

Urban growth by fragments. Consolidation and land value in peripheral areas resulting from housing policy in Córdoba, Argentina

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ARTICLE INFO	ABSTRACT
Received: January 8, 2023	The study of the consolidation of built-up areas in the periphery of cities is interesting because it is linked to the differential forms of access to land, services, urban facilities, workplaces, and daily mobility for the inhabitants. The research identifies the locations of public housing in Córdoba city and the transformations that were produced in the physical morphology of the surroundings during a decade. Land uses, the level of building consolidation, and the dynamics of land prices in the surrounding areas lead us to reflect on the evolution of social housing areas as urban fragments built on the periphery. The objectives of the study are to recognize the effects of housing policy location in urban development and to discuss the sustainability of the urban-growth model. In the context of the increasing commodification of the city, this development pattern intensifies socio-territorial inequalities derived from the location of low-income families in scattered outlying areas.
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1. Introduction, the research problem

The objective of the research is to recognize the transformations in the edge-expansions derived from the location of public housing projects and to inquire about the sustainability of this type of urban-growth model by discontinuous fragments. The study identifies the locations of large-scale housing neighborhoods in the city periphery and examines the conditions derived from the particular development in each area. Also, the transformations in the neighborhood's physical morphology. It recognizes their dynamics and evolution in a period that goes from materialization (between 2003 and 2008) to 2018.

The dispersed urban form in Latin American cities is the product of powerful public-private dynamics of occupation and hierarchical requalification of land (Cuenya, 2016) whose material results are mainly exclusive urban developments. As a consequence, central areas of the city requalify and the periphery expands promoting exclusive gated communities. In previous works (Marengo, 2021) it is mentioned that since the 1990s, the periphery of Latin American cities has been associated with a more divided urban space. Social inequalities are manifested in the physical form. Dual, polarised, and closed residential areas are built next to impoverished places that gather vulnerable populations, poverty, and low levels of public investment in services and infrastructure.

Numerous authors (Fernández Wagner, 2015; Barretto, 2018; Rolnik, 2017) point out that housing policies after the first decade of the 21st century in Latin America have been characterized by a process of housing commodification. In this work, this question is related to the high value of land in the market, and as a consequence, the impossibility for large sectors of the population to access developable land and housing. In Córdoba Argentina, the spatial growth pattern is characterized by low densities, discontinuous expansion of urban form, spatial fragmentation, and the intensification of residential segregation (Marengo, 2021).

Public housing policies have (as a condition for making investments) the management of low-cost land to be urbanized. This has implications for the expansion of built-up areas due to the low-cost land located on the outskirts. The result is the growth in leapfrog, in a discontinuous way, made by fragments and without the conditions of urbanity that consolidated areas have.

The processes of hierarchical requalification of land result in the reproduction of low-quality urban areas relegated to housing policy. This condition is evident, for example, in the development of the Federal Housing Programs (in the first decade of the 21st century) where the reactivation of the economy after the deep crisis in the country and the generation of new jobs prevail as a central objective of the housing policy. As Fernández Wagner (2015) mentions, the demands of compliance with deadlines in the execution of programs (to which costs and budgets are added) affect the management of developable land and result in peripheral locations of projects, where land values were fewer than consolidated areas. The author points out that since 2002, "the incidence of land value in the final price of the dwellings materialized through public policies, increased from 10% to 40%" (p. 85). Paradoxically, it did not mean better locations, but rather highlighted the speculative management of land supply and the difficulty in locating social housing in the consolidated city. The result: greater extensions in the process of low-density urban growth, peripheral enclaves for social housing location (Fernández Wagner, 2015; Marengo and Elorza, 2018), and deepening of socioeconomic residential segregation in the city periphery (Marengo, Elorza, and Sosa, 2019; Sabatini, Wormald, and Rasse, 2013).

The study of the process of consolidation of built-up areas in the periphery of cities derived from housing policy is of interest insofar as the location is linked to a certain structure of opportunities in the urban space. That is to say: probabilities of access to goods, services, or the performance

of activities, that are significant for the daily reproduction of people and households (Katzman, 1999). Location conditions in a certain city area are associated with different forms of access to land, services, urban facilities, workplaces, mobility (private or public transport), and the type of habitat in which people choose to live (Di Virgilio and Perelman, 2014).

Accessibility to places depends largely on the possibility of individuals accessing to urban-land market, and paying for a certain location. Land values represent the opportunities that certain territories have. Thus, location is one of the most significant variables to provide spatial quality considering the different residential areas materialized through public policies.

The research relies on analyzing the consolidation of built-up areas, urban morphology, and evolution of land values. The methodology is based on comparative analysis and looks to identify the differences in the morphological consolidation of the neighborhood cities' surrounding areas and the physical pattern of land use. It is based on primary sources of information such as observations and registration in the neighborhoods, and secondary sources through the survey of information available in various formats. Data on housing programs was provided by state institutions, such as the Municipality of Córdoba, the Ministry of Social Development of the Province, as well as Spatial Data Infrastructure of Córdoba Province (IDECOR), which were consulted for the analysis of dynamics of land value (2008-2018). The systematization of the data collected for the study cases is based on Geographic Information Systems (QGIS Software). Satellite image (Google Earth) and its application tools, ex. Google Street View tours) are also incorporated.

2. Public housing policy in Córdoba and the case study: The Neighborhoods-City

In the 21st century, the city of Córdoba has sustained a growth process characterized by the significant extension of the urban form, the physical fragmentation of the new residential developments, and the configuration of edge areas that present unequal conditions in terms of urbanity and residential quality (Marengo, 2015). The development of public and private housing projects in the periphery includes various actors (development companies, associations, cooperative entities, the State at different levels, and individuals who produce their housing formally or informally, among others). In a context characterized by the commoditization of land and housing, the consolidation of peripheral areas presents different degrees of urban dynamics (Marengo, Elorza, and Sosa, 2019). These areas configure new locations in which, places of opportunity are assembled with other pre-existing ones and also observed conflicting interests due to urban-land access among the different actors that intervene.

As Iracheta (2020) mentions: for economic actors the “exchange value” of land predominates over the “use value”. Strictly economic interests take precedence in determining urban policies in almost all Latin American cities and asymmetries between social groups in accessing the benefits of consolidated areas have deepened (p.146).

During the last two decades, various housing developments promoted by the real state for high-income sectors (in the forms of gated communities, or towers) and by the State (through subsidized housing programs), have materialized in Córdoba periphery.

One of the most impactful in recent years is the program called “My House, My Life” (MHML) executed between 2003 and 2010 by the provincial government with resources from a loan from the Inter-American Development Bank. The program has had a significant impact in quantitative terms¹; however, socio-territorial inequalities linked to the process of urban growth,

¹ The program meant the construction of 9870 housing units for the relocation of families living in 40 slums (informal occupations) in the city of Córdoba (34% of informal settlements in 2010).

and difficulties in accessing housing by large sectors of the population persist. During the first years since the inauguration of the neighborhoods, we identify that although some indicators of quality of life were improved (related to sanitary conditions, or the material conditions of the dwellings), the minimum dimensions of housing typologies (two bedrooms and 42 square meters), reproduced conditions of critical overcrowding. Mono-functional² land use and socio-spatial homogeneity in these areas were reinforced by the concentration of extreme-poverty population in public housing neighborhoods (Marengo and Elorza, 2018).

More than 15 years after the materialization of the program, the study of the housing policy presents the opportunity to reexamine those location decisions and confront them with the evolution of urban development dynamics in the period.

The program includes neighborhoods and neighborhoods-cities. The latter is made up of more than 250 individual dwellings. In these cases, the program incorporates community equipment (schools, health centers, police posts, and neighborhood shops). These interventions were 11 in total. Under this modality, 52% of the houses were developed.

This paper analyzes the transformations in the physical surroundings of the neighborhoods-cities during the period (2008-2018). The socio-spatial configurations related to the location and the evolution of the physical morphology allow the recognition of different types of situations. The analysis considered: a) the conditions of the surrounding area at the time of materialization and the temporal evolution of them (for this the context includes the degree of building consolidation, land uses, type of neighborhood, and nearby housing); and b) the evolution of urban-land values in peripheral locations, both in the neighborhoods and in the immediate areas nearby.

The location of the social housing neighborhoods makes it possible to identify socio-territorial dynamics with spatial qualities and differential morphologies derived from certain specific locations in the urban structure. The systematization also allows the identification of new qualitative variables considered useful to be analyzed through in-depth interviews with the different actors in the territory, in progress now.

3. Location, immediate context, and levels of consolidation

The MHML program was aimed at relocating the population of shantytowns, which were in situations of risk due to flooding. Families moved from often central (and usually consolidated areas) to peripheral locations (Figure 1). A regulatory change in the pattern of land use (from rural/industrial to urban/residential) was made to develop the housing program. This condition generated environmental conflicts in some cases due to the incompatibility of land uses (rural, industrial uses), increased costs in the extension of services (water supply, electricity, sewage), and reproduction of informal settlements due to the existence of vacant land nearby, among others.

The 11 Neighborhoods-Cities present dissimilar conditions in terms of location within the limits of Córdoba municipality and levels of consolidation of the surrounding built-up areas. Although they all have a peripheral location, only two cases are located within the limit defined by the external ring road, and the rest, are outside it. On the other hand, it is observed that they are mostly located in the southeast, east, and northeast areas which are historically recognized as the most impoverished in terms of urban-land values³.

² Mixed land use development combines residential, commercial, cultural, or institutional functions into a building, block, or neighborhood, mono functional land use refers to bedroom areas.

³ IDECOR (2021) <https://www.idecor.gob.ar/nuevo-mapa-del-valor-de-la-tierra-urbana-2020-en-cordoba-innovaciones-y-lecciones-aprendidas/>

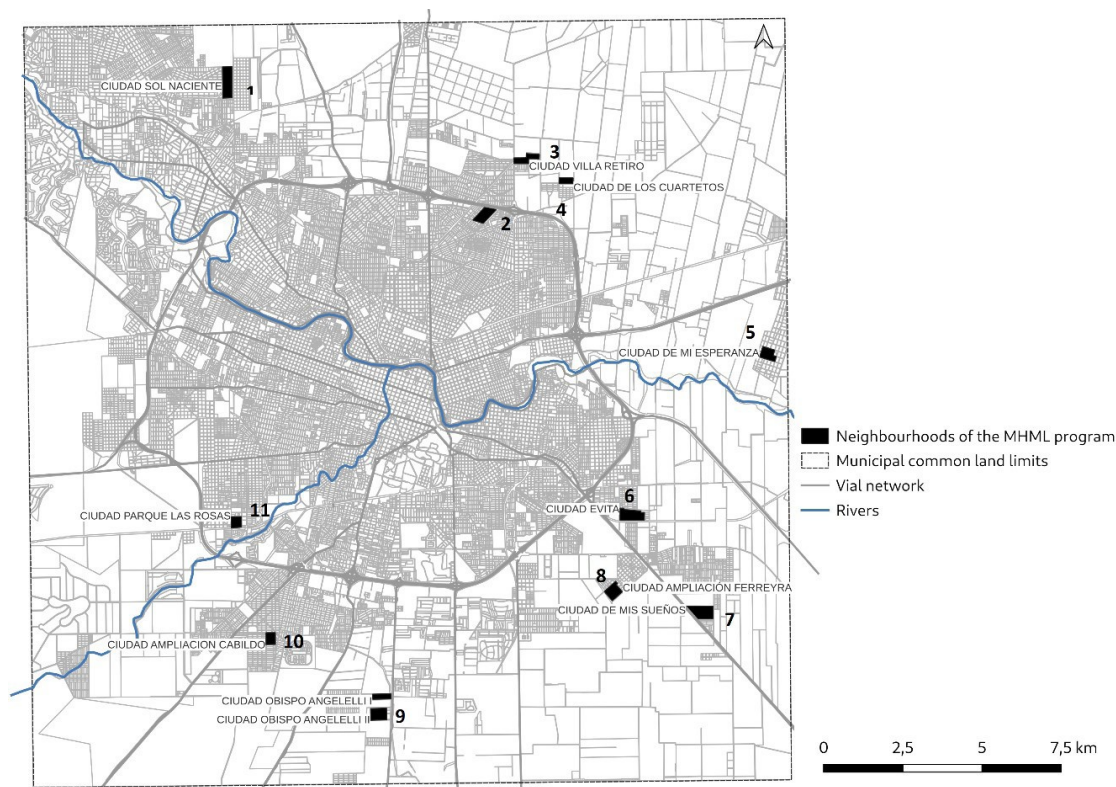


Figure 1. Location of Neighborhoods-Cities of My House, My Life (MHML) Program in the Municipal common land. Own elaboration. Source: Government of Córdoba Province.

Table 1 describes the situations of consolidation of the surroundings of the neighborhoods at the time the construction finished and in 2018.

A surrounding area was defined in a 1km radius centered on each neighborhood 4. The characteristics of occupation and land use are analyzed within this area to observe the evolution of the neighborhoods and their surroundings 5 (Figure 2).

#	Neighborhoods-cities of MHML Program	Location	Evolution of the surroundings	Description	Evolution of the surroundings
1	City "Sol Naciente"	northwest	urban edge Residential / rural	Initial border situation, adjacent to rural land and self-produced neighborhoods. Partial continuity of the urban fabric. Currently, informal occupations and greater densification of the residential area are also observed, without significant changes.	without changes
2	City "Juan Pablo II"	north	residential urban edge	Initially, it is adjacent to a vacant area and social housing neighborhoods in a sector under consolidation. Discontinuity of the existing plot. Completion of the plot with social housing aimed at the population with medium and low incomes and relocation of the population from shantytowns is verified.	consolidated
3	City "Juan Pablo II"	northwest	urban edge residential, rural, industrial	The original location was in a purely rural and industrial environment with proximity to popular neighborhoods. Subsequently, the location of public social housing developments and cooperatives is observed, maintaining characteristics of rural/industrial borders.	incipient consolidation
4	City "de Los Cuartetos"	northwest	rural enclave	Isolated residential neighborhood. Surrounded by land for rural use and vacant area for institutions. No changes were observed in the edges in the period.	without changes
5	City "de Mi Esperanza"	east	rural enclave	Initially an isolated neighborhood, adjacent to rural land. Next to a social neighborhood, border conditions are maintained, although with partial continuity with the urban fabric and densification of the residential area. A process of urban expansion is observed in the municipality of Malvinas Argentinas, a small town in the metropolitan area of Córdoba.	without changes

6	City "Evita"	east	urban edge residential, rural, industrial	Initial border situation, adjacent to rural land, industrial uses, and formal working-class neighborhoods. Completion of the urban fabric. Densification of formal neighborhoods and informal occupations in their surroundings is observed.	incipient consolidation
7	City "de Mis Sueños"	southeast	rural enclave	Isolated residential neighborhood. Surrounded by land for rural use and previous social housing development. Densification of formal neighborhoods and informal occupations in their environment is observed.	incipient consolidation
8	City "Ampliación Ferreyra"	southwest	Urban edge	Initial border situation, adjacent to rural land and formal working-class neighborhoods densification and road layout for new neighborhood is observed.	without changes
9	City "Obispo Angelelli"	south	rural enclave	Isolated neighborhood, adjacent to rural land and previous informal occupations. Continuity of the plot is observed with new informal occupations and proximity to urban development dynamics, mainly with new informal occupations and private residential development for the middle-high income population.	incipient consolidation
10	City "Ampliación Cabildo"	southwest	urban	Initial border situation, adjacent to rural land and formal working-class neighborhoods. Partial continuity of the urban fabric. In the period, consolidation of the borders, new informal occupations, and private residential development for the middle-high income population is observed.	consolidated
11	City "Parque Las Rosas"	southwest	urban	Border situation, adjacent to a green reserve area, formal working working-class hoods, and vacant areas. Currently, its insertion in the urban fabric is consolidated from neighborhoods of cooperatives and private neighborhoods for middle and middle-high income sectors.	consolidated

Table 1. Evolution of the consolidation process in the environment of Neighborhoods-Cities.

Source: Own elaboration.

Taking into account the evolution of growth since the neighborhoods were built in 2018, the type of environment and the level of urban consolidation were identified in the 11 cases studied. The observations considered: the relationship between built-up/vacant areas; change in land uses (residential/rural); continuity/discontinuity of the urban fabric; types of occupations on the edges (informal; self-produced housing, or real estate developments).

Three differential situations are identified (Figure 2): 1) cases that maintain the initial situations of morphological isolation, with no or minimal changes in the physical surrounding areas (36.36% of the cases); 2) those that have acquired greater dynamism and present a process of incipient consolidation (36.36% of the cases); and 3) cases that over time have led to fully consolidated physical areas (27.27%)

⁴ This methodological decision recovers studies on Gehl (2011) who mentions that the pedestrian routes of the inhabitants are usually short, 400 or 500 meters. As it is a peripheral area it is considered a larger distance, neighbors move into a relative area around their house to access facilities or services. Except for #9, which has two non-adjacent housing neighborhoods, so it takes the center between both neighborhoods and an area of a 2 km radius.

⁵ The moment of the inauguration of the Neighborhoods-Cities is 2008 and its transformation occurred 10 years later (2018).

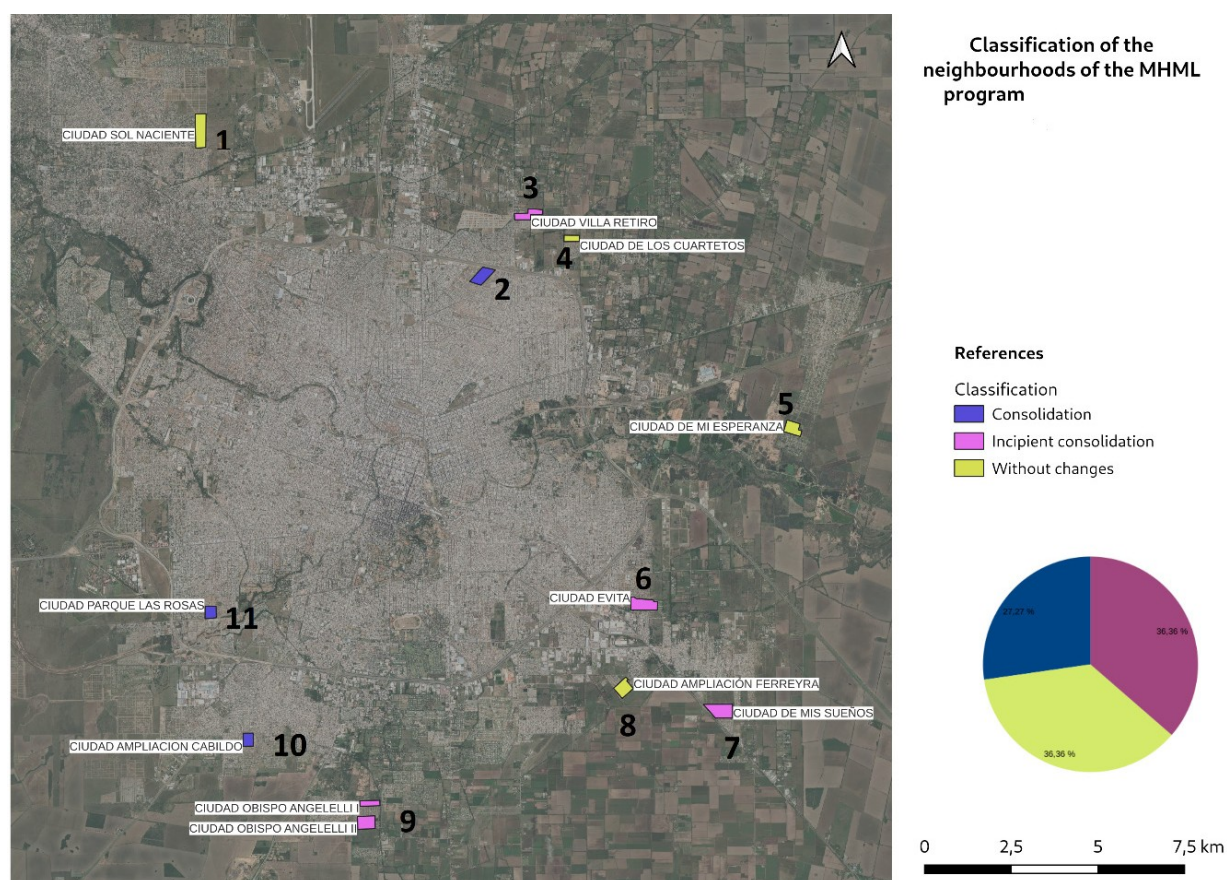


Figure 2. Location of state neighborhoods according to classification based on surrounding urban conditions. Own elaboration based on Google Earth and its application tools and software QGIS 3.16

In the first group are identified the Neighborhoods-cities: “Sol Naciente” [1], “de Los Cuartetos City” [4]; “Ampliación Ferreyra” [8], “de mi Esperanza” [5]. The neighborhoods present an initial location of morphological isolation, (total or partial) surrounded by rural land use. This group is characterized by a surrounding area with few (or insignificant) modifications compared to the time the neighborhood was built. After more than ten years, the current situation remains similar: for example, in [4] (Figure 3); [1], and [8], no changes are observed, and in [5] a process of urban expansion towards other municipality (Malvinas Argentinas) adjacent to the city of Córdoba, which could allow future opportunities for access and integration to this metropolitan town.

In the second group, are the cases of “Villa Retiro” [3]; “Evita” [6]; “de Mis Sueños” [7], and “Obispo Angelelli City” [9]. They present situations of relative transformation in the surrounding area, concerning the initial conditions when the houses were built. The consolidation of new dwellings in the borders of the neighborhoods also varies depending on the social actors who build in those locations. The most common situation is that one side of the neighborhood is limited by new residential development.

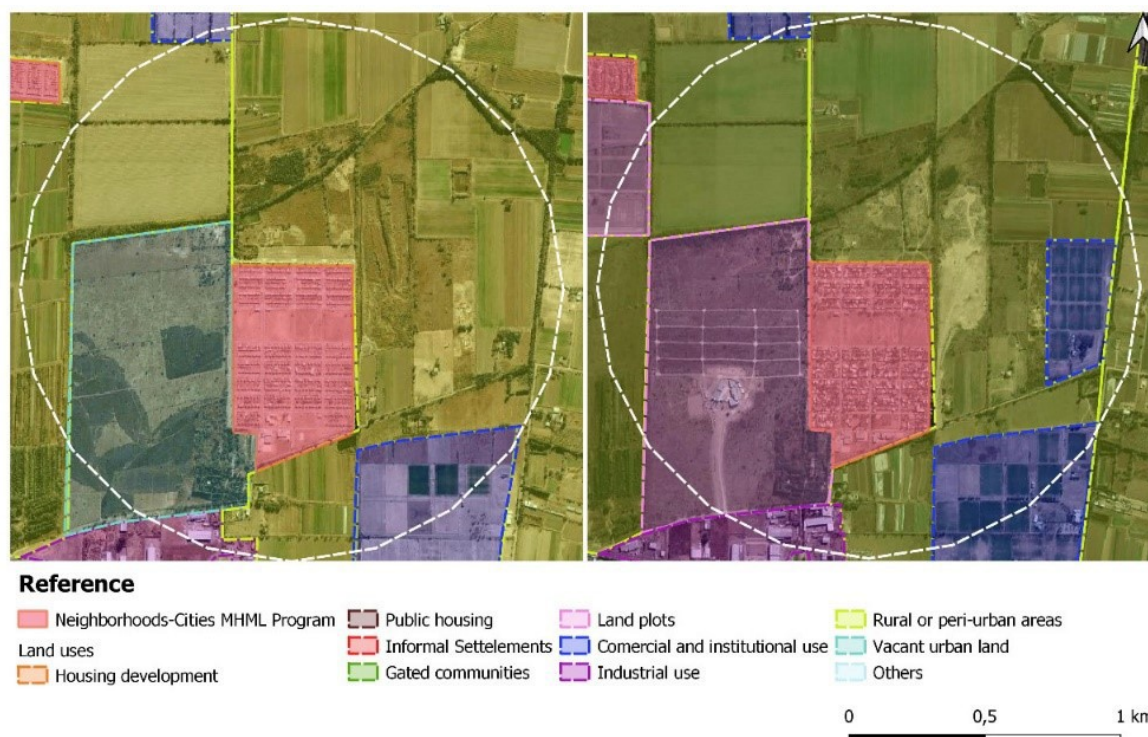


Figure 3. Evolution of neighborhood surroundings (at the time the houses were built and in 2018): example of situations without transformations, as “de Los Cuartetos” [4]. Own elaboration based on Google Earth and its application tools and software QGIS 3.16

In the case [3] “Villa Retiro”, the action of the state and intermediate entities (cooperatives) in the production of an open-space structure of social housing neighborhoods is evident. In this case, it is seen that rural land becomes urban, with housing or industry. (Figure 4).

The most common situations are social housing neighborhoods, both through public production and by cooperatives [3,6], and informal settlements of self-production [7,9]. In case 9 and beyond the radius defined in the study, are located gated communities developed by the real estate market, which marks a distinctive growth trend at the scale of the urban sector that before state action, had rural uses.

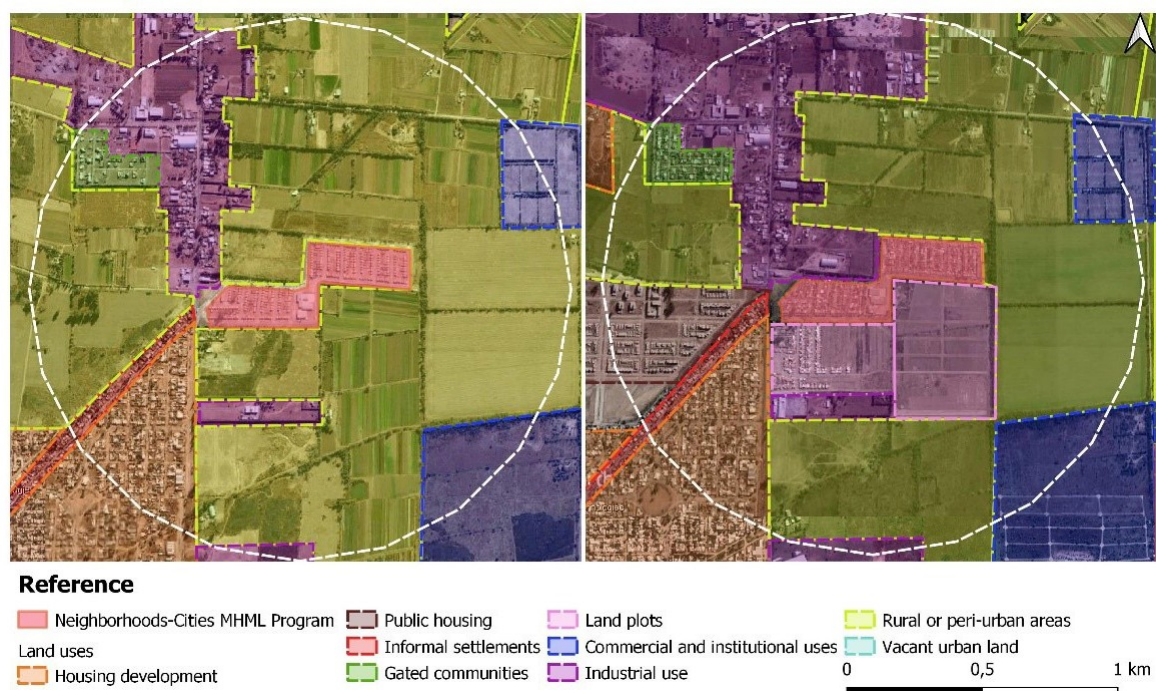


Figure 4. Evolution of neighborhood surroundings (at the time the houses were built and in 2018): example of situations without an incipient process of consolidation, as “Villa Retiro” [3]. Own elaboration based on Google Earth and its application tools and software QGIS 3.16

The third group includes the cases of: “Juan Pablo II” [2], “Ampliación Cabildo” [10], and “Parque Las Rosas” [11]. These cases, at the time the houses were built already have situations of greater insertion in the urban fabric which represents advantages in terms of an urban location. As a result of urban growth and the location of new dwellings, the sector has consolidated residential land uses in the period. It presents a more heterogeneous pattern and mixed land uses with diverse types of dwellings. Different types of actors intervene, the State through public policy housing [2], social housing cooperatives, vulnerable population in informal settlements, and real estate corporations. The consolidation of new neighborhoods adjacent to social housing interventions is also varied. “Parque las Rosas” [11] clearly shows a dynamic in the process of completion and transformation. The completion of the plot is also clearly seen with those vacant spaces that, due to their scale, house small ensembles. (Figure 5)

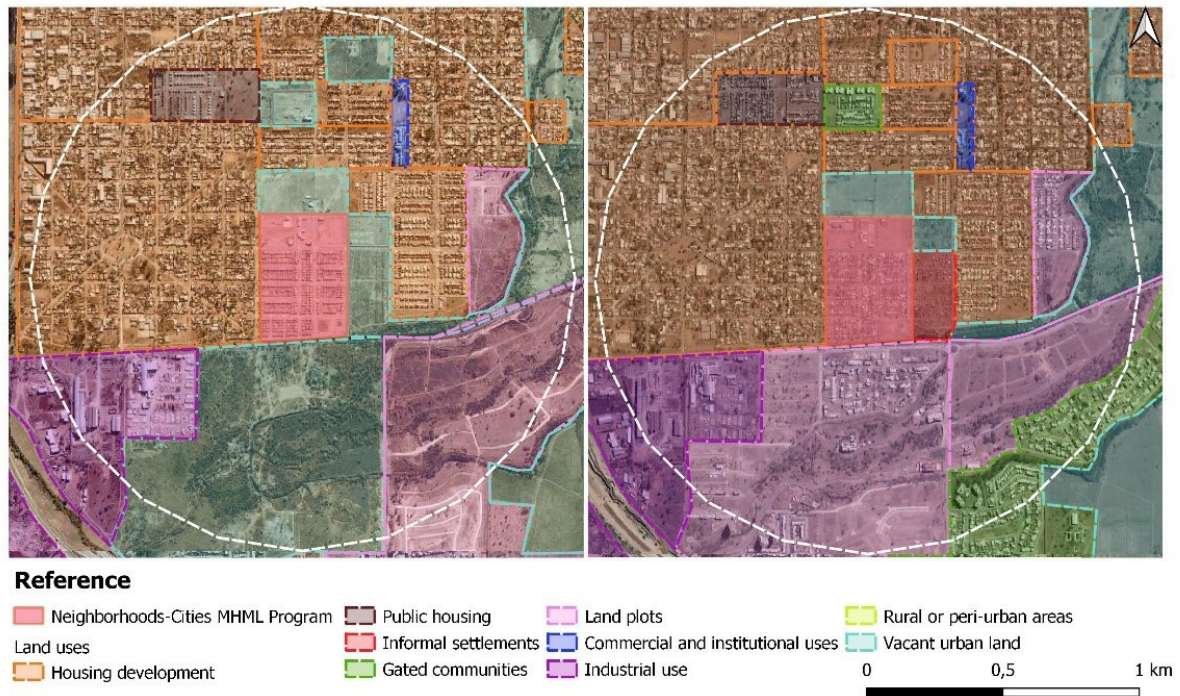


Figure 5. Evolution of neighborhood surroundings (at the time the houses were built and in 2018): examples of situations with a process of consolidation, such as “Parque Las Rosas” [11] Own elaboration based on Google Earth and its application tools and software QGIS 3.16

In summary, after more than ten years, it is observed that in most cases persist discontinuous physical settlement patterns, the morphological isolation of the neighborhoods in rural surroundings (fragments, enclaves), or incipient consolidation processes that have no conditions of urbanity. The adjoining rural land uses reinforce the morphological isolation of these developments even though more than ten years have passed to date.

Those cases that present a situation of more morphological consolidation have continuity with the urban fabric and streets of the surroundings and more spatial and functional integration. At the time of their construction, the urban location was less peripheral than in other cases, (two of them are located inside the ring avenue and the other is near a very populated and consolidated neighborhood), which represents an advantage to the spatial integration of the inhabitants in their daily movements.

The evolution of these areas in the period has resulted in greater physical-spatial integration in the sector and greater social heterogeneity in the surrounding area derived from the building consolidation process itself.

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4. Evolution of the urban-land value in neighborhoods and surroundings

The urban development processes produced by different actors who urbanize the territory have an impact both on the physical structure pattern of urban land uses and on land price dynamics. Understanding an urban regime (Abramo, 2007) requires accounting for the transformations that have occurred, the evolution in time of land prices, and the agents that produce them. From this perspective, urban-land value is considered a central variable in the comparative analysis of the structure of opportunities present in each location because this variable summarizes the presence of activities, changes in land use and occupation as well as the dynamics of transformation and future trends.

Data on the value that land acquires in the market, in general, are not systematically registered in an official and public manner in Latin American cities. However, the province of Córdoba has been periodically updating the tax valuation with methodologies based on real estate market studies and prices and making the results public since 2018. Córdoba Municipality through the Cadastral Directorate already had a history of land valuation at market prices in 2008. For this study, the results of the cadastral valuations in the city of Córdoba in both periods (2008-2018)⁶ are taken as sources, understanding that the results can be compared given that the values are close to the price in the real estate market. The temporary period allows us to identify the transformations that have occurred in the urban structure of the neighborhoods-cities and their surroundings.

The location of the neighborhood cities was the result, in most cases, of the acquisition of land in the market by the provincial government that was responsible for managing the housing program. The projects materialized in rural areas due to the lower land cost they have, and more or less distant from consolidated urban fabric depending on the case.

As shown above, the 11 sectors present different land-use processes of consolidation and types of surroundings according to the actors that built up these zones. Some cases involved modifications in land-use regulations, to allow the change from rural activities to residential, to build the neighborhoods and provide services (water, electricity). The evolution of land values

⁶ Source <https://www.mapascordoba.gob.ar/#/mapas>

has a straight relationship with the building transformations produced in the neighborhoods-cities and their surroundings during this period.

The median value⁷ within the selected neighborhoods and their surroundings is taken as data for the analysis.

Table 2, summarizes the evolution of land values in the neighborhood cities. It is observed a constant increase in the price of land in the 2008-2018 period. However, the increase in land prices, present cases where it is lower. They correspond to neighborhood cities located nearby urban areas, with more consolidated morphology. In these areas, there were no regulatory changes in land uses, and are inhabited by low-income populations [#2; #11; #10].

On the other hand, cases #6; #4; those where the evolution of land prices is higher, correspond to changes in land uses in normative regulations (from rural uses –to residential uses). The neighborhoods present a high level of morphological consolidation and the surroundings are inhabited by high-income social sectors. This condition provides more economic dynamism to the area and labor opportunities for inhabitants and informal settlements nearby. (see Table 3). It should be clarified that there are particularities that emerge from the real estate valuation methodology itself, taken as a source. In some cases, the plots of the neighborhoods and their surroundings maintained the rural condition for the cadaster despite the territorial transformation. For example, case #3 was valued in 2008 and 2018 as a single plot and maintained the rural cadastral condition, also in its surroundings throughout the period. This is reflected in the low incidence of land price increase in the surrounding areas.

#	Neighborhoods-city	Median land value 2008 in the neighborhood-city*	Median land value 2018 in the neighborhood-city **	Increases in values neighborhood-city 2018)
2	Juan Pablo II	106	900	7,49
11	Parque Las Rosas	80	750	8,38
10	Ampliación Cabildo	78	900	10,54
1	Sol Naciente	59	550	8,32
5	Mi Esperanza	18	250	12,89
8	Ampliación Ferreyra	46	900	18,57
7	Mis Sueños	21	450	20,43
3	Villa Retiro	34	850	24,00
6	Evita	30	950	30,67
4	Los Cuartetos	18	600	32,33
9	Obispo Angelelli	14	650	45,43

Table 2: Value of urban land in the Neighborhoods Cities, are ordered according to the levels of increase in the number of times comparing neighborhoods. Source: Own elaboration based on data from the Municipality of Córdoba and IDECOR. *Unit Value of Land expressed in \$/m², considering the United States Dollar equals to \$3.07 in June 2008. **Unit Value of Land expressed in \$/m², considering the United States Dollar equals to \$23.66.

Neighborhoods-city	Neighborhoods-city	Median land value 2008 in the surroundings of the neighborhood-city *	Median land value 2018 in the surroundings of the neighborhood-city **	Increase in times (2008/2018)
10	Ampliación Cabildo	144	1100	6,64
2	Juan Pablo II	136	1100	7,09
3	Villa Retiro	78	700	7,97
11	Parque las Rosas	112	1462	12,05
7	Mis Sueños	43	712	15,56
5	Mi Esperanza	18	300	15,67
1	Sol Naciente	28	750	25,79
6	Evita	45	1250	26,78
4	Los Cuartetos	20	700	34,00
8	Ampliación Ferreyra	24	1000	40,67
9	Obispo Angelelli	10	501	48,10

Table 3: Value of urban land in the surroundings of the Neighborhoods Cities, are ordered according to the levels of increase in the number of times comparing them. Source: Own elaboration based on data from the Municipality of Córdoba and IDECOR. *Unit Value of Land expressed in \$/m², considering the United States Dollar equals to \$3.07 in June 2008. **Unit Value of Land expressed in \$/m², considering the United States Dollar equals to \$23.66.

When examining the evolution of land prices in neighborhood cities (Table 3) it can be seen that, in general, the values are higher than those obtained inside them. It is noteworthy that those cases that correspond to neighborhoods originally located in more consolidated areas (eg: Parque Las Rosas [11]; Ampliación Cabildo [10] and Juan Pablo II [2]) show lower increases in land prices (in the neighborhood and the surroundings) that those originally located in rural areas. This is related to a lower dynamic of transformation of land uses, given that they were initially located on vacant urban land (infill areas). There is a lower gap in rent because there are no changes in land use.

In the period, the case of Villa Retiro City [3] observes a higher increase in land values inside the neighborhood compared to the surroundings. This situation is explained by the change in land use: (from rural to urban-residential) which affected only the perimeter of the neighborhood. The surroundings maintain, to a greater extent, characteristics of rural use, and only there is a physical transformation associated with social-housing developments by cooperatives on the southern border.

On the other hand, are the neighborhood cities whose surroundings show a more evident dynamic of transformation and with a greater mix of land uses, especially residential typologies. Obispo Angelelli neighborhood-city [9] stands out, as it presents the greatest increases in land price both at the neighborhood level and in the surrounding area. In this case, the location is characterized by scattered land occupation, with vacant interstices that may even maintain the rural characteristics and activities before the process of building the neighborhoods.

Other borders limit contiguous urban areas, although with different conditions of integration/fragmentation concerning the type of surroundings and their evolution in time. Although it is one of the most distant locations from the city center and originally was a rural territory, after the change in land use, it has been transformed into an area with significant economic growth dynamics and population.

As a trend, the surroundings of the neighborhood have registered large private capital investments and have normative guidance for urban development ⁸. Important land built-up areas are observed due to gated communities (of closed perimeter), as well as other neighborhoods of an open physical structure but with private security services devoted to high-income populations that inhabit them. The paradox is that, in the surroundings of this neighborhood, is also observed the growth of informal settlements due to a dynamic of population growth. It is related to the public housing policy and the proximity of family nets that inhabit these dwellings. It also responds to an informal economy and a better structure of labor opportunities for these sectors, derived from the land consolidation process initiated by the public housing policy.

6. Final reflections

The process of physical changes that take place in peripheral areas is an opportunity to discuss the impact of public housing interventions on the pattern of urban development. The cases presented are evidence of the interaction between the housing policy and the morphological evolution of the surrounding areas nearby, where they are located. The results allow us to understand how the urban land use process was consolidated in the peripheral territories and the differential effects in the evolution of built-up surrounding areas derived from public housing neighborhoods.

It is evident a model of growth by fragments, in most cases discontinuous according to the availability of land offered and its initial low value in the market to locate public-housing programs. The temporal evolution translates into differential processes in terms of the level of built-up areas and relations with the surrounding areas (urban, rural) and valorization of urbanized land.

The transformations of the surrounding areas show a fragmented urban development process in the city periphery, as the main characteristic of the pattern of growth. In the period, expansion continues, accounting for growth in jumps, leaving vacant areas, and only in a few exceptions, the consolidation process maintains continuity with the existing urban fabric.

On the other hand, the process of morphological consolidation with a diversity of actors and proposals (in different formats: gated communities, cooperative housing programs, informal settlements, among others), translates into greater heterogeneity, social mixture, and economic dynamics in those areas. This condition brings a higher urban intensity.

The temporal evolution of the different neighborhoods in the urban structure, their internal process of morphological consolidation, and the evolution of their surroundings (land uses, land values, social profile) account for dissimilar conditions in the neighborhoods. Regarding the structure of opportunities for the inhabitants derived from the evolution of the urban form, the 11 cases present unequal opportunities for urban integration and access to urban quality in the city periphery.

⁸ “On the other hand, the evolution of the traditional real estate market, the one that seeks the property for quality of life or family needs, specifically in the southern part of the City... there is a growth and permanent evolution of this market.” <https://puntoapunto.com.ar/juan-pablo-maer-director-de-maer-in-versiones-inmobiliarias/> (own translation)

The level of built-up consolidation in the neighborhoods and the surrounding areas and the evolution of land prices are the central variables that capture the dynamics of transformation.

A process that should take into account is that a dispersed location of housing (due to a lower land value in peripheral locations) impacts the production of new and isolated residential areas and, in general terms, contribute to the increase in land values in distant locations.

In the temporal evolution, the socio-economic dynamics of the consolidated residential areas expressed a differential valuation of land-prices and locations. The temporal evolution of the surrounding areas of the neighborhoods also demonstrates processes of differential valuation of the location. Even when all the neighborhoods were built in the city periphery, some locations offer more opportunities to consolidate the urban development process and to connect the neighborhood to the consolidated urban fabric. This condition impacts positively the daily mobility of households, and the accessibility to urban equipment, services, and labor opportunities and allow more integration.

Dynamics that reproduce inequality in access to land and housing are recognized in areas with no spatial changes in the urban dynamics in the period. More than a decade after its materialization, some public housing neighborhoods persist in the same physical conditions as the time there were built, conforming to isolated enclaves surrounded by rural land use. The persistence of isolated conditions in neighborhoods located in rural areas indicates the real estate market's lack of interest in built-up in very distant locations and very poor social mixture.

The process of commodification of urban space is manifested in the growing difficulties in access to land for low-income households, and the reproduction of informal settlements that surrounds the public housing neighborhoods and take advantage of the proximity of access to services, family nets, and facilities in these areas.

The availability of developable land and the evolution of land prices in the surrounding areas nearby public housing programs are indicators that should be taken into account while planning new social housing developments that consider a morphological (physical and social) pattern with greater urban integration.

Housing policies contribute to the process of valuing land in the outskirts by building housing neighborhoods in initially rural areas that are urbanized. The incidence of land valuation in housing projects translates into increasingly distant locations (seeking to reduce costs), and in the case of Córdoba, it demonstrates the difficulty in locating social housing close to consolidated fabrics. On the other hand, these initially isolated areas evolve by consolidating a fragmented urban fabric, which reproduces the growth process in jumps in an unsustainable way.

8. References

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