Community Resilience Under Contexts of Informal Housing and Climate Change in the Americas

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Abstract

Informal housing and settlements are produced by spatial and social inequalities, increasing vulnerability, and risk for communities. In recent years, community resilience perspectives in architecture and urbanism have highlighted the idea of transformative adaptation where communities are able to restore their built environment, and to transform it based on their needs and desires. However, little has been explored and compared about whether and how informal housing influence local community resilience strategies and adaptations to disturbances and challenges. To compare how informal and precarious housing in different topographic contexts influenced community resilience, this research examines three case studies from the Americas (Peru, Uruguay, and Southern US). Methods included semi-structured interviews, architectural documentation, and analyses of secondary data. This study reveals informal housing characteristics and its underlying processes in different geographical and cultural contexts were critical for communities to address local challenges. Findings aim to provide lessons to architects, planners, and policy makers, about how community-based initiatives can enable communities to adapt to stresses while contemplating the complexities that informal housing often entail.

Keywords

Informal housing · Right to the city · Community resilience

45.1 Introduction

This paper explores the social production of informal housing and self-help housing as ways of challenging uneven and unjust urbanization processes with unequal access to resources and public infrastructure. Spatial justice theory argues that social and spatial inequalities created by unjust urbanizations and geographical uneven development, systematically oppress segments of the population reducing their wellbeing, their participation in social life, and their access to resources (Soja 2010).

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Lefebvre's framework of the "right to the city" emphasized the idea that spatial injustice can be challenged by those who are negatively affected embracing their right to occupy and transform urban space (Lefebvre 1996). In the most basic form, informal housing and self-help housing embody inhabitant's right to solve their housing needs and to access to community resources. The right to the city is embraced through everyday life empowering inhabitants of space, especially those who have been marginalized and disenfranchised from space (Purcell 2002; Limonad and Monte-Mor 2015).

Informal housing and settlements are produced by spatial and social inequalities, increasing vulnerability and risk for communities. The informal city might seem chaotic at first glance, but it exists and grows in a "form" of self-regulated systems (Turner 1972). It is a living ecosystem in constant transformation, it is critical to understand how architecture can operate and embrace the dynamic nature of the informal city to effectively improve the wellbeing of its inhabitants (Turner 1976).

Over decades, architects and urban planners have struggled to understand the logics of the informal city and its everyday life architectural manifestations. During the second half of the twentieth century, architects and planners made unsuccessful attempts to address the emergence and rapid growth of the informal city through mass housing projects and tabula rasa urban initiatives, characterized by grand gestures of modernity and modern architecture. Because of these reasons, Latin America has been a laboratory of housing experiments in the twentieth century. Over time these grandiose modern solutions got blurred and absorbed by the context of the always expanding informal city (McGuirk 2014).

In recent years, community resilience perspectives in architecture and urbanism have highlighted the idea of transformative adaptation where communities are able to restore their built environment, and to transform it based on their needs and desires. However, little has been explored and compared about whether and how informal housing is contemplated by local community resilience strategies and responses to disturbances. In this paper we examine how communities in precarious housing contexts have responded and adapted to different disturbances and challenges. Using case studies from Peru, Uruguay, and the United States, we compare how the different patterns of lot occupancy, access to public infrastructure, and informal housing typologies influence community resilience.

This paper uses spatial justice and the right to city as framework to discuss the ways informal housing and self-help housing are produced in different regions in the Americas by disenfranchised communities to address their housing needs and to transform urbanization processes.

45.2 Methods

This transnational study combines research methods from Architecture and the Social Sciences. Methods include architecture fieldwork documentation and semi-structured interviews with community leaders and inhabitants of the different geographical areas of this study (Peru, Uruguay, and U.S). Architecture fieldwork documentation includes onsite observational methods and survey drawings of different housing typologies.

Using purposive snowball sampling strategy, we identified other key actors (Esterberg 2002; Neuman 2003) actively involved in the different communities of the three case studies. Data collected through semi-structured interviews reveals information about how the informal neighborhoods have changed through time adapting to different stresses (e.g., social, economic, and environmental) and in some cases becoming vibrant neighborhoods. Additionally, secondary sources are used to complement data collected from the interviews as well as architectural documentation.

Architectural field work documentation includes spatial analysis at the neighborhood scale through interpretation of satellite imagery from Google Earth cross-referenced with spatial information from site visits. This spatial

interpretation allowed to identify spatial housing patterns. At the housing unit scale, we use field work observations to interpret facades, the relationship of the housing towards the street, and the identification of housing typologies. The study of housing typologies is used to understand how housing units are transformed over time to accommodate dwelling and livelihood needs.

45.3 Case Studies Results

We compare case studies to understand the various methods by which informal housing is produced in different geographical and cultural contexts. Most importantly, we aim to shed light on the underlying processes of the informal city and examine their influence on the community's resilience capacity, as well as on the community's ability to claim the right to the city and transform the built environment to address their needs.

We understand informal housing and self-help housing as a participatory grassroot practice that is in continuous process of improvement. Therefore, the dynamism of the informal city is the result of the production of housing as an evolving process that is never completed and is in constant adaptation. This is embodied by the ongoing expansion, adaption, and change of housing units to accommodate evolving household conditions and the changing environment.

Through three case studies we focus the comparison on the four overarching parameters looking at their similitudes and differences. First, we study the morphology of the built environment and how the topographic context influences the access to public infrastructure including the relationship between the domestic space and the street. We analyze the patterns of lot occupancy and the relation between building structures on the lot, and how the topography influences the density of the lots. Second, we analyze housing typologies, how they adapt to households' evolution, different building material practices in response to different the local conditions, and environmental stresses. Finally, we study how the housing practices affect sense of place and collectiveness in the different communities influencing their community resilience.

45.3.1 Case Study 1: Lima, Peru

Our area of study in Lima is the neighborhood, Juan Pablo II. This neighborhood started as a *land invasion*[1] in part of the district San Juan de Lurigancho. Juan Pablo II was funded in 1984, through land invasions in an area that was utilized for mining and the extraction of sand for the construction industry. This community was self-organized since its inception, and they endured violence and oppression during the land invasions and the domestic terrorism era. In the early stages of the informal settlement there was a lot of mobility between land lots. Before people were able to finally set in a specific lot, they occupied lots temporarily and moved to different lots in the neighborhood. In 1987, the settlement was divided into land lots and residents obtained their more permanent lots. As the neighborhood consolidated over time, large areas of the neighborhood were regularized, obtaining land titles in the mid-nineties, and ensuring access to basic infrastructure.

The effective organization of the community safeguarded access to important public infrastructure such as access to potable water and electricity. In this case study we focus on informal housing adaptations and community resilience in response to dramatic topographic context in a desert area with a strong grassroots community organization.

Lot Occupancy and Access to Infrastructure

This neighborhood is currently mostly consolidated, and it was originally an informal settlement located in a valley between two hillsides in the periphery of Lima. The housing areas in the valley are more developed than the housing areas in the hillsides. Housing in the valley have access to public infrastructure such as electric grid, municipal water system, and paved streets with

[1] Land Invasions are planned and community organized squatter settlements in unoccupied land.

sidewalks. As we move further up the hillsides, housing structures increasingly become more precarious, streets became narrow without sidewalk, and activities that usually belong to the domestic space sphere gradually start taking place in the realm of the public space and the street. Also, the access to potable water becomes a challenge without the presence of municipal water system on the hillside areas. This areas access to potable water through cistern trucks that deliver potable water on regular basis.

In Juan Pablo II, land lots that are in the valley are highly dense occupied with little to non-open space available for building expansion. Once a lot is completely occupied, then the building structure expands vertically by adding levels to the building structure. In the consolidated areas of the neighborhood, housing buildings structures range from one-story building to four-story buildings. When the building structure includes mixed-uses, the more public and commercial uses are located at the ground level towards the street.

Plots that are located on the steeper parts of the hillsides have lower density occupancy and housing units are one-story buildings. As building structures became more precarious and sometimes only accessible by public hillside stairways, there is less presence of commercial activity and uses in the housing structures.

Housing Typologies

Informal housing is an ongoing process of improvement and change. They transform and adapt to the evolution and transformation of their households. In general, houses are constructed expecting to grow in the future. In their early stages of the ongoing housing improvement, they start as single family homes at the ground level and as the household's composition change (i.e.: natural family growth, where adult children build their home in their parent's land lots) other housing units are added into the lot. This housing growth occurs through different floor levels, in some cases informal single family homes evolve into multi-family consolidated buildings (Fig. 45.1).

Community Resilience: Sense of Place and Collectiveness

One of the most important characteristics of Juan Pablo II mentioned by interviewees was sense of ownership and collective achievement through the years by the neighborhood organization. Resiliency in this community is revealed capacity to self-organize through time to claim their right to the city to ensure their access to public services and infrastructure. As an interviewee described,

> …We were the first ones that obtained electricity…and Juan Pablo II fought to get the streets constructed. Juan Pablo II did it with its own money. We did not wait to obtain the assistance of the District Mayor or the government… the same for the water Juan Pablo II always collaborated and fought. It accessed and built its own public infrastructure and services. (Juan Pablo II resident and community activist. Translated by author)

This community resilience influenced the sense of collective achievement reinforcing sense of belonging and ownership in the neighborhood.

45.3.2 Case Study 2: Dolores, Uruguay

Dolores is a small town located in Southwestern Uruguay, a region that has been affected by urbanization and industrialization of agriculture in the last two decades. This small town with increasing social-spatial inequalities (DINOT and Intendencia de Soriano, 2017; Thompson 2014) was severely affected by an F3 tornado in 2016. Informal housing neighborhoods were severely impacted and transformed after this natural disaster (Dolores 2017).

This case study allows to understand community resilience and informal housing adaptation after a disruptive climate event. Post-disaster housing adaptations in the form of assisted self-help housing (among others) were developed by governmental institutions at local and national level, primarily to assist affected residents from these informal settlements. (Thompson and Lopez Barrera 2022).

Fig. 45.1 Consolidated areas of Juan Pablo II

Lot Occupancy and Access to Infrastructure

Unlike San Juan de Lurigancho, Dolores and the informal settlements are in flatland areas without any dramatic topographic formations. In the informal housing areas, the lot occupancy is middle and low density. These neighborhoods have access to basic public infrastructure and services such as electric grid, municipal water system, street lighting, and paved streets in most cases.

In general, housing structures are one-story buildings, and lots are occupied by multiple housing units in the ground level. Therefore, when several housing units share a plot, they also share access to the street through some type of open space such as patios or narrow corridors. This pattern of lot occupancy creates challenges to access to daylight and natural ventilation, especially for the housing units that are not located towards the street.

Housing Typologies

Informal housing or self-help housing in Dolores develops horizontally maximizing the occupancy in the ground level. As households' growth and transform, rooms are added at the ground level. As multiple families share one plot, they create party walls that are internal to the lots. In some cases, there are internal patios that delineate the designated private spaces for each unit (Fig. 45.2).

Housing building materials range from temporally materials to materials intended to be used for long-term purposes such as concrete blocks. In Uruguay, the production of low-cost concrete blocks is the main source of materials for self-help housing. This widespread production of concrete blocks allows for longer term building solutions if we compare them with more temporary building materials such as wood and plywood. However, these can be precarious structures during adverse weather events.

Community Resilience: Sense of Place and Collectiveness

After the devastating tornado of 2016, housing reconstruction was done in different ways in

Fig. 45.2 Informal housing in Dolores

most cases through self-help with governmental technical assistance. Because of the urgency to address rapid housing solutions with limited resources, the long-term sustainability of the self-help housing solutions was compromised impacting their energy and structural performance impacting their capacity to resist future hazard climatic events (Lopez Barrera and Thompson 2021).

While the self-help housing strategies represented community resilience and created a sense of collectiveness, community resilience was undermined because of community dependency on external resources that were allocated through a top-down decision-making process during the post-disaster housing reconstruction (Lopez Barrera and Thompson 2021). A community architect who was involved in the post-disaster reconstruction described the debate between the community and the government about reconstruction ideas:

> …We wanted the residents that were affected by the tornado, could rebuild their homes in the same land lot, in the areas were the town was already consolidated. We did not want people to be relocated to other areas and in a different type of housing such as apartment housing because they were not used to that type of housing. Folks were used to one-story homes on the ground level with a patio…. (Community architect. Translated by author)

In many ways the community's ideas were undermined by top-down decision-making by the government affecting the community resilience and sense of collective achievement by the entire community.

45.3.3 Case Study 3: Mississippi, United States

In general, informal housing has been a subject of study focusing on cities in the global south.

The third case study presented in this paper, sheds light on the characteristics of informal housing in the American South, specifically the Mississippi Delta. The Delta, the way is usually referred by local people, is a floodplain and one of the poorest areas in the country. Persistent poverty and limited access to community resources are interconnected with historically marginalized communities in the Mississippi delta. In this context, the rise of informal housing attempts to address basic access to housing needs (Lopez Barrera 2022).

Lot Occupancy and Access to Infrastructure

The Mississippi delta presents a different pattern of lot occupancy when compared with San Juan de Lurigancho and Dolores. In the delta, informal housing can be described as "diffused" and "embedded" (Harris 2018). Therefore, informal housing is dispersed and deeply stablished within the formal fabric of the small towns with access to basic services and infrastructure such as municipal water system, electric grid, street lighting, paved streets.

Informal housing in the delta is manifested in two basic the forms. The first one, is in the form of "shed" structures that are used for dwelling purposes. Shed structures are usually adjacent to an existing "formal" single family house sited on land lot with front yard and backyard. The second form of informality is the use manufactured mobile homes. In the U.S manufacture homes are usually clustered in trailer parks and scattered in rural areas. However, in the delta, manufactured mobile homes are mixed with formal housing and placed on private property.

Housing Typologies

The predominant typologies of informal housing in the delta are based on inexpensive prefabricated mobile structures. Shed structures are used as an extension of an existing house to increase the indoor living area for sleeping or working purposes. When shed structures are intended only for dwelling purposes, sometimes informal structures are placed in the backyards where they can be concealed from the public street view. On the other hand, when shed structures are used for commercial or small businesses purposes, they are place in the front yard in proximity to the street (Fig. 45.3).

Since before WWII the production of manufactured housing has become a vital component of the housing stock for low-income and middle-income population in the U.S. (McAlester 2013). Single-wide and double-wide manufactured mobile homes mixing with traditional housing can be observed throughout the delta. The single-wide is the most common type and it has a linear floorplan with rooms organized in a single file. This type of housing is rarely moved to a different site.

Community Resilience: Sense of Place and Collectiveness

The presence of informal housing in the Delta can be largely attributed to the lack of affordable housing and a deteriorated housing stock in the region. Blight properties are the result of disinvestment and poverty, combined with environmental challenges that make housing structures expensive to be maintained. The Delta is a region prone to flooding due to its climate and unique environmental and geological soil conditions that are characterized by the presence of expansive clay soil. These environmental conditions affect quality of housing and the capacity to for homeowners to maintain them. Differential settlement on foundations is an important issue on housing structures, it compromises the structural integrity and the performance of the building systems (Lopez Barrera 2022). At its most basic level, prefabricated informal structures emerge as low-cost short-term solutions to remediate existing housing pathologies and to accommodate households growing needs.

Unlike the case studies of informal housing in Latin America that are based on the use of locally available materials, the U.S counterparts are based on low-cost prefabricated structures. This difference in building materials and methods underscore some of the key differences between informal housing in Latin America and the U.S. which their characteristic of ongoing transformation and their capacity to improve and grow over time. The U.S. low-cost prefabricated

Fig. 45.3 Shed structures in the Delta

structures can provide short-term solutions, but they do not have the capacity to grow and change as households' compositions change and housing needs change.

Compared with the Latin American case studies, the concealed and dispersed quality of informal housing in the U.S contrasts the sense of collectiveness in San Juan de Lurigancho and Dolores. These often concealed practices are the outcome of individual practices to address housing needs rather than organized actions by the community, making the claim to the right to city more challenged to be carried out.

45.4 Conclusion

This paper provides insights on the underlying processes of informal housing and how they influence community resilience and the capacity of communities to adapt and transform their built environment embracing their right to the city. The case studies present a framework to understand community resilience and informal housing in different contexts in the Americas.

When we compare the characteristics of informal housing in Latin America and the United States, we recognize some important distinctions regarding their approach to collectiveness and governance as well as their physical manifestations. Although informal housing is developed in response to address housing needs in both Latin America and the United States, the social production processes and architectural appearance differ between these regions of the Americas.

In Latin America, informal housing and especially self-help housing in general involves some type of communal organization and sense of collectiveness. This usually is revealed on how communities negotiate their access to land, their negotiated spatial delineation between public and private space, as well as how they organize to claim and secure their access to infrastructure and services (for example, access to water supply, to the electric grid, and public transportation, among many others). The spatial result or the physical manifestation of these complex negotiated spatial delineations is a self-regulated urban fabric where private property boundaries are often blurred (Grashoff and Yang 2020).

While informal housing in the US also has the very practical goal of solving housing needs, it has different implications and physical characteristics of those in Latin America (Lopez Barrera 2022). Informal housing in the U.S tends to be the result of individual actions instead of a collective organized practice, this is reflected in its dispersed and concealed spatial configuration which is very different from the Latin American informal housing practices. These different underlying processes highlight how collective actions and the sense of collectiveness impact in different ways the community's resilience capacity and their ability to self-organize to claim their right to the city. Finally, this paper advocates for a progressive understanding of informal housing and it provides lessons to architects, planners, and policy makers, about how community resilience could be enhanced through community-based initiatives contemplating the complexities that informal housing often entail.

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