

ORIGINAL

Structural conditions of habitability in informal urban expansion in the AA.HH. Nadine Heredia, Banda de Shilcayo

Las condiciones estructurales de habitabilidad en la expansión urbana informal en el AA.HH. Nadine Heredia, Banda de Shilcayo

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ABSTRACT

Introduction: life in the city of Banda de Shilcayo has been significantly affected by the uncontrolled expansion of informal urban development. According to recent research, multiple factors contribute to this situation. Sociospatial segregation is one of the main ones, which has a detrimental effect on important areas: education, employment, and housing.

Method: the current research uses quantitative methods. Furthermore, the type of research is basic, since it seeks to examine the effects of unplanned urban expansion on living circumstances, taking into account objective elements that evaluate the quality of life. The study has a quantitative approach with a non-experimental design. Regarding its level of difficulty, the study is descriptive.

Results: 56 % have brick as the predominant material in their walls, 34 % have wood as a wall material, 5 % have adobe as a wall material, 3 % have cement as a wall material, and 2 % have other materials. 100 % of the homes are between 10 and 15 years old. The percentage of diverse land uses in the homes is as follows: 93 % are residential, 6 % are commercial, 1 % are other land uses, 1 facility represents healthcare, and 1 facility symbolizes education.

Conclusion: the results obtained in the Nadine Heredia Human Settlement allow us to identify a characteristic pattern of urban consolidation processes in informal contexts: predominance of brick as a construction material, homes with a homogeneous age of 10 to 15 years, predominantly residential land use with incipient diversification toward commerce and basic amenities, as well as partial coverage of essential services, with electrification standing out in the face of limited digital connectivity.

Keywords: Human Settlement; Living Conditions; Quality of Life.

RESUMEN

Introducción: la vida en la ciudad de la Banda de Shilcayo ha sido significativamente afectada por la expansión descontrolada de la urbanización informal. Según investigaciones recientes, hay múltiples factores que contribuyen a esta situación. La segregación socioespacial es una de las principales, que tiene un efecto perjudicial en áreas importantes, la educación, el empleo y la vivienda.

Método: la investigación actual utiliza métodos cuantitativos. Además, el tipo de investigación es básica, dado que busca examinar los efectos de la expansión urbana no planificada en las circunstancias de vida, teniendo en cuenta los elementos objetivos que evalúan la calidad de vivir. El estudio posee un enfoque cuantitativo de diseño no experimental. En cuanto a su nivel de dificultad, el estudio es de carácter descriptivo.

Resultados: el 56 % tienen al ladrillo como material predominante en sus muros, 34 % tienen a la madera como material en muro, 5 % tienen al adobe como material en muro, 3 % tienen al cemento como material en muro y 2 % tienen otros materiales en muro. El 100 % de las viviendas tienen entre 10-15 años de antigüedad. El porcentaje de los diversos usos de suelo de las viviendas teniendo que, 93 % tienen como uso de suelo la vivienda, 6 % tienen como uso de suelo comercio, 1 % tienen otros usos de suelo, 1 equipamiento que representa al uso de salud y 1 equipamiento que simboliza al uso de educación.

Conclusión: los resultados obtenidos en el Asentamiento Humano Nadine Heredia permiten identificar un patrón característico de los procesos de consolidación urbana en contextos informales: predominio del ladrillo como material de construcción, viviendas con una antigüedad homogénea de 10 a 15 años, uso de suelo mayoritariamente habitacional con incipiente diversificación hacia el comercio y equipamientos básicos, así como una cobertura parcial de servicios esenciales, destacando la electrificación frente a la limitada conectividad digital.

Palabras clave: Asentamiento Humano; Condiciones de Habitabilidad; Calidad de Vida.

INTRODUCTION

Life in the city of Banda de Shilcayo has been significantly affected by the uncontrolled expansion of informal urbanization. According to recent research, there are multiple factors contributing to this situation. Socio-spatial segregation is one of the main factors, which has a detrimental effect on important areas such as education, employment, and housing. Poor urban planning and a lack of adequate infrastructure in these informal settlements have worsened the precarious living conditions in the Shilcayo Band in Peru. In addition, rapid population growth has increased pressure on basic essential services such as water, sanitation, and electricity.^(1,2)

Due to increased informal growth and lack of planning, growing cities globally face significant changes in their territorial and social structure. Developing cities lack urban plans that meet the needs of their populations due to these changes, which are often not beneficial.⁽³⁾

The structure is disorganized and chaotic as a result of the lack of projects that promote improvements in lifestyle and housing conditions through urban guidelines for sustainable growth. In addition, there are many factors that impact the growth of cities, and without these urban guidelines, the expansion of cities is carried out in an uncontrolled manner due to the lack of adequate control and planning in land use.^(3,4)

In Peru during the 21st century, special attention has been paid to urban planning to improve the well-being of the population. This has been achieved through the implementation of policies and programs that promote the creation of sustainable, balanced, and inclusive cities that provide quality services and infrastructure to all inhabitants.⁽⁵⁾

Although there has been significant progress, considerable obstacles remain, such as the lack of collaboration between different levels of government, the lack of funds to implement urban design projects, and, above all, the continued neglect of marginalized groups.

According to urban planning analyses, the informal market exploits the housing needs of many people, which causes these problems. Therefore, it is concluded that in a society with limited state resources and exclusionary real estate markets, the most vulnerable sectors benefit from illegal squatting or irregular acquisition of housing.^(6,7)

In San Martín, particularly in the city of Banda de Shilcayo, informal urbanization in the Nadine Heredia Human Settlement has led to the proliferation of makeshift housing and inadequate building structures, which has increased vulnerability to potential flooding.

This has led to the deterioration of urban infrastructure and has had detrimental effects on living conditions. Informality has an impact on the social and economic spheres. The lack of skills and low productivity resulting from informality reduce tax collection, which in turn limits the formal economic growth of the district.

Based on the above, the research question is posed: What are the living conditions in the informal urban expansion in the Nadine Heredia Human Settlement, Banda de Shilcayo?

Therefore, the general objective of the study is to determine the living conditions in the informal urban expansion in the Nadine Heredia Human Settlement.

METHOD

The current research uses quantitative methods. In addition, the type of research is basic, as it seeks to examine the effects of unplanned urban expansion on living conditions, taking into account the objective elements that evaluate quality of life. The study has a quantitative, non-experimental design. In terms of its level of difficulty, the study is descriptive in nature.

Following the context of the study, the independent variable is informal urban expansion. Within this variable, the following dimensions are identified: use and zoning, urban structure, roads, and environmental pollution. Likewise, it is taken into account that the dependent variable is the living conditions in the Nadine Heredia Human Settlement, Banda de Shilcayo. Within this variable, the following dimensions are identified: housing and population.

The group of participants in this study will consist of men and women from the Nadine Heredia Human Settlement, Banda de Shilcayo. The population will be considered to be the Nadine Heredia Human Settlement in general, approximately 2,000 people.

As an inclusion criterion, individuals over the age of 18 will be considered to ensure that participants can give their informed consent and have an adequate understanding of the living conditions.

Those under 18 years of age and those residents who have lived in the area for less than 3 years will be excluded from the study population.

For a population of approximately 2,000 people, a sample of around 322 individuals will be needed to obtain representative results with a margin of error of 5 % and a confidence level of 95 %. Thus, the sampling used for the research will be probabilistic.

The following data collection techniques will be used in the research, such as questionnaires, and we will also use observation. The instrument to be used in this study will be the observation sheet, which will allow us to analyze and determine the living conditions in the informal urban expansion in the Nadine Heredia Human Settlement as a case study.

The data analysis method we will use will be tabulation as a resource for classifying and evaluating the information collected. This will simplify the organization of the data and findings obtained and enable the creation of tables and diagrams to optimize the interpretation and presentation of the research.

The study will be conducted in accordance with all the ethical standards required for this type of research. Turnitin anti-plagiarism software was used to ensure that the research project was completely original. Another important ethical aspect is that any information obtained from previous sources, such as research, journals, theses, or other documents, was correctly cited and referenced in accordance with ISO standards.

RESULTS

Materiales en muro	Cantidad	Porcentaje
Ladrillo	180	56%
Cemento	11	3%
Tapial	0	0%
Adobe	16	5%
Madera	110	34%
Otros	5	2%
Total	322	100%

Figure 1. Materials used in the walls of the houses in the Nadine Heredia housing development



Figure 2. Planimetry of materials used in the walls of homes in the Nadine Heredia housing development

Figure 1 shows the results obtained from the observation forms completed in the Nadine Heredia Human

Settlement, 2024. It shows the percentage of different materials used in the walls of the dwellings, with 56 % having brick as the predominant material in their walls, 34 % having wood as the wall material, 5 % having adobe as the wall material, 3 % having cement as the wall material, and 2 % having other materials in their walls.

Antigüedad	Cantidad	Porcentaje
0-5 años	0	0%
5-10 años	0	0%
10-15 años	322	100%
15 - más	0	0%
Total	322	100%

Figure 3. Age of homes in the Nadine Heredia neighborhood



Figure 4. Planimetry of the age of the homes in the Nadine Heredia neighborhood

Figure 3. shows the results obtained from the observation forms completed in the Nadine Heredia Human Settlement, 2024. It shows the percentage of the age of the dwellings, with 100 % being between 10 and 15 years old.

Usos de suelo	Cantidad	Porcentaje
Vivienda	301	93%
Comercio	16	6%
Municipalidad	0	0%
Salud	1	0%
Educación	1	0%
Culto	0	0%
Comisaría	0	0%
Otros	3	1%
Total	322	100%

Figure 5. Land use of homes in the Nadine Heredia neighborhood

Figure 5. shows the results obtained from the observation forms completed in the Nadine Heredia Human Settlement, 2024. It shows the percentage of the various land uses of the dwellings, with 93 % used for housing, 6 % for commerce, 1 % for other uses, 1 facility representing health care, and 1 facility representing education.

Servicios básicos	Cantidad	Porcentaje
Luz	322	87%
Agua	0	0%
Desagüe	0	0%
Internet	47	13%
Total	369	100%

Figure 6. Basic services in homes in the Nadine Heredia Human Settlement

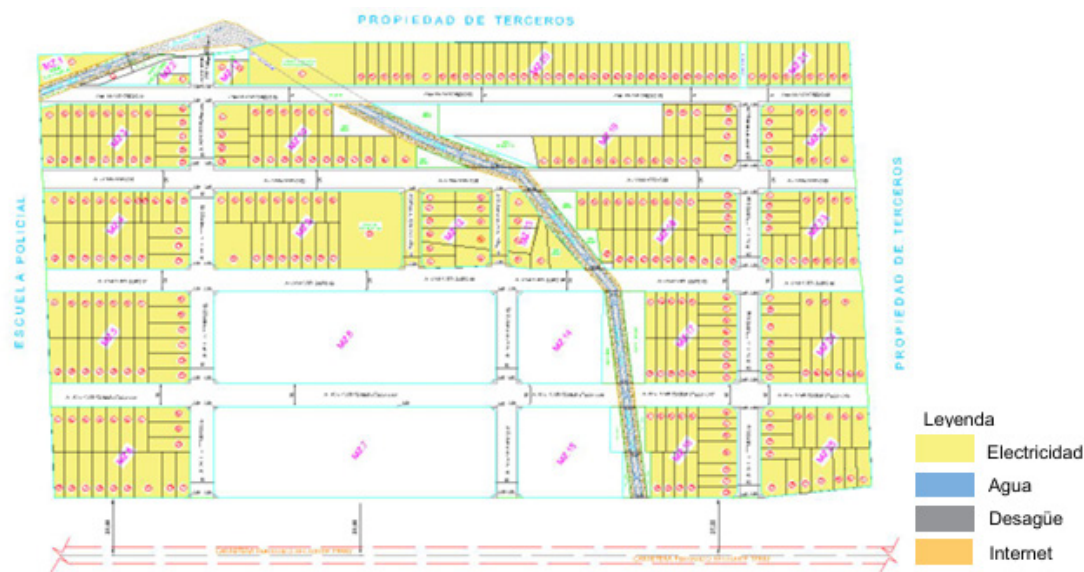


Figure 7. Planimetry of basic services in homes in the Nadine Heredia neighborhood

Figure 6. shows the results obtained from the observation forms completed in the Nadine Heredia Human Settlement, 2024. It shows the percentage of the various basic services available in the homes, with 87 % having electricity and 13 % having internet service.

DISCUSSION

To achieve the desired results through the study conducted in line with the overall objective of “Determining the living conditions of informal urban expansion in the Nadine Heredia Human Settlement,” a comprehensive study covering a sample of 322 homes in the Nadine Heredia Settlement revealed several problems related to informal urban expansion that directly affect the quality of life of residents. When analyzing living conditions, the following aspects stand out: Availability of basic services. One of the most critical problems identified in the study is the lack or instability of basic services such as drinking water, sewage, and electricity.

The results obtained in the Nadine Heredia Human Settlement show that brick is the predominant material for housing walls (56 %), followed by wood (34 %), while adobe, cement, and other materials represent smaller percentages. This finding reflects a trend toward the use of industrialized materials in peripheral urban contexts, which coincides with the findings of García et al.⁽⁸⁾ It has been reported that brick is the most widely used material in informal urban settlements due to its accessibility and relative durability in adverse weather conditions.

However, the significant presence of wood as a building material (34%) demonstrates a structural vulnerability in these dwellings. Previous studies have shown that the use of wood in walls is associated with an increased risk of fire and moisture damage, which compromises the safety of dwellings.⁽⁹⁾ Likewise, research conducted in settlements in Metropolitan Lima has identified that the choice of materials such as wood is mainly due to economic factors and local availability, rather than structural safety criteria.⁽¹⁰⁾

On the other hand, the low percentage of homes built with adobe (5 %) and cement (3 %) suggests a transition from traditional construction practices to more industrialized materials. Adobe, although historically used in rural areas due to its low cost and thermal properties, has been displaced in urban contexts due to its low seismic resistance .⁽¹¹⁾ Conversely, the limited use of cement may be related to its higher cost, which restricts

its adoption in low-income populations. These results suggest that socioeconomic conditions and resource availability are determining factors in the choice of building materials in human settlements.⁽¹²⁾

Secondly, the quality of infrastructure was recognized. Another alarming problem is the quality of housing, where a considerable number of buildings have been constructed with substandard materials, which, as a result, do not provide the required habitability conditions. In addition, Table 1 indicates that 56 % of homes are in fair condition. This not only affects the physical protection of residents, but also their health and mental well-being, due to the instability of their living conditions.

In this context, the World Bank notes that cities continue to expand in an informal and unsustainable manner, as low-income households are forced to opt for land occupation and self-construction in risky or remote areas of the city to meet their housing needs, compared to the existing supply of social housing. As previously indicated, 90 % of urban expansion in Peru over the last two decades has followed this model, which has resulted in poor living conditions and limited access to services for low-income families, as well as social and economic fragmentation, inaccessibility, pollution, and congestion.

The finding that 100 % of the dwellings in the Nadine Heredia Human Settlement are between 10 and 15 years old suggests a relatively recent consolidation process in the settlement. This data is relevant, as the literature indicates that the age of buildings is a determining factor in the assessment of structural safety and habitability.⁽¹³⁾ In informal urban contexts, homogeneity in the age of dwellings reflects processes of collective occupation in specific periods, which coincides with the findings of Calderón et al.⁽¹⁴⁾, who identified that human settlements in Lima tend to consolidate within 5 to 10 years after their initial occupation.

The concentration of dwellings within a relatively short age range may also be associated with dynamics of progressive self-construction. Previous studies have shown that, in informal settlements, housing is often built in stages, with structural and material improvements over time, depending on the economic availability of households.⁽¹⁵⁾ In this sense, the uniformity in the age of the dwellings could indicate that most families began their construction processes within the same period, probably linked to urban development policies or internal migration processes.⁽¹⁶⁾

On the other hand, the age of 10 to 15 years poses challenges in terms of maintenance and durability of the materials used. Research conducted in settlements in the Andean region has indicated that, after the first decade of use, self-built homes begin to show significant deterioration in walls, roofs, and sanitation systems, especially when low-strength materials are used.⁽¹⁷⁾ Consequently, this result highlights the need to implement comprehensive housing improvement programs aimed at ensuring safety and habitability in the medium and long term.

The social and community impact is considered a third aspect. Informal urban development has a significant social impact, which manifests itself in a shortage of urban infrastructure, such as green spaces and educational and health centers. The survey results indicate that residents perceive an insufficient presence of the State, which causes feelings of helplessness and marginalization. However, at the community level, support networks have been established among residents seeking to mitigate these deficiencies, although these informal solutions are not sustainable in the long term without adequate State intervention.

The predominance of residential land use (93 %) in the Nadine Heredia Human Settlement reflects the residential nature of this urban space, characteristic of human settlements in the process of consolidation. As Driant⁽¹⁸⁾ points, informal settlements in Latin America tend to prioritize land use for housing, relegating commercial uses and urban facilities to a secondary position. This pattern responds to the immediate need to address the housing shortage, which explains the low proportion of areas designated for other purposes.

The 6 % of dwellings with commercial land use reflects a trend toward functional diversification of the settlement. Previous studies have shown that the presence of commercial activities in residential areas constitutes a subsistence strategy for families, generating income and reducing travel costs.⁽¹⁹⁾ Likewise, research in settlements in Metropolitan Lima has identified that neighborhood commerce plays a fundamental role in the local economy and social cohesion by facilitating access to basic goods and services in contexts of limited urban infrastructure.⁽²⁰⁾

The existence of health and education services, although minimal, is significant, as the literature highlights that the presence of these services is an indicator of urban consolidation and an improvement in quality of life.⁽²¹⁾ However, the low proportion of services reflects a structural deficiency in settlement planning, which coincides with the report by Sabatini and Wormald⁽²²⁾, who point out that the absence of basic services and public facilities is one of the main constraints to the integration of informal settlements into the formal city. In this regard, the results highlight the need for public policies aimed at strengthening the provision of essential urban services. Access to basic services is a fundamental indicator of the level of urban consolidation and the quality of life of its inhabitants. In the Nadine Heredia settlement, the results show that 87 % of households have electricity, while only 13 % have internet access. This relatively high electricity coverage is consistent with reports from other urban settlements in Lima, where electrification is often one of the first services to be implemented due to its direct impact on the habitability and safety of homes.⁽²³⁾

The low proportion of households with internet access reflects a significant digital divide, which is consistent with studies indicating that lower-income sectors face connectivity limitations due to economic factors and insufficient telecommunications infrastructure.⁽²⁴⁾ This situation is even more relevant in the current context, where internet access has become an essential resource for education, work, and social participation.⁽²⁵⁾ In this sense, limited connectivity can deepen social inequalities and limit the population's opportunities for development. Various studies have shown that the provision of basic services in human settlements does not only depend on the population's quality of life.^(26,27)

The results obtained in this settlement highlight the need for comprehensive strategies that address both infrastructure and the affordability of services. A joint analysis of the results on building materials, age of dwellings, land use, and access to basic services reveals a pattern characteristic of human settlements in the process of consolidation: a predominance of intermediate materials such as brick, relatively new dwellings, predominantly residential land use, and uneven service coverage. This overview shows how socioeconomic conditions, progressive self-construction, and limited urban planning interact to shape an urban space with partial progress but still with structural deficiencies that affect the quality of life of its inhabitants.

CONCLUSION

The results obtained in the Nadine Heredia Human Settlement allow us to identify a characteristic pattern of urban consolidation processes in informal contexts: predominance of brick as a building material, dwellings with a homogeneous age of 10 to 15 years, mostly residential land use with incipient diversification towards commerce and basic facilities, as well as partial coverage of essential services, with electrification standing out in contrast to limited digital connectivity. Taken together, these findings reflect how socioeconomic conditions, progressive self-construction, and the absence of comprehensive planning condition the configuration of the settlement, generating advances in habitability but also persistent structural deficiencies that require attention from public policies aimed at urban equity.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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