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## ASSESSING URBAN SPRAWL-RELATED HOUSING DYNAMICS IN THE ROMANIAN METROPOLITAN AREAS

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**Abstract:** Currently, in Romania, nearly 7,500,000 inhabitants (34% of the country total population) live in the metropolitan areas. Following the political and socio-economic changes which came after the post-communist period, the metropolitan landscape witnessed significant transformations, mainly related to urban sprawl (suburbanisation), in terms of land use/land cover changes and conversion to residential, commercial or services areas triggering both deconcentration and spatial redistribution of the population. The authors intend to assess the main urban sprawl-related housing dynamics in connection with some triggering driving forces in terms of the spatial transformations of built-up areas, changes in population patterns, residential expansion, etc., while focusing on the most important Romanian metropolitan areas: Bucharest, Oradea, Iași and Constanța. Therefore, using GIS computer mapping techniques, statistical data and field surveys, the current study seeks to provide an insight into the connections between the main patterns of change and the residential development pathways in the Romanian metropolitan areas.

**Key-words:** urban sprawl, suburbanisation, GIS, housing, metropolitan areas, Romania.

### Introduction

The first decade of the 21st century brings about the most extensive urbanisation share ever reached with more than half of the world's population living in the urban areas. In Europe alone over 70% of the population live in the urban areas - a number likely to increase to 84% by 2050 (Kabisch and Haase 2011). Moreover, most of the European countries have faced the increasingly extensive transformation of the urban shape and development patterns (Patacchini et al. 2009) through suburbanisation and densification processes (ESPON FOCI 2010).

The classic cyclical urbanisation model built by Van den Berg et al. (1982) is broadly accepted as a pattern of the past and present population changes in both urban cores and surrounding fringe areas, thus triggering both urban growth and decline periods in Europe in four stages: urbanisation, suburbanisation, desurbanisation and reurbanisation. Next, each stage is divided into two periods of population increase (centralisation) or decrease (decentralisation) (Bayona and Gil-Alonso 2011).

The first stage, i.e. urbanisation, is characterised by a concentration of population in the core city compared to the surrounding region, while the following phase, i.e. suburbanisation, leads to a strong process of deconcentration of both population and economic activities from the core areas towards the periphery. Suburbanisation sometimes turns into counterurbanisation based on the population shifts from the urban periphery towards the small and medium-sized towns of less urbanized metropolitan surroundings. During this process the core areas lose more people and jobs than the suburbs gain. Even though at the suburbanisation stage the urban area, in general, still shows positive growth, it shifts to a negative trend at the following phase, desurbanisation, when population starts declining both in core cities and fringe areas. Reurbanisation is triggered by the revitalisation of inner cities, a process specific to the West-European urban areas. Over the past twenty years, suburbanisation has become the leading process in Southern and Eastern Europe (ESPON FOCI 2010; Grigorescu et al. 2012b).

In most post-communist Central and East-European metropolitan areas the urban sprawl has been understood as a process of urban development triggering population deconcentration and territorial transformations related to the restructuring of the physical shape, land-use patterns and socio-spatial configuration (Sykora and Ourednicek 2007; Letmaa 2008). Furthermore, suburbanisation becomes an important issue due to the rapid changes related to the commercial and residential expansion experienced by the former compact socialist cities through non-contiguous, leap-frog suburban sprawl with negative economic, social and environmental consequences (Sykora and Ourednicek 2007).

The urban sprawl, mainly the suburbanisation process, has become present in the Romanian towns subsequent to the fall of communism. Up-to-date investigations the urban sprawl phenomenon carried out in Romania underlined a strong connection with its driving factors of change (natural, socio-political, economic) and the related environmental consequences (Nicolae 2002; Bălteanu and Grigorescu 2006; Grigorescu 2008; Suditu 2009; Ianoş et al. 2010; Grigorescu and Dumitrescu 2010, Grigorescu et al. 2012a etc.). Moreover, studies on urban sprawl-related issues, dealing mainly with its major characteristics and typologies (Suditu et al. 2010), legal tools and territorial planning (Suditu 2012) residential development and real-estate market dynamics (Conway et al. 1995; Niculiţă et al. 2011; Zilişteanu 2011), land cover/land use changes and related environmental impacts (Pătroescu et al. 2011; Ioja et al. 2011; Grigorescu et al. 2012b), counter-urbanisation process and rural-urban fringe patterns (Guran-Nica and Sofer 2011), metropolitanization process (Erdeli and Simion 2006) etc., were undertaken, regarding Bucharest Metropolitan Area or other Romanian metropolitan systems.

The current research is aiming to relate the specific patterns of urban sprawl (mainly suburbanisation) and housing dynamics in the post-communist period, a time frame which triggered significant transformations, especially at the urban-rural interface. The authors are trying to highlight the impacts of environmental and socio-economic patterns of urban sprawl in the Romanian metropolitan areas by means of some relevant statistical and spatial indicators in order to trace the main residential development pathways and their projection on housing dynamics and patterns.

## Methods and data

In view of the above, specific spatial and statistical data were used in order to assess the urban sprawl-related patterns of the Romanian metropolitan areas with focus on selected case-studies (Bucharest, Oradea, Iași and Constanța). Thus, spatial data (GIS processing of maps at different spatial and temporal scales after the fall of the communist regime when the urban sprawl process, mainly suburbanisation, come into force), statistical data (supplied by the National Institute of Statistics for the 1991–2012 time frame) were used and field surveys were carried out. The spatial data (topographic maps, 1990; EEA Corine Land Cover 2006) were used in order to understand and picture the territorial dynamics of suburbanisation, as well as the connections between the environmental driving forces and the main patterns of change (Grigorescu et al. 2012a). In addition, relevant statistical data were processed (e.g. population growth, finished dwellings, built-up areas, dwelling units density) in order to provide comprehensive information on the housing dynamics in the Romanian Metropolitan Areas focusing on the selected case-studies.

## Urban sprawl in the Romanian metropolitan areas

Currently, over 11,000,000 inhabitants (55% of Romania total population) live in the urban areas, out of which almost 7,500,000 (34%) live in the metropolitan structures. In the political and socio-economical context of the post-communist period, the dynamics of urban population marked the emergence of the urban sprawl phenomenon in Romania (Grigorescu et al. 2012a). In the Romanian geographical literature the metropolitan areas are defined as "spaces under the influence of urban centres that have macro-regional functions and whose population exceeds 1 million people" (Erdeli et al. 1999) and only one metropolitan area (Bucharest) falls into this category. Given that the rest of Romanian towns have less than 400,000 inhabitants each and polarise spaces under 1 million inhabitants, the metropolitan development was supported by some legal instruments according to which a metropolitan area is to be established based on the joint association of the administrative-territorial structures (Grigorescu et al. 2012a). Thus, the Intercomunitary Development Associations were established as cooperation structures intended to jointly address the development projects at local and regional level. Amongst 600 partnerships recognized by 2012, 19 were established around large and medium-sized towns as an example of metropolitan associative structures (STDR 2015) of which 9 are a part of the Federation of Romanian Metropolitan Areas and Urban Agglomerations – FZMAUR (Bacău, Baia Mare, Brașov, Constanța, Cluj, Iași, Oradea, Târgu Mureș și Timișoara)<sup>1</sup>.

In addition to this, in order to carry out priority investments under the programmes funded from the Community and national budget, according to Government Decision no. 998/2008, seven national growth poles and 13 national development poles were also designated in Romania (Fig. 1)

At the European Union level, in accordance with the EUROSTAT provisions, metropolitan regions are classified as NUTS3 regions or a combination of NUTS3 regions (County in Romania) which represent agglomerations with over 250,000 inhabitants. The same Eu-

<sup>1</sup> <http://www.fzmaur.ro>

ropean Union data source classifies metropolitan regions in three main categories totalling 8 such structures: capital metro regions (Bucharest/Ilfov County), second-tier metro regions (Cluj-Napoca/Cluj County, Timișoara/Timiș County, Craiova/Dolj County, Constanța/Constanța County, Iași/Iași County) and smaller metro regions (Galați/Galați County and Brașov/Brașov County)<sup>2</sup>.

Moreover, in line with the project document regarding the Strategy for Territorial Development of Romania 2035 the spatial entities scheduled to play a major role in the Romanian urban system are foreseen to be developed: *metropolitan poles with international potential* (Bucharest, Timișoara, Iași and Constanța), *metropolitan poles with superregional/interregional potential* (Brașov, Cluj-Napoca, Craiova, Oradea, Ploiești and Galați-Brăila), *poles with regional potential* (Arad, Suceava, Râmnicu Vâlcea, Sibiu etc.), *poles with limited regional potential* (Tulcea, Bacău, Vaslui, Călărași etc.), *sub-regional poles with urban functional zone potential*, *urban poles with zonal influence*, *urban poles with local influence* and *towns in the vicinity of metropolitan poles*<sup>3</sup>.

Currently, in Romania, there are 22 towns aiming to develop metropolitan areas, out of which only one – Bucharest – (*very large city*, according to the classification of towns) meets the requirements of such a structure according to both international and Romanian legislation (Geografia României 1984; Urucu et al. 2006; Mitrică et al. 2014). The rest of 21 towns attempted to develop metropolitan areas based on the legislative context which supports metropolitan development by the association of the administrative units under the influence of a city rather than by the size of the polarising city (Table 1, Fig. 1) (Grigorescu and Dumitrescu 2010; Grigorescu et al. 2012a). Thus, the population living in metropolitan structures is totalising nearly 7,500,000 (34%) inhabitants, out of which over 2,500,000 (11.5%) in Bucharest Metropolitan Area.

Given that the fall of the communism brought about significant socio-economic changes followed by urban restructuring and spatial transformations which mainly affected the capital-city and some of the large cities, the authors intend to address the suburbanisation-related issues while focusing on Bucharest, Oradea, Iași and Constanța Metropolitan Areas.

Bucharest is the only city which meets the requirements of metropolitan area in terms of size and dynamics. However, the city and its surrounding territory do not have the functionality of an independent metropolitan administrative structure as Oradea, Iași and Constanța do. Consequently, over the last years, several attempts to delineate its metropolitan area through scientific (Iordan 1998; Ianoș et al. 1998–1999; Iordan 2003; Săgeată 2005; Ianoș et al. 2012 etc.) or political-oriented (Gherasim 2003; Săgeată 2006) approaches have been made.

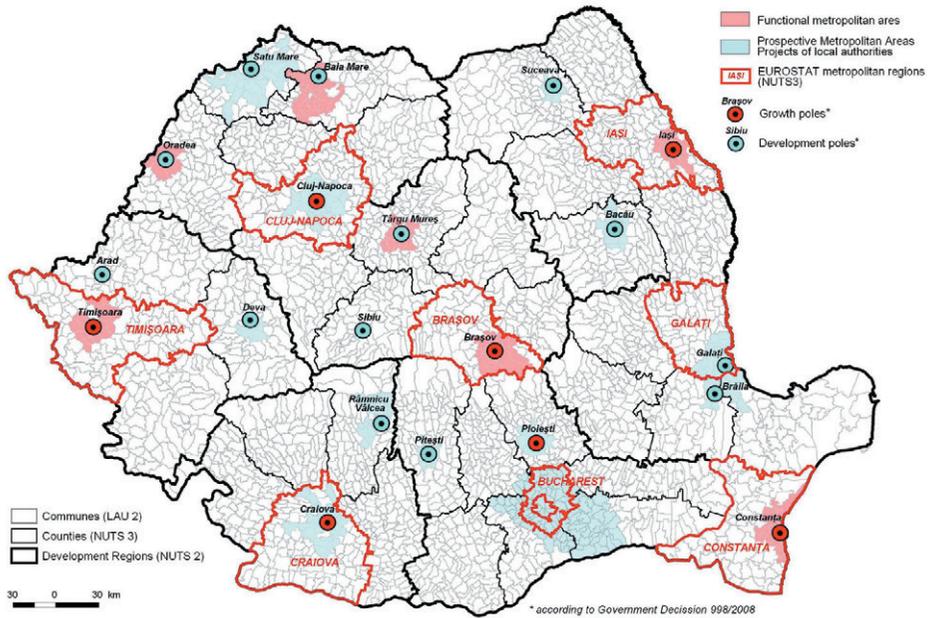
Currently, *Bucharest Metropolitan Area* acts as an urban-rural structure organised into one core city (Bucharest) and around 100 administrative units (LAU2 level) pertaining to Ilfov (40), Giurgiu (24), Călărași (29), Dâmbovița (5) and Ialomița (2) Counties, gathering over 2,500,000 inhabitants. It is located in the south-eastern part of Romania and overlaps with the Romanian Plain also known as the Lower Danube Plain (Bălțeanu et al. 2006) which has always been a predominantly agricultural rural space with over 70% of arable land. Due to these environmental conditions which add to the political and socio-economic factors the area had faced over time major transformations from arable to residential oriented land use.

<sup>2</sup> [http://epp.eurostat.ec.europa.eu/portal/page/portal/region\\_cities/metropolitan\\_region](http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/metropolitan_region)

<sup>3</sup> [www.sdtr.ro](http://www.sdtr.ro)

**Table 1.** Towns/metropolitan areas in Romania grouped by demographic size

Town group/inh.	No. of towns in 2012	Towns which have become functional and prospective metropolitan areas
Total towns of which:	320	22
<b>Small towns (total) with</b>	<b>215</b>	
under 5,000	20	
5,000–10,000	98	
10,000–20,000	96	
<b>Medium-sized towns (total) with:</b>	<b>81</b>	<b>5</b>
20,000–50,000	59	1 (Simeria)
50,000–100,000	22	4 (Deva, Hunedoara, Râmnicu Vâlcea, Sibiu)
<b>Large cities (total) with:</b>	<b>23</b>	<b>16</b>
100,000–150,000	9	4 (Baia Mare, Suceava, Târgu Mureş, Satu Mare)
150,000–200,000	4	2 (Bacău, Piteşti)
200,000–300,000	5	5 (Brăila, Braşov, Galaţi, Ploieşti, Oradea)
300,000–400,000	5	5 (Cluj-Napoca, Constanţa, Craiova, Iaşi, Timişoara)
<b>Very large cities:</b>	<b>1</b>	<b>1</b>
Over one million	1	1 (Bucureşti)



**Fig. 1.** Metropolitan development in Romania

*Oradea Metropolitan Area* is located in the north-western part of Romania adjacent to the border with Hungary. It consists of 8 localities<sup>4</sup> with a population exceeding 240,000 inhabiting the administrative territory of 62.1 ha. The area is spread between Crişana Hills and Crişana Plain, with certain disparities in terms of urban residential sprawl; the plain landscape in the western part with the lakes and rivers (Crişul Repede, Peţea) is much more preferred than the hilly relief found in the eastern part despite its vegetation cover.

*Iaşi Metropolitan Area* is located in the north-eastern part of Romania adjacent to the border with the Republic of Moldova. It includes the town of Iaşi and 13 surrounding villages<sup>5</sup> spanning over an area of 787.87 sq.km, with a population exceeding 400,000 inhabitants. The area overlaps with a hilly stretch with lower elevation in the north – Jijia-Bahlui Plain (100–150 m altitude) whence it rises up to 300–350 m altitude in the Central Moldavian Plateau separated by a monocline structure with cuesta alignments (Coasta Iaşului nearly 100 km long) (Bălţeanu et al. 2006). Thus, lower altitudes, dense network of rivers (Bahlui, Nicolina) and lakes (e.g. Veneţia, Rediu), as well as a large spread of vegetation favoured urban sprawl and residential development mainly in the southern and north-eastern parts (Grigorescu et al. 2012a).

*Constanţa Metropolitan Area* embraces the most important urban system composed of Constanţa Municipality and 14 surrounding localities<sup>6</sup> with about 450,000 inhabitants in the Romanian Black Sea area. The area is overlapping with the eastern part of the South-Dobrogea Plateau (150–200 m altitude) with flat plateau-like interfluves and with the Romanian Black Sea Coast with 10–35 m high cliffs (Bălţeanu et al. 2006). Abandoned land (mostly agricultural) and tourism development along the sea shore have triggered significant landscape changes associated with urban residential development, largely through land reconversion and transformation.

When discussing urban sprawl-related processes, the natural factors, in addition to the social, political and economic ones, have always been crucial in developing metropolitan structures. Therefore, the location of the most Romanian metropolitan areas in the plain and low hills/plateaux relief units have had an important role in the emergence and development of new residential/housing patterns, especially in some of the most urbanized metropolitan systems, such as Bucharest, Oradea, Iaşi and Constanţa.

### **Urban sprawl-related housing dynamics in the romanian metropolitan areas**

Generally, in recent years, the Romanian towns have recorded constant dynamics, facing a built-up area expansion of up to 200% (e.g. Arad 60%, Iaşi 73.7%, Suceava 76%, Mihaileşti 106.3%, Bragadiru 114.6%, Buftea 106%) or even more (e.g. Măgurele 872.4% in the Bucharest Metropolitan Area), favoured by their position in the proximity of important urban centres (Suditu et al. 2010). This unleashed phenomenon in combination with the new social and economic conditions the Romanian metropolitan structures are coping with, the need to find new housing and services alternatives inside and mostly outside the urban area had led to the new residential perspectives (Grigorescu et al. 2012a). The-

<sup>4</sup> <http://www.zmo.ro/en/>

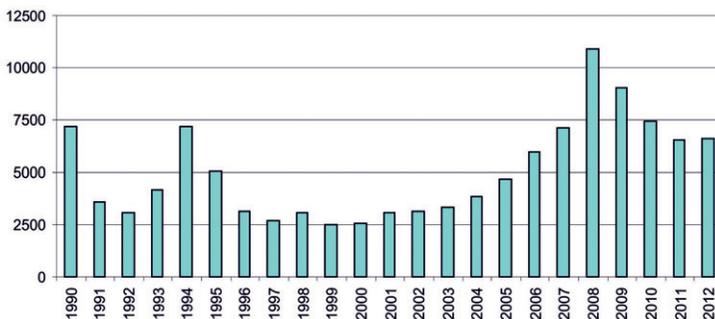
<sup>5</sup> <http://www.zmi.ro/en>

<sup>6</sup> <http://www.zmc.ro/>

refore, combination of the urban sprawl with housing dynamics in selected metropolitan areas becomes essential for identification of the suburbanisation-related spatial trends and for spotting of new residential pathways using several indicators such as: finished dwellings, built-up area dynamics, and dwelling units' density.

**Finished dwellings.** This statistical indicator concerns the dwellings finished during a specific year, which did not exist before, for which all categories of work planned in the detailed design documentation were executed and which were accepted by the users (TEMPO online 2012). It also reveals the spatial transformations in terms of patterns and functions, on the one hand, and the sprawling and emergence of new residential areas, on the other.

During 1990–2012, the number of finished dwellings had a fluctuating dynamics in the Bucharest Metropolitan Area with 3 main peaks: in 1990 (7,198), 1994 (7,185) and 2008 (10,872), followed by a gradual decrease due to the economic crisis. The sharpest drop in the number of finished dwellings was recorded in Bucharest Municipality: from 6,467 in 1990 to 1,637 in 2012 (Fig. 2). Over the past few years the number of empty apartments in Bucharest has risen in the largest residential projects with about 1,000 houses available for sale. Therefore, the largest number of dwellings which potential buyers could immediately move in may be found in the Greenfield and Ibiza Sol projects located in the northern part of Bucharest (totalling over 250 dwellings) – while dozens of houses are available in residential projects such as: Primăvara Ghencea, Ten Blocks Militari, Pallady Residence or Metropolis Residence<sup>7</sup>.



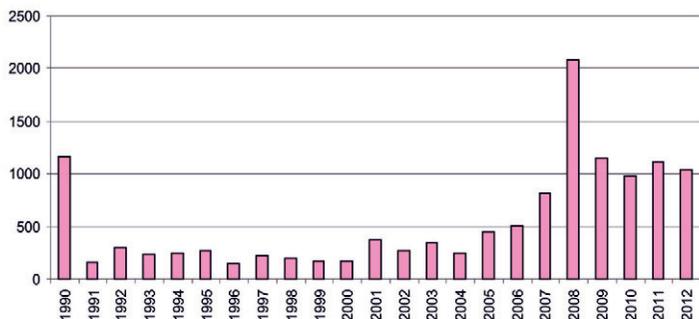
**Fig. 2.** Finished dwellings dynamics in Bucharest Metropolitan Area

Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

The largest number of dwellings completed in 2012, compared to 1990, was recorded in Popești-Leordeni (1,398), Pantelimon, Dobroești, Corbeanca, Chiajna, and Crevedia (between 100 and 300 dwellings each), suggests that the localities in the vicinity of the Bucharest Municipality are more attractive in terms of real estate development, that is confirmed by the continuous expansion of the built-up area in the metropolitan area.

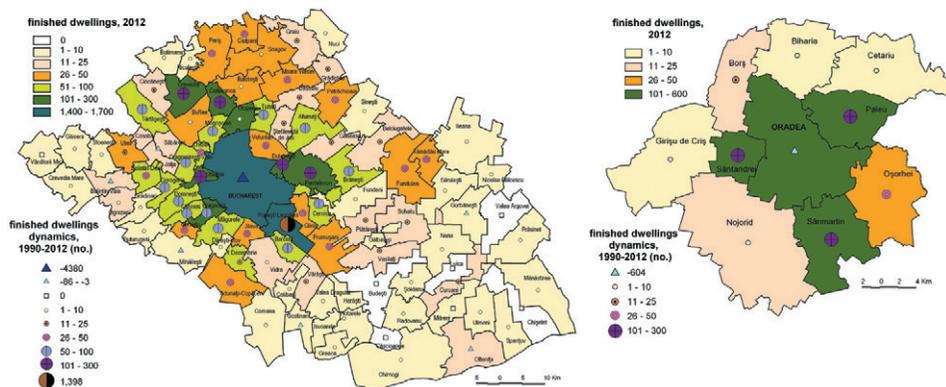
Over the same analysed period, in **Oradea Metropolitan Area** 12,662 dwellings were completed (66.8% out of the total number of finished dwellings in Bihor County). Most of them were completed between 2008 and 2012 (6,355–50.2% of the total number finished during the 1990–2012 period) (Fig. 3).

<sup>7</sup> [www.ziarulfinanciar.ro](http://www.ziarulfinanciar.ro)



**Fig. 3.** Finished dwellings dynamics in Oradea Metropolitan Area  
Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

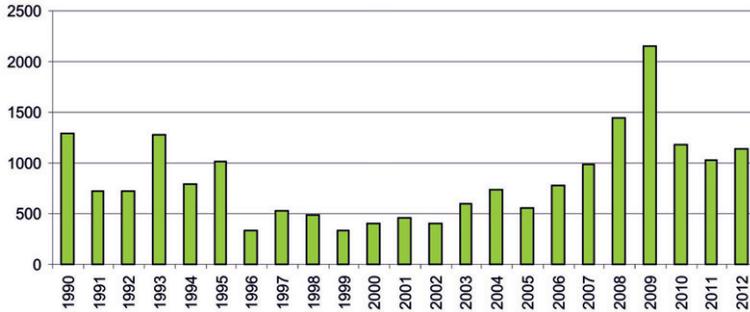
The town of Oradea is characterised by a high volume of finished dwellings due to its economic potential and development trends. Over the last few years, the real estate sector of its metropolitan area has generally followed the national trends of new residential projects which are under implementation or completed: "Housing for Young People" project, Comfort Real Estate Ensemble, Henry Ibsen Ensemble, Gh. Doja Residential Complex, Robert Owen Complex, Forvila Residential Neighbourhoods, Lotus and Europa Residential Ensembles, Lucafărul Neighbourhood, Iosia Residential Complex, Miorița Residential Complex, etc. (Fig. 4)



**Fig. 4.** Finished dwellings dynamics by localities in Bucharest Metropolitan Area (left) and Oradea Metropolitan Area (right) • Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

The number of finished dwellings in **Iași Metropolitan Area** remained relatively steady in 2012 compared to 1990 (around 1,200), with fluctuations over the analysed period between 330 dwellings in 1999 and 2,147 in 2009. Spatially, the highest finished dwellings rates in 2012 compared to 1990 were recorded in the city of Iași (830 dwelling) with top values in Miroslava commune (259) (Fig. 5).

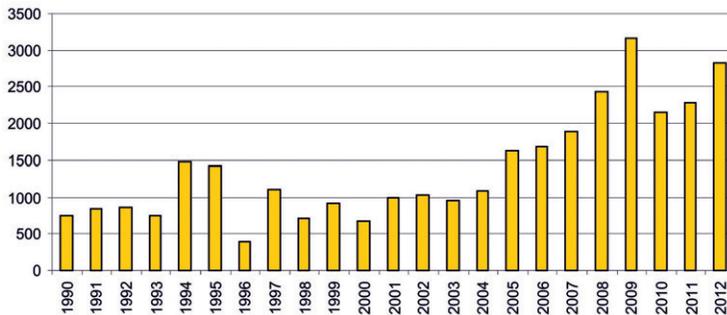
In Iași Municipality The dwelling stock has increased over the past 10 years due to hundreds of millions of euro invested in infrastructure and real estate projects (e.g. Green Park, Palas, Copou Bellevue, Dream Village, etc.), projects that have already changed and will radically change city landscape. The neighbouring villages are experiencing the same



**Fig. 5.** Finished dwellings dynamics in Iași Metropolitan Area  
Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

process through the new residential areas (e.g. Bârnova, Miroslova, Ciurea, Valea Lupului, Tomești) (Fig. 7).

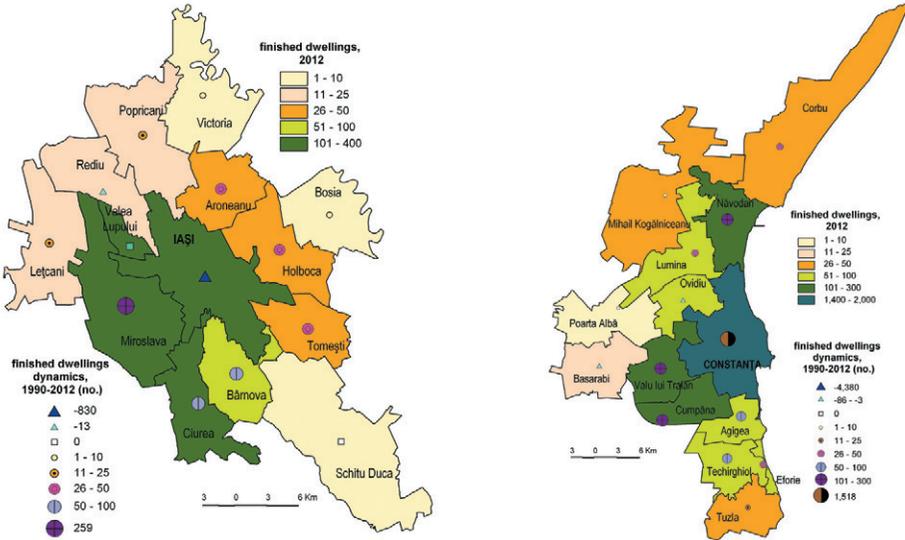
In **Constanța Metropolitan Area** 32,037 dwellings were completed over the analysed time interval with 75% of the total number finished in Constanța County. The largest number of houses was finalized over the 2008–2012 period (40% of the total number of houses finished during 1990–2012 period) (Fig. 6).



**Fig. 6.** Finished dwellings dynamics in Constanța Metropolitan Area  
Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

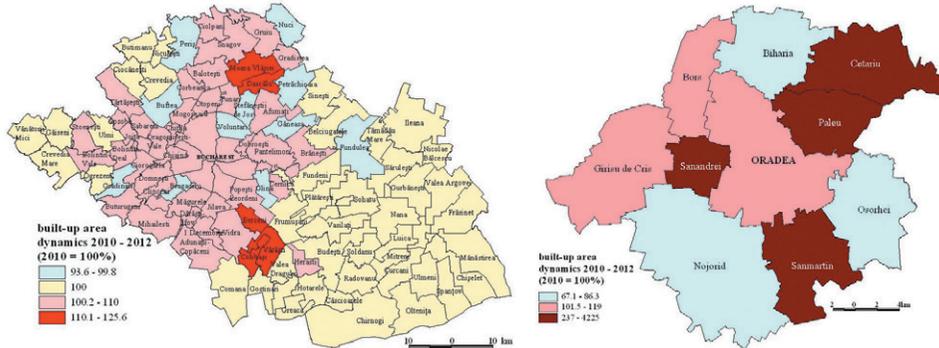
With the exception of Murfatlar and Ovidiu towns, where the number of dwellings finished in 2012 was lower than in 1990, in the other localities the numbers ranged from 9 dwellings in Poarta Alba and Tuzla communes to 1,519 in Constanța Municipality (Fig. 7).

**Built-up area dynamics.** This statistical indicator was computed based on the relationship between the 2010 data, considered as baseline (=100%), and 2012 data at the administrative-territorial units level (LAU2). The obtained values, higher or lower than 100%, point to the reduced or increased built-up surfaces in 2012 compared to 2010. Thus, during 2010–2012 period, in Bucharest Metropolitan Area the highest values were recorded north, north-west (Moara Vlăsiei and Dascălu communities) and south of Bucharest Municipality (Berceni, Colibși and Vărăști communities), generally due to the residential and commercial development. Both the residential projects (e.g. Green Hill Residential Ensemble in Berceni) and several individual housing projects in Voluntari (Pipera)- Tunari, Ștefănești, Dascălu, Corbeanca (Tamași village), Otopeni – Balotești, Mogoșoaia – Chitila,



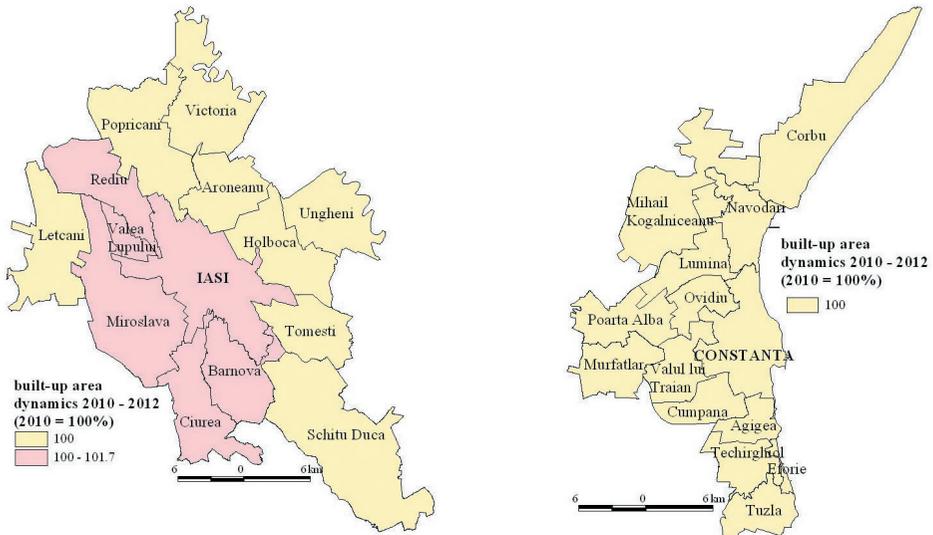
**Fig. 7.** Finished dwellings dynamics by localities in Iași Metropolitan Area (left) and Constanța Metropolitan Area (right) Data source: www.statistici.insse.ro

Buftea – Crevedia, Snagov-Periș and Pantelimon – Cernica – Brănești areas point to built-up area expansion of over 100% in the central, northern and south-eastern territory of Bucharest Metropolitan Area. The southern and south-eastern areas display rather stagnant values (Fig. 8).



**Fig. 8.** Built-up area dynamics in Bucharest Metropolitan Area (left) and Oradea Metropolitan Area (right) Data source: www.statistici.insse.ro

In the **Oradea Metropolitan Area** the built-up area dynamics show increased values in Cetariu, Paleu, Sânmăndrei and Sânmărtin localities compared to the developed residential projects (e.g. Forvila Residential Neighbourhoods). Biharia, Nojorid and Osorhei localities are subject to the reduced built-up area dynamics mainly due to the expropriation processes in view of the fact that the Transylvania Motorway (the case of Biharia commune) or other transport means are constructed, such as the metropolitan ring to diverge heavy traffic from Oradea municipality to other destinations (Fig. 9).



**Fig. 9.** Built-up area dynamics in Iași Metropolitan Area (left) and Constanța Metropolitan Area (right)  
Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

In the case of **Iași Metropolitan Area** and **Constanța Metropolitan Area**, in spite of the increased number of finished dwellings over the last ten years, the built-up area shows declining to stagnant values in Iași, Rediu, Valea Lupului, Miroslava, Bârnova and Ciurea localities (Fig. 9).

The **Dwelling units density** was considered the relationship between the number of finished dwellings of a certain administrative-territorial unit and its surface (ha)<sup>8</sup>. Overall, the Bucharest Metropolitan Area records the highest values (about 1.95 dwelling units/ha), followed by the other metropolitan areas with up to 1.6 dwelling units/ha.

In the first half of the analysed period (1990–2012) there was a downward tendency of the dwelling units density (in Bucharest Metropolitan Area, Oradea Metropolitan Area, Iași Metropolitan Area and in Constanța Metropolitan Area the drop amounted to 10%, 6%, 4.1% and 2.3%, respectively) due to a decline in dwelling units against the changing political and economic background that marked the fall of the communist regime. Subsequently, the dwelling units density had followed an upward trend, thus almost catching up in 2012 with the values recorded in 1990 (Fig. 10)

In **Bucharest Metropolitan Area** only two of the 13 towns recorded a rather small decrease in dwelling units density (Bolintin-Vale by 0.89% and Budești by less than 0.30%), while the others, acting as satellite towns of Bucharest Municipality, display a more dynamic trend of up to 2.51 dwelling units density in Bragadiru and 3.62 in Voluntari. Bucharest itself reaches the highest records of over 30 dwelling units' density/ha (Fig. 11).

In the **Oradea Metropolitan Area**, the Oradea Municipality has recorded a reduced density after 2003 due to an increase in the Municipality surface by 434 ha, while the number of dwelling units remained relatively constant (nearly 81,000 dwelling units), followed by a constant increase, thus reaching a peak of nearly 7.5 dwelling units/ha in

<sup>8</sup> Urban sprawl in Europe The ignored challenge, EEA Report No. 10/2006, <http://www.eea.europa.eu>

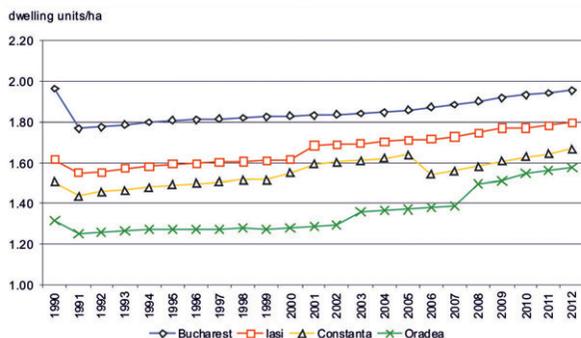


Fig. 10. Dwelling units density in selected metropolitan areas, 1990–2012

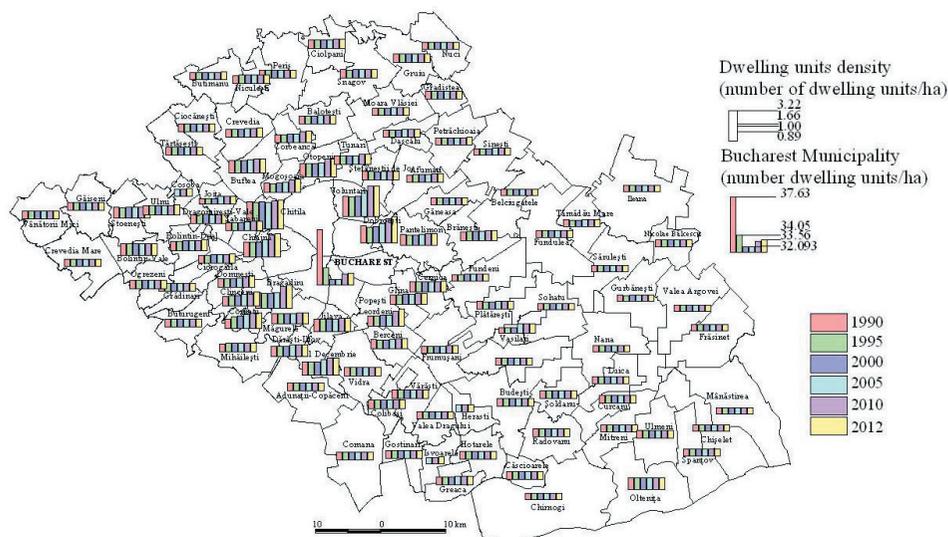
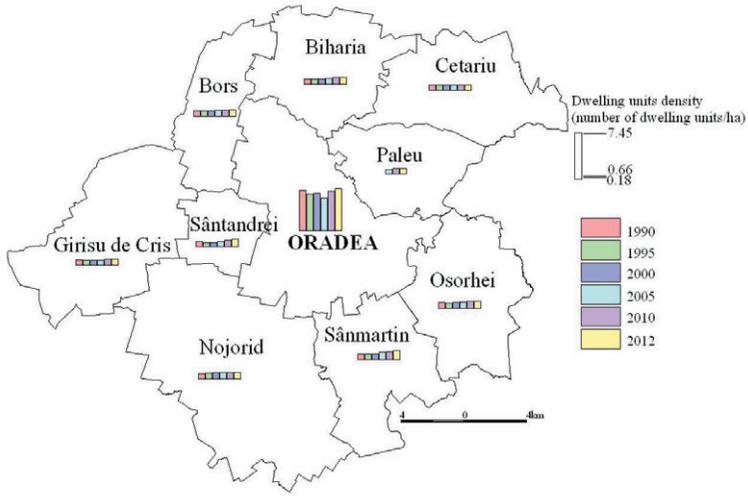


Fig. 11. Dwelling units density dynamics in Bucharest Metropolitan Area  
Data source: www.statistici.insse.ro

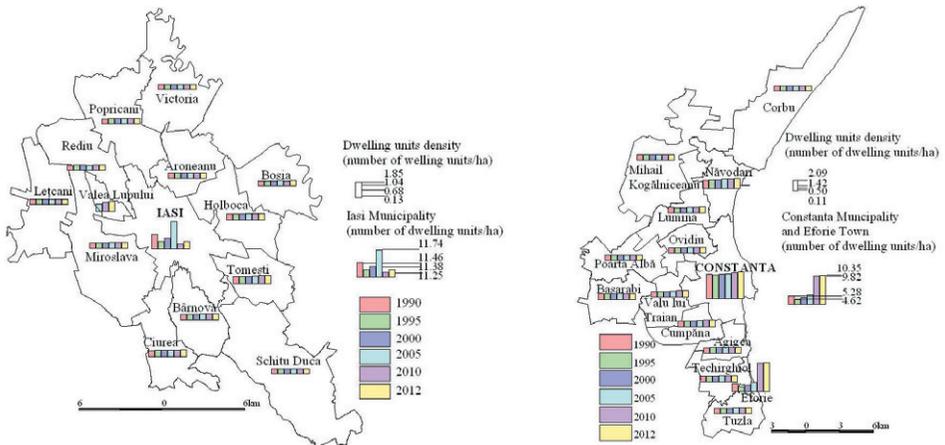
2012. Generally, in the metropolitan area the dwelling units' record was the lowest – up to 0.66 dwelling units/ha (Fig. 12).

In the **Iasi Metropolitan Area** the maximum values were recorded in Iasi Municipality (up to 11.5 dwelling units/ha in 2005). However, the indicator reveals uneven dynamics in relation to total surface of the area which decreased by 136 ha between 1990 and 1994 and increased by 673 ha in 2010. The surrounding localities recorded lower values of up to 1.85 dwelling units/ha (Fig. 13).

In the **Constanța Metropolitan Area**, the Constanța Municipality records rather constant values of about 8.80 to 9.38 dwelling units/ha in relation to the total surface dynamics which was subject to increase/decrease processes (Fig. 13). In the remaining part of the metropolitan area, except for the town of Eforie with about 10 dwelling units/ha recorded, the values do not exceed 5.28 dwelling units/ha.



**Fig. 12.** Dwelling units density dynamics in Oradea Metropolitan Area  
Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)



**Fig. 13.** Dwelling units' density dynamics in Iași Metropolitan Area (left) and Constanța Metropolitan Area (right) 1990–2012 • Data source: [www.statistici.insse.ro](http://www.statistici.insse.ro)

Over the past twenty-five years, Romania housing sector has undergone dramatic transformations induced by a rapid privatisation and the reduced government role in the building and allocation of housing (Conway et al. 1995). Moreover, a high fragmentation and abandonment of property triggered by the transition from State and collective property to private ownership induced the developers to carry out "strategies" able to turn these abandoned terrains mainly into residential areas. Consequently, they purchased large surfaces of land and endowed it with the requisite environmental infrastructure (sewage networks, water supply systems, wastewater treatment plants, waste collection systems) in order to develop residential projects. These practices in combination with

enhanced financial crediting provided by the banks encouraged the real-estate boom in terms of increased number of transactions and prices dynamics until 2008 when the financial crisis struck. If before 1990 most of the new residential areas had been predominantly in agricultural use and their value was only a few eurocents/sq.m, soon after the residential projects were finished the prices raised up to more than 100 euro/sq.m. Thus, Bucharest Metropolitan Area was experiencing the highest residential boom until 2008 when the most expensive land valued at up to 1,100 euro/sq.m., for example in the Pipera-Tunari area, followed by the town of Otopeni with 600–800 euro/sq.m near the airport and the Bucharest-Ploiești Motorway, and Snagov with 400 euro/sq.m. near the lake, etc. Following the economic crisis the real-estate market collapsed and in the majority of cases the prices dropped to more than half of their previous value (Grigorescu et al. 2012a).

Compared with other Central and East-European countries (e.g. Hungary, Poland, the Czech Republic), after 1990 both economic and residential suburbanisation occurred at the same time, supported by the processes, such as privatisation of apartment buildings, the boom on the real estate market and the availability of cheaper properties in the suburbs, emergence of huge shopping centres, hypermarkets, warehouses and industrial properties (logistic parks), etc. (Soós and Ignits 2003; Sykora 2006; Sykora and Ourednicek 2007; Hirt 2008).

It is acknowledged that the new housing developments regularly emerge in the areas with good physical environment and transport connection to the city centres (Sykora and Ourednicek 2007). Sometimes, these are counterbalanced by the design of the residential projects or the access to different services related to security, health, leisure etc., turning them into luxury neighbourhoods or "gated communities" (Grigorescu 2010).

In the Bucharest Metropolitan Area six compact residential areas (*Pipera-Tunari, Ștefănești, Mogoșoaia-Chitila, Corbencă-Otopeni-Balotești, Snagov-Periș, Pantelimon-Cernica-Brănești*) and six residential nuclei (*Dascălu, Buftea-Crevedia, Tărtășești, Domnești, Berceni, Comana*) were identified conditioned by the traditional nucleus in the north and north-east and by the low land prices, attractive environmental features and good transport infrastructure in the south and north-west (Fig. 14).

Although in the Oradea Metropolitan Area the number of residential property transactions increased in recent years, in spatial terms the residential projects are quite scattered, however, some development clusters can yet be distinguished: in the south-western part of the city where important residential projects can be found (e.g. Europe, Henry Ibsen, Ioșia), Paleu (e.g. Golden Residence), Sântandrei, etc. (Fig. 13).

The metropolitan area of Constanța witnessed a sprawling process in the Lazău – Agigea, Cumpăna, Poiana – Ovidiu, Valul lui Traian and Mamaia Sat – Năvodari areas, but over permissive legal framework with respect to land use conversion and relocation in combination with high land prices (especially before 2008) had led to a certain marginalization of the rural population.

In the case of the Iași Metropolitan Area, the investments in infrastructure and real-estate projects were decisive for the growth of the housing stock and the development of large residential areas (individual dwellings or housing projects) in the core-city and in the surrounding communes (e.g. Bârnova, Holboca, Miroslava, Ciurea, Valea Lupului, Tomești) (Fig. 15).

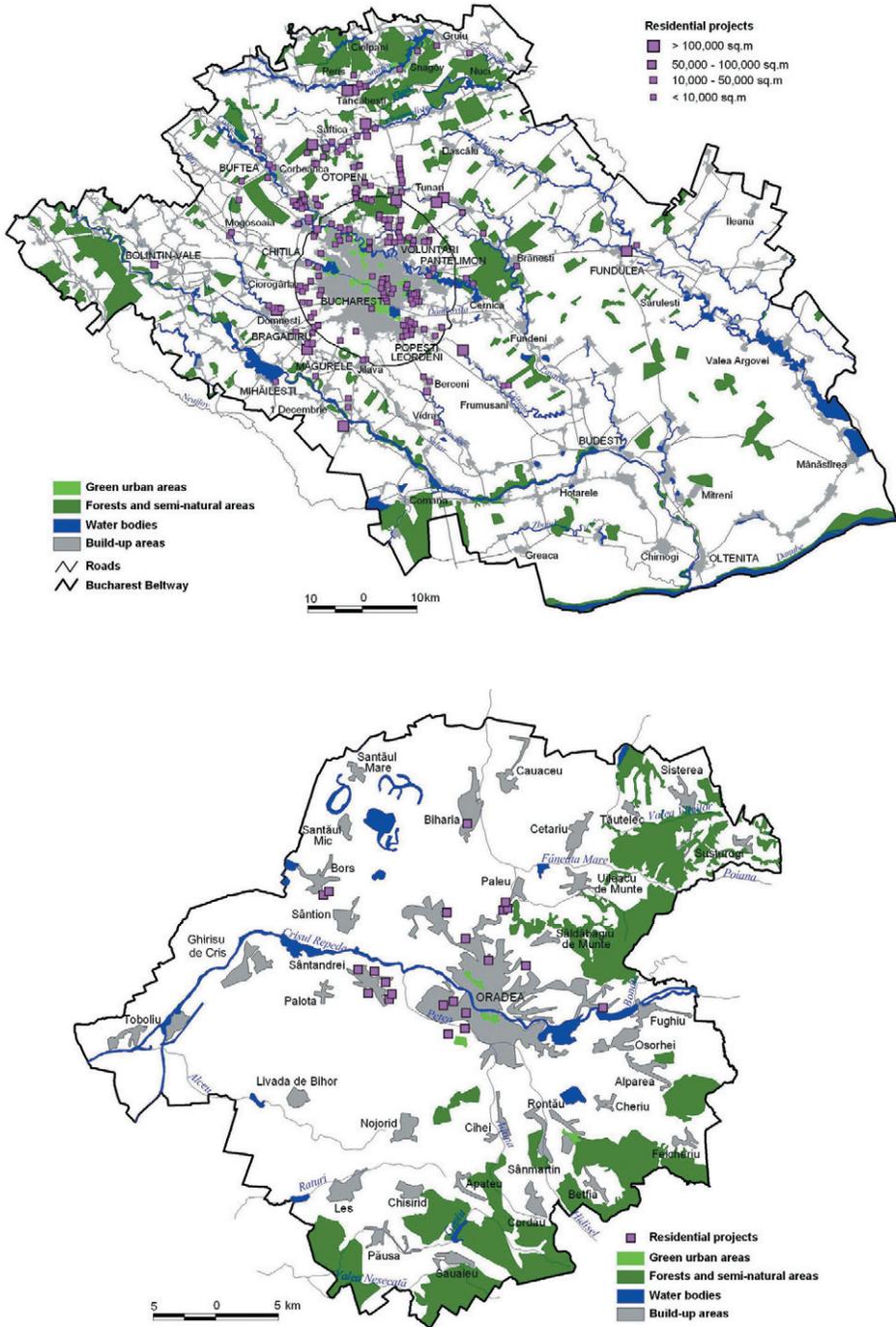
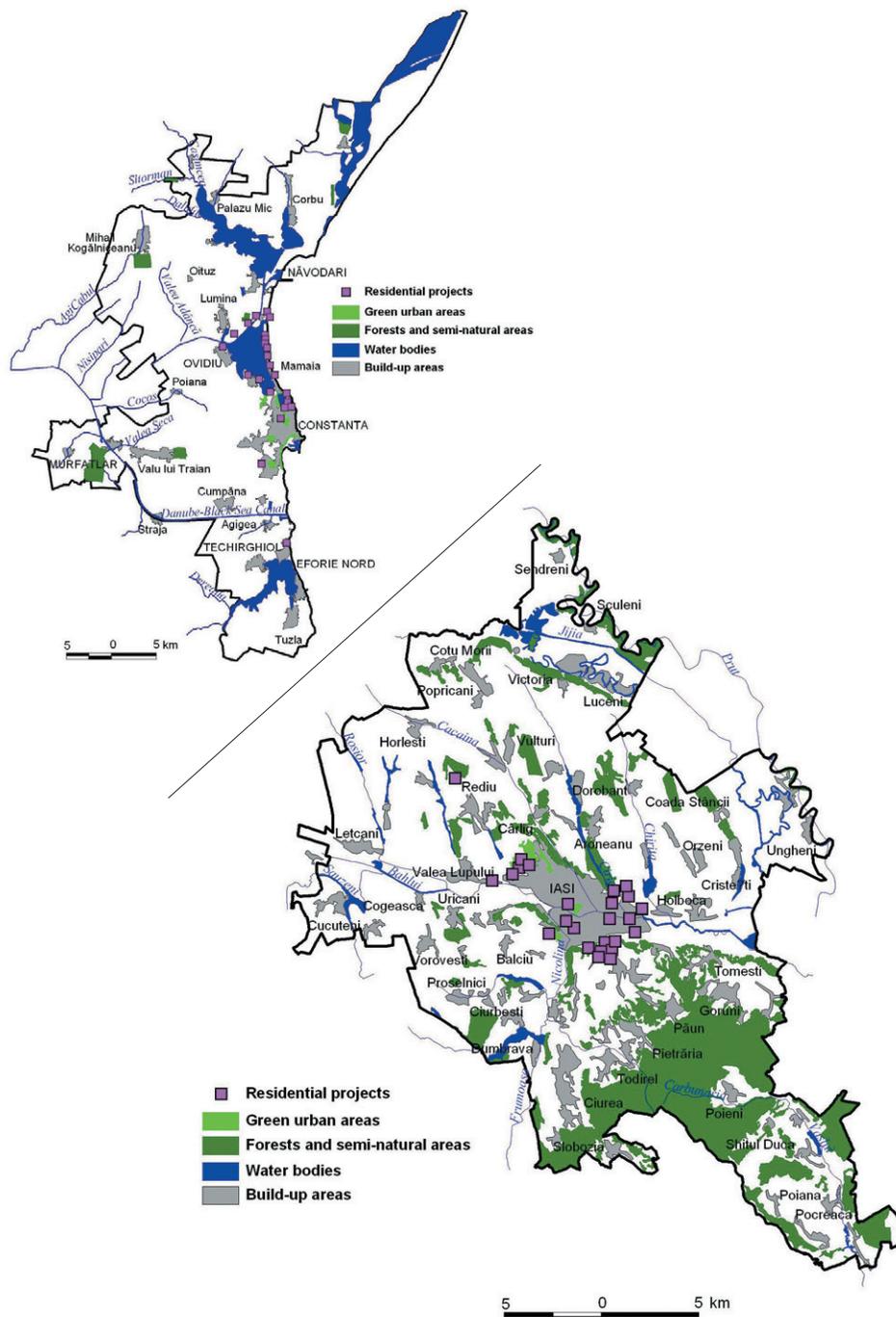


Fig. 14. Residential projects in the Bucharest Metropolitan Area (top) and Oradea Metropolitan Area (bottom)  
Source: Grigorescu et al. (2012a).



**Fig. 15.** Residential projects in the Constanța Metropolitan Area (top) and Iași Metropolitan Area (bottom)  
Source: Grigorescu et al. (2012a).

## Discussions and conclusions

The urban sprawl-related trend together with housing dynamics enable to outline the main residential patterns: *irregular residential development* characterized by individual houses which vary in size and architecture according to the availability and affordability of land, often located in the city's outskirts; *small-size residential projects* made up of high buildings or villas, sometimes providing luxury apartments, usually developed within the city limits and their surrounding areas and *residential complexes/projects* which, according to their affordability and accessibility could be divided into *open residential projects* – residential areas with access to all the necessary environmental facilities and other services and *gated communities* – for high-income groups.

The current study reveals rather uneven trends in the evolution of the urban sprawl-related housing dynamics driven by the indicators under scrutiny in the selected metropolitan areas. Hence, the dwellings dynamics records a decreasing drift in the Bucharest Metropolitan Area and a slight upward tendency in the remaining part of the analysed metropolitan areas. In terms of spatial dimension of the analysed phenomenon the built-up area dynamics points to higher values for Bucharest Metropolitan Area of up to over 100%. Overall, the dwellings units' density indicator shows an upward trend in all analysed metropolitan areas, thus revealing the growing need of housing stock over the last twenty-five years.

The spatial transformations triggered by the urban sprawl phenomenon and the related housing dynamics and residential development had led to new urban patterns which have affected the landscape of metropolitan areas. As a result, the territorial governance involvement in the local policy to manage urban sprawl-related impacts becomes of ever greater importance.

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