Integrating housing as critical infrastructure in urban agendas

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Abstract

Housing is not often viewed as a de facto critical infrastructure in public policies. However, housing is more than just the house and comprises aspects of both “soft” and “hard” infrastructures. An understanding of the ways in which housing and infrastructure converge has significant potential to influence the shift of public policies toward community-driven approaches. We posit that dialogues on resilience offer an opportunity to reposition housing as a critical infrastructure in urban strategies, framing it as a critical asset, risk, and powerful tool for reduction of social and economic vulnerabilities. This approach positions housing as a fully-fledged component in resilient strategies and thus as critical infrastructure. Our analysis considers resilience frameworks and assesses their capacity to support housing as both a critical component of planning and a key to unlock funding. We identify how housing provides a critical foundation for many of these frameworks through case studies. In showing how resilience is a relevant conceptual framework for the integration of housing as critical infrastructure in urban agendas, we demonstrate an approach to program design that has the potential to transform cities, making them capable of recovering from sudden changes in their physical, social, and economic environments.

Keywords: Critical Infrastructure – Housing – Urban agenda – Communities

1. Introduction

Housing is not often viewed as a de facto critical infrastructure in public policies. However, housing is a public interest issue and bears special characteristics, which reflect on its criticality. Considering housing as a piece of public infrastructure is complicated by the fact that a house itself is considered to be for private use. However, housing is more than just the house and when considered in this light comprises aspects of both “soft” and “hard” infrastructure. Here the challenge is conceptual, yet an understanding of the ways in which they converge within housing, and houses themselves, has significant potential to influence the shift of public policies toward community-driven approaches.

We posit that dialogues on resilience offer an opportunity to reposition housing as a critical infrastructure in policy discourses. Through the interdisciplinary and networked lens of resilience, housing can be framed as a critical asset, and a risk that needs to be accounted for. Housing is also a powerful tool for the reduction of social and economic vulnerability. This approach positions housing as a fully-fledged component of infrastructure in resilient strategies.

2. Conceptual framing

We posit that the Sendai Framework for Disaster Risk Reduction (SFDRR) and the “Build Back Better” response to disaster offer a foundation for understanding housing as critical infrastructure, but need to go further. The conceptualization of housing needs to advance beyond the physical and technical aspects to move towards an interdisciplinary conception in which housing, not just the house, is a focal point in urban environments. In demonstrating the opportunity that interdisciplinary and ecosystemic resilience frameworks present for housing and its framing as critical infrastructure, we adopt the following premises:

A. Housing as a sector addresses more than the physical house, it is a fundamental component of community building and city shaping.

Housing is a basic need which affects every human and has interdependence with the environment, society and the economy (Nicol and Knoepfel, 2014). Housing has multidimensional characteristics and illustrates on its own the multiplicity of challenges that urban fabrics face. Specific aspects of housing (e.g. social housing, tenants’
Housing is interlocked into a larger environment and embedded into the urban fabric. Understanding the housing ecosystem (both the supply side – how housing is built – and the demand side – how housing is accessed and financed) in a particular place provides insight on how housing relates to the urban environment and helps to assess the interconnectedness of systems.

Figure 1.0 Housing Ecosystem Assessment Framework

Source: Affordable Housing Institute

B. Housing sits at the core of urban functionality, linking physical, social, and economic elements.

Housing plays a central role in mitigating social and economic vulnerability, because houses are where jobs go to sleep at night. It is also where children study, and where many households engage in income generating activities. This emphasizes the key role of housing in urban economies but also in the daily life of the labor force and households’ income stability. By extension, a whole community is negatively impacted when housing/residential infrastructure are at risk.

Functional, affordable housing depends on structural conditions and is affected by incidental shocks. Both conditions disproportionately impact the poorest. Structurally, low-income city dwellers are priced out of safer locations and must resort to settling in high risk areas, creating an ‘every-day’ and permanent risk for these households. Because secure housing is a fundamental infrastructure for the social and economic situation of the most vulnerable, its loss during a disaster affects them in greater proportion. For these communities, vulnerability to disasters and daily vulnerability are connected. By considering housing as critical infrastructure the extent of this vulnerability can be taken into account.

C. Housing is not typically considered a part of infrastructure in urban development and planning.

This is in part because while safe and affordable housing contributes to public health and safety, housing is essentially for private use. The construction or purchase of a house is typically privately financed by a developer or household making it seem auxiliary to city’s fundamental hard infrastructures. Even public housing is typically seen as a social service to be provided rather than a critical element of a city’s infrastructure.

Because the development of housing is often seen as private investment, public opportunities in the physical and social aspects of this infrastructure can be obscured.
D. Disaster recovery and urban risk management policies have started to acknowledge the physical house as vital infrastructure.

Consistent with the New Urban Agenda and the SFDRR, housing initiatives are increasingly considered in urban planning as a way to mitigate risks to households who are living in high-risk physical environments. As part of this, disaster recovery and urban risk management policies have started to acknowledge the physical house as vital infrastructure.

Yet, we observe a dualism in the conception of housing and resilience in the academic literature and the public debate. Risks are endogenous or exogenous, disasters happen via slow onset or sudden shock, and resilience is approached through prevention or recovery. Similarly, post-crisis housing reconstruction is directed toward either returning to the pre-shock status-quo or ‘bouncing forward’ to greater stability.

In the context of housing, resilience is conceptualized either on a ongoing basis or in response to a specific disaster. In each case the notion of housing as infrastructure is approached differently. Post-disaster strategies to housing tend to be short-term and temporary, whether supporting recovery from sudden shocks or prolonged disruptions. Yet housing is seen as central to community reconstruction in the aftermath of a disaster both for immediate personal safety and as an enabler of economic and social recovery (Steinberg, 2007). Strategies that focus on ongoing resilience look at chronic stresses and emphasize capacity building and community empowerment as part of a long-term approach to improving housing. This later approach encourages policy makers to commit to longer-term actions, such as upgrading the housing stock, without a catalytic disaster event.

E. This had led to an increased focus on the resilience of the physical aspect of housing, which is a positive step forward but has to go further.

Following the SFDRR, disaster recovery strategies consistently include a specific focus on strengthening houses as physical objects and disaster management entities increasingly address housing issues. A number of innovative technical solutions have been successfully developed in response to multi-hazards’ impacts on the physical house structure and have proven efficient (e.g. disaster-resistant design, “whole building approach”, shear walls and braced frames to improve resistance to seismic activities or hurricanes, elevated buildings and dry-flood proofing to prevent from floods, to mention a few). Physical resilience and houses tend to be linked together in many contexts.

However, this does not address the many social and economic aspects of urban life that affect, and are affected by, the stability and affordability of housing. Houses can be physically impacted by both natural and man-made disasters, housing as a system, and a household’s access to housing, can also be affected by socio-economic-political crises. Urban risk management policy has started to include the physical house as a critical infrastructure but it has to go further; beyond the physical to produce inclusive and long-lasting planning processes that look at housing from an ecosystemic perspective.

3. Implications for resilience planning

The term ‘resilience’ has many different conceptualizations and is noteworthy in its capacity to call for change. Because “sustainability over time requires resilience at each time” (Nicol and Knoepfel, 2014), resilience could be the key to sustainability.

We posit that the prism of resiliency is a powerful tool to reconsider the significance of housing, positioning housing as both a critical infrastructure and a driver of growth for contemporary societies, and further elevating it in urban strategies. Through resilience, housing infrastructure can be framed not just as a risk, but as a critical asset and a public good.

4. Housing as a part of city resilience strategies

In urban contexts, resilience is being implemented via resilient policies and city resilience strategies. Actors framing these strategies include climate-related city networks such as 100 Resilient Cities and C40, which promote conscious, sustainable urban development within an integrated stakeholders’ system. A city resilience strategy is a tool to achieve the objectives described above and can be defined as a process through which “a city develops a better understanding of the challenges it faces; reviews its ability to address those challenges; and unites people, projects, and priorities, so that cities can collectively act on their resilience challenges” (100 Resilient Cities,
The main objectives are to produce a map of challenges, be fully aware of issues, and design solutions that build on existing urban frameworks to strengthen them. Resilient strategies have essentially adopted an ecosystem approach to resilience and hazards and are an illustration of adapting interventions within a broad and comprehensive framework, linking hazards’ characteristics with city’s challenges. There is an opportunity in the development of these strategies to foreground housing as a critical infrastructure and better integrate housing policies with city resilience plans.

In fact, a significant number of the cities participating in these networks have identified housing as a key risk, and several have incorporated housing in their final strategies. These strategies provide current, empirical examples to assess how housing has been seen through the lens of resilience. By considering the economic and social environment as well as the physical housing structure, the cities have created ecosystemic solutions adapted to their own particular housing challenges and hazards. Thus, resilient strategies enable a quasi-systematic interdisciplinary approach to urban challenges, in which housing challenges are related to the larger urban ecosystem.

**Surat, India**

Surat identified actions related to affordable housing in a logic of chronic stresses: housing demand/supply assessment, availability of financial aid for affordable housing, identification of affordable localities, and green infrastructure (e.g. innovative green building techniques and improving thermal comfort of buildings using cool roofs and passive ventilation). Surat’s affordable housing pillar is mainly driven by the challenges of population growth and speculative land/real-estate markets. Surat acknowledges the high level of interdependencies with other urban challenges and advocates for a comprehensive approach involving other areas, including; employment, economic dependency, and social cohesion.

**Rio de Janeiro, Brazil**

Housing is foregrounded through the initiative “Right to the City” and promotes an inclusive city which will welcome each income strata of residents, especially homeless. Housing is framed as a right, and the starting point for a dignified integration into the urban environment. The strategy focuses on the chronic stresses of housing shortage and the risks of natural hazards (landslides, floods). Housing resilience is also driven by “Access to Safe Housing” which focuses on favelas upgrades, quality of life improvements and climate risk mitigation. This initiative benefits from multi-hazard assessment mapping and climate trend impacts monitoring which are developed for better risk integration under the theme “better understand and mitigate impacts of severe weather and climate change”. This is an explicit reference to the interdisciplinary approach driving the Rio city resilience strategy and decision making process.

**Mexico City, Mexico**

Mexico’s past history of seismic activity is a starting point to better anticipate risks and learn from that experience on how to cope with high geological risk. As shown in the diagram below, risk is accounted for and assessed based on human losses, physical losses, and social impact. Mexico City is prone to natural hazards but also faces a shortage of affordable homes, which translates into a housing and social crisis.

![Figure 1.1 Mexico City earthquake damages, 1985](image-url)
Mexico City prioritizes building resilience and reducing vulnerabilities of the poorest. Approaches to housing emphasize the built environment and the physical characteristics of housing but also consider housing as a means to empower and integrate communities and promote their participation in pilot project design. Mexico City also faces chronic stresses related to inequalities and is committed to increasing spatial social equality by improving “access to affordable and public housing in areas with access to public transportation and sources of employment”. The objective lying behind this initiative is to create an accessible city and well-connected housing and social infrastructure to foster mobility. Mexico City’s resilience strategy makes a case for an interdisciplinary approach linking employment, public transportation and housing infrastructure. The “resilience value” is the following: “Housing that is connected to the transportation network and the locations of employment contributes to economic and social development and improves accessibility to urban services and infrastructure”. Here again, long-term strategies are highlighting the interconnectedness of housing and other urban challenges.

5. Leveraging finance opportunities and crossing funding streams

As post-disaster and humanitarian actors shift their focus from simply providing relief to establishing foundational elements of redevelopment and future resilience, the implementation of initiatives in the shelter sector has to expand beyond the distribution of transitional shelters. This expansion naturally leads to an engagement with housing as a sector within the urban development context and provides opportunities to cross funding streams, developing long-term initiatives that link the implementation of resilience strategies and housing policies. Despite this, there is a lack of uniformity in the discourse and the conceptualization of the links between infrastructure and housing. As Paul Freeman explains, the focus on housing by government in a context of immediate relief is conditioned by public authorities’ motivations. Housing often figures prominently following a disaster because a government might benefit politically by allocating money to housing reconstruction, or because it is expected that support of the construction sector might strengthen the overall country’s economic activities in a disaster’s aftermath. However, the shift of focus from shelter to housing could also inform the structure of resilience financing, as there are often parallel and important investments to be made in housing reconstruction. Natural disasters remain costly; disaster-relief aid will exceed $300 billion per year by 2050.

Therefore, it is worth looking at options to finance resilient cities through housing related initiatives, as well as international adaptation funds. We focus below on climate adaptation funds and Tax Increment Financing (TIF)
because they represent new opportunities to engage private capital in the improvement of public infrastructure – including housing – within the context of a city resilience strategy.

According to Jeb Brugmann, resilience involves a concept of performance that can induce a business logic and attract conventional and private investment flows. Urban risk reduction must be framed as "an investment opportunity to improve the economic performance of urban assets and locations but also to reduce economic losses when disasters happens whether it is under the form of casualties or reconstruction" (Brugmann, 2011). Housing could be seen as a starting point for that approach, since it is at the core of the urban fabric and links urban systems and infrastructures together. The figure below describes two strategies in which international adaptation funds could have the greatest impact:

1. Adaptation fund resources can be directed to mainstream urban infrastructure policy and programs which are implemented on different governance. This mainstreaming shift will attract and support lower risk investments into revenue-generating urban projects. Climate funds will finance scaling of resilience standards.

2. Adaptation funds can be leveraged with other source of finance for resilience upgrading projects. This approach enables coordination between public and private investments in priority areas.

This approach could inform public policy and direct engagement of the private sector as mentioned in the SFDRR Priority 3 institutional and market mechanism aspirations.

Figure 1.2 Leveraging ICLEI climate adaptation funds

Another option to consider in linking the financing of housing and resilience is TIF. The implicit economic bargain here is that the municipality – the typical recipient of taxes and provider of infrastructure for the urban environment – is investing in these infrastructure benefits, to enable the private sector to finance an improved privately owned environment that will in turn add value to the tax base of the municipality. In any jurisdiction where ad valorem real estate taxes are collected, the recipient of these taxes holds a carried ownership interest in the real-estate value of the income-producing built environment. Capital investments in infrastructure, whether to provide it or increase it’, increases the value of the built-environment that is supported by such infrastructure, and thus increases the value of the municipalities ownership interest in the property.
TIF has typically been used in the context of urban redevelopment and land value increase, yet it could certainly be applied in support of a city’s resilience strategy. To the extent that the city undertakes urban renewal on land that is otherwise at risk, investments in infrastructure which increase the resilience of that land and the structures that sit atop it increases the potential for vertical development, and by extension value of the property. The use of TIFs in risk prone areas will ensure that the improvements financed also increase the resilience of the building or property because without that the market is unlikely to invest in the TIF bond. In the case of housing, if a municipality has adopted strategies for both climate resilience and affordable housing, the use of TIF in an area that has been up-zoned for housing development or neighbourhood redevelopment can unlock financing to both upgrade the housing stock and improve the classical infrastructures that are linked to it.

The enduring effect produced will improve housing stability and affordability and increase the overall resilient capacity of the city. Use of the TIF mechanism requires a clear real-estate tax base and established zoning codes so that improvements to land and increased verticality will have added value. Because TIF relies on an incremental increase in taxes to support the repayment of the associate municipal bond, the municipality needs to have enough zoning to ensure that capital improvements financed will provide a rateable share of benefits by virtue of proximity to a central business district or other amenities.

6. Conclusion

Housing conceptualization as critical infrastructure is a powerful tool which enables key actors and entities to reconsider the significance of housing and further SFDRR implementation. Housing as a sector within urban development addresses more than the physical house, it is a fundamental component of city shaping and provides insight on all urban chain links. Housing helps to illuminate and assess the interconnectedness of urban social and economic systems. Even though disaster recovery and risk management policies have started to acknowledge the physical house as vital infrastructure and increased focus on the structures’ physical resilience as defined by Priority 4 in the SFDRR, this has to go further in considering housing as part of infrastructure in urban development and planning. Using resilience as a conceptual framework provides an opportunity to integrate housing as critical infrastructure in urban agendas and surpass the SFDRR “Build Back Better” approach. Resilience frameworks can help actors to design inclusive and long-lasting planning processes that incorporate housing from an ecosystemic and multidisciplinary perspective. Furthermore, the application of new financing mechanisms that link housing and urban infrastructure will support the continued implementation of SFDRR Priority 3, which emphasizes private market and institutional engagement.

References


100 Resilient Cities – City Resilient Strategies of Surat, India; Rio de Janeiro, Brazil; Mexico City, Mexico.