

Dispersion and socio-spatial fragmentation in the recent growth of an oil city of Argentinean Patagonia

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Resumen

La ciudad de Comodoro Rivadavia en la Patagonia argentina ha crecido históricamente de forma dispersa a partir de la localización y consolidación de los asentamientos de trabajadores en torno a las amplias áreas de explotación petrolera. El presente trabajo tiene por objetivo reconocer y caracterizar las recientes pautas de crecimiento urbano en esta ciudad recurriendo complementariamente a datos cuantitativos provenientes de fuentes oficiales, a relevamientos propios y a una técnica de observación y análisis de imágenes satelitales. Todo ello permite identificar los cambios recientes en la ocupación del espacio. Los resultados corroboran que la expansión dispersa de la ciudad tiende a profundizarse con fuertes connotaciones de fragmentación social y espacial.

Palabras clave: Crecimiento urbano, transformaciones socioterritoriales, Patagonia.

Abstract

Dispersion and socio-spatial fragmentation in the recent growth of an oil city of Argentinean Patagonia

The city of Comodoro Rivadavia in Argentina Patagonia has grown historically dispersed from the location and consolidation of settlements of workers around the broad areas of oil exploitation. This paper aims to recognize and characterize the recent patterns of urban growth in this city using complementary data from official sources, own surveys and a technique of observation and analysis of satellite images. This allows identify recent changes in the occupation of space. The results confirm that the dispersed expansion of the city tends to deepen with strong connotations of social and spatial fragmentation.

Key words: Urban growth; socio-territorial transformations; Patagonia

INTRODUCTION

In various contexts, numerous cities around the world have witnessed, since the middle of the last century, new patterns of urban growth. Baptized with many names, counter-urbanization, de-urbanization, urban dispersion, this phenomenon has given an account of a process of demographic dissemination outside the traditional areas.

The phenomena of disperse growth are no novelty for cases of cities which, as Comodoro Rivadavia in Argentine Patagonia, historically have growth from the localization and consolidation of workers' settlements around extensive areas of oil exploitation at considerable distances of the central city. Indeed, in this city the urban territory is disperse, fragmented, with various urban, social, economic and environmental conflicts; whose mark has been shaped by the development of extractive activities.

The boom of oil extraction as of the early 2000's decade has had as a counterpart a heavy increment in the residing population, which makes us wonder about the impacts in the patterns of the recent urban growth. Where is the city growing to? Which zones have greater demographic dynamism? And which are the characteristics of this growth in function of the morphologic changes and particularities of the population involved? Consequently, this article has as an objective to recognize and characterize the recent urban growth patterns of the city of Comodoro Rivadavia.

The methodology is descriptive, we resorted to quantitative data from various official sources, cartographic information, literature specialized in the topic and area of study and the application of an additional technique of observation and analysis of satellite images from 2006 to 2013 using the free software Google Earth; this technique allows generating new information that helps understand spatial phenomena and adds information not disclosed by traditional sources.

The article structures as follows. After this introduction, the theoretical frame of the work is exposed and the methodology explained. This is ensued by a characterization of the study area and a historic outline of this city's urban configuration process. Later on, the empirical analysis is undertaken, central part of the work, devoted to specify the recent pattern of urban growth in Comodoro Rivadavia and underscore their most distinguishable characteristics. Finally, a discussion and a reflection on the

results are developed. About them, the results, it is underlined that in recent years, the city has intensified its model of disperse growth with string connotations of socio-spatial fragmentation. This pattern, verified by means of the combination of statistical data, thematic cartography, surveying satellite images, relates with the expansion of peripheral neighborhoods, the occupation of periurban land and interstices in the urban grid where vacant plots lack conditions to settle. The identified growing areas overlap sectors in which the proportion of households with some deprivation indicator is higher, where households are densely inhabited and there is a high percentage of foreigners among the population.

These issues and others mentioned in the following pages severely compromise the public policies of urban planning that should activate in the search for an integrated territory, where various parts of the city relate keeping their own internal functioning in conditions of habitability and interconnection that enable the city's social and economic integration.

THEORETICAL FRAME

Cities are realities in permanent change. The current phase of capitalist development has been imposing structural, morphologic, functional, cultural and social transformations in cities around the world.

In the 1970's decade, in American cities it became evident the boom of suburban areas before the demographic decline of the traditional central city; this phenomenon was initially associated to counter-urbanization (Berry, 1976) or de-urbanization (Van Den Berg, 1982) processes in the context of economic crisis, which back then was experienced in industrialized countries. These phenomena became evident, though later and with their own connotations, in cities of Europe and Latin America, where notions of "diffuse city" (Indovina, 1990) and "disperse city" (Monclús, 1998) came to name new patterns of disperse urban growth, which not only have meant the loss of population in the traditional central city and suburbs, but also has implied the dissolution of the traditional compact city from the discontinuous occupation of the land (Monclús, 1998 and 1999).

Flexibility, openness, integration, competitiveness and distance relations are favored by technological innovations that have altered time/space relationships (Santos, 1996, Harvey, 1996, Caravaca Barroso, 1998) and with it they have promoted the diversification of the spatial trajectories of activities, functions, enterprises, employment (Méndez, 2007) and population.

Technological advances in production, communications and transport enable the reduction of distance business/management; and with it a broadening of externalities associated with the urban which add network economies (Boix, 2004) to the classic agglomeration economies. Because of this, the cities and metropolises grow with deconcentrated locational and residential patterns (Cuadrado Roura and Fernández Güell, 2005).

We witness a joint dynamic of selective dissemination-concentration of the population, of the productive activities and the economic functions that directly affects the organization and functioning of the cities at all scales (Soja, 2005). Not only is it possible to verify urbanization processes from the mere residential dissemination toward peripheries, which the road networks and automobiles enable, but also the formation of actual metropolitan sub-centers specialized according to the entrepreneurial functions located in them (Duranton and Puga, 2005). Consequently, urban structures tend to be increasingly multipolar or polycentric (Méndez, 2007) where new centralities become not only residence places, typical pattern of sprawling processes and suburbanization, but also centers of production, consumption, recreation and leisure and services for production and people (Vecslir and Ciccolella, 2011). There is a flow that links relatively disperse areas distanced from the traditional downtown, which changes the center-periphery relations and expanding the cities and metropolises at regional levels.

These urban transformation processes are also clear in the Latin American reality (Prévôt-Schapira, 2000a; De Mattos, 2006; Romein *et al.*, 2009; Rubiera Morollón and Aponte Jaramillo, 2009; Fernández-Maldonado *et al.*, 2014), in which new ways of urban growth can be noticed in the case of Chile (Truffello and Hidalgo, 2015; Maturana and Arenas, 2012 and Maturana *et al.*, 2012), Mexico (Muñiz *et al.*, 2015), Peru (Gonzales de Olarte and Del Pozo Segura, 2012) or Argentina (Vidal-Koppmann, 2008; Romein *et al.*, 2009; Vecslir and Ciccolella, 2011 and 2012; Ciccolella and Vecslir, 2012; Colella, 2013).

In the case of Latin America evidence states that the structure of cities tends to be increasingly multipolar, where new centralities not only become places to live, a typical pattern of sprawl, dispersion or suburbanization processes, but also as centers of production, consumption, trade, leisure and entertainment as well as services for production and people (Vecslir and Ciccolella, 2011).

Albeit, these processes in the Latin American reality have also become “the fragmented city” (Borsdorf, 2003; Borsdorf e Hidalgo, 2010;

Prévôt-Schapira, 2000b), which reveals the socio-spatial contradictions and disparities associated to these new ways of urban growth. Urban dispersion and socio-spatial fragmentation are two phenomena heavily intertwined, promoted by the absence of urban planning, market deregulation, promotion and aperture to private capital, growing social inequality and material and/or immaterial barriers that separate the various fragments inside the cities (Harvey, 1997; Prévôt-Schapira, 2001 and Vidal, 1999).

From the conceptual standpoint, it is worth mentioning that by dispersion it is usually understood the urban growth generated spontaneously and unfolded with no apparent order (Monclús, 1998) from the middle and upper classes' options to buy low-density single-family houses, ampler and far from urban centers, which allows them to escape from certain problems associated to urban life and be in contact with natural environments; added to this, the possibility to commute everyday from greater particular mobility and better infrastructure. Muñoz and García-López (2013) understand dispersion as a process of urban expansion that implies the decentralization of population and employment following a deconcentrated model, not dense, discontinuous and lacking structure, random or chaotic. Indeed, low density in land use, preferring single-family houses and dependence on the automobile, fragmentation of labor markets and dissociation between residence and working places (Precedo, 2004) are characteristics of models of disperse urbanization. Other particular notes associated to the notion of dispersion are the limited nature of outward development; fragmentation of land use; physical disparities between metropolitan municipalities; generation of mechanism of exclusion in housing and employment based on race and social classes; congestion and environmental pollution that dependence on particular means of transport generates; concentration of poverty in certain areas and a declining sense of belonging to the community among the residents (Squires, 2002).

From these definitions and taking a comprehensive approach, in this work we understand dispersion as a form of urban structuring that generates spaces of demographic concentration, marked by discontinuity with diffuse urban edges and which unfolds with no apparent order. For the case analyzed here, we state that this form of structuring does not only responds to new locational logics and preferences of the population and employment, but urban dispersion is a traditional way for the cities to grow in which residential location has responded to the disperse unfolding of productive activities oriented to exploit natural resources. Therefore, in these urban environments the processes of productive and territorial restructur-

ing of recent decades might have aggravated these previous tendencies of disperse growth, imposing new social and spatial inequalities.

METHODOLOGY

The work is fundamentally descriptive, it resorts to quantitative data from official sources, others from empirical works and specialized bibliography, combined with the implementation of Geographic Information Systems¹ (GIS) and the application of a complementary technique of observation and analysis of satellite images (Equipo Urbano, 2007), available by means of Google Earth free software², which allows updating and complete inexistent data or not revealed by other media.

The statistical information utilized corresponds to data from the National Censuses of Population Households and Housing (2001 and 2010) and the Permanent Survey on Households (2003 and 2012), produced by the National Institute of Statistics and Censuses (INDEC). In like manner, we resort to another information provided by the General Direction of Cadaster and Territorial Information of the Municipality of Comodoro Rivadavia.

It is worth underscoring that GIS are an efficacious tool to deal with data and fundamentally to generate new information such as graphs and thematic maps, among others, broadening and complementing the possibilities of analysis in the face of potential limitations that censal databases and other available stats might pose. This way, the study of territory has found in digital technologies a powerful graphic support of great dynamisms and sophistication, which facilitates the understanding of spatial phenomena and provides information not revealed by traditional sources.

In this work the implementation of this methodology intends to describe and explain the evolution of the city and their main recent transformation processes. In the following section there is a brief characterization of the study area in view of locating and contextualizing the coming work.

CHARACTERIZATION OF THE STUDY AREA

The city of Comodoro Rivadavia is located in the southwest of the Chubut Province, in the Patagonia Region, Argentina (map 1). It has a clod desert climate with winds from the west. Land use and its possibility of ur-

1 GIS, Open-source software, Quantum Gis 1.8 Lisbon.

2 Thoroughly researched methodology, implemented to study urban morphology via Google Earth by Equipo Urbano directed from the Department of Human Geography by Dr. Horacio Capel, in Barcelona.

banization are conditioned by physical and anthropic aspects. Among the former, it is worth mentioning that geomorphology features plateaus, hills and ravines, becoming an urban space with marked unevenness. Even if precipitations are normally scarce (mean annual 180 mm), when they take place, the rugged terrain and the high saline content of the soil produce localized floods and water erosion on embankments and areas to channel surface flows, which also supposes a restriction to the availability of plot suitable to be inhabited.

Among the anthropic factors that restrict the availability of urban land distinguishable is the development of hydrocarbon activity, which as of 1907, is the main sector of the city's productive specialization. Oil extraction is an unmistakable mark on the urban landscape and a limit to land use. The locations of production with their individual pumping machinery (popularly called *cigüeñas*), towers, pipelines, other equipment and sort of infrastructure linked to this extractive industry alter the conditions and uses of land reducing their availability for other activities.

This city's urban structure comprises 50 neighborhoods, defined in the cadaster,³ these are divided by Chenque hill which separates the city in north and south. Both zones are connected by National Route No. 3, which crosses the city in parallel to the Atlantic Coast. By and large, these neighborhoods incorporated to the municipal cadaster are allotted, have sanitary infrastructure, community institutional equipment (neighbors association, social programs, spaces for recreation and urban hygiene services) and are mainly devoted to residential use and in them one finds social housing developments financed by public funds.

The northern zone of the city presents disperse methodology compared with the greater compactly of the southern zone, for it has been in the north where oil exploitation boosted the unfolding of camps that became the inception of the current neighborhoods in the area, as it will be exposed further in the text.

Indeed, as noticed in map 2, from Chenque hill to the north the disposition of the neighborhoods shows an increasingly disconnected development, with poor connections with the rest of the city. The relative isolation and disconnection of these neighborhoods is a consequence of the irregular topography which adds to the anthropic activity that determines its growth. The broad distances that separate these neighborhoods from the rest of the city (Astra, 20 km, and Diadema Argentina, 27 km away from downtown)

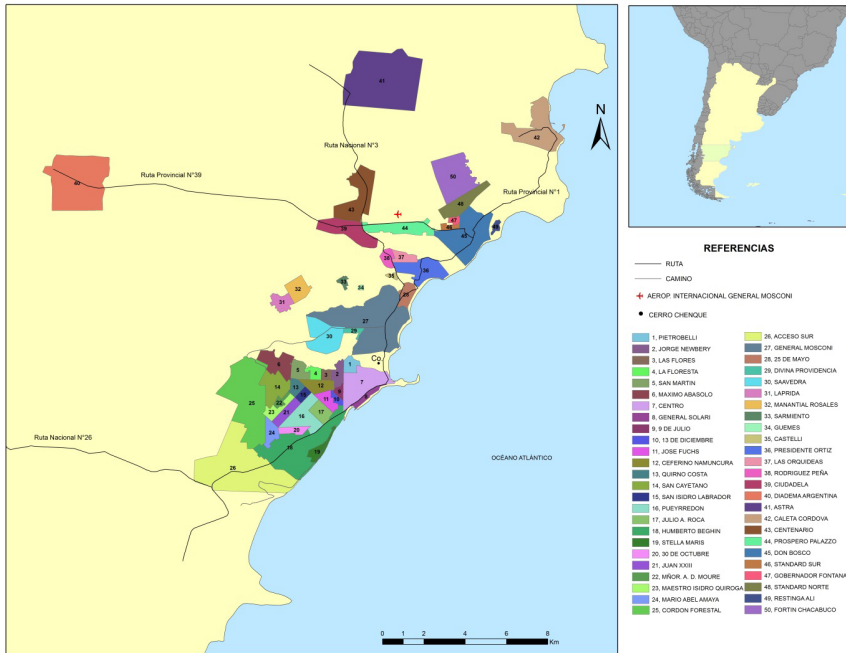
3 In reference to the formally recognized neighborhoods and registered by the municipality of Comodoro Rivadavia, as there are other population concentrations not recognized as neighborhoods, which are given a status of informality or illegality.

Map 1. Main urban centers in the Patagonia Region, Argentina



Source: own elaboration using censal data (2010) from INDEC.

Map 2. Study area: Comodoro Rivadavia, division by neighborhoods



Source: own elaboration.

are not shortened by adequate means of transport or efficacious interconnection infrastructure with the rest of the city. As an instance, public transport at both neighborhoods is offered by the same company, whose frequencies and travel times are insufficient, being these the main problems mentioned by the neighborhoods (Dirección de Investigación Territorial, 2012).

Other islet in the northern zone, on the Atlantic coast, is neighborhood Caleta Córdova, a fishing center, has its mark closely tied to the namesake port.

Likewise, distinguishable are the neighborhoods Manantial Rosales, Sarmiento and Laprida, with origins in oil extraction, their current use is mainly residential, even though as of the 1990's decade by the municipal ordinance no. 3613, the zoning of its sub-rural zone has been regulated, assigning a land use as "zone of farms and rearing grounds".

Close to these, Güemes neighborhood also has its origins in oil extraction, as a residence place for high-ranking professionals in the oil companies.

South from Chenque hill, one finds the central city; it is called Centro neighborhood, which is the most important commercial and service pole in the city. Here public intuitions have their seats and the highest number of education and health institutions, public services buildings and community equipment are found. Likewise, it is the connection node of public transport that joins the north and the south.

A large number of neighborhoods (twenty-six) locate around downtown to the south and west, whose adjacency and tight bonding favor a relatively more compact urban morphology. However, as further analyzed, the compactness of the southern area has been altered in recent years from the expansion of the city toward the peri-urban area.

This characterization of the study are needs to be complemented by the explanation of some historical background that allow understanding the process of urban configuration of Comodoro Rivadavia. The following section is developed with such intention.

THE HISTORICAL CONFIGURATION OF COMODORO RIVADAVIA

The current socio-spatial structure of Comodoro Rivadavia comes as a historical inheritance from the city origins. Even if it was founded in 1901 as an exit port for livestock from the locality of Sarmiento (currently Antonio Morán Port), the discovery of oil some years later, in 1907, would change its productive profile and determine its socio-spatial layout. Even since, in the areas of oil exploitation were occupied by encampments, from which the population centers that were the origin of the neighborhoods consolidated in the north of the city. The growth and consolidation of these relatively isolated neighborhoods in the zone took place under the tutelage and housing planning of public and private enterprises in charge of oil exploitation or linked to them and their inhabitants were largely Argentinian migrants or European groups. Over the physical barrier of Chenque hill, to the south, in the central city, civil, commercial and residential life gradually consolidated and concentrated around the foundation zone.

The city grew following a socially and spatially fragmented pattern, for even if each oil encampment functioned as a relatively autonomous center on its own (Crespo, 1992; Marques and Palma Godoy, 1993), with services provided by oil companies, these production ways of the inhabited space promoted the scission and fragmentation of the city as a whole.

Such has been the spatial and social scission between the various areas of the city that it was but by the early seventies when the Municipality of Comodoro Rivadavia started to take up neighborhoods and encampments

in the northern zone in its jurisdiction (Marques, 2008). This “late municipalization” of an entire territorial strip located north of Chenque hill has had socio-spatial consequences manifested in the difficulty of the local government to generate policies to articulate the city (Marques, 2008).

The process of consolidation of neighborhoods by historic stages (Crespo and Massera, 2013) evinces such diffuse and fragmented urban structure that is reinforced in the entire city. The work of the aforementioned authors allows identifying the evolution of the neighborhoods of Comodoro Rivadavia over various historical stages (map 3) and in them one clearly notices this disperse growth.

By the early XX century, from 1901 to 1909, the city is founded with the purpose of having a port that allows trading the products from the current Colonia Sarmiento. Franciso Pietrobelli had established a first shed in Punta Borjas, creating a settlement that was officially recognized in February 23rd, 1901, by decree of Vice-President Quirno Costa. In 1907, an expedition from the Division of Mines, Geology and Hydrology⁴ (División de Minas, Geología e Hidrología) of the Ministry of Agriculture of the Nation found oil in well no. 2 (Huergo and Hermitte, 1911) located in which eventually would be part of neighborhood General Mosconi, in km 3. From then on, the history of the first encampments around extraction wells started, initially scattered from km 3 to km 5; even though in this period there was no recognizable human settlement around.

In the period from 1910 to 1917, Astra encampment appeared, which has its origins in the creation of Astra Argentina Oil Union, which intended to explore for and exploit oil, building a residential neighborhood for its workers (Marques, 2008).

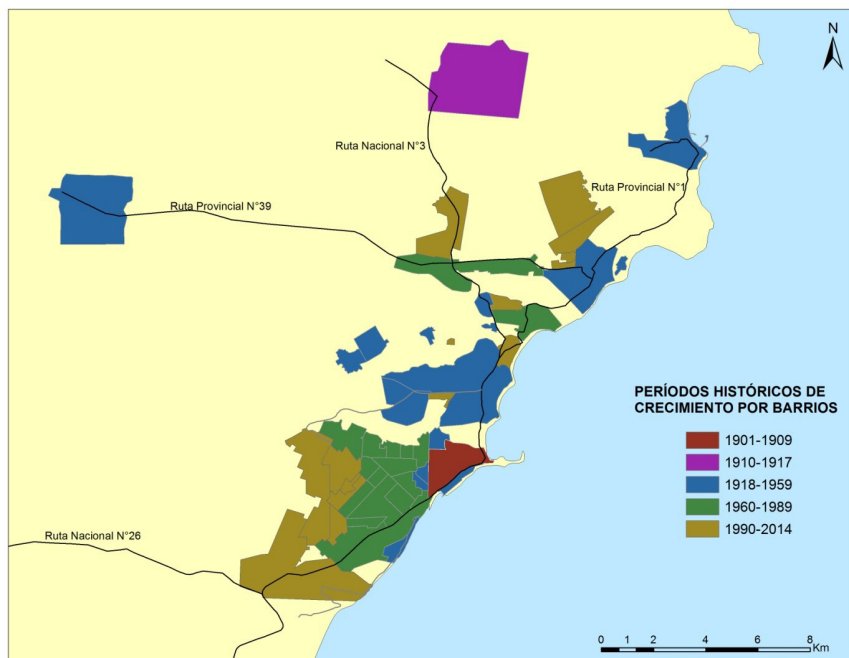
Oil extraction activities grew over this stage, supported on the execution of the railroad Sarmiento-Comodoro Rivadavia in 1911, locating mainly in km 5.

The interregnum from 1918 to 1959 is a stage of important expansion of oil extraction whose boost multiplied the encampments (concentrations or workers) far from the central city, but close to the oil wells. The encampments’ location and the relief of the area defined their characteristic fragmentation and isolation from the civil-administrative center.

On provincial route no. 1, Caleta Córdova was set up, with a pier for small craft, fishing vessels and is utilized to transport oil. With the arrival

4 It would be in charge of everything related to mining, geologic, mineralogical and hydrological explorations, as well as the production of a geological-economic map of the country. In 1912. The Division was renamed General Direction of Mines, Geology and Hydrology of the Nation (Dirección General de Minas, Geología e Hidrología de la Nación).

Map 3. Comodoro Rivadavia, historical periods of growth by neighborhoods, 1901-2014



Source: own elaboration, with information taken from Crespo and Massera (2013).

of Shell Oil Company, Diadema Argentina was born, which by 1952 provides 800 workers with housing, schools and suppliers, etc.; back then the population amounted to 2500 people. The neighborhoods nowadays know as Kilometro ocho have their origin in the creation of Petroquímica, which generated a rather dynamic node. Km 8, General Mosconi, concentrated mainly leisure activities and also housing for the state workers (Municipalidad de Comodoro Rivadavia, 1989 and Marques, 2008).

By the end of the period, at national level President Frondizi signed contracts with private companies (national and foreign) to extract oil. The National Law on Hydrocarbons and the new organic statute of Yacimientos Petrolíferos Fiscales (YPF) [Fiscal Oil Fields] promoted and fomented the setting up of enterprises in the whole country and particularly in Comodoro Rivadavia, they implied the creation of encampments in the well's whereabouts, fostering the development of population centers in the northern zone.

In this period, other lesser population centers grew in the zone from oil-related and complementary activities such as Manantial Rosales, Lapri-

da, Castelli, Rodríguez Peña and to the south Stella Maris. At this stage, the original downtown of the city also began to expand. Focalized urban growth is observed along the coast line.

Between 1960 and 1989, growth evolved toward the southern zone, from the so called “first oil boom”, when the first mass migration toward the city took place. This phenomenon is linked to the boom and expansion of oil exploitation and the activity of contracting enterprises, especially Pan American Energy, which started operations in 1959.

In the northern zone, by the mid 1960’s, the neighborhoods Prospero Palazzo and Ciudadela were born; they were mainly inhabited by Argentine Airforce workers and Gas del Estado, neither has the characteristics: encampment-neighborhood.

At this time, it was necessary for YPF to solve the problems of housing for the personnel which started working and that which retired. This way, in the southern zone the surveying of the present-day neighborhoods *13 de Diciembre* and *9 de Julio* and to the extent employees, new spaces with residential areas for them appeared, while the old housing closer to the wells were left for the active personnel. The creation of neighborhoods General A. Roca and Pueyrredón (the only ones under a previous municipal project) start as one single project.

In 1969, the national government authorized provinces to create industrial parks in view of accomplishing harmonic development. With this in mind, in the southern zone, the first surveying of the industrial neighborhood Humberto Beghin started; the neighborhood was devoted only to activities complementary to oil extraction. Later on, fostered by industrial promotion policies, the Industrial Park in Acceso Sur appeared, which was destined for concentrating and installing enterprises.

Limited by the topography, the so called “*barrios altos*” (upper neighborhoods) start to be built around the organized nucleuses, mainly with spontaneous occupations. This way appear the present-day neighborhoods F. Pietrobelli, J. Newbery, Las Flores, La Floresta, San Martín and Quirno Costa (Diagnóstico Urbano I, 1989).

Over the 1980’s decade, the promotion policies encouraged the appearance of protective poles such as the textile-wool and the mechanical-metallurgic, across the Patagonia; thus appeared enterprises that made heavy investments and created new job posts. This situation boosted unplanned demographic growth in a number of cities in the region, among them Comodoro Rivadavia.

In order to face the pressing housing demand, as of 1983, social housing was developed by means of the National Fund for Housing. These endeavors would become the later demographic densification toward the south-west sector of the city, with the creation in 1984 of neighborhood 30 de Octubre (also called 1 008 Viviendas).

Finally, over the stage from the 1990's to the present, the city has acquired new patterns of urban growth at the pace of the local and national socioeconomic changes.

As of the last decade of past century, new residential developments of social housing took place in the northern zone: Centenario, Fortín Chacabuco, Divina Providencia; this time, not only for oil-related workers, but for other sectors of the heterogeneous society of Comodoro Rivadavia: police officers, health-care and education personnel, among others. In those years there was a process of social polarization as a consequence of the neoliberal policies, in which the privatization of the state enterprise Yacimientos Petrolíferos Fiscales had dramatic repercussions in the labor market and social structure of Comodoro Rivadavia (Cicciari, 1999 and Salvia, 1999).

For its part, the occupation of the southern zone has advanced mainly to the west, where neighborhoods Cordón Forestal, Bella Vista Sur, Avelino Moure or Abel Amaya, among others were developed in recent years with residential, recreational and landscape ends. In like manner, distinguishable inside neighborhood Acceso Sur is the industrial park established there for entrepreneurial and manufacturing use.

In the last decade, the boost of oil-related activities, motivated by the international rise in oil prices, has had repercussions in the growth of the city and its characteristics. Nowadays, Comodoro Rivadavia is a territory fraught with urban, social, economic and environmental conflicts, whose mark has followed the evolution of the extractive activity.

In view of specifying more accurately the final part of the last period, the following section analyzes the recent urban growth pattern and its most distinguishable characteristics.

ANALYSIS OF THE RECENT GROWTH OF COMODORO RIVADAVIA

As it has been explained so far, the dynamic of extractive activity and territorial modalities imposed by this functionality have determined a fragmented and disperse growth in this city. However, over the last decade, this patterns has presented characteristics, factors that foster it and a demographic dynamic dramatically different from the previous periods.

Table 1. Population, households, sort of housing and house property, Comodoro Rivadavia, 2001 and 2010

	2001	2010	Absolute variation	Relative variation (%)
Total population	137 061	177 038	39 977	29.17
Population born abroad	14 835	16 160	1 325	8.93
Households	37 659	53 792	16 133	42.84%
Number of households with unsatisfied basic needs (absolute)	4 291	5 193	902	21.02%
Households with Unsatisfied basic needs (%)	11.4	9.7	-2	-15.28
<i>Sort of housing</i>				
House	29 774	46 919	17 145	57.58
Ranch ¹	194	779	585	301.55
Shack ²	566	1 489	923	163.07
Department	4 779	8 345	3 566	74.62
Rented rooms	414	540	126	30.43
Hotel rooms	9	22	13	144.44
Buildings not for inhabitation	61	80	19	31.15
Mobile home	24	32	8	33.33
Street	1	12	11	1100
Total	35 822	58 218	22 396	62.52
<i>Households by house property</i>				
Proprietor of house and land	25 510	33 794	8 284	32.47
Proprietor of household	1 801	2 631	830	46.09
Tenant	5 552	11 198	5 646	101.69
Living on a borrowed place	2 999	3 800	801	26.71
House provided by the employer	907	941	34	3.75
Other situation	889	1 428	539	60.63
Total	37 659	53 792	16 133	42.84
Private household with direct access to the exterior their dwellers do not use common hallways or corridors. They generally have walls of adobe, dirt floor and straw roof (INDEC, undated). ² Private household with direct access to the exterior, originally built to be inhabited (their dwellers do not use common hallways or corridors). Usually built with low quality materials or rejects (INDEC, undated). Source: own elaboration using data from INDEC.				

A first issue to distinguish the city's growth is that in the last inter-censal period, the population of Comodoro Rivadavia changed from 137 061 to 177 038, which implies an increase of more than 29 percent (over the growth in relative terms of the country and Chubut Province, 10.6 and 23.2, respectively). This supposes the addition, over the nine-year inter-censal period, of 40 thousand people living in the city (table 1).

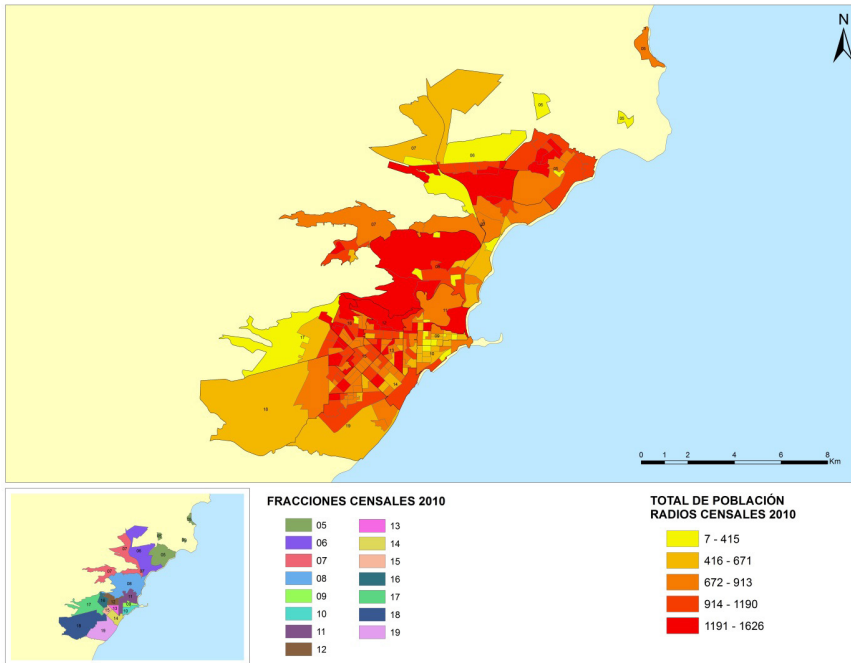
Well now, this demographic increase over the last decade, which urban growth pattern responds to? To the concentration of the central area, to the densification of consolidated neighborhoods, the redistribution between the center and outskirts or the expansion toward suburban zones? This is to say, which characteristics does recent urban growth take? Data displayed in map 4, from the last census, shed some light: the city seems to expand mainly toward the peri-urban area; a zone that seems more dynamical and susceptible to demographic changes.

In view of clearing the difficulty imposed by the format of censal data for the years 2001 and 2010, which prevent a correct comparison, map 5 has been produced with the previously detailed methodology. In this map, the satellite images from 2006 to 2013 are contrasted against the cadastral plane of the municipality of Comodoro Rivadavia. The information generated with this methodology allows observing and recording populating and location patterns of housing not accounted for in the official cadaster, offering convincing evidence regarding the growing areas in the city.

This information evinces that indeed the growth of the city of Comodoro Rivadavia takes places from three joint processes:

- a) Expansion toward peripheries owing to the broadening of preexisting neighborhoods though spontaneous settlements, which are popularly called "extensions" of neighborhoods 30 de Octubre, Monseñor Avelino Moure and Máximo Abasolo, for example.
- b) Occupation of peri-urban land not previously inhabited, which produces new neighborhoods or spontaneous settlements, not legally recognized as such by the municipality. In the northern zone, instances are: "Las Chapitas", "Sector 22" and "Los locos".
- c) Together with the two aforementioned processes, it evinced that some zones of the city, relatively more consolidated, tend to densify from the spontaneous occupation of interstices in an urban layout where vacant land lacks adequate conditions of inhabitability: settlements on the municipal landfill, on the line of beach or in the slopes of hills, mainly in the southwest.

Map 4. Comodoro Rivadavia, total population by radiuses, 2010



Source: own elaboration with data from INDEC.

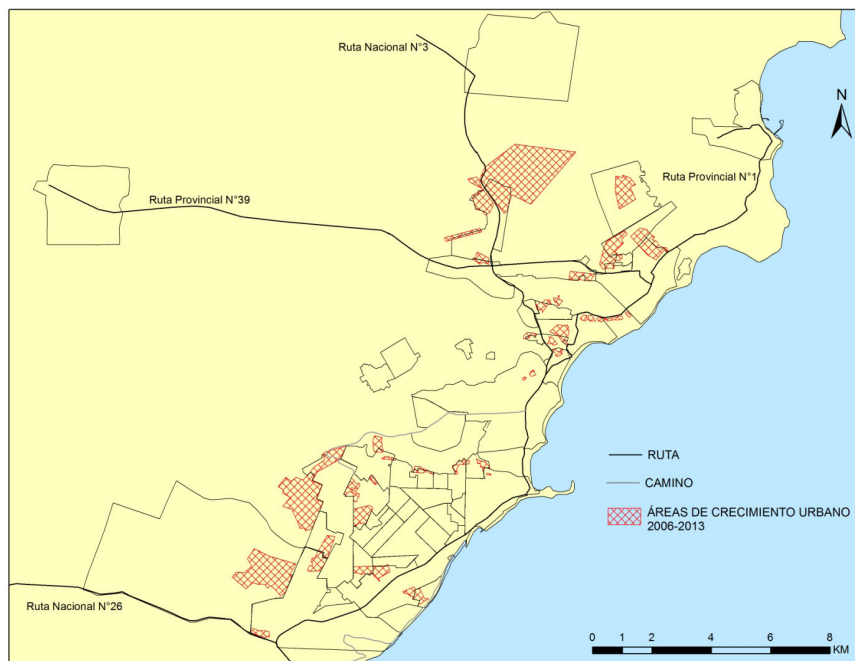
The characterization of the recent urban growth requires not only bearing in mind the idea that there is more population and that it seems to settle on certain sectors of the municipal lands, but also considering other series of factors such as the particularities of population and housing.

In this regard, a first issue is that the last censal data indicate that in the city the number of households increased in 43 percent, i.e., in 2010 there are 16 133 more households than in 2001 (table 1) and that in percentage, the proportion of households with unsatisfied basic needs (UBN) reduced. However, it is necessary to pay attention to the fact that, in absolute terms, Comodoro Rivadavia has added, over the last inter-census period, 902 households with at least an indicator of UBN, which amounts to 5 193 households with any sort of deprivation (involving almost 10 percent of the households in Comodoro Rivadavia) (table 1).

In this regard, map 6 shows an important datum: the areas in expansion previously identified seem to overlap with the radii where the 2010 census shows a greater proportion of households with UBN. The most intense colors remain at the urban edges and in some interstices in the consolidated layout. In the north, largest proportion of UBN clearly agree with radii that involve areas of growth identified in map 5. To the south of Chenque, the radii with the highest proportions of households with some deprivation partly overlap the neighborhoods Pietrobelli, Máximo Abásolo, Cordón Forestal, Mario Abel Amaya and the south of Stella Maris, which corresponds with precarious settlements on the municipal landfill.

Regarding this situation, table 2 shows for the years 2010 and 2012 the percentages of coverage of electricity, sewer and water services provided by Sociedad Cooperativa Popular Limitada (S.C.P.L) [People's Limited Cooperative Society], the concessionaire in charge of providing such public services. In this regard, it can be noticed that referring to the three ser-

Map 5. Areas of growth from 2006 to 2013



Source: own elaboration based on the overlapping of the urban cadastral plan 2006 on the satellite images from *Google Earth* 09/02/2013.

vices, the coverage percentages have noticeably reduced. This means that the city growth takes place outside the areas traditionally served by S.C.P.L and does not directly imply a densification of the consolidated areas with basic infrastructure. Therefore, in recent years the growth of Comodoro Rivadavia has meant the fast occupation of the peri-urban space without the provision of basic services.

The pervious observation can be complemented with more information, exposed in table 1 which shows other evidence that helps characterize the recent growth of Comodoro Rivadavia. In this regard, it is worth mentioning that the total of households in the city substantially increased: in 2010, there were 17 145 households and 3566 departments more than in 2001; albeit, the number of rural houses and cubicles (585 and 923 more than in the previous census, respectively) as well as other sort of inconvenient housing. This evinces that a sizeable part of the new households formed within last decade live in ranches and small houses and that the new housing developments, houses and departments, is not destined to respond to the demand produced by the city's demographic growth. The households' low occupation density in downtown also points this way (map 7): the central zone is not the one with the most densely occupied households; a more dense occupation occurs in the neighborhoods adjoining downtown, toward the west and southwest mainly and in a strip in the north, where several of the growth areas identified in map 5 are located.

On the other side, data regarding land tenancy (also displayed in table 1) evince that comparatively in the inter-census period, 2001-2010, the proportion of household owners proportionally reduced, while the proportion of rented households increased (11 198 households in this situation in 2010). This is to say, a half of the 16 133 new registered households are proprietors of the house and land they live in, while 35 percent of them, 5 646 houses are tenants.

Indubitably, certain inequalities in the income distribution and high prices of housing and land are behind these demographic phenomena without the correlative increase in households capable of purchasing property. Let us deepen into such variables.

The indicators shown in table 3 and graph 1 express that inequality, strictly measured in monetary terms, reduced in the city of Comodoro Rivadavia between 2003 and 2012. In short, Gini index, considering the employed population's main income reduced from 0.520 in 2003 to 0.478 in 2012. The situation is noticed in graph 1, where Lorenz curves for 2012 are somewhat closer to equi-distribution line; in particular, in quadrant A regarding quadrant B.

Table 2. Coverage of services of water, sewer and electricity supplied by Sociedad Cooperativa Popular Limitada, in percentages, 2010 and 2012		
Service	Coverage percentage	
	2010	2012
Water	87	76
Sewer	83	74
Electricity	92	82
Source: own elaboration from Dirección de Investigación Territorial (2012), based on the data base supplied by S.C.P.L. by August 31 st , 2012.		

In spite of the afore-mentioned improvement in these indicators still reflect a heavy concentration of income in this urban conglomerate. In fact, in 2012, the wealthiest ten percent of the employed population receives an income 30 times superior to that of the poorest workers. In the case of total family income, the situation also reveals an important gap between rich and poor and a heavy concentration in the highest decile, which has an income 27 higher than that of the households in the first decile (table 3).

Comodoro Rivadavia is a society fragmented in function of the different position of urban workers in the labor market: on the one side, workers whose incomes are linked to oil extraction, who hold the highest income levels, compared with those of workers who perform other activities whose remunerations are substantially lower.

The background for this situation is the considerable dynamism of the local economy in an international context of oil price rise as of 2003, in the so-called new oil boom. Two direct consequences of this economic boost is the increase in immovable property prices and the renewed attracting condition of Comodoro Rivadavia's labor market; two aspects closely linked to the conditions and characteristics of the city's recent growth.

Regarding the first factor, the price of immovable property, a survey on the cadastral or fiscal value of a sample of 30 properties was made plots, departments and houses were considered and related with their respective market prices. A summary of this information is shown in table 4. The quotient of the magnitudes works as an indicator of the overpricing of the real estate market;⁵ the higher the quotient, the more similar the fiscal value is to the market value, and vice versa.

⁵ Also reflects certain delay in the fiscal appraisals against municipal finances.

Table 3. Indicators of inequality, population and households, 2003 and 2012

Indicators		2003 (3 rd quarter)	2012 (3 rd quarter)
Population	Gini index	0.524	0.447
	Ratio, last and first decile	37	30
	Average income (main occupation, in ARS)	1 050	8 018
Households	Gini index	0.520	0.478
	Ratio, last and first decile	31	27
	Average income (total family, in ARS)	1 855	14 123

NB: variables of reference of the indicators: employed population according to income from the main occupation and Households according to total family income. Source: own elaboration based on Encuesta Permanente de Hogares of INDEC.

As it is noticed, in the lands is where the difference between both values is superior, this is to say where the sale price excessively surpasses the fiscal value. The existence of an important real estate business in which the best positioned agents obtain land at low prices and make them available to the market at prices that increase the cost several times.

Adding to this, it is distinguished that on average to purchase land, the mean salary of a worker is needed 150 times (table 3), 245 to buy a department and 141 to buy a house (table 4).

The correlate of this situation is the de facto occupation of private and public lands by the social sectors that cannot access the formal property market. As it has been previously mentioned in this article, the new occupied land corresponds to areas that lack public services, in environmental risk or not suitable for building, which additionally generates social conflicts. This implies that a large part of urban growth in recent years has a precarious conditions regarding access housing and land. The traditional patterns of spreading/fragmentation, seem to stress recently by the fierce real-estate market that favors transactions linked to the higher-income sectors, promoting difference and asymmetric access to housing and land.

The second consequence of the economic boom is, as mentioned before, the attracting condition of the labor market as of 2003. Among other issues, this appears as a larger number of people who live in the city, but were born somewhere else. Particularly, of the total of registered population in the 2010 census, plus nine percent had been born abroad (a total 16 160 people as shown in table 1). Of them, 87 percent come from neighboring countries: Chile (65 percent), Bolivia (15 percent) and Paraguay

Table 4. Fiscal appraisal and market value of a sample of immovable property, relation between both and average income necessary to acquire them, 2013

	Average fiscal appraisal (FA) (in ARS)*	Average market price or sale price (SP) (in thousand ARS) **	Quotient VF/PV	No of average incomes to buy ***
Plots	51 706.2	1 201 530	0.04	150
Departments	137 783.3	1 965 000	0.07	245
Houses	241 220.8	1 128 000	0.21	141

* Fiscal appraisal (VF).

** Market value (MV).

*** calculated from the average income of those employed, referred in table 3: 8 018 ARS.

Source: own elaboration with data from the Municipality Digest of Comodoro Rivadavia, rates and taxes and surveys on developers.

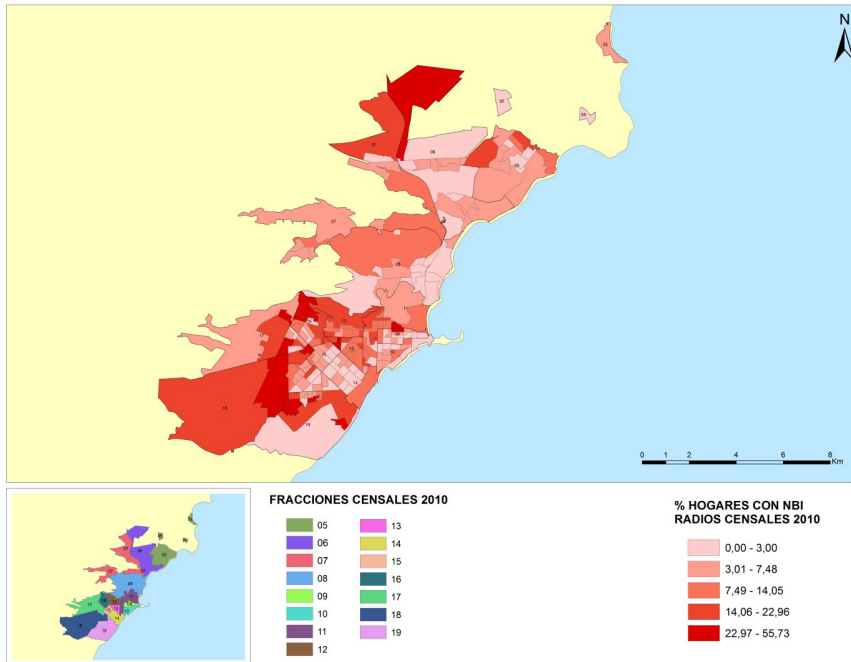
(seven percent). In comparison with census data for 2001, the total of new residents born abroad amounts to 1 325 people, which evinces that population born abroad living in the city increased almost nine percent between 2001 and 2010 (table 1).

As shown in map 8, the largest proportions of population born abroad are found in the popularly called “high neighborhoods” (Máximo Abasolo, San Martín, La Floresta, Las Flores, Jorge Newber and Pietrobelli) and in the south zone (parts of the neighborhoods Stella Maris, 30 de octubre and Abel Amaya). In like manner, it can be recognized that the most recent growing areas identified in the map 4 agree with zones where foreigners concentrate. Even if in the northern zone there are lowest indexes, two areas with relatively higher indicators are distinguished: along the coast line and toward the west neighborhood Centenario.

There is a tendency distinguishable in plain sight that help characterize urban growth in recent years, with the exception of the aforementioned high neighborhoods, to the extent we move away from downtown the percentage of population born abroad gradually increases. This characteristic is shared by with the total population (map 4); the largest percentages of households with UBN (map 6) and the amount of people per household (map 7). These indicators have their unifying correlate in that such characteristics are found in areas of recent growth, indicated in map 5, and associated with precarious and informal settlements.

Separately, we also have to mention that growth in Comodoro Rivadavia over the last decade originates in international migrations, fundamentally from the referred countries and also from northern Argentina (see Baeza, 2013a and 2013b), which has repercussions in important social conflicts and disputes between the new residents and the population born in the city. An instance of this sort of disputes is the self-called “children of

Map 6. Proportion of households with unsatisfied basic needs by censal radiuses, 2010

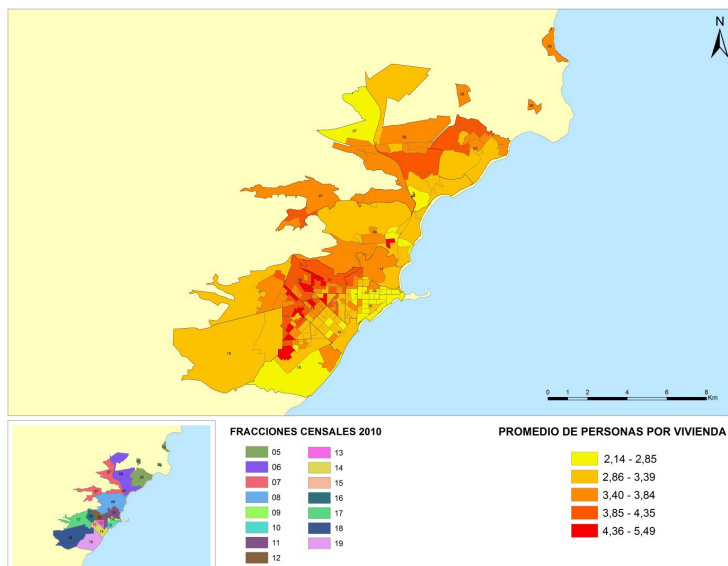


Source: own elaboration with data from INDEC.

the neighborhood” composed of largely young people, children of earlier inhabitants, who reclaim “their” place in the land allotment to build their houses (Olivares, 2013).

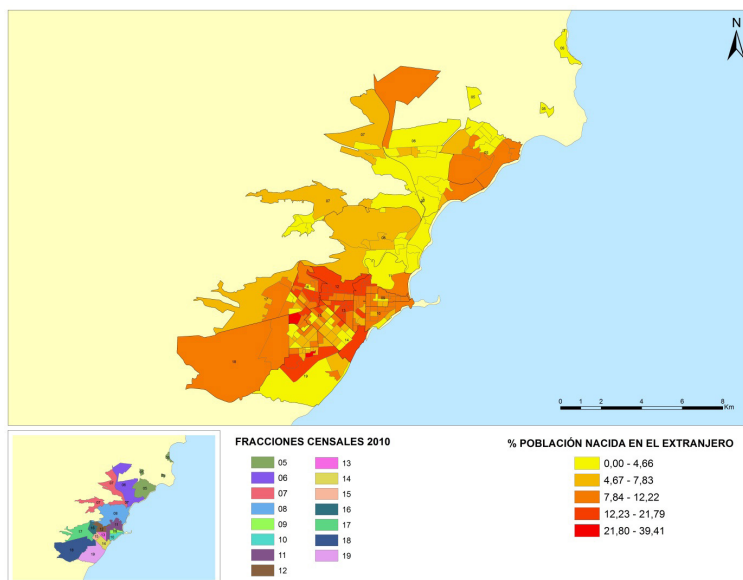
Similarly to other Patagonian cities with economies heavily dependent on their natural resources, Comodoro Rivadavia is a scenario for strong conflicts between social classes and sectors that fight for the scarce inhabitable lands, which are largely exploited by real-estate entrepreneurs, while the poor strata, mainly new migrants, occupy the edges and interstices the city offers, escaping the control of state agencies (national, provincial and even municipal). The subaltern members of this society interact everyday producing coexistence spaces and also fights for the land (Baeza, 2013a) and the survival strategies (occupation of urban land, housing construction, connection of electric service and water, for example) escape the legal control. The edges of the city and its interstices become “invisible” spaces where precarious habitats that lack basic services, aside the formal regime, are in a situation of great vulnerability in the face of the region’s hostile natural conditions.

Map 7. Average people by household, by censal radiuses, 2010



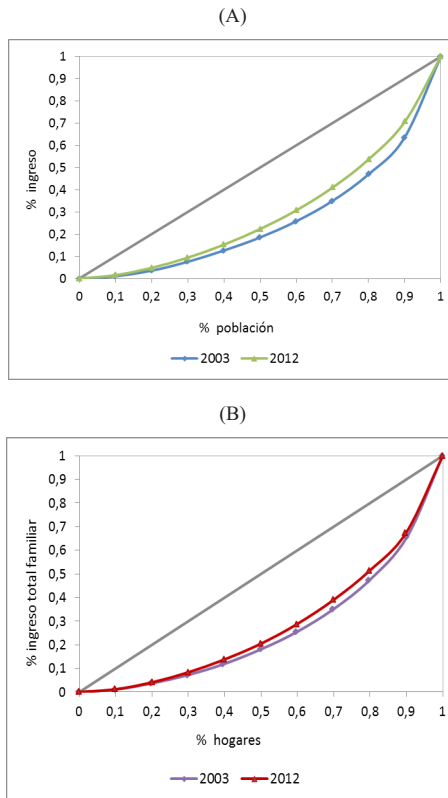
Source: own elaboration with data from INDEC.

Map 8. Proportion of people born abroad, by censal radiuses, 2010



Source: own elaboration based on INDEC.

Graph 1. Lorenz Curves, population and households, 2003 and 2012



NB: reference variables: (A): employed population according to income from main occupation and (B): households according to total family income.

Source: own elaboration based on data from Encuesta Permanente de Hogares, INDEC.

CONCLUSIONS AND FINAL REFLECTIONS

Along this work, we have shown numerous indications that help characterize the recent growth of Comodoro Rivadavia. The city grows under a pattern of clear dispersion, different from that which historically marked the pace of urban growth. This is not the case of the elites' suburbanization, as in other latitude where the higher-income population tends to locate at the edges of the city, in private gated communities, searching for better life conditions, contact with nature and security. In the case of Comodoro Rivadavia, the disperse growth is fundamentally produced by the occu-

pation of spaces characterized by precarious housing, generally lacking suitable infrastructure, unfavorable life conditions.

Particularly, the identification of growth areas by using satellite images has worked to acknowledge that such growth occurs owing to the following processes: the expansion of the peripheries due to the broadening of preexisting neighborhoods by means of spontaneous settlements on the “extensions” of some neighborhoods; the occupation of periurban land previously uninhabited, which produces new informal settlements not recognized by the municipal cadaster and the occupation of certain interstices in the urban layout that lack suitable conditions to inhabit (settlements on the municipal landfill, on the coastline or in the mountainsides).

Indeed, the growth of the city does not become a densification of consolidated neighborhoods in the layout or downtown, but the greater demographic dynamism is noticed at the edges and peripheral spaces. The areas identified overlap with spaces for which the 2010 census reveals a marked proportion of households with UBS, larger amount of people per household and an important percentage of people born abroad.

The growth in recent years has been certainly favored by the boom of oil extraction and the ongoing urban restructuring is closely linked to informal settlements in the most vulnerable sectors of the city and surroundings. The economic boost has not substantially closed the gap between rich and poor, which is still important, and the conditions to access housing and land become more difficult, while the prices of the real estate market evolve together with oil revenues, whereas the income of the large part of the population and households keep a much slower pace.

To sum up, the result verify that over the last decade the city has intensified its patterns of disperse growth, however with marked connotations of socio-spatial fragmentation.

Before this panorama, in the face of this panorama, numerous challenges appear for the policy makers. Among them the improvement and increase of communication and interconnection flows between isolated nucleuses; providing sanitary structures and adequate public services in areas without these; the adaption and conditioning of vacant spaces between the isolate nucleuses mainly in the north zone, as areas of possible urban growth in the future, where the previous anthropic use permits. Bearing in mind this last, it is utterly important that new urbanization projects both public and private foresee in adequate structures for residential use, not only regarding basic services, education, health and commercial facilities as well as other that tend to generate their own internal dynamic, but it is

necessary the establishment of suitable public and leisure spaces that favor the meeting and interaction of various social sectors.

Comodoro Rivadavia indubitably needs territorial policies that consider the heterogeneous set of the city, which seeks to balance urban functions, access to land, distribution of productive activities and intercommunication by means of intraurban roads that facilitate access to the furthest neighborhoods.

The characteristics of the recent urban growth evinced in these pages reveal that urban planning has been at the back of the city's growth, where projects have generally considered the short-term solution of problems, which tends to aggravate the preexisting serious problems, increasing the precariousness and vulnerability of many inhabitants and potentiating social, environmental and urban problems.

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