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Design and management of social housing in hillside areas: guidelines for intervention in informal-origin neighborhoods in Bogotá

Diseño y gestión de vivienda social en zonas de ladera: lineamientos para la intervención en barrios de origen informal en Bogotá

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ABSTRACT In Bogotá, inadequate habitability conditions in self-produced housing within informally established neighborhoods persist as an unresolved challenge. Existing housing improvement programs are highly limited in scope, and the production of new housing units remains insufficient to facilitate the relocation of households residing in areas exposed to non-mitigable risk. This study aimed to identify design and management guidelines that could contribute to addressing these challenges, with a particular focus on neighborhoods located in hillside zones. The research involved an analysis of housing conditions and household characteristics, relevant regulatory frameworks, and public management instruments. Findings suggest that the most effective strategy is to densify underutilized single-story dwellings in deficient conditions by developing three-story buildings comprising a minimum of three compliant housing units. This approach offers a feasible solution for property owners, prospective beneficiaries, and private sector investors alike.

RESUMEN En Bogotá, las malas condiciones de habitabilidad en las viviendas autoproducidas en los barrios de origen informal, sigue siendo un problema no resuelto. Los programas de mejoramiento de vivienda son muy limitados, y adicionalmente, no se producen viviendas suficientes para reubicar los hogares en condición de riesgo no mitigable. Para la atención de estos problemas, se desarrolló una investigación dirigida a identificar lineamientos de diseño y de gestión que contribuyeran a su solución, con énfasis en los barrios localizados en zonas de ladera. Se analizaron las viviendas y sus familias, las normas aplicables y los instrumentos de gestión pública. Se concluyó que la mejor opción es aprovechar las viviendas de un piso en condiciones deficitarias, para desarrollar edificaciones de tres pisos, con mínimo tres viviendas cumpliendo la normativa. Esta es una opción viable tanto para los propietarios de los predios, como para beneficiarios de las nuevas unidades e inversionistas del sector privado.

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1. Introduction

In Bogotá, social housing and priority housing policies have focused on promoting formal housing production by developing projects on the city's outskirts. These homes have habitability deficiencies, including inadequate locations, small sizes, and prices unaffordable for low-income households. As in other Latin American cities, the informal housing supply is called upon to meet this demand, which worsens the quality deficit. This is because it produces a supply with serious habitability deficiencies due to poor construction conditions, inadequate natural lighting and ventilation, and overcrowding, which lead to various health problems (Orlando et al., 2023; Ceballos et al., 2015).

Given the deficiencies in the habitability of these homes and their surroundings, the city administration has implemented improvement interventions through the Comprehensive Neighborhood Improvement Program (PMIB). This program acts on the environment, legalizes settlements and property tenure, and implements housing improvement measures. About the latter, interventions in this century have focused mainly on two actions: on the one hand, improving habitability through finishes such as floors, roofs, kitchens, and bathrooms; and on the other, improving facades. These types of interventions do not guarantee the structural safety of the homes, nor do they resolve their construction deficiencies.

In response to this problem, research was conducted to identify design and management guidelines to address the quantitative and qualitative housing deficits in informal urban settlements. The Ciudad Bolívar locality was selected as the study area because it has a large population with a housing deficit. This demand is largely met by the informal sector. This research considered both the inhabitants of existing substandard housing targeted for intervention and the public and private sectors in its development and subsequent implementation. The starting point was knowledge derived from previous research and the research team's teaching experience. This exercise accounted for technical and regulatory requirements, as well as compliance with the attributes of adequate housing (United Nations [UN], 1991). Thus, design and management guidelines are proposed to address the quantitative and qualitative housing deficit faced by low-income households living in informal neighborhoods in hillside areas.

2. The housing problem in Bogotá in the Latin American context

In Latin America and the Caribbean (LAC), governments face challenges to economic, social, and political development due to three contradictions within the region's countries. First, there is growth with inequality and persistent poverty, because despite economic growth in several countries, its benefits have not been distributed equitably throughout society. Second, although the quantitative housing deficit has been reduced, poor households must settle in remote areas on the outskirts of cities, at a clear disadvantage, increasing their social and economic exclusion. Finally, there is democratization with high rates of violence, which shows that many countries face problems related to crime, urban violence, organized crime, and gender violence, hindering social, economic, and political development (Economic Commission for Latin America and the Caribbean [ECLAC], 2016).

Regarding the contradiction between deficit reduction and increased spatial, social, and economic segregation, it is recognized that the problem stems from the definition of housing policies based on inaccurate diagnoses of the housing deficit and the functioning of the land market. There is no good characterization of the construction sector, nor are there mechanisms to ensure the development of good quality projects, to name a few of its weaknesses (Garay, 2020). An example of this has been the implementation of social housing policies based on subsidy systems that enable poor households to purchase property, with housing units produced by private companies.

The widespread problem with these projects is their peripheral location, low quality, spatial characteristics that do not respond to household needs, and difficulties of access for poor households. This scheme requires savings and mortgage credit, which are

unfeasible because most people lack stable incomes and depend on informal-sector work (Rubio and Coronel, 2018). In this scenario, urban informality is indirectly encouraged by this public policy approach, becoming the spatial expression of urban poverty (Alvarez et al., 2019).

As a result, there are urban asymmetries that deepen socio-spatial segregation, a condition that is not limited to an economic phenomenon, since the way in which the state organizes the territory can contribute to increasing urban inequality to the detriment of poor households (Chanampa and Lorda, 2020). In this sense, the presence of informal settlements, also known as slums, shantytowns, favelas, or *barriadas*, is widespread in LAC cities, coexisting with formality despite following distinct logics (Rincón and Hernández, 2022). In this context, self-production of housing is the main form of land and housing production for poor households living in cities in the region (Di Virgilio, 2021a).

In the case of Bogotá, according to the 2018 census, the quantitative housing deficit amounted to 96,947 households and the qualitative deficit to 256,633 (DANE, 2018). The qualitative deficit is the most worrying, as it affects around 10% of households, most of which are low-income, and the most pressing issue is the mitigable overcrowding in 70% of their homes. Although the quantitative deficit was reduced by almost half compared to

the 2005 census data (DANE, 2005), which could indicate a certain efficiency of housing policy, the increase in the qualitative deficit to almost double the estimate at that time would suggest the opposite. One possible explanation for the significant reduction in the quantitative deficit is the sustained increase in informal supply, which continues to meet the housing needs of low-income households. This, together with the quality deficiencies observed in the production achieved there, would, in turn, explain the increase in the qualitative deficit (Ceballos, 2020).

This growth in informal settlements has continued for decades, with no possibility of being controlled, as a persistent phenomenon in the city since the middle of the previous century (Camargo, 2023). Self-built housing has not declined despite increased formal production, possibly not only because of fiscal constraints and rising poverty, but also because public housing policy favors large construction companies. This approach impacts poor households that are not interested in state-supported housing production, not only because of difficulties in accessing it, but also because of the advantages of self-construction (Cuervo Ballesteros and Jaramillo González, 2022). For these households, it is a better decision to invest in a plot of land on which they can build several floors and create several housing units that meet family needs or contribute to generating income, rather than buying a small apartment and going into debt with a bank for 20 years (Niño et al., 2023)¹ (Figure 1).

¹ It is estimated that a total of 444,738 properties have been developed, of which 97.4% (313,063 properties) were constructed without a building permit, while only 2.6% (8,357 properties) obtained a construction or recognition license. Of these constructions, approximately 39.4% were built using semi-confined masonry systems. Based on this distribution, it can be inferred that roughly 77.8% of these housing units do not comply with the seismic resistance requirements established under current regulations (CVP, 2020).



Figure 1: Panoramic view of Ciudad Bolívar, Bogotá, DC. (2021)

Thus, the city grows in a disorderly and precarious manner, with informal developments that tend to settle on hillsides, some at high geomorphological risk, in waterways, and/or in rural areas close to the urban area (Figure 2). The problems arising from these processes must be addressed through the PMIB and through resettlement programs for households at unmitigable risk. As for housing improvements, little budget is allocated, and very little impact is achieved regarding the problem at hand (Yunda et al., 2021).

The above demonstrates the importance of taking action in these areas and addressing them appropriately, since, in addition to infrastructure works, which are undoubtedly important for improving the quality of life of their inhabitants, attention to housing built with technical deficiencies must be a priority in public policy.

3. Methods

A mixed-method approach was adopted, combining documentary analysis, case studies, and participatory research. A study area was defined comprising the neighborhoods of Caracolí, Potosí, and Santa Viviana in the locality of Ciudad Bolívar, based on both relevance and availability of information (Figure 3). These neighborhoods share the characteristic of having been developed informally on steep slopes located on one of the southwestern edges of the city.

Caracolí and Santa Viviana are in an area adjacent to the municipality of Soacha, and Potosí is on the edge of the Cerro Seco Ecological Park (Figure 4).

Three phases were developed to identify design and management guidelines for social housing in informal hillside areas, which are outlined below:

Phase 1: This involved reviewing the urban, architectural, and technical conditions of the housing under study, contrasting them with the attributes of adequate housing: security of tenure, availability of services, materials, facilities, and infrastructure; affordability, habitability, accessibility, location, and cultural adequacy (UN, 1991). At the regulatory level, the standards applied to VIS and VIP in Bogotá were analyzed, as were the NSR-10 earthquake-resistance standard.

Six experts on the issues addressed in the research were also interviewed to gather their opinions on the subject based on their experience. The supply of VIS and VIP in Bogotá, 34 projects in total, was also reviewed to analyze the design proposals developed.

Phase 2: To analyze housing issues in terms of habitability conditions and household characteristics, information from 94 architectural surveys containing urban, architectural, and social data was used.

Phase 3: Based on the results from phases 1 and 2, design and management guidelines were identified, and a participatory workshop was held with residents of the study area to gather their opinions.



Figure 2: Sloping street in the Caracolí neighborhood. (2022)

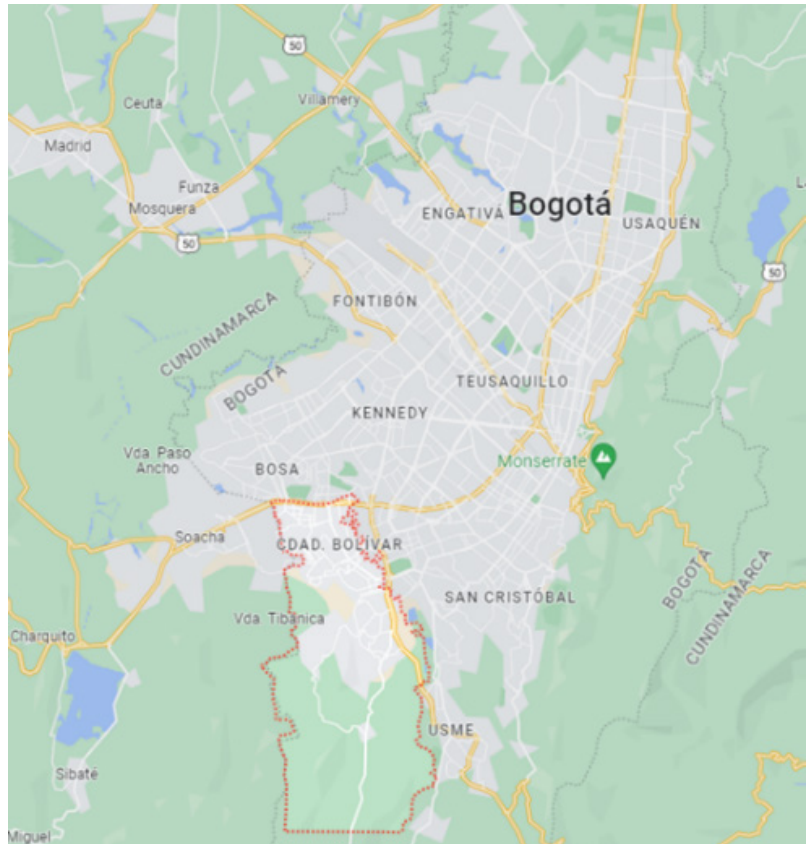


Figura 3: Location of Ciudad Bolívar, Bogotá, DC. Google Maps (2023)

The guidelines for the social and financial management strategy were based on an analysis of district programs that finance both new home purchases and home improvements. The program for the resettlement of households living in areas of unmitigable risk was also reviewed. The proposed alternative was submitted for consultation through three opinion polls: residents of the study area, officials from the Caja de la Vivienda Popular CVP (Popular Housing Fund), and construction entrepreneurs in Bogotá.

4. Results

4.1. Housing improvement regulations and programs in Bogotá

In the case of Bogotá, two regulations have a significant impact on the development of housing improvement programs. The first is Decree 555 of 2021 (Mayor's Office of Bogotá, 2021), which concerns comprehensive improvement measures for legalized neighborhoods of informal origin. Regarding urban planning guidelines, a maximum height of three stories is allowed on slopes greater than 12% (art. 338), which applies to neighborhoods developed on hillsides where slopes are often steeper than that. At the architectural level, a minimum area of 42 m² is required for VIP VIS (art. 384). Natural ventilation and lighting are required for living spaces, allowing for overhead lighting and ventilation through ducts for bathrooms and kitchens (art. 337). Similarly, regulations are in place for the resettlement of families, giving priority according to the imminence of the risk and determining when immediate and/or temporary relocation is required (art. 386, no. 2).

The second standard to highlight is the Colombian Seismic-Resistant Construction Regulation NSR-10 (Ministry of Environment, Housing, and Territorial Development of Colombia, 2010), which sets minimum requirements for safeguarding human life in the event of a strong earthquake. For homes in legalized informal neighborhoods, owners can legalize their buildings by complying with the requirements established in the comprehensive improvement process. This procedure, called Recognition of the Existence of Buildings, establishes the obligations for structural adaptation or reinforcement.

On the other hand, according to Chapter E1, Section E.1.3.4.3, seismic joints are required for slopes greater than 30%, and in E2, Section E.2.1.2, a geotechnical study is required for soil with slopes greater than 30%. These two requirements are noteworthy because it is not feasible for homeowners on this type of slope to assume the costs, which can impede access to housing improvement subsidies.

As noted above, even though these regulatory provisions recognize the need for interventions in legalized informal settlements, they impose technical requirements that are unfeasible for most homes. For example, the requirement for geotechnical studies and seismic joints on land with slopes greater than 30% increases costs beyond what a renovation subsidy can cover. This would explain why district programs tend to be limited to superficial interventions—facades or finishes—neglecting critical problems such as structural risk and overcrowding.

After consulting experts, it was concluded that moderate densification is feasible through interventions in homes with qualitative deficits. Thus, it is possible to improve their conditions and expand the housing stock to serve households in unmitigable risk conditions that need to be relocated. Regarding NSR-10 and construction on hillsides, in addition to the provisions of that standard, it is necessary to consider drainage between party walls



Figure 4: Potosí and Caracol neighborhoods, Ciudad Bolívar. SINUPOT(2023)

to address runoff, which, if not properly managed, can generate moisture in homes. Regarding technological innovations for reducing costs in the construction of social housing, it was concluded that advances do not yet make their applicability feasible in the contexts of the MIB (A. Florián, personal communication, march 16, 2022; M. Ruiz, personal communication, march 18, 2022; J. Torres and E. Pérez, personal communication, march 29, 2022; M. Carrizosa, personal communication, march 9, 2022; H. Molina, personal communication, april 12, 2022; C. López, personal communication, april 5, 2022).

Based on the results presented, it was determined that the intervention guidelines should include architectural-level actions that complement urban-level improvement interventions to close the gap between informal settlements and self-managed housing in formal housing production. In relation to the regulatory provisions analyzed regarding legalized informal neighborhoods included in the comprehensive improvement process, guidelines were identified to define interventions to improve living conditions in accordance with regulatory requirements. There is also a need to consider several architectural program alternatives consistent with the diversity of existing homes. This applies both to homes with a qualitative deficit and to the quantitative deficit arising from the need to address households that must be resettled due to unmitigable risk.

4.2. Housing in the study area

Analysis of the 94 available architectural surveys of housing in the study area found that 46% are overcrowded, with 3-11 people per room. Furthermore, 28% of the homes in the sample are located in risk areas. Regarding construction issues, 100% of the homes did not comply with NSR-10, 29% used poor-quality materials, and 33% experienced building subsidence. These results highlight the shortcomings of the approach to housing improvement in terms of construction finishes or facades, as well as the economic unfeasibility of carrying out reinforcement work to comply with NSR-10, as this would entail a high investment that could exceed the costs of new construction. Serious problems, such as overcrowding per room and the serious risk of building collapse in the event of an earthquake, are not addressed (Figures 5 and 6).

Among households living in the dwellings analyzed, 44% are nuclear households, mostly with two or three children, followed by families with one child, and a minority with four or more children. Next are intergenerational households (i.e., families with grandparents, parents, and children), which represent 23% of the sample. Within this type of household, the largest groups are those with 6-8 people, reaching up to 11 members (Table 1). In some of these dwellings, several households with blood ties may live together,

indicating overcrowding. This is the case of children who form their own households and continue to live with their parents.

Single-parent households account for 19%, with the mother being the head of the household in almost all cases. In terms of the number of members, 84.4% have 2 or 3 members. Next in frequency (8%) are single-person households of women aged 39-75. Finally, there are couples (6%) aged between 38 and 60. In these last two types of households, it is worth noting the existence of households of older adults who, in many cases, suffer from extreme poverty and live in very precarious conditions.

The above led to the conclusion that the best alternative is to demolish the single-story self-built houses that present the problems described, including those built with non-permanent materials, in order to develop new houses that guarantee safety in the event of an earthquake and good living conditions. In this way, it is possible to comprehensively address the qualitative deficit of self-built housing and contribute to addressing the quantitative deficit by producing new housing solutions through moderate densification. About the identified household compositions, there is a clear need to consider different architectural housing programs and management strategies to address the qualitative or quantitative housing deficit.

5. Guidelines for the design and management of housing in informal neighborhoods

Based on the results, guidelines for design and management were defined to address the housing deficits identified in the research. Taking into account that the objective of the research is to contribute to the solution of the qualitative and quantitative housing deficits in informal neighborhoods located on hillsides, the following was proposed:

Property-by-property intervention: in hillside areas, topographical conditions with slopes greater than 20% make it unfeasible to encompass properties due to technical requirements and costs. Furthermore, because the stages of progressive construction in this type of neighborhood are asynchronous, it is not feasible to find blocks in which all or some adjacent buildings have the same floor. In this sense, intervention is contemplated for 6m x 12m properties, which are typical of lots in Bogotá's informal neighborhoods.

Focusing the intervention on substandard single-story dwellings: Evidence of low or even total non-compliance with NSR-10, in addition to the existing habitability problems in the dwellings analyzed, leads to considering the feasibility of demolishing these buildings and constructing new ones that

comply with quality standards and regulations. Additionally, this facilitates high-rise construction to develop several housing units that can meet the demand for households to be resettled from areas of unmitigable risk, as well as the deficit associated with overcrowding in homes in these areas.

Definition of minimum areas for different architectural programs: The design guidelines for defining minimum areas were established based on the principle of adaptability to the types of households identified, considering nuclear, extended, or single-parent households consisting of between three and six members, which correspond to 81% of the households in the sample (Table 1). The area of 72 m² of the lot in question, leaving a rear setback of 12 m (2 m minimum side required by the standard for a 6 m frontage), gives an area of 60 m² from which 6 m must be deducted from the fixed point for a buildable area of 54 m² per floor. This area is sufficient for a home with up to three bedrooms, a multipurpose bathroom, kitchen, and social area. The design of a multipurpose bathroom is considered, with each service independent so that it can be used by three people at the same time. Thus, a second bathroom is not required, which reduces costs. Now, in households with three or fewer members, a space within the dwelling can be allocated for generating income. In the case of single-person households and/or couples without children, it is also possible to consider 27 m² studio apartments, aimed more at young couples without children or vulnerable older adults.

Building height: In this regard, three stories were considered to maintain an appropriate scale with respect to the average 6m road profile in the neighborhoods studied. Thus, it would be possible to develop three to four independent dwellings.

To gather opinions on the design guidelines and determine possible adjustments, a workshop was held with 21 residents of the Caracolí neighborhood. A 1:50-scale model was used to illustrate and explain the proposed guidelines. The level of acceptance of the proposal was assessed using a “traffic light” system with post-it notes, allowing red, yellow, or green stickers to be placed in different spaces depending on whether the proposal was disliked, viewed with indifference, or liked (Figure 7). As a result of the workshop, a high level of acceptance of the proposal was identified.

The management focused on two types of households: the owner of the homes to be renovated and the beneficiary households that will have access to a solution to their housing problem. Within these households, several types of households are considered according to their characteristics, with the following proposals:

Homeowner

- Elderly only: payment with social benefits, half pension, and improvement of their living conditions. They must transfer ownership rights to the district, but will retain their usufruct rights.



Figure 5: Left. Interior of a home in Ciudad Bolívar. (2022)



Figure 6: Right. Structural and construction deficiencies. Housing in Ciudad Bolívar. (2022)

Percentage of households	Type of household	Number of people
15,20	Nuclear	3
30,40	Nuclear	4
30,40	Nuclear	5
24	Nuclear	6 or more
100		
11,75	Intergenerational	3
11,75	Intergenerational	4
76,50	Intergenerational	6 or more
100		
26,30	Single parents	2
58,10	Single parents	3
5,20	Single parents	4
10,40	Single parents	6 or more
100		

Table 1: Distribution of households by number of members. (2022)

- Nuclear households may choose to sell their real estate rights for high-rise construction or retain ownership of the new units with access to mortgage credit, as long as the units become part of a program to generate rental housing units under the district's responsibility. The mortgage would be paid with the rent.
- Households with consanguinity in quantitative deficit due to cohabitation: In working-class neighborhoods, it is common practice for the children of homeowners to continue living with their parents after forming their own households. Thus, two or more households are cohabiting in the same housing unit. The owner household can transfer property rights to their children so that each household can access a home built on the same property, thereby improving their living conditions.

Beneficiary household

- Households of older adults are highly socially and economically vulnerable, consisting of one or two older adults with no permanent income or family support. In this case, it would be exclusively a protected rental program.
- Household benefiting from the resettlement program: This corresponds to households that must be relocated because they live in areas of unmitigable risk. They can receive subsidies of up to 90 SMMLV (minimum monthly legal wage), which could help close the project's finances. The management can consider granting them home ownership or protected rental housing.
- Households with blood ties and a quantitative deficit due to cohabitation: In this case, each new household could apply for a new housing subsidy and credit to invest in the construction of additional floors in their parents' homes, to obtain independent housing units.

To validate these management proposals, several opinion polls were conducted, including public officials, residents of the neighborhoods where the homes were analyzed, and construction entrepreneurs. The consultation with CVP officials was attended by 11 officials from the entity. Ninety-one percent considered it feasible to develop a housing program for the elderly in neighborhoods of informal origin. Sixty-eight percent considered it feasible to grant subsidies for new housing to households with blood ties living in the same dwelling so that they could build on the same property, and 63,6% considered it feasible to increase the supply of VIP for the resettlement of vulnerable households in legalized informal neighborhoods through moderate densification programs.

6. Discussion

For the consultation with residents of the neighborhoods in the study area, responses were obtained from 24 heads of households who owned their homes, of whom 91% said it would be feasible to develop a three-story building so that their children could live on the other two floors, assuming the mortgage payments and applying for new housing subsidies. Also, 58% considered it feasible to continue owning the homes developed on the three floors by paying a 20-year mortgage, while 42% would prefer to receive a payment for transferring their building rights. Among older homeowners who live alone and do not receive an old-age pension, 87,5% would accept two small apartments as a condition for allowing the construction of a three-story building on their property, renting one and living in the other.

The consultation with construction entrepreneurs was attended by 17 entrepreneurs. Eighty percent consider it feasible to participate in a program of moderate densification, property by property, in neighborhoods of informal origin that have been legalized within the framework of corporate social responsibility, recognizing that, although they would have low profitability, the social impact would be very positive. To get involved, they would be interested in a minimum of 20 properties designated for the development of these buildings.

In Latin American cities where neighborhood and housing improvement programs have been developed, interventions at the urban scale focus on the availability of services, materials, and infrastructure. The location improves as urban health and education facilities are developed, thereby raising the quality of life of the neighborhoods served (Ortiz and Di Virgilio, 2020; Torres-Tovar et al., 2013; Di Virgilio, 2021b; Salazar and Vázquez, 2021). However, not all the conditions for adequate housing are met, as very few programs aim to improve housing on an architectural scale, instead prioritizing improvements to the surrounding environment and leaving residents to intervene through self-managed processes. Some programs contemplate improvements to facades and sanitary modules, interventions to address construction pathologies, and the expansion of housing spaces, all of which can help address overcrowding (Motta, 2018). Innovations to address this problem face not only technical challenges but also significant uncertainty in residents' lives and the complexity of urban intervention processes (Motta, 2018).

In the case of Bogotá, the research highlights some structural and regulatory limitations of current housing improvement policies in informal neighborhoods, especially in hillside areas. It finds



Figure 7: Workshop with the community of the Caracolí neighborhood, Ciudad Bolívar. (2023)

that existing district programs tend to focus on interventions such as finishes or facades, without addressing critical problems such as structural instability, overcrowding, or seismic risk, which are particularly serious in self-built housing. As a result, these dwellings fail to meet attributes such as habitability. The impossibility of complying with regulations such as NSR-10 without incurring costs exceeding the value of new construction underscores the need to rethink the traditional approach.

Households that must be resettled because they occupy areas of unmitigable risk and are forced to move to another neighborhood or sector of the city suffer significant impacts due to the loss of social ties and family and community support networks. For this reason, the property-by-property intervention, which takes advantage of single-story homes to construct three-story buildings, increases housing supply. In this way, these households can be served by guaranteeing their permanence in their neighborhoods, as a technically and socially viable strategy.

The proposed alternative focuses on attributes of adequate housing, such as habitability. It allows moderate densification that addresses quantitative and qualitative deficits while maintaining the neighborhood's social structure in terms of affordability and cultural adequacy. Validation through interviews and surveys with residents, public officials, and businesspeople indicates strong support for the proposal, highlighting the potential participation of various actors in housing co-production schemes.

Likewise, the diversity of households in the sample—nuclear, extended, single-parent, and single-person households, with a high presence of vulnerable older adults—underscores the urgency of a flexible design approach that is sensitive to family composition. The design and management guidelines incorporate this diversity by proposing multiple options for area and organization, including the possibility of generating income through rent, based on the household's affordable housing expenses.

Finally, it is recognized that the right to housing cannot be understood without linking it to the right to the city, understood as the possibility for all inhabitants to participate in the configuration of their spaces (Lefebvre, 1968). Also, as the right to access not only urban goods and services, but also the processes of space production (Harvey, 2008), which the proposal presented here would be betting on.

7. Conclusions

This paper highlights several paradoxes in housing policy in informal contexts in Bogotá: on the one hand, safety and quality standards aim to protect the population, but on the other hand, compliance with

them results in higher costs that ultimately exclude low-income households. Similarly, improvement programs aim to reduce the qualitative deficit, but their limited scope to finish reinforces structural precariousness and seismic risk.

In this context, self-built housing in informal neighborhoods on hillsides has serious structural and habitability deficiencies due to the conditions involved in construction in such areas, especially on steep slopes, which are not addressed by current public improvement programs. Additionally, these programs are insufficient to address problems such as overcrowding, seismic risk, and poor construction quality.

Harnessing the potential of single-story homes, including those built with non-permanent materials, and replacing them with three-story buildings, with several alternatives tailored to different types of households, represents a viable and strategic option. This solution improves quality of life, complies with current regulations, and allows for controlled densification. Intervention on a property-by-property basis, adjusted to local topographical and regulatory conditions, facilitates the technical viability and social acceptance of the project and promotes private sector participation.

Considering units with one to three bedrooms, multifunctional bathrooms, and adaptable spaces contributes to better livability and allows for addressing both qualitative and quantitative deficits. This allows for greater attention to household diversity through a flexible architectural design sensitive to their needs.

The coordination between owners, beneficiary households, the state, and the private sector, under innovative management schemes, enables sustainable housing solutions. It is a scalable and replicable proposal for other areas with similar conditions, constituting an innovative contribution to overcoming existing paradoxes.

Incorporating these guidelines into public housing policies would enable structural intervention to address the housing deficit in informal contexts, thereby reducing urban segregation and improving socio-spatial equity. Recognizing the diversity of family types and incorporating protected income or differentiated credit schemes would allow for the construction of housing solutions that are more equitable, sustainable, and sensitive to local realities.

This proposal is innovative in that it proposes property-by-property intervention as an intermediate strategy between informal self-construction and large housing projects. It thus challenges the model of subsidies for the purchase of new housing. It proposes moderate densification as a way to redistribute land value and expand the housing stock without displacing original inhabitants.

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9. Bibliographic references

- Alcaldía Mayor de Bogotá, D. C. (2021). *Decreto 555 de 2021. Por el cual se adopta la revisión general del Plan de Ordenamiento Territorial de Bogotá D.C.* <https://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=119582>
- Alvarez, M., Montero, S. y Santamaría, S. (2019). *Hacia ciudades incluyentes, el ODS 11 y el reto de la segregación socioespacial en América latina. Centro de los Objetivos de Desarrollo Sostenible para América Latina y el Caribe (CODS).* <https://cods.uniandes.edu.co/wp-content/uploads/2019/12/Documento-CODS-Ciudades-Sostenibles.pdf>
- Camargo, A. (2023). Metropolitización y crecimiento informal: Dinámicas de movilidad residencial intrametropolitana en Bogotá y los municipios aledaños. *Eure*, 49(148). <https://doi.org/10.7764/eure.49.148.06>
- Ceballos, O. (2020). La producción de vivienda subsidiable y la política integral del hábitat en Bogotá 2007-2017. *Informe especial, Bogotá Cómo Vamos, Bogotá.* <https://bogotacomovamos.org/la-produccion-de-vivienda-subsidiable-y-la-politica-integral-del-habitat-en-bogota-2007-2017/>
- Ceballos, O., Vega, R., Fernández, A., Martínez, J., Ferney, R., Londoño, O., y Giraldo, C. (2015). La habitabilidad y la salud en Colombia: Una propuesta metodológica para su análisis. *Bitácora Urbano Territorial*, 25(1), 31-41.
- Comisión Económica para América Latina y el Caribe [CEPAL]. (2016) *La matriz de la desigualdad social en América Latina*. CEPAL.
- Cuervo Ballesteros, N. y Jaramillo González, S. (2022). *Persistencia y nuevas manifestaciones de la autoconstrucción de vivienda en Bogotá*. Universidad de los Andes, Facultad de Economía, CEDE.
- Chanampa, M. y Lorda, M. (2020). Asentamientos informales y regularización urbana. La producción de territorialidades en tensión. *Bitácora Urbano Territorial*, 30(1), 141-150. <https://doi.org/10.15446/bitacora.v30n1.69896>
- DANE. (2005). *Censo general 2005*. Departamento Nacional de Estadística.
- DANE. (2018). *Boletín técnico: Déficit habitacional. Censo nacional de población y vivienda*. Departamento Nacional de Estadística.
- Di Virgilio, M. (2021a). Participación social y gestión del hábitat: Formas y tipos de participación en la experiencia de América Latina. *Revista de Reflexión y Análisis Político. Postdata*, 26(1), 11-46. <https://www.redalyc.org/journal/522/52272887001/html/>
- Di Virgilio, M. (2021b). Desigualdades, hábitat y vivienda en América Latina. *Nueva Sociedad*, (293). <https://nuso.org/articulo/desigualdades-habitat-y-vivienda-en-america-latina/>
- Garay, A. (2020). Agendas de políticas de vivienda e infraestructura en América Latina: diez errores frecuentes en el diseño de la política habitacional (dossier). *Revista Estado y Políticas Públicas*, 21-38. <https://repositorio.flacsoandes.edu.ec/bitstream/10469/16450/1/RFLACSO-EPP15-2-Garay.pdf>
- Google Maps. (2023). *Captura de pantalla mapa de Bogotá, localización Localidad Ciudad Bolívar.*
- Harvey, D. (2008). El derecho a la ciudad. *New Left Review*, 53, 23-40
- Lefebvre, H. (1968). *El derecho a la ciudad*. Península.
- Ministerio de Ambiente, Vivienda y Desarrollo Territorial de Colombia. (19 de Marzo de 2010). *Reglamento colombiano de construcción sismo-resistente NSR-10. Decreto 926 de marzo 19 de 2010.* <https://www.unisdr.org/campaign/resilientcities/uploads/city/attachments/3871-10684.pdf>
- Motta, J. M. (2018). Procesos de mejoramiento del hábitat y la vivienda en Latinoamérica: La participación como instrumento de producción de la ciudad. *Gestión Urbana*, 2(3), 27-57. <https://publicaciones.sociales.uba.ar/index.php/cuestionurbana/article/viewFile/5185/4316>
- Niño, C., Chaparro, J., López, W. y Jiménez, L. J. (2023). *Bogotá hecha a mano. Barrios autoconstruidos, una gesta social y cultural*. Instituto distrital de patrimonio cultural. https://idpc.gov.co/publicaciones/descargas/2023/Bogota_hecha_a_mano.pdf
- Organización de las Naciones Unidas [ONU]. (1991). *Observación general N.º 4 sobre el derecho a una vivienda adecuada.* <https://defensoria.org.ar/normativas-cdh/observacion-general-n4-aprobada-por-el-comite-de-derechos-economicos-sociales-y-culturales/>
- Orlando, L., Vives, A., Valdebenito, R., Cortinez, A., Baeza, F., y Rasse, A. (2023). "Mi vida va a ser mucho mejor de lo que ha sido": Estudio cualitativo sobre el vínculo entre regeneración de viviendas sociales, calidad de vida y salud.

- Cadernos de Saúde Pública*, 39(5). <https://www.scielo.org/article/csp/2023.v39n5/e00149822/es/>
- Ortiz, C., y Di Virgilio, M. (2020). Laboratorios de Vivienda (LAVs): Asentamientos precarios y vivienda social: Impactos del COVID-19 y respuestas. *Urban Housing Platform*. <https://discovery.ucl.ac.uk/id/eprint/10106201/>
- Rincón, M. y Hernández, J. (2022). Urbanización informal en Bogotá, entre la teoría y la política urbana. *Urbe. Revista Brasileira de Gestão Urbana*.
- Rubio, J. y Coronel, J. (2018). La tendencia de vivienda propia desde una perspectiva de género. *Cuestiones Económicas*, 28. <https://estudioeconomicos.bce.fin.ec/index.php/RevistaCE/article/view/259>
- Salazar, B., y Vázquez, L. (2021). Percepción de la calidad de vida en la vivienda: Periodo de contingencia por COVID-19 en la ciudad de Xalapa-México. *ACE: Architecture, City and Environment*, 16(46), 9492. <https://doi.org/10.5821/ace.16.46.9492>
- Secretaría Distrital de Planeación. (2024). *Sistema de Información POT – SINUPOT. Alcaldía Mayor de Bogotá*. <https://sinupot.sdp.gov.co/>
- Torres-Tovar, C. A., Rincón-García, J., Vargas-Montero, J., y Amaya-Medina, N. (2013). Hacer del mejoramiento barrial y urbano una política pública estratégica para la superación de la pobreza. *Bitácora Urbano Territorial*, 23(2). <https://revistas.unal.edu.co/index.php/bitacora/article/view/42413>
- Yunda, J., Ceballos, O., & Rincón, M. (2021). The challenge of low-income housing quality in Latin American cities: Lessons from two decades of housing policies in Bogotá. *Housing Studies*. <https://doi.org/10.1080/02673037.2020.1867080>