especially in areas not previously prone to such, present a wide range of issues, including increased risk of wildland fires, wildland-urban interface fires, serious building fires, and even conflagration, as combinations of dry conditions, hot temperatures, high winds, and lack of firefighting water can combine to create catastrophic conditions.

Climate adaptation requires adjustments in building siting, design, and construction. Uncertainty regarding projected hazards' characteristics poses a unique challenge for the establishment and implementation of environmental, health and safety standards. Adaptation requires future oriented hazard mapping and calculation of expected hazard loads on structures. It is of critical importance that mechanisms for land use, building and fire regulation are established to apply knowledge and guide future investment and infrastructure development.

Protection of existing settlements in a cost-effective manner will require a dynamic regulatory approach that guides adaptation in advance of growing hazard effects. The Building Regulatory Capacity Assessment can help assess the potential exposure to climate change risks and vulnerabilities. Investment into effective implementation of building regulations will contribute to: (a) limiting the expansion of disaster risk in the siting and construction of new settlements; (b) reducing disaster risk in vulnerable existing settlements; and (c) helping reduce disproportionately higher and less effective commitments on emergency and response activities.

3.6– Climate Change Mitigation

In addition to creating more resilient communities, efforts must focus on promoting a more sustainable built environment. Carbon contributions from the built environment are a recognized concern. More than half of all resources consumed globally are used in construction and almost half of all energy generated globally is used to cool, light, and ventilate buildings. Moreover, buildings account for 18 percent of greenhouse gas emissions—a share expected to double by 2050 as more people migrate to urban centers.[16] While, numerous technologies and strategies exist for achieving more sustainable or 'green' buildings, such as LEED, BREEAM, or EDGE,[17] many of these tools are applied in an extra-regulatory fashion, which can sometimes add cost

[16] "Mitigation of Climate Change," Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Intergovernmental Panel on Climate Change (IPCC), 2014.

[17] Leadership in Energy and Environmental Design (LEED) is a rating system developed by the US Green Building Council to evaluate the environmental performance of a building and encourage sustainable design (www.usgbc.org/leed).
BREEAM is a sustainability assessment method for masterplanning projects, infrastructure and buildings (www.breeam.com).
EDGE Green Buildings Certification System is an IFC initiative that offers tools for assessing the financial viability of a green building project and provides options for reducing energy and water consumption with the goal of promoting and incentivizing the construction of green buildings in emerging markets (www.edgebuildings.com).

and result in 'competing objectives'. An example of the latter is encouraging the use of more thermal insulation for buildings, which if it is combustible, can increase the risks associated with fire (i.e., by adding additional fuel load). If photovoltaic panels are added to a building, which happens to have combustible insulation, the ignition and fire risks increase.

However, if sustainability and safety objectives are both considered within the building regulatory environment, suitable mechanisms can be put into place to encourage sustainability without increasing fire safety risk. The Building Regulatory Capacity Assessment can identify where potential conflicts exist between sustainability and safety objectives, and result in appropriate mechanisms to reduce or eliminate them, based on the structure and interaction of the associated enabling legislation, regulations, enforcement, and market mechanisms.

3.7– Upgrading of Informal Settlements

A characteristic of many urban environments, particularly but not exclusively in low- and middle-income countries, are areas of informal settlements and/or slums. According to UN-Habitat, one in eight people (or a total of one billion) live in slums and the number continues to grow. Some of these areas developed as a result of socio-economic inequality and an absence of social policies to support those at the bottom of the pyramid. Others have emerged as a consequence of the high influx of refugees seeking safety from war, famine, climate-change related natural hazards and other events, or those in search of gateways to markets, employment opportunities and access to urban services. More such environments might be expected in the near future as urban settings expand more quickly than the social, economic and physical infrastructure can support.

The problem is not one of simply large numbers of people, but of having the legal, social, technical and economic frameworks in place to support the growth in population at a socially acceptable level. The lack of good governance regarding building location, design, construction, materials, safety and sanitation is a critical factor in this regard.

In some cases, people and builders in low-income settings have integrated risk into their building practices, developing informal coping strategies for the enhancement of local resilience. The *Dhaji Dewari* and the *Taq* type constructions in Kashmir and Himachal Pradesh and the *Assam* type constructions in the Assam region, for example, are common resilient building practices developed locally in response to devastating earthquakes and with the goal of strengthening resilience to acute shocks. Many of such practices, though widespread, are almost never recognized by formal building and land use systems, which has inevitably widened the gap between the formal and informal built environment. Such shortcomings in building regulatory framework governance can place

inhabitants at much higher risk to illness and injury, with the potential impact from chronic hazards, such as fire, and natural hazards resulting in far more extensive damage than for similar events that might impact regulated buildings.

The Building Regulatory Capacity Assessment can be helpful in assessing the role of a building regulatory framework to respond to specific needs of a jurisdiction in incrementally bringing appropriate levels of planning, building and fire regulation to these settlements, so as to increase the levels of health, safety and welfare of the occupants. The Building Regulatory Capacity Assessment can help identify and avoid challenges such as implementing regulatory instruments that are beyond the capacity of the jurisdiction, applying technology that is not known, not local and beyond reasonable market capability, or achieving unreasonable expectations for compliance.

3.8– Protection of Cultural Heritage

Existing buildings, be they several decades or several centuries old, present a wide range of challenges, including safety of occupants or visitors, energy efficiency and accessibility for all. This can be particularly true for designated cultural heritage sites, where the intent is to protect the historic fabric of the building from destructive change while providing safe access to the visiting public.

While many historically significant buildings have stood the test of time with respect to resiliency against a wide range of hazard events, they may not be constructed in a way that reflects current social norms regarding accessibility, safety or energy efficiency. Adding features to facilitate these objectives, in a historically- and culturally-sensitive manner, can be a challenge. In addition, inadequately implemented modifications over decades or centuries may have inadvertently reduced the building's resiliency to various hazards.

In some countries, specific regulatory mechanisms and instruments have been implemented for addressing the needs of existing buildings and heritage buildings. This includes specific building codes, engineering approaches for risk mitigation, and risk management and mitigation strategies.[18] The Building Regulatory Capacity Assessment can help identify aspects of a building regulatory framework that respond to such specific needs, and can result in recommendations for how the framework can be enhanced to address related challenges.

[18] For example, see: www.worldbank.org/en/news/feature/2016/08/08/supporting-lebanons-cultural-heritage-as-a-driver-of-job-creation-and-local-economic-development and www.worldbank.org/en/news/feature/2016/12/22/cultural-heritage-project-strengthens-economic-community-activity-in-lebanon

Chapter

04

Screening Questions and Required Information

This chapter identifies information of importance to the Building Regulatory Capacity Assessment. Questions reflect key data to be collected, and commentary is provided as to why it is important. As this information is being collected, it is important that verbal or summary written communication alone is insufficient: verification of verbal statements and written summaries should be made on site (e.g. check if laws exist, obtain copy of building regulation, verify that referenced documents for reviews are available on building officials' desk, see if those referenced documents are really used (e.g., look for audits), undertake actual headcount of staff; etc.).

4.1– Legal and Administrative

This first component of the Building Regulatory Capacity Assessment focuses on identifying whether the necessary legal and administrative structure is in place to implement and support a comprehensive building regulatory framework. Additional detail is provided in Annex A.

Potential Informants

Texts of legislation and laws related to building regulation may be accessible. It may also be necessary to consult with local experts in construction law and parties active in the construction sector including building professionals, contractors and owners to understand the actual functioning of the legal process. In the case where responsibility for code development and implementation has been clearly assigned, those agencies should be consulted. In a unitary (national) government framework, starting at the ministerial level (or equivalent) will be helpful. In federal frameworks, one will need to reach out to parties at each level of government, consistent with project objectives.

Screening Questions

	Questions	Why This is Important
4.1.1	What is the form of government: national / centralized, federation, or other?	In a national government, the enabling legislation for building regulation will be at the national level. In a federation, the enabling legislation may be at the state (territory, provincial) level. However, even in a centralized system, it is important to understand the level of decentralization that may render national and sub-national laws and regulations at odds.
4.1.2	Which acts, decrees, laws or similar enable the regulation of: (a) the use or condition of land upon which a building can be constructed (i.e., planning or zoning), and whether disaster risk management elements are integrated into the legislation; (b) the design, construction and operation of buildings, and the strengthening or upgrading of existing buildings; (c) fire prevention / control, and/or the fire service; (d) resource / energy conservation; (e) accessibility / usability rights; and (f) historic / cultural heritage preservation?	The first step in the assessment process is to identify whether the fundamental enabling legislation for such regulations is in place. For disaster mitigation and related projects, land use, building design and construction, and fire safety regulation is critical, so related enabling legislation must be in place. A parallel condition exists for other areas where regulation can be helpful (e.g., energy conservation, accessibility, etc.). *Obtaining text of the relevant legislation is needed for the assessment.*
4.1.3	Are there regulations[18] for the following: (a) land use planning/zoning; (b) building design and construction, and retrofitting of existing buildings; (c) fire prevention; (d) resource / energy conservation; (e) accessibility; and (f) historic / cultural preservation?	Assuming the enabling legislation is in place, it is then important to understand what specific regulations are in place in each pertinent area. *It will be necessary to obtain text of the pertinent regulations.*
4.1.4	What entity has primary responsibility for the development of regulations for: (a) the use or condition of land upon which a building can be constructed (i.e., planning or zoning); (b) the design, construction or operation of buildings; (c) fire prevention / control, and/or the fire service; (d) resource / energy conservation; (e) accessibility / usability rights; and (f) historic or cultural heritage preservation?	The development and promulgation of regulations may not be by the same entity, so it is important to know what entity is responsible for each function. For example, development may be by a private sector 'model code' development organization, but promulgation is typically the responsibility of government. *Here we need to know which entities are responsible for the development of the associated regulations.* It will also be helpful to know if influence peddling or corruption is of concern in the client country, as it might influence development of the regulation.
4.1.5	What Ministry, Agency, Department or other entity has primary responsibility for promulgation of regulations for: (a) the use or condition of land upon which a building can be constructed (i.e., planning or zoning); (b) the design, construction or operation of buildings; (c) fire prevention / control, and/or the fire service; (d) resource / energy conservation; (e) accessibility / usability rights; and (f) historic or cultural heritage preservation?	The development and promulgation of regulations may not be by the same entity, so it is important to know what entity is responsible for each function. For example, development may be by a private sector 'model code' development organization, but promulgation is typically the responsibility of government. *Here we need to know which entities are responsible for promulgating the associated regulations.* It will also be helpful to know if influence peddling or corruption is of concern in the client country, as it might influence promulgation of the regulation.

[18] Note that the term 'regulation' is used to encompass the document, or set of documents, which define the legally mandated building requirements. With respect to buildings, such documents may be referred to as Building Regulations (as in England), Building Codes (as in Australia and the USA), or Building Standards (as in Scotland, or the Building Standard Law, as in Japan).

	Questions	Why This is Important
4.1.6	Which acts, decrees, laws or similar enable the regulation / licensing / certification of, and define the roles of: (a) architects / planners; (b) engineers; (c) builders (carpenters, masons, ...); (d) trades (plumbers, electricians, ...); (e) contractors, installers, ...; (f) building / fire officials (inspectors, ...); and (g) third-party reviewers?	The extent to which the professions and trades associated with design and construction are controlled, including minimum qualifications and competency requirements, experience, and so forth, can have a significant influence on the quality of construction and compliance with regulation. Identifying who is controlled by legislation, and how, is the first step in the assessment process.
4.1.7	Which acts, decrees, laws or similar enable the regulation / certification / testing / quality control of: (a) building materials (e.g., steel, timber, masonry, concrete, ...) (b) building products and systems (e.g., walls, doors, windows, heating appliances, lighting systems, etc.); and (c) contents or aspects of contents (e.g., materials which may be toxic, ...)?	The extent to which construction materials and contents are controlled, in terms of quality, strength, and overall fitness for purpose, can have a significant effect on the ultimate safety, health, energy or other performance of a building. Identifying what legislation and regulation is in place with respect to material control is important. It will also be helpful to know if corruption is of concern in the client country, as it relates in this case to building materials.
4.1.8	Within the legal framework of the country, which stakeholders have responsibility, accountability and liability with respect to assuring compliance with building-related legislation, and how is the responsibility and liability apportioned?	Who has liability in relation to compliance with regulations, and how liability is apportioned, are importance aspects to understanding the effectiveness of the regulatory framework and what measures are needed to facilitate enforcement.
4.1.9	Within the legal framework of the country, what types and forms of penalties are possible with respect to non-compliance with building-related regulations, and to what extent are such penalties levied?	Closely related to the above, understanding what penalties are in place for non-compliance, and the extent to which they are enforced, provides insight into the effectiveness of the regulatory framework.
4.1.10	Is there legislation in place that facilitates the establishment and collection of fees or levies that can be used to financially support implementation of regulations for planning, zoning, design, and construction of buildings?	Many jurisdictions utilize fees or levies on various stages of the building regulatory process, including when applying for permits to build, for plan review and approval, and for inspection and witnessing of building commissioning. The intent here is to identify the enabling legislation or regulation used to allow and govern the fee levels that can be charged.

4.2– Development and Maintenance

The second component of the Building Regulatory Capacity Assessment focuses on the regulatory documents themselves: those documents that define and describe specific requirements that must be complied with, as well as how they are developed and maintained (updated). This includes land use planning, building and fire regulation. More background discussion is provided in Annex B.

Potential Informants

First contact may be made with the head of the government entity designated with primary responsibility for development and maintenance of the building regulations. Within a unitary (national) government system, this may be a unit of the ministry concerned with construction, urban development or other (e.g., Ministry of Construction, Public Works, Economic Development, etc.). Regulation related to buildings may also reside with the ministries of Health, Energy, Civil Defense or Interior. Within a federal system, this may be the equivalent entity within a state, territory or province. In some instances, the entities may be commissions or boards (e.g., Building Regulation (Code) Commission, Board of Building Regulations). This structure may also be observed at a county or municipal level. Occasionally, the regulatory development process may be managed by a non-governmental organization (as in the case of the USA) or quasi-governmental organization (such as in Australia, Austria, and Canada). In such cases the assessment questions should be addressed to the relevant official of that organization.

Screening Questions

	Questions	Why This is Important
4.2.1	What are the sources for hazard / risk data, maps, etc. reference in the regulations (land use planning, zoning, building, and fire)?	Hazard and risk data, as used in regulations, needs to come from a credible source, such as a relevant government ministry, agency, etc. in the country of the project. It is important to understand the level of institutionalization (e.g., research program, or fixed bureau/agency) of these sources, and mechanisms/frequency of updating, especially exposure and fragility information.
4.2.2	Do formal land use planning / zoning regulations exist, and if so, do they incorporate: a) hazard maps or related means that identify areas in which building is not permitted due to natural hazards; b) hazard maps or related means that identify minimum separation between residential and hazardous occupancies; c) maps or related means that identify areas in which building is not permitted in relation to natural resources; and d) requirements for infrastructure associated with building density, population or related factors?	For any building project, and in particular for projects addressing disaster risk and vulnerability mitigation, disaster recovery, and urban densification, it is critical to have a set of comprehensive planning, building and fire regulations in place. This first question focuses on the land use planning and zoning regulations, as this gets to the issue of what building can be constructed in which locations, and to what extent are those locations within, or external to, hazards that need to be mitigated (natural or man-made). Obtaining text of such regulations is essential.
4.2.3	Do formal building regulations exist, and if so, do they have specific provisions for, or is there a separate building code, for indigenous, “non-engineered” and/or “informal” construction (buildings)? By ‘formal’ we mean adopted by law and are enforceable, and not used simply as guidance.	In low and middle-income countries, building codes, if they exist, may not include provisions related to indigenous, “non-engineered” and/or “informal” construction. Significant vulnerability resides in the buildings of the “informal” sector, in particular, so having this information is critical to investment decisions. Texts of regulations will be needed.
4.2.4	If building regulations exist, do they incorporate provisions for: a) structural design for normal and expected loading and hazard conditions; b) material requirements (e.g., strength, testing, quality, etc.); c) means of access and egress, including for people with disabilities; d) fire prevention and protection systems; e) mechanical systems (e.g., heating, cooling, ventilation); f) plumbing & sanitary systems; g) electrical systems; h) energy / resource efficiency; i) elevators, escalators and lifts; j) fire service access; and k) environmental protection?	The extent to which a building regulation comprehensively addresses the wide range of health, safety, welfare, sustainability and resiliency issues will have a direct relationship to the effectiveness of the building regulation in mitigating health, safety & welfare vulnerabilities, and/or enhancing sustainability and resiliency objectives. If a robust building regulation is not in place, there can be significant questions around the quality of buildings and the performance they deliver. If a robust building regulation is not in place, there may be need for investment to put a framework into place, before construction / reconstruction, to help assure objectives for buildings are met.
4.2.5	With respect to material requirements (e.g., strength, testing, quality, etc.), are the requirements consistent with the quality of locally available materials, and are accredited test laboratories locally available to accredit local materials?	The utility of comprehensive material performance criteria in the regulations is reduced or can even be negated if there are not materials locally available that can be, and have been tested and certified to meet, the requirements. It is important to make sure that the regulatory requirements match available materials and production capacities, and that local, accredited and trusted laboratories exist to certify materials against the material performance requirements.

	Questions	Why This is Important
4.2.6	If building regulations exist, do they have: a) hazard maps identifying expected natural hazard loads by region; b) requirements for structural resistance to expected hazard loads; c) importance factors for critical facilities; d) requirements for resistance to moisture penetration of the building envelope; and e) requirements for fire separation from other buildings, wildland interfaces, etc.?	Robust building regulations differentiate structural, moisture, wind and related requirements according to the geographic distribution of expected loads or disaster impacts. Hazard (or risk) maps are used to show such vulnerable areas as flood plains, earthquake and liquefaction zones, wind, rain and snow loads, storm surge and tsunami hazard areas, and wildland (bush) fire prone areas. Important facilities, which need to operate during emergencies, including as safe refuge for people, may require higher levels of performance during hazard events.
4.2.7	If building regulations exist, do they have specific provisions for: a) assembly spaces (restaurants, theaters,...); b) businesses (offices); c) educational buildings (schools); d) healthcare structures (hospitals, nursing homes,...); e) correction and detention buildings; f) domestic housing (homes, apartments); g) hotels and motels; h) dormitories, hostels, ...; i) light industry; j) heavy industry; k) hazardous industry; l) light storage; m) hazardous storage; n) above and below grade parking; o) underground structures; p) high-rise structures; q) small to medium shops; r) malls and large shopping complexes; and s) mixed use buildings?	The extent to which a building regulation comprehensively addresses the wide range of building uses, or occupancies, is important in terms of understanding how health, safety & welfare vulnerabilities are addressed for different population groups (e.g., families in dwellings, workers in a factory, patients in a hospital, urban poor). It is also important in regards to the extent to which 'high risk' buildings (as either posing risk to the community, such as a chemical processing facility, or placing large numbers of occupants at risk, such as a space of assembly or high-rise building) have associated requirements, specific to those particular building uses.
4.2.8	If building regulations exist, do they have specific provisions for: a) minor repairs to existing buildings; b) renovation of existing buildings; c) structural retrofit of existing buildings; d) extensions to existing buildings; e) change of use of existing buildings; and f) culturally / historically 'listed' buildings?	Building regulations typically apply only to new construction, unless major changes are made to a building. A robust building regulation will identify what types of changes require upgrading of some or all of the building to meet current requirements. Historically or culturally protected buildings may have exemptions for some otherwise required change.
4.2.9	To what extent are access, use and egress requirements for disabled and aged populations addressed within the building regulation?	The World Bank estimates that 15 percent of the world's population have some kind of disability, with 80 percent living in developing countries. Effective implementation of building and urban development standards for accessibility and protection of persons with disabilities and elderly requires policies and principles to be translated into actual change in the configuration of the built environment.

	Questions	Why This is Important
4.2.10	Do formal fire regulations exist, and if so, what do they address, and what is their relationship to the building regulations (codes, standards)?	This is important, especially in countries for which requirements for fire protection systems are located in the fire regulations and not within the building regulations (e.g., Japan, Singapore, Hong Kong). In such cases, one can only assess fire safety by assessing both building and fire regulations.
4.2.11	In question 4.1.4 above, it was asked what entities have responsibility for development of land use, building and fire regulations. For each of these entities, *what is the process used for development and maintenance of the documents*, and to what extent are pertinent stakeholders consulted or involved in the development, review and/or approval of the final provisions?	Developers of regulations can range from bureaucrats within a government ministry (department, agency), to contractors working for government, to private sector organizations which form committees of stakeholders to develop regulatory provisions. Furthermore, consultation with industry can range from little or none, to review of text with no obligation by the developer to change the text, to requiring the developer to act and report on every proposal to change the regulatory text. In general, the more stakeholder involvement the better, and the more transparency the better. There can be particular concerns in 'opaque' regulatory development frameworks, especially within countries where influence peddling or corruption is of concern.
4.2.12	If formal building and fire regulations exist, do they require, by reference, the use of nationally or internationally recognized *consensus standards*[19] which specify required material properties and performance (e.g., strength, durability, fire resistance, ...), the tests to confirm performance, and which specify requirements for design, installation, testing and maintenance of building and safety products, components, systems and assemblies? If so, what standards are referenced and what entities develop them?	Robust building regulatory frameworks include both regulations, which identify societal expectations for buildings (e.g., resilience against earthquakes, resistance to fire, ...), as well as *consensus standards*, that are legally enforceable by being referenced or cited in the regulations (thus sometimes referred to as reference standards), which specify what types of materials, systems and components are acceptable for use in meeting building regulation requirements, but defining such aspects as material properties, test methods, and installation requirements. These may be developed by nationally-recognized standards development organizations (SDOs), such as the National Fire Protection Association (NFPA) in the USA, regional SDOs, such as the European Committee for Normalization (CEN), or international SDOs, such as the International Organization for Standardization (ISO). Having a robust set of recognized consensus / reference standards is essential to assuring quality of building construction.
4.2.13	Do educational curricula exist regarding the structure, content and use of land use planning, building, and fire regulation that can be used as a basis of formal education, continuing professional development and outreach to the informal sector?	A well-functioning building regulatory framework needs suitably educated professionals and properly trained skilled craftspersons for the framework to work well. It is also essential to socialize the benefits of the building regulatory framework via social networks outside of traditional channels, especially within informal settlements and other unregulated areas, where traditional communication paths may be absent.

[19] As used here, a 'consensus standard' is a standard, developed by an accredited standards-making organization (e.g., the International Organization for Standardization (ISO)), which is required to have a 'balanced' committee of varied interests participate and reach consensus on the content. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.

4.3– Implementation

This third component of Building Regulatory Capacity Assessment focuses on the implementation and management of the building regulatory regime at the level(s) associated with the project scope. More discussion is provided in Annex C.

Potential Informants

The primary focus of this assessment are the Planning, Building and Fire Departments (or equivalents), and/or the private sector organizations with the implementation and enforcement functions. Within government entities, the chief official (planning, building, fire) of the jurisdiction, or CEO of a private sector entity, will typically be the principal informant, with reference to relevant subordinates when appropriate. It is also highly desirable to consult with relevant senior jurisdiction officials such as mayors, city managers, related city department heads and members of the building community, including designers, builders, developers, building owners and contract regulatory staff. It is also essential to reach outside of traditional channels, especially within informal settlements and other unregulated areas, where traditional communication paths may be absent. This may be through the social workers, medical professionals or others, who work with inhabitants, observe conditions, and can help to facilitate change.

Screening Questions

	Questions	Why This is Important
4.3.1	If formal land use planning, building, and fire regulations exist, are they legally promulgated and enforced *throughout all areas of the country, region (state, territory, province), or city(ies)* covered by the project?	While it may be that a country has appropriate legislation to enable pertinent regulation, that fact alone does not mean such regulations have been adopted into use throughout the entirety of the area addressed by the project. In order to assess the effectiveness of the building regulatory framework, the extent of promulgation and enforcement needs to be known.
4.3.2	If the answer to 4.3.1 is no, estimate the percentage of the country, region or city(ies) covered by the project does not have a set of comprehensive land use planning, building, and fire regulations legally promulgated and enforced for all buildings. Include in this estimate any areas of indigenous, "non-engineered" and/or "informal" construction, which may be materially affected by the project, in particular disaster risk / vulnerability mitigation, disaster recovery, urban densification, and energy conservation type projects. Estimate the percentage of buildings not currently subject to formal regulations.	This question gets to the issue of to what extent are (or will) buildings subject to formal regulations on planning, zoning, design, construction and use. In the case that a significant portion of the building stock is somehow outside of the building regulatory framework (e.g., 'informal' construction, shanties, etc.), there are limits on the effectiveness of a formal building regulatory framework. Conversely, a higher level of investment in the building regulatory framework may be needed to facilitate the target resiliency, sustainability, or energy efficiency of the building stock.
4.3.3	What are the natural and technological hazards and risks of concern in the country, region or city(ies) covered by the project? What is the recent loss history related to such hazards and risks?	The range of natural and technological hazards, which can be expected to impact the building stock that is affected by a project, should be well-understood for all geographic regions addressed by the project. This is to help assess whether the hazard / risk maps in the regulations, if they exist, are appropriate to the required mitigation targets.
4.3.4	Are hazard and risk data, maps, etc., pertinent to the country, region or city(ies) covered by the project, comprehensive, up to date, and appropriately cited in the regulations and available for use in assessing the adequacy of the regulations in helping to mitigate or avoid the hazard or risk as part of the project?	Related to 4.3.3 above, the presence of hazard and risk data, maps, and related information within the regulations does not assure that they are up to date and appropriate to the needs of the project, especially for disaster risk and vulnerability mitigation. It also does not assure that sufficient technical capacity is available to properly apply and use hazard and risk information in decision-making. This is especially true with respect to projected climate change related hazards and mitigation needs in the future.
4.3.5	What are the 10-year historical and 10-year projected number of building projects – new construction, renovation, expansion, etc. – for the country, region or city(ies) covered by the project?	Aside from having the legislation and regulations in place, building regulatory capacity is largely a function of how many projects are being controlled, and how many people are involved in the regulatory control of those projects. This question provides benchmarking data on the historical and projected volume of construction.
4.3.6	How many fulltime-staffed Planning Departments, Building Departments and Fire Departments (or equivalent) are there in the country, region or city(ies) covered by the project, how many fulltime staff are employed in each Department in the relevant geographic area (i.e., country, region or city(ies) covered by the project), and what are their salary levels? If contractors are used in support of fulltime staff, what is the associated number of contractors by department and geographic area?	The best, most up-to-date, and comprehensive set of planning, building and fire legislation and regulations will only be effective if they are implemented and adequately enforced. While neither the only nor a complete measure, obtaining a count of the total number of relevant departments, and of the fulltime staff working in each relevant department in all relevant areas of the country can provide insight on capacity and quality. This is especially true where rapid urban expansion is taking place, and the need for large staff exists due to the volume of construction.

	Questions	Why This is Important
4.3.7	What is the number of staff and, where applicable, contractors, in each Planning Department, Building Department and Fire Department (or equivalent), who are responsible for reviewing and approving land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project, such as: a) site review; b) plan / drawing review and approval; c) calculation verification; d) permit issuance, and for what (e.g., foundation, construction, ...); e) site inspection, and for what (e.g., foundation, structure, materials, electrical, mechanical, plumbing, fire, ...); f) witnessing of commissioning tests; and g) Issuance of certificate of occupancy?	Following on the above, this question aims to provide additional detail on the number of staff and/or contractors assigned to the key functions of regulatory review and approval.
4.3.8	Identify the types, turnaround times and frequency of review and approval activities undertaken by relevant Planning Departments, Building Departments and Fire Departments (or equivalent), who are responsible for enforcing land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project, such as: a) site review; b) plan / drawing review and approval; c) calculation verification; d) permit issuance, and for what (e.g., foundation, construction, ...); e) site inspection, and for what (e.g., foundation, structure, materials, electrical, mechanical, plumbing, fire, ...); f) witnessing of commissioning tests; and g) issuance of certificate of occupancy.	Along with the numbers of building projects to be undertaken, and the staff and contractors in any given department, the number of activities that the staff need to perform, and the target time allotted or required to perform those tasks, is essential information for assessing capacity. In some countries, very short turnaround times are mandated by law (e.g., 2-4 weeks for review and approval of drawings and issuance of building permits), where in others up to a year might be expected.[20] To be efficient, there needs to be an appropriate balance of available time and resource. One should collect information on the documents used or referenced during the review process.
4.3.9	What actual, verifiable qualifications are held by fulltime staff of the Planning Departments, Building Departments and Fire Departments (or equivalent, such as third-parties), who are responsible for reviewing and approving land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project?	The capacity assessment rests on the qualifications as well as the numbers of staff involved in regulatory review. Use of un- or ill-qualified persons might 'make the numbers look good' in terms of capacity, but the outcomes can be dangerous, especially when it comes to approving safety-related issues (e.g., geotechnical assessments and design, structural analysis and design, fire safety design, etc.).

[20] For examples, see World Bank Doing Business website http://www.doingbusiness.org/data/exploretopics/dealing-with-construction-permits.

	Questions	Why This is Important
4.3.10	What is the number of staff in each Planning Department, Building Department and Fire Department (or equivalent), who are responsible for enforcing land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project, such as: a) wetlands infringement; b) improper building use; c) building modification, including increase in area, height, change of use; d) improper storage of hazardous materials; and e) inadequate upkeep of required safety systems (e.g., fire systems)?	Similar to the above line of questioning, this question seeks to understand the capacity, in numbers, of persons available for enforcement activities. In this case, we focus largely on post-occupancy enforcement, as improper use of permitted buildings, improper storage, etc. can lead to significant losses in hazard events – much more so than in compliant buildings.
4.3.11	Identify the types and frequency of enforcement activities undertaken by relevant Planning Departments, Building Departments and Fire Departments (or equivalent), who are responsible for enforcing land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project, such as: a) site inspection; b) building inspection; c) stop work orders; and d) stop use of building orders.	As with 4.3.9 above, the number of enforcement activities which staff need to perform, and the target time allotted or required to perform those tasks, is essential information for assessing capacity.
4.3.12	What actual, verifiable qualifications are held by staff of the Planning Departments, Building Departments and Fire Departments (or equivalent), who are responsible for enforcing land use, zoning, building and fire regulation compliance, in the country, region or city(ies) covered by the project?	As with question 4.3.9 above, the capacity assessment rests on the qualifications as well as the numbers of staff involved in regulatory enforcement. Use of un- or ill-qualified persons might 'make the numbers look good' in terms of capacity, but the outcomes can be dangerous, especially when it comes to inspecting safety-related issues in operational buildings.
4.3.13	To what extent are land use planning, building and fire regulations used in the education of professionals in the country, region or city(ies) covered by the project? What are the different types of trainings and capacity-building programs available for building officials (course titles, content) and are they carried out by the government, associations of engineers/ architects, or other training institutions, and what level of expertise do they have in the topic areas?"	A well-functioning building regulatory framework needs suitably educated professionals and properly trained skilled craftspersons for building regulation to work effectively.
4.3.14	To what extent are land use planning, building and fire regulations used as educational tools for describing the benefit of regulation to be applied to any informal sectors which exist in the country, region or city(ies) covered by the project?	It is essential to socialize the benefits of the building regulatory framework via social networks outside of traditional channels, especially within informal settlements and other unregulated areas, where traditional communication paths may be absent.

Chapter

05

Quick Assessment Scorecard

While a detailed assessment of the building regulatory capacity of a country is expected to appropriately determine investment decisions on the benefits of building regulatory capacity enhancement, one can obtain a 'first-order' estimate, based on answers to the questions posed in Chapter 4. The scorecard is meant to provide a quick snapshot, or summary, of the regulatory environment through closed questions prompting 'yes' or 'no' answers.

The Background is intended to baseline the scope of the effort. The breadth in terms of number of government agencies or levels of government involved gives insight into the number of entities that may one may need to contact and the complexity and magnitude of assessment effort. A small country with a national government system and national scope will likely require less resources than a large federal system, where differences exist between states (territories, provinces) and municipalities, and the regulatory framework needs to be addressed at all levels.

1	Background	
1.1	The project scope is: (a) national; (b) regional (state, territory, province within the country); (c) municipal (city level).	
1.2	The project type is: (a) disaster risk / vulnerability reduction; (b) disaster recovery; (c) rapid urbanization; (d) climate change adaptation; (e) resource / energy management; (f) upgrade of informal settlements; (g) protection of cultural heritage.	
1.3	What are the natural and technological hazards and risks of concern in the country, region or city(ies) covered by the project?	

Section 4.1 Legal and Administrative provides a quick snapshot of the extent of regulatory capacity-building that may be needed with respect to enabling legislation. Quite simply, the more enabling legislation in place, the less resources will be needed to build capacity. All 'yes' responses likely means a good legislative infrastructure is in place, and investment needs are comparatively low. All 'no' responses might suggest significant investment and time are needed.

2	Legal and Administrative	Yes	No	Partial
2.1	Are there acts, decrees, laws or similar that enable the regulation of building aspects pertinent to the project (i.e., land use, building design and construction, fire prevention, energy conservation, accessibility, or preservation of cultural heritage)?			
2.2	Are there formal regulations (codes / standards) for those areas pertinent to the project?			
2.3	Are there acts, decrees, laws or similar that enable the regulation / licensing / certification of: architects / planners; engineers; builders (carpenters, masons, ...); trades (plumbers, electricians, ...); contractors / installers; building officials; fire officials?			
2.4	Are there acts, decrees, laws or similar that enable the regulation / certification / testing / quality control of: building materials (e.g., steel, timber, masonry, concrete, ...); building products and systems (e.g., walls, doors, windows, heating appliances, lighting systems, etc.); and contents or aspects of contents (e.g., materials which may be toxic, ...)?			

Much like above, Section 4.2 Development and Maintenance provides a quick snapshot of the extent of regulatory capacity building that may be needed around specific regulations (e.g., planning and zoning, building, fire, etc.). As with the above, the more formal regulatory components in place the less capacity-building resources will be required. All 'yes' responses likely means a good regulatory infrastructure is in place, and investment needs comparatively low. All 'no' responses might suggest significant investment is need.

3	Development and Maintenance	Yes	No	Partial
3.1	If formal land use planning / zoning regulations exist, do they incorporate: (a) hazard maps or related means that identify areas in which building is not permitted due to natural hazards; (b) hazard maps or related means that identify minimum separation between residential and hazardous occupancies; (c) maps or related means that identify areas in which building is not permitted in relation to natural resources; and (d) requirements for infrastructure associated with building density, population or related factors?			
3.2	If formal building regulations (codes, standards) exist, do they have specific provisions for, or is there a separate building code, for indigenous buildings, "non-engineered" and/or "informal" construction? By 'formal' we mean adopted by law and are enforceable, not used simply as guidance.			
3.3	If building regulations (codes, standards) exist, do they have: (a) Hazard maps identifying expected natural hazard loads by region; (b) Requirements for structural resistance to expected hazard loads; (c) Requirements for moisture resistance to expected hazard loads; (d) Requirements for fire separation from other buildings, wildland interfaces, etc.?			
3.4	If formal building and fire regulations exist, do they require, by reference, the use of nationally or internationally recognized *consensus standards* that specify required material properties and performance (e.g., strength, durability, fire resistance, ...), the tests to confirm performance, and requirements for design, installation, testing and maintenance of building and safety products, components, systems and assemblies? If so, what standards are referenced?			

Section 4.3 Implementation is a more detailed assessment to determine to what extent the systems, documents and appropriately educated and trained people are in place to facilitate the regulatory framework. The rating here may require somewhat detailed information, especially with respect to percentage coverage of 'formal' building code, and numbers and training of regulatory and enforcement personnel. In particular, having a solid 'formal' framework in place is all well and good, so long as it applies to a significant portion of the country. If not, and the 'informal' sector is dominant, that much work and resource may be needed to achieve set objectives.

4	Implementation	Yes	No	Partial
4.1	Are formal land use planning, building, and fire regulations legally promulgated and enforced *throughout all areas of the country, region [state, territory, province], or city[ies].*			
		> 80%	**50% - 80%**	**< 50%**
4.2	If the answer to 4.1 is no, indicate the estimated percentage of the country, region or city covered by the project which *does not* have a set of comprehensive land use planning, building, and fire regulations legally promulgated and enforced for all buildings. Include in this estimate any areas of indigenous, "non-engineered" and/or "informal" construction that may be materially affected by the project, in particular disaster risk / vulnerability mitigation, disaster recovery, urban densification, and energy conservation type projects. Estimate the percentage of buildings not currently subject to formal regulations.			
4.3	Are hazard and risk data, maps, etc. pertinent to the country, region or city(ies) covered by the project: comprehensive, current, and appropriately cited in the regulations and available to assess the adequacy of the regulations in helping mitigate or avoid the hazard or risk?			
4.4	Are there fulltime-staffed Planning Departments, Building Departments, and Fire Departments in the geographic region of importance to the project?			
4.5	Based on initial assessments, are the departments in 4.4 above reported to be adequately staffed in terms of number and qualifications of staff?			

REFERENCES

Adeniran, A.J. 2013. "Environmental Disasters and Management: Case Study of Building Collapse in Nigeria." International Journal of Construction Engineering and Management, 2(3): 39-45, DOI: 10.5923/j.ijcem.20130203.01.

Angel, S., Blei, A., Parent, J., Lamson-Hall, P., and Galarza Sánchez, N. 2016. Atlas of urban Expansion. NYU Urban Expansion Program at New York University, UN-Habitat, and the Lincoln Institute of Land Policy.

Haynes, H. J.G. 2016. "Fire Loss in the United States During 2015." National Fire Protection Association.

IFC EDGE Green Buildings Certification System website www.edgebuildings.com

"Mitigation of Climate Change," Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Intergovernmental Panel on Climate Change (IPCC), 2014.

Jain, S.K. "Earthquake Safety in India: achievements, challenges and opportunities", Bull Earthquake Eng (2016), 14: 1338-1436

Maki, N. and Hayashi, H. 2000. "Building Codes and Tradeoffs for Earthquake Risk Reduction: Disaster Management for Housing." Proceedings, 12th World Conference on Earthquake Engineering, Auckland, New Zealand, January 3—February 4, 2000.

Market Reports Store. 2015. "Global Construction Market Worth $10.3 Trillion in 2020 (50 Largest, Most Influential Markets)."

National Institute for Land and Infrastructure Management, Building Research Institute. 2016. "Quick Report of the Field Survey on the Buildings Damage by the 2016 Kumamoto Earthquake." Tsukuba, Japan: National Institute for Land and Infrastructure Management, Building Research Institute.

UN-Habitat. 2016. “World Cities Report, Urbanization and Development, Emerging Futures.” Nairobi: UN-Habitat.

World Bank. 2016. “Building Regulation for Resilience: Managing Risks for Safer Cities.” Washington, D.C.: The World Bank.

World Bank. 2016. “Roadmap for Safer Schools.” Guidance Note. Washington, D.C.: The World Bank.

World Bank. 2016. “Cultural Heritage Project Strengthens Economic, Community Activity in Lebanon.” World Bank Feature Story.

World Bank. 2016. “Supporting Lebanon’s cultural heritage as a driver of job creation and local economic development.” World Bank Feature Story.

World Bank Doing Business website http://www.doingbusiness.org/data/exploretopics/dealing-with-construction-permits

World Bank. Jhelum Tawi Flood Recovery Project.

World Health Organization and World Bank. 2011. “World Report on Disability.” Geneva: World Health Organization.

Annexes

Annex A: Legal and Administrative

Context

A fundamental responsibility of most governments is to protect the health, safety and welfare of the general public. This responsibility is often articulated within the constitution, charter or other foundational document, which defines and enables the authorities and responsibilities of the state. The level of government at which particular protections are provided can vary based on the type of government, form of government, and authority and accountability of responsible entities within the government. The form of law, or legal framework, is also an important consideration with respect to enabling, enacting, promulgating and enforcing regulatory instruments, as well as market instruments, such as insurance. By form (rule) of law we refer to largely to Common Law, Civil Law, Customary Law, and their various combinations.

Why Does Understanding the Legal Basis Matter?

Inadequate or incomplete legal and administrative frameworks can undermine the effectiveness of a building regulatory framework, making it difficult to achieve the intended benefits. Assessment of the existing legislative and legal foundation for laws and regulations related to buildings can identify shortcomings and provide the basis for relevant technical and legal assistance. Before the framework can be assessed, one must collect the foundational information.

Since there is a wide range of legal and administrative frameworks in use around the world, and the required information can exist in many government entities and various levels of government, one needs to know where to look. In a unitary government system, this might be a small number of central government ministries or agencies (e.g., New Zealand), or dozens of national, state and

local government entities within a federal government structure (e.g., the USA). Establishing the baseline type and form of government inform at what level of government pertinent information might be found.

There may also be several government entities with some type or level of responsibility, depending on the overall objective of the project (e.g., 'disaster risk / vulnerability reduction' as compared with 'facilitating energy efficient buildings'). For this reason, it is important to understand which entities may be responsible for the types of information required for a project.

Unitary System (e.g., National / Central Government focused responsibility)

Legislated Area	Level of Government	Type of Document	Where to Look
Land use	National	Resource Management Act or equivalent	Ministry of Environment or equivalent
	National or Local	Planning / Zoning Regulations or equivalent	
Buildings	National	Building Act or equivalent	Ministry of Construction or equivalent
		Building Regulations (Codes, Standards[20], Laws)	Ministry of Construction or equivalent
	Regional or local	Building regulation orders, ordinances, ...	Local Council or equivalent
Fire prevention	National	Fire Services Act or equivalent	Ministry of Public Safety or equivalent
	National, Regional or Local	Fire Regulations (Codes, Laws)	National, Regional or Local authority
Energy conservation / efficiency	National	National Climate Policy, Energy Policy, Resource Management Policy	Office of the PM, Ministry of Environment, Ministry of Energy, and so forth

[21] It should be noted that in this context, Regulations, Codes and Standards all have equivalent meanings, e.g., the Building Regulations (England) is equivalent to the Building Code (New Zealand) and the Building Standards (Scotland) or Building Standards Law (Japan). Terminology is a function of the country and legal system. It should also be noted that Standards, in this respect, are different than 'reference standards,' which provide details on such areas as testing, design, installation and maintenance, and are developed by standards-making organizations, such as the International Organization for Standardization (ISO) or equivalent in each country. Such 'reference standards' are referenced by the top-level regulations as means to demonstrate compliance.

Annex
A

Legislated Area	Level of Government	Type of Document	Where to Look
Climate Change / Hazard Resiliency	National	National Climate Policy, Resiliency Policy, Disaster Recovery Policy, and so forth	Office of the PM, Ministry of Environment, Ministry of Disaster Response and Recovery, and so forth
Licensing and certification of practitioners	National or Local (or market, e.g., professional society)	Building Act, Planning Act, etc.; Building Regulations, Zoning Regulations, etc.;, Consumer Protection Policy	Office of Consumer Affairs, Board of Professional Engineers, etc. (or Institution of Architects and so forth)
Licensing and certification of contractors	National or Local (or market, e.g., professional society, industry association)	Building Act or equivalent, Building Regulations, Consumer Protection Policy	Office of Consumer Affairs, Board of Contractor Licensing, etc. (or Association of Electricians or so forth)
Product certification	National (or market, e.g., insurance entity)	Building Act or equivalent, Building Regulations, reference standards; Consumer Protection Policy	National Bureau of Standards, National Product Testing Laboratory and so forth (or Underwriters Laboratories or so forth)
Insurance	National (e.g., flood insurance) or market	Resiliency Policy, Disaster Recovery Policy, and so forth	Emergency Management Agency (or market)

Federation (e.g., combination of national government and regional / local government responsibility)

In federal system countries, one will need to identify the above types of information at each level of government – national, regional (e.g., state, territory, or province) and local (as appropriate). In such countries, it will also be important to know the regulatory hierarchy. For example, in the USA, buildings are regulated at the state or local level, as is planning and zoning. However, there are resource management and environmental regulations at national and state level. As such, understanding how the hierarchy of regulations works will be important to inform decisions relative to understanding what land areas might be available to be built upon, what types of assessments and permission will be needed, and so forth.

Annex B: Development and Maintenance

Context

With the establishment of the authority and responsibility for controls on the design, construction and use of building via legislation, the next element for review within the building regulatory regime is the regulatory documents themselves.

In general, this assessment seeks to identify and describe the organizations responsible for regulatory development and promulgation, the particulars of the regulatory development process, the level and inclusiveness of participation in regulatory development, and the extent to which the regulations reflect appropriate solutions in terms of the local political, social, cultural, technical and economic conditions.

For the purpose of the Building Regulatory Capacity Assessment, the building regulatory framework includes land use planning, zoning, building and fire regulation. There can be numerous applicable regulations depending on the type of project (e.g., disaster risk / vulnerability reduction as compared with climate change mitigation or cultural heritage protection). The range of regulations can include: Planning and Zoning Regulations, Building Regulations, Fire (or Fire Prevention) Regulations, Energy Use / Efficiency Regulations, Accessibility / Universal Design Regulations, Cultural / Heritage Protection Regulations, and the like. The components of the building regulatory framework function holistically to assure that a particular building, on a particular site, exposed to well-characterized hazards, is able to achieve the minimum levels of performance.

Note that the terminology may vary by country. For example, the regulatory document associated with mandating the provisions for building design and performance is called the Building Regulations in England, the Building Standards in Scotland, the Building Standards Law in Japan, and the Building Code in Canada, New Zealand, USA and several other countries. For simplicity, the term 'building regulation' is used in subsequent discussion. These documents may be developed by the government or the private sector, but have the force of law when adopted and implemented through enabling legislation.

Using the term 'building regulation' for the legally-enforceable regulatory document also helps differentiate these regulatory documents from 'reference standards,' developed by standards development organizations (such as the International Organization for Standardization (ISO)), and 'design codes,' such as the *Eurocodes for Structural Design*. Such reference standards and design codes are often developed in the private sector through a consensus process involving stakeholders across many areas, and focus on specific requirements associated with testing, design, installation and maintenance of materials and systems. Such reference standards and design codes are cited by reference in building regulation, which makes them legally enforceable, or are available as voluntary guidance. There can be many hundreds of applicable reference standards and design codes that underpin a comprehensive building regulatory framework.

Consider the relationships between the

International Building Code (IBC) in the USA and related regulations, standards, and market entities. The IBC is a model code developed by the International Code Council (ICC), a private sector code development organization. The IBC contains the 'top level' regulatory provisions for buildings, which, if adopted into law at a state or local level, becomes the legally enforceable building code (regulation).

However, the IBC is not the only applicable code which must be adopted into law. There are numerous other codes (regulations) which support the IBC, including the International Mechanical Code (IMC), the International Plumbing Code (IPC), the International Fire Code (IFC) and several others, which address specific attributes of a building's framework or features.

Within each code are numerous reference standards, which address all types of material, system, and product performance, quality, design, installation, test and maintenance features. For example, requirements for material, system and component performance, design, installation, test and maintenance associated with fire protection are largely addressed by standards of the National Fire Protection Association (NFPA), but also by test standards, such as from the American Society of Testing and Materials (ASTM), and product certification standards, such as from Underwriters Laboratories (UL) and others. Likewise, structural design provisions, and basic structural material properties, are largely addressed by standards of the American Society of Civil Engineers (ASCE), but as supported by the American Iron and Steel Institute (AISI), the American Concrete Institute (ACI), and others. These, in turn, are supported by test standards, such as from the American Society of Testing and Materials (ASTM), and product certification standards, such as from Underwriters Laboratories (UL) and others.

The IBC alone references more than 500 standards, many of which in turn reference several others. There can be literally thousands of applicable standards within the regulatory framework.

Building regulations may be promulgated at a national level (unitary government system), state (territory, provincial) level (federation), or municipal level (in either system). The provisions of the building regulation establish the legally mandated design requirements, functional requirements, and construction practices.

The regulatory development process varies from country to country. In countries with a unitary government system, the building regulatory development process is often managed by a unit of the national government (e.g., ministry of construction, public works, urban development, or...). In federal systems, building regulations may be developed by a government entity, a quasi-government entity, a research institution, or a private sector entity, but are not legally enforceable until adopted via enabling legislation. The process varies by country, and can be a reflection of the form of law (i.e., Civil law, Common law, Customary law or some combination or variation) and of the regulatory style (i.e., adversarial, elite consensual, or strong central government).

In many respects, building regulations represent the embodiment of data, political policies, public perceptions and expectations, and expert judgment about technical aspects of building performance and social evaluation of tolerable or acceptable risk. In

order to adequately reflect the breadth of issues and perspectives, the building regulatory development process should be broadly representative of technical experts, such as engineers, architects, building researchers, manufacturers and suppliers of construction materials and systems, the construction and real estate industry, the building finance and insurance industries, those who represent the concerns of public health and safety, and those who represent the owners and occupants of buildings.

Building regulations should be periodically reviewed and updated to address shortcomings or reflect improvements based on loss experience to hazard events, research and technology, to reflect new policy objectives, such as climate change adaptation or universal accessibility, to reflect changes in social norms, and to meet affordability objectives. Critical functions of the building regulations include setting the benchmark for the minimum level of acceptable performance in terms of safety, health and welfare of the occupants, and doing so in a way that facilitates the introduction of new knowledge and improved processes into building practice. This requires that codes be written in clear language accessible to designers and builders and, to the extent possible, accessible to informal sector builders. Codes should aim to cover all prevalent construction types, providing guidance for safe construction and use of buildings.

At the end of the day, building regulations must be local instruments that address local economic, social and technical capacity. This is particularly true for low- and middle-income countries, which rely on the regulations to be appropriate to local conditions. However, for expediency, reference is sometimes made to building regulations from developed countries (e.g., the International Building Code, the Building Code of Australia, the Building Standards Law of Japan, etc.). In these cases, it is imperative to understand the extent to which such documents, if used, are effectively adapted to meet local conditions, materials, expertise and values, and that the associated level of required regulatory infrastructure is in place.

Annex C: Implementation

Context

Once the legislative and legal foundation for building regulation is established (Component 1) and a building regulation has been promulgated by the relevant authority having jurisdiction (Component 2), the critical remaining step is the implementation and management of the building regulatory regime at the municipal or local level. For building code compliance, this is often referred to as building control.

This component of the assessment focuses on the type, organization, efficiency and effectiveness of the building control framework. In particular it assesses the regulatory implementation by governmental entities responsible for compliance and enforcement of building regulations and other jurisdictional ordinances relating to enhancing the safety and quality of life within their jurisdictions, such as planning, zoning, building, fire, resource conservation or accessibility ordinances. Having an adequate building control framework is critical for ensuring building quality and safety.

There are various types of frameworks, the principal ones being: solely or fundamentally governmental, solely or fundamentally private sector, or some combination, often with both a governmental option and private sector option. Broadly, building control in such frameworks may contain some or all of the following functions: planning and zoning control (e.g., siting of the building); control of technical requirements (e.g., permitting, plan review, building regulation / code compliance); control activities during construction (e.g., inspection); completion of the building (e.g., final inspection and/or commissioning); and, maintenance and use (e.g., inspection and enforcement). Within governmental frameworks, these functions may be across several agencies or departments (e.g., Planning, Building and Fire). In frameworks with private certification / building control, some or all of the functions are undertaken by private sector entities.

There are also frameworks that are of a more 'quality management' structure, where 'self-certification' or 'self-approval' of designs is made by qualified design professionals without any significant government or private sector building control.

Building control is one of the most important aspects of the building regulatory framework, as this is the point at which compliance should be determined and assured. If the building control component is weak, it can negate the benefits of strong legal foundations and technical regulations. The adequacy of building control functions is fundamentally dependent on the number, competency and qualifications or building control practitioners (government, private sector or both). Local implementation and enforcement is in many cases a critical point of failure in the pursuit of resilience.

A well-functioning building regulatory framework needs educated professionals and properly trained skilled craftspersons for the framework to work well. This relies on having a sound set of university educational programs for professionals, such as architecture and engineering, but also appropriate training institutions for skilled tradespersons and craftspersons, who are involved in such areas as

construction, installation and maintenance of buildings and systems.

In addition, these people should be trained on the regulations and supporting infrastructure (e.g., standards). As such, it is helpful to have educational curricula regarding the structure, content and use of land use planning, building, and fire regulation that can be used as a basis of formal education, continuing professional development.

It is also essential to socialize the benefits of the building regulatory framework via social networks outside of traditional channels, especially within informal settlements and other unregulated areas, where traditional communication paths may be absent. This may be achieved through social workers, medical professionals, NGOs or others, who work with inhabitants, observe conditions, and can help facilitate changes. Having outreach materials about the benefits of formal regulatory framework and components can be very useful in this regard.

BUILDING REGULATORY CAPACITY ASSESSMENT

Level 1 – Initial Screening

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