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Incremental production of the informal urban landscape: A typology in intermediate cities of the Peruvian coastal area

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Abstract

This paper investigates informal urban landscapes and their incremental adaptations in various forms, based on empirical evidence from the case study of two intermediate cities of the Peruvian coast: Piura in the north and Tacna in the south. This exploration reveals the practices of self-organisation and morphologies in informal urban areas. The research methods used were satellite imagery, direct observations, photographic studies and urban cartography. As a result, the work presents a typology of increments to explain the emergence of the morphologies of informal settlements. Additionally, this work considers the incremental processes through which residents extend and renew their neighbourhood-scale environments. Thus, the study reveals the way in which informal settlements produce habitable land, decent housing and quality public spaces. Understanding these informal urban landscapes would facilitate the incorporation of sustainable design strategies and consequently improve the quality of life for inhabitants. The findings of this article contribute to the growing body of knowledge on informal urban morphology and incremental urbanism.

Keywords: *informal settlements, incremental production, typologies, urban landscape, Peru*

Introduction

Cities have resulted from deliberate, coordinated human efforts but also show characteristics of 'self-organisation' and emergent behaviour (Kropf, 2009). These mostly informal processes are prominent in many developing cities, especially in Latin America. However, little has been done to understand the characteristics of these informal urban forms or how they are constructed or designed. The enormous variety in informal practices, including how they emerge and grow, causes difficulties in their identification and taxonomy.

In Peru, an urban explosion intensified by massive migration to coastal cities has generated informal growth. That is, people have moved to empty land on the outskirts of cities, which has become the country's predominant method of urbanisation. For this reason, a sophisticated understanding of urban morphologies in relation to informal processes is critical for exploring the space of future urban possibilities. Therefore, the objective of this study is to explore informal urban landscapes and their incremental adaptations across their various forms. This exploration is conducted based on empirical evidence from the case study of two intermediate cities on the Peruvian coast, Piura in the north and Tacna in the south. This investigation demonstrates practices of self-organisation and morphologies of informal urban development, explaining the spatial production and adaptation of informal settlements. For this purpose, three questions guide the work: 1. How have informal settlements developed?; 2. What aspects have determined the different

morphologies of informal settlements?; and 3. What can people learn from this particular way of making a city? Investigating these questions reveals how informal settlements produce habitable land, decent housing and quality public spaces.

Background

The rapid urbanisation experienced by major Latin American cities in the mid-twentieth century produced extensive informal settlements. This pattern became a particular mode of urbanisation, where 'first the land is inhabited and then it is a matter of providing complementary services and works (water, drainage, electricity, tracks and sidewalks), while the house is built' (Riofrío, 1991, p. 31). According to Calderón, informal settlements 'are half-built cities, or to be benevolent, in permanent construction' (1999, p. 4). However, this form of constructing a city does not comply with the standards and criteria established by civil and urban legislation. Additionally, this method is neither isolated nor an exception but rather a structural process for organising urban landscapes (Fernandes, 2008). In one study, Arecchi (1984) highlighted the importance of this type of self-construction as an empirical problem-solving system. Variations in this process exist between countries and also within each settlement. Thus, this method involves constant self-construction and self-production of houses, as well as incremental consolidation of these structures and the urban environment (Connolly, 2014).

With the beginning of the new millennium, in a neoliberal context and in the face of the increase in informal urbanisation, studies such as those by Roy and AlSayyad (2004), have established that informal settlements constitute a generalised mode of urbanisation. That is, these settlements are not the exception to the planning process. In this sense, the term 'urban informality' has recently been understood as a general concept of urbanisation and introduced as an 'organisational logic' and as a 'mode of production of space' by Roy and AlSayyad (2004, p. 5). In contrast to the arboreal restrictions of urban regulation and planning, informal practices are rhizomic, involving small adaptations and tactics that contrast mainstream master planning strategies. Additionally, these informal practices include informal network connectivity instead of the mainstream method of hierarchical control (Dovey, 2012). In this context, Rykwert (1988) explained the fundamental interrelation between the urban form and human activity in a specific morphology, generally of 'unplanned' or 'spontaneous' origin. As a consequence, the structure of the city is permanently modified (Duhau, 1998). According to an article by Marshall and Çalişkan (2011), urban morphology has many different definitions that imply the study of the urban physical fabric. Moreover, it involves a broader sense of urban change, including influences such as spatial organisation, principles, single components, relationships and configuration. The complexity of urban areas has given rise to differentiated urban fabrics, and since the 1980s, there has been a growing emphasis on studying the physical forms of cities within urban planning (Fainstein, 2000; Talen and Ellis, 2002). The main approaches to such study are the historical–geographical approach consolidated by MRG Conzen (1960); the typological process structured around the work of Saverio

Muratori and Caniggia (Cataldi, Maffei and Vaccaro, 2002); the spatial syntax of Hiller et al. (1987); and other forms of spatial analysis. All of these have strongly influenced the research within the ISUF association.

By working outside state control, informal settlements have emerged and adapted over time through generative processes of change. These processes address the actions to be taken rather than the final results (Hakim, 2007). Thus, Kamalipour (2016) argued that although these results of urbanisation and construction may appear random and chaotic, there is often an underlying logic to the emergence and growth of various forms of informality. Additionally, these informal morphologies emerge in different forms at multiple scales with adaptations that are often similar. The results of this study revealed the temporal dimension of informal morphologies and thus affirm that incrementalism is an integral part of this system. Moreover, Kamalipour and Dovey (2020) argued that even after upgrading and formalisation, the informal settlements remain in a process of incremental change, characterised by the co-evolution of architecture and urban design, in which new pathways may emerge between exiting buildings (Dovey et al., 2020).

Methodology

This research focuses on a case study of informal settlements in Piura and Tacna. These inner-city sites developed in earlier periods, the informal settlements emerging through subdivisions of rustic land and generating horizontal expansion of these cities (Figure 1). Thus, the morphological and urban impact of these massive constructions have shaped an essential part of the urban landscape.

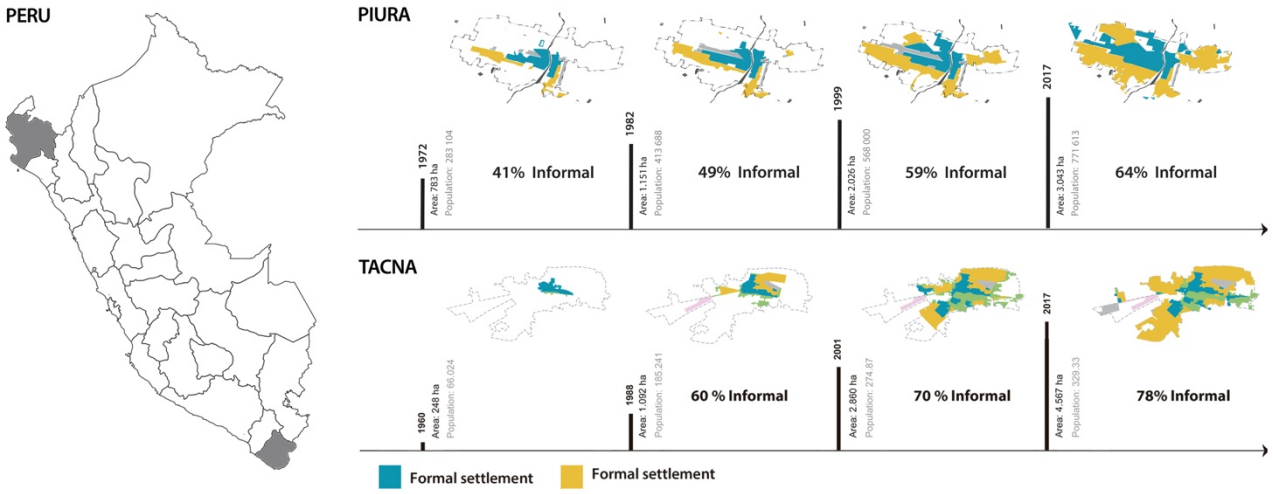

Figure 1. *Urban development and informal settlements in Piura and Tacna. Source: Authors*

Informal systems are unpredictable, dynamic and nonlinear. Generally, they are not documented and do not appear on official maps, so their accessible data is critical to exploring their forms, uses and users. The key data sources used for this study were Google Earth with the Street View database and photographic studies and direct observation by the authors. Two settlements of informal origin were selected, one in each city, and each was mapped to show the detailed emergence of settlement morphology and occupation of urban land over a period of urban formation.

Typology of increments: Similarities of the two case studies

The study investigated (1) urban expansion, including the growth of the two aforementioned settlements, and (2) the types of increments defined by using an example of an urban by block of houses. Through map material, photographs and site visits, this study explained the development of the settlement since its first occupation. This method reveals the way in which informal settlements produce habitable land, decent housing and public spaces. Although there are some particularities in this growth, certain similarities can be detected and used as examples of the production of the informal urban landscape in Peruvian medium-sized cities. Figure 2 shows this urban growth, construction of houses, lot division and the street system.

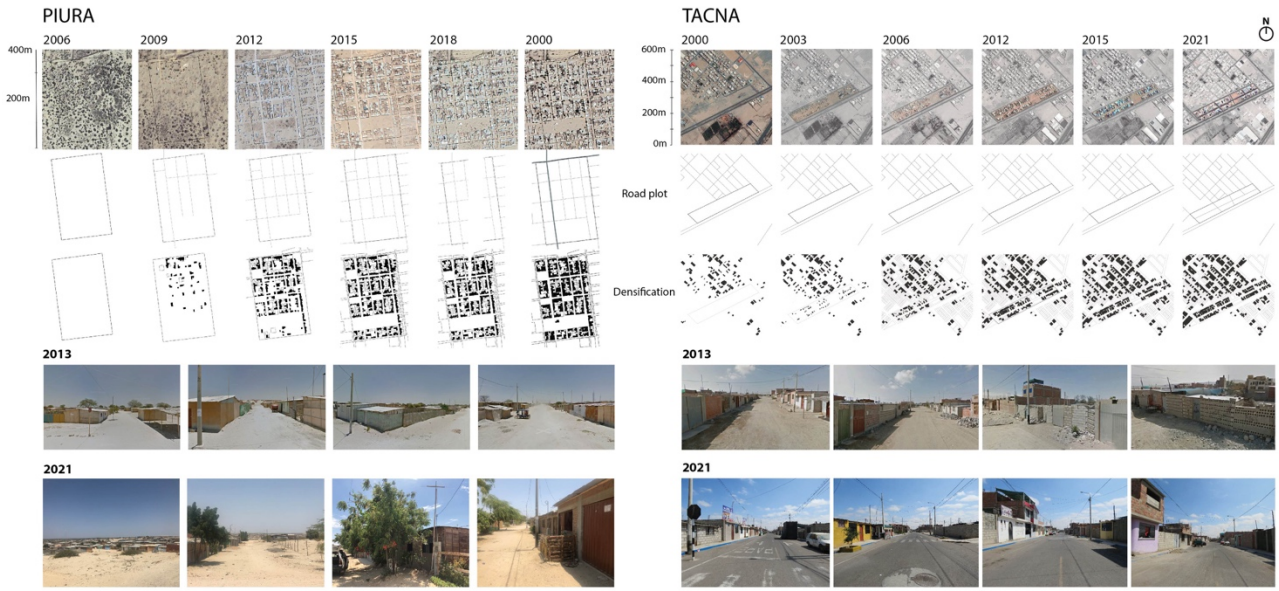

Figure 2. *Incremental development, Villa Chulucanas, Piura and Asociación Hijos de Leguía, Tacna. Source: Authors*

UPIS Villa Chulucanas, Piura

With 473,025 inhabitants (INEI, 2017), Piura is the fifth largest city of Peru, located in the north of the country. Located in the city's periphery, the informal settlement Villa Chulucanas, gradually reclaimed urban land since 2010, and currently started the process of formalisation. This region occupies approximately 1.5 km^2 and is home to approximately 9,000 inhabitants, most of whom are migrants from the rural parts of the region, especially the Andean area. The topography of the area supports the constant growth from north to south, following a first road network with no asphalted pathways, and the organisation of the street network emerged over time as the lots were built. Additionally, the main access routes through the settlement were visible by 2009 and stabilised by 2012. The housing scheme was designed in a grid; some of these streets were extended, and the rest were developed in a highly informal morphology. The lot sizes, block formations and street widths share morphological similarities with other formal and informal settlements of the surrounding neighbourhoods and present an orthogonal or reticular urban morphology. This settlement lacks a well-built road system, so the streets are limited only by the lots, without any clear separation. Moreover, it is it not connected to the water and electricity network of the city. Some spaces exist for recreational use,

but these areas are not yet regularised. Thus. people have been using these spaces for sports or other activities, and each resident attend to the public area close to their house.

Hijos de Leguía, Tacna

The city of Tacna has a population of 242,670 (INEI, 2017). Due to its border location with Chile, the city has become a dynamic centre for administrative activities, economic flows and services. Moreover, migration has increased as well as informal occupation of the land, as is the case for the association Hijos de Leguía, located on the city's southwest border. This settlement was founded in 2001 and occupies a total of 0.23 km2, with an approximate population of 1,000 inhabitants, mostly from the high Andean area of Puno. This group received ownership of the property in 2018. Since its first occupation, this settlement has developed through progressive and incremental consolidation, according to the economic possibilities of its inhabitants. One characteristic of these constructions is their initial material precariousness, which later produces improvement. In the same way, basic services appear, and urban empowerment is consolidated. Additionally, the settlement is composed of a reticular structure of seven blocks and 114 residential lots that present a heterogeneity in their morphology on both neighbourhood and housing scales. This area displays certain hybrid characteristics in its architecture, typical of its area of origin, as well as traditional cultural manifestations. At present, the sector has basic services and streets and sidewalks, respectively incorporated in 2011 and 2019. However, the area still lacks quality public spaces.

Incremental development

In informal settlements, such as emergent or ascending systems, the development process of the house and the urbanisation is mainly simultaneous. That is, after a previous subdivision, an area is urbanised and built at the same time. In this section, the study analyses the typology of increments to explain the emergence of the morphologies of informal settlements. This evaluation considers the incremental processes in which residents extend and renew their living environments. One urban block is used as an example to show the growth and incrementation of the built-up land (Figure 3). Further analysis revealed four different main types of incremental development. Figure 4 shows photos of each type in the two study areas.

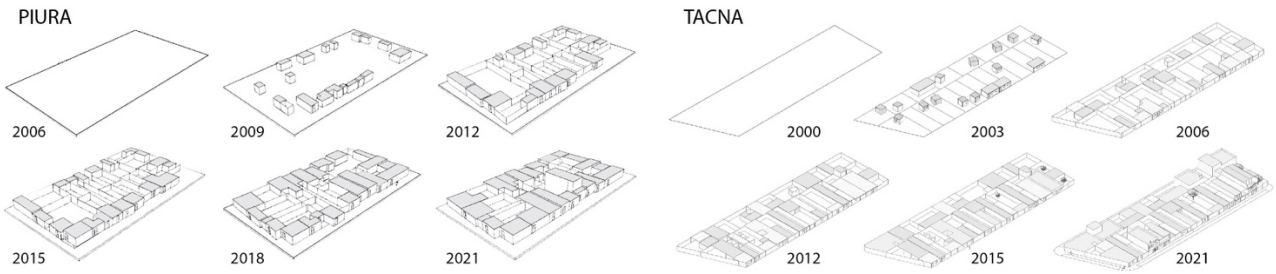

Figure 3. *Transformation of an urban block. Villa Chulucanas, Piura and Hijos de Leguía, Tacna. Source: Authors*

Incremental Type 1: Occupation of land

The first incremental type begins with the occupation of an area of land, where basic modules of wood and *esteras* (fabric of vegetable fibres) are installed on a sandy ground, known as a *choza* in Peru. This arrangement marks the territorial occupation. In some cases, this module is constructed with block walls and corrugated iron roof, along with wooden and corrugated iron walls and ceilings. In this way, the basic modules are often used to access and occupy urban land. However, these structures are poorly built without any professional technical supervision. Additionally, there is no clear, visible division of the occupied land. These modules are generally 2 x 2 meters in size and exist for temporary use of between one and two years.

Incremental Type 2: Horizontal expansion of the house

In the second type, lots are delimited in a rudimentary way. Using plaster for the first delimitation, the owners construct a fence to enclose part or the entire ground floor of the lot. For the extension, the owner-builder uses materials such as *esteras*, woods, blocks, bricks and corrugated iron, mostly without complying with local technical construction standards, generating a hybrid and precarious architecture. Such houses assume certain urban functions, such as shops or workshops, and grow as a settlement is densified. In this spatial configuration various architectural pieces are incorporated – two or three rooms – which vary between 10 and 20 m^2, according to the economic possibilities of the inhabitants. Additionally, curtains or mats are used for the internal barriers, and the backyard serves as a laundry room or is used for animals. Each house begins to have an internal concrete floor, and an exterior linear configuration is evident that is defining the urban fabric. Because the houses are built gradually without help from architects or engineers, they lack lighting and ventilation and show structural deficiencies.

Incremental Type 3: Improvement of materials and construction

The third incremental type shows how the owner-builder begins to improve the quality of the houses, mostly by granting property titles, ensuring the owner's possession of the property and guaranteeing that their investment will be worthwhile. More consolidated materials are used, such as cement, brick and steel, to consolidate their houses. The houses get expanded, and new permanent parts are added, which will be improved over time, since many lack a final finish such as painting or plating. In this type of structure, the walls and roofs are made of concrete, allowing better thermal and acoustic control. However, the lack of technical constructive aspects in conception and development still dominates.

Incremental Type 4: Vertical expansion

For the fourth incremental type, material improvement continues, now accompanied by vertical growth. Some houses, built of noble material like concrete, brick and steel, can contain two or three upper floors. This growth is not homogeneous and is directly linked to the inhabitants' economic income and personal tastes, which define the aesthetics of the house. However, for this vertical growth, the used materials might not meet the minimum habitability requirements but still provide the possibility of adding one or more rooms

to the house. In some cases, this expansion could involve new construction and could follow higher construction standards with the addition of two or more floors.

Figure 4. *Four incremental types. Villa Chulucanas, Piura and Hijos de Leguía, Tacna. Source: Authors*

Conclusions

The objective of this paper was to explore informal urban landscapes and their incremental adaptations in their various forms, based on empirical evidence from two intermediate cities in Peru. The results demonstrated that modes or processes of informal growth emerge in similar ways. These two cities followed the four incremental types defined above, but this growth was gradual, revealing certain characteristics of these development processes, depending on space and time. This consolidation process of self-construction and self-production produces an informal urban landscape, characterised by a hybrid architecture. However, a clear qualitative deficit in these informal constructions existed across all of these types.

Various studies mentioned earlier in this paper identified processes of informal settlement. Explaining why informal construction emerges and defining synergies facilitated an interpretation of how informal growth influences the built environment. However, the concept of urban informality is a complex preconception, and informal activities are linked to other key issues occurring in the urban realm, such as negotiation, self-organisation and co-production. Interpreting informal urbanism requires multi-scalar thinking about the relationships between informality and formality in a given city. With these findings regarding types of

incremental development, this study promotes further typological analysis as a resource for identification and design. Such exploration would be beneficial in terms of the local identity underlying the dynamics of occupation and recognising the potential qualities of a settlement and its spatial organisation and intensity of use. Therefore, this study introduces a set of dynamics that existing urban morphological studies have not sufficiently analysed. Clearly, a need exists for a deeper understanding of the production of space and its relationship with the urban informality of any socio-cultural landscape.

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