



# Disaster risk construction in the progressive consolidation of informal settlements: Iquique and Puerto Montt (Chile) case studies



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## ABSTRACT

The relationship between informality and vulnerability, common in Latin American communities, is analyzed using data from two medium-sized cities in the Chilean urban system as case studies: Iquique, located in the northern desert zone of the country, and Puerto Montt, located in the rainy south. Informal settlements, or '*campamento*' (literally meaning campsites in Chile), within these cities were studied and analyzed. The results revealed that while these originally illegal *campamentos* have gradually been absorbed by urban sprawl and have reached internal consolidation, they continue to maintain their conditions of precariousness and social vulnerability.

The *campamento* settlements are frequently located in areas exposed to natural hazards. They have also been subject to institutional backwardness, or a lack of oversight, with little to no attention being paid to risk reduction. In Iquique, the *campamentos* located in the northern zone of the city are highly exposed to seismic threats and landslides. They are also close to the port and the tax free zone (ZOFRI). In the case of Puerto Montt, the most vulnerable areas of the *campamentos* are the coastline areas to the west and east of the city, which are subject to landslides and flooding.

The *campamento* settlements constitute real vulnerability *hotspots* for their residents, as they are high risk zones within the cities, characterized by high levels of precariousness. In general, they have not been considered in the urban improvement measures, even though they have been part of each city's main urban area for several decades now.

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## 1. Introduction

Informal urban settlements are particularly vulnerable to natural disasters [1,2]. Consequently, many studies have investigated the relationship between economic growth, poverty, informality, and urban vulnerability issues. However, few studies have addressed the link between informality and vulnerability in Latin America, one of the most urbanized regions of the world. One possible explanation for this is that the explosive growth in the cities and the formation of informal settlements, as a result of the rural-to-urban migrations, seems to be part of the past.

In countries like Chile, changes in urban patterns and processes produced by new demographic dynamics, constant economic growth and public policies, has helped hundreds of thousands of inhabitants leave their informal settlements and move to big social housing projects [3]. This has resulted in an institutional oblivion

regarding these informal settlements that have consolidated within the cities, preserving the unstable and precarious socio-residential conditions and the exposure to natural hazards, resulting in significant risk conditions that should be considered by researchers and decision-makers.

In this article, two Chilean medium-sized cities are analyzed, both of which have experienced significant demographic growth as a result of improvements in their economies. This growth has resulted in the generation and consolidation of informal settlements in disaster risk areas within their boundaries.

## 2. Urban growth, informal settlements and disaster risks

### 2.1. The debate between formality and informality in the urban context

Formality and informality have been addressed as opposite, dichotomous and mutually exclusive processes. Formality is strongly associated with the compliance of legal norms and is understood within social and cultural frameworks. Informality is

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the movement away from formality [4]. According to Gonzalez [5], informality is perceived as a consequence of poverty. However, it rarely reflects its relationship with development models, where processes, such as industrialization and neoliberalism, have radically influenced the urbanization process, encouraging movements of the population and changes in settlements that widely exceed the provision of housing and existing infrastructure, services, and markets.

The coexistence of formality and informality in the same territory, as described by Hernandez [6], reflects one of the most ancient paradigms: the existence of two cities within a city. These two cities are the formal and planned city and the informal, non-planned and (sometimes) illegal city. In the 'illegal' city, populations grow in the peripheral territories, without roads, public transport or basic utilities.

Fiori and Brandão [7] indicated that informality is not necessarily a problem, as it can be an opportunity. It is an alternative mode of the production of the urban space, where you can experience models of integrity, inclusion, and diversity. Hence, it is an opportunity to better understand the different ways to perceive and think about the city [8]. Unfortunately, as Romero et al. [9] argued, a different perception prevails, where informality becomes both a source of stigma that removes power to the informal neighborhoods and a systemic determinant characterized by a lack of access to assets and options to adapt and resist to the effects of stressors, such as climate variability, extreme climatic events and natural disasters.

Far from being static processes, formality and informality are dynamic states. As described by McFarlane [10], they are forms of practice that change over time. According to Roy [11], urban informality generates multiple challenges, due to the "unplannable" exceptions to the order of formal urbanization" [11]. Roy argues for the importance of acknowledging this unplannable exception and provides suggestions for how to work with it.

## 2.2. Urban growth patterns in Latin America

In Latin America, the process of rapid urbanization has been studied by Bähr and Mertins [12], Janoschka [13], and Borsdorf [14], among others. These studies have developed urban growth models that illustrate the presence of rapid growth, not only in large cities, but also in medium-sized and small cities as well. In regard to this, Bähr and Mertins [12] proposed a new structural model of the functional and social differentiation of the city that is expressed in three patterns: circular, sector-based and cellular patterns. Cellular patterns correspond to discontinuous settlements primarily located in the periphery. These cellular patterns are characteristic of rapid unregulated growth and are referred to as informal settlements. Many of these settlements are "regularized" afterwards through a legal formalization process.

In a recent contribution, Abramo [15] postulated the term, "com-fused city", which represents a city experiencing 'compaction' and 'diffusion.' The Latin American cities of today can be considered com-fused cities. The formal and informal real estate markets in these cities leads to the construction of "compact" cities, as a result of the concentration and consolidation processes. It also leads to "diffused" cities, due to the dispersed migrations to areas of the urban periphery.

Besides the great interdependence between the two, there is a tendency, in diffused cities, towards consolidation or "compaction". More specifically, the market not only responds to the demand for plots and construction that comes from the formal and informal sectors, it also guides the definition of the policy that will determine local urban development and land use.

Local governments are seen as being limited in their competence and responsibility. For that reason, they are often alienated

by those who dominate the land market and construction sector. It is within this context that the traditional informal settlements of the 1960s and 1970s are undergoing consolidation within the urban areas, far from the interest and attention of the real estate and public sectors, particularly in the Chilean case.<sup>1</sup>

## 2.3. Informal settlements: establishment, consolidation and definition problems

Mertins [16] defines an irregular or informal settlement as "an area or settlement where development (spatial expansion) and occupancy are not conforming to the legal, urban and environmental standards set by the public authorities". Consequently, Mertins estimated that nearly 70% of the urban areas in Latin America were initiated as informal occupations of land.

In Latin American, there is clear evidence of the existing governance structures' priorities regarding land tenure, the plot and the real estate market, interactions between the State and the private sector, and the role of local politicians in committing to investments in the urban infrastructure in exchange for votes. "In informal quarters, the non-adherence to norms of urban planning and building laws or to labor-legal standards are examples of a common habit to tolerate or ignore certain (informal) processes, which have characterized Latin metropolitan areas for decades" [16].

The link between poverty, informality and urban settings has been developed by authors like Gonzalez et al. [17]. They talk about the so-called 'new poverty', characterized by being more structural, more segmented and more exclusive than before. This significantly reduces the opportunities for social mobility among the urban poor. Far from considering this process as something that is isolated and local, Ziccardi [18] indicated the direct relationship between the imposition of neo-liberal economic policies to developing countries and the acute processes of poverty's urbanization, where the local governments play a critical role in the implementation of the social and inclusion policies within the cities.

While this trajectory, observed in Latin American urban settings, is useful in better understanding the distinction between the formal and the informal, it also leaves some questions open, especially regarding disaster risks. Compliance with legal rules, in and of itself, does not indicate much about living conditions, vulnerabilities, and risks. In fact, as observed in the study area in this investigation, it is the progressive consolidation process of informal settlements, including their formalization, which seems to amplify the existing risks and create new risks, as a result of the socio-political "oblivion" discussed previously.

In a recent contribution, Nuissl and Heinrichs [19] reviewed the progress made in the discussion about what they call "the slum phenomenon", stating that: "(1) *Slums are too complex to be defined by a single parameter*, (2) *Slums are too multifaceted for a slum definition based on a set of criteria that can be universally applied*, (3) *Slums are too changeable for a permanent slum definition*, (4) *Slums frequently have blurred boundaries; their limits, for example, depend on the shape of the administrative units*".

Under the premise of informal settlements, or *slums*, are "relational concepts" [19]. The UN-Habitat proposed: "...any specific place, whether a whole city or a neighborhood, as a slum area if half or more of all households lack [i] improved water, [ii] improved sanitation, [iii] sufficient living area, [iv] durable housing, [v] secure tenure, or combinations thereof. An area or neighborhood deprived of

<sup>1</sup> There are countries where informal settlements do play an important role in urban planning and public policy. One example is Brazil, with its Favela Bairro Program. In Chile, there is a program called "I love my neighborhood", which does not reference the socio- and natural risks and issues.

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