

## **RESIDENTIAL AREA DYNAMICS AND IMPACT ON ENVIRONMENT COMPONENTS IN PITESTI**

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**Key words:** residential area, population's displacement, environment.

**Abstract:** The city, according to its size, is a pole of attraction for different groups of people, located both nearby and at a greater distance. The causes of population displacement from rural to urban areas are related to the developed economic activity, the possibility of finding a job, the presence of educational institutions, hospitals, cultural centers and better living conditions. The attraction of the city is consistent with its size, the bigger the city is, more population it attracts, that may be located in more distant locations or smaller towns, while a small city only attracts people from neighboring municipalities. Both industry and population have a major influence on the dynamics of residential space in the city of Pitesti. After 1990 and until now, the city population had three periods of development, namely: a period of growth between 1990 and 1997, followed by a period of stagnation between 1997 and 2001 and a period of decline between 2001 and 2009. To these periods of development have contributed the economic activity, increasing and then restructuring, the natural movement and migration of residents in neighboring municipalities and abroad.

### **Introduction**

The dynamics of space means all the changes taking place in an area. In this case, it is residential space dynamics and the definition of this space can be said to represent the area for housing in a human settlement (Elena Matei, 2007) and covers the most important part of the urban space (Beaujeau GJ, 1971). Regarding the residential area, but also environmental issues, several authors have mentioned in their works these issues, the most representative being "Urban Geography" (Beaujeau G., Chabot G., 1971), "Urbanism in Romania" (C. Lazarescu, 1977), "The Pitesti whole medieval city" (Greceanu Eugenia, 1982), "The city and the urban system in the Romanian market economy" (Ianoş I., Bells C., 1994), "Architecture and the Urban Environment" (D. Thomas, 2002), "Human Ecosystems - a geographic approach" (Matthew Elena, 2007), etc. Additional information on these two issues is encountered in the general urban plans,

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statistical summaries of the Arges County, at the National Statistics Institute, the Municipality of Pitesti and the Regional Environmental Protection Agency in Pitesti.

### **1. Materials and methods**

For this study, the main materials used were the statistical data on the area of the city, the total number of households consisting of state-owned housing and private housing, living space comprising living area of the state and private living area, the total number of dwellings completed (from government, private or public funds) and green area for the period 1990-2008. Statistical data were provided by the National Institute of Statistics of Arges, censuses and various works in which the author has dealt with some aspects of residential space and environment for the city of Pitesti. The methods used in the study were: the statistical data collection method, the enquiry method, the method of interpreting the data collected and the explanation method.

### **2. Case study**

The residential area known as the living area (or living space) represents the area housing within an urban settlement. In most urban settlements, residential space is systematized in districts, counties, micro-districts, etc., occupying the largest area within the town hearth. Along with the buildings used for housing, in residential areas are also included the public buildings, engineering services facilities, children's playgrounds, sports fields, roads and alleys.

In Pitesti, the space for housing is divided into districts, the total number is now 13, and possibly in the future their number will slightly increase. In Table 1, we have Pitesti city districts with the area, population and population density for each district separately, in 2007.

The district with the largest area (1039.06) and the highest number of inhabitants (35 840) is Gavan, neighborhood with a population density of 34.49 inhabitants / km<sup>2</sup>, lower compared to other districts, due to the very large areas. The population density varies by area and number of population. A neighborhood with a lower surface and a large number of inhabitants, recorded a high density. The highest population density is found in the Negru Voda district - 149.53 inhabitants / km<sup>2</sup>, and the lowest in the Calea Campulung district - 7.29 inhabitants / km<sup>2</sup>, due to the location in the floodplain district river, but also to the type P and P +1 dwellings.

Pitesti city neighborhoods have been defined in the "List of streets," approved by the Pitesti City Council in 2001 and then completed with the subsequent modifications.

Tab. 1 – Area and population by districts (2007)

District	Surface (ha)	Population	Population density
Banat	103,48	14.217	137,39
Calea București	163,65	14.284	87,28
Calea Câmpulung	140,50	1.024	7,29
Central	226,19	7.297	32,26
Craiovei	127,60	15.738	123,34
Găvana	1039,06	35.840	34,49
Mărășești	50,27	4.927	98,02
Negru Vodă	122,11	18.260	149,53
Prundu	292,25	18.641	63,78
Războieni	202,17	14.992	74,15
Traian	47,17	3.966	84,07
Trivale	211,77	24.797	117,09
Tudor Vladimirescu	78,77	6.654	84,47
<b>Total</b>	<b>2805,00</b>	<b>180.637</b>	<b>84,09</b>

Source: Pitesti City Hall

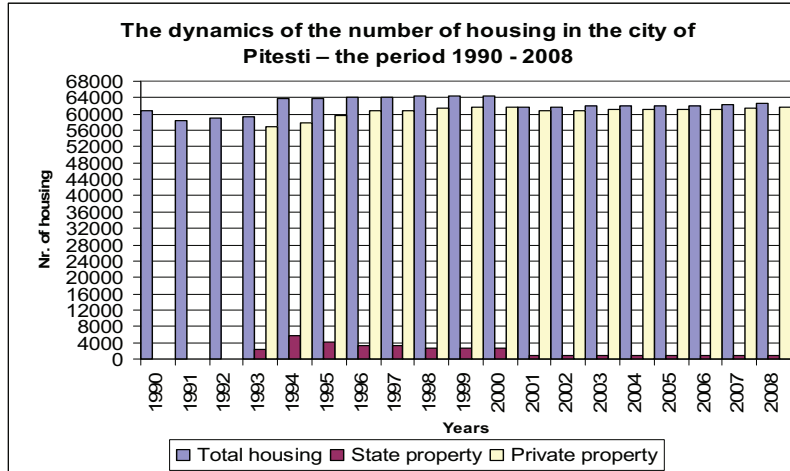


Fig. 1 – The dynamics of the number of housing in the city of Pitesti – the 1990 – 2008 period

**2.1. Housing dynamics.** In Pitesti, the total number of housing has two development periods (fig. 1):

- the decline, between the years 1990 - 1993, is characterized by the

decrease of the total number of dwellings by 1473 (from 60,721 in 1990 to 59,248 in 1993) and the period from 2000 to 2008 by the reduction of the number of dwellings by 1874 within eight years;

- the period of growth, between 1993 - 2000, presents a development of the number of housing by 5297 (from 59,248 in 1993 to 64,545 in 2000);

Depending on the type of property, the dwellings are of two types: private homes and apartments owned by the State. Of the total number of existing homes between 1993 - 2008, most are private homes and a small part of State property. For the period 1990 – 1992, data on the type of property are unknown, but for personal reasons most of the housing were privately owned.

For this case study, we conducted an analysis on the dynamics of housing completed during the period 1990 - 2008 (fig. 2), precisely on the types of funds coming in each year to complete the housing (fig. 3).

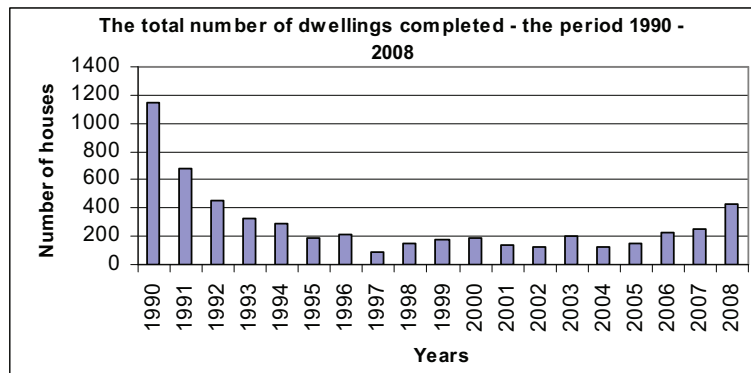


Fig. 2 – The total number of dwellings completed in the 1990 – 2008 period

Figure 2 shows a massive reduction in the number of dwellings completed between the beginning of the period (year 1990) and end of the period (year 2008). In the year 1990, a number of 1143 housing was completed (the highest number recorded during the reporting period), and in 2008, the number of homes decreased considerably, reaching a value of 433 dwellings. The lowest number of completed dwellings was recorded in 1997 (83 homes), and then, the number of households experienced a slight increase. This reduction in the number of dwellings recorded in the analyzed period was due, in principle, both to the reduction of the demand and of the population of the city. The slight increase that occurred after 1997 was due to private housing construction of the P, P+1 and P+2 type within the municipality area, close to the periphery. Such homes are located on the outskirts

of the Pitești urban area, but only in the adjacent localities, their owners largely coming from Pitești, fact that reduced the population of the city.

Figure 3 shows the total number of completed dwellings, but also the types of funds that have led to housing building. This figure is identical (similar in shape) to Figure 2, the difference being identified in the types of funds that led to the completion of housing.

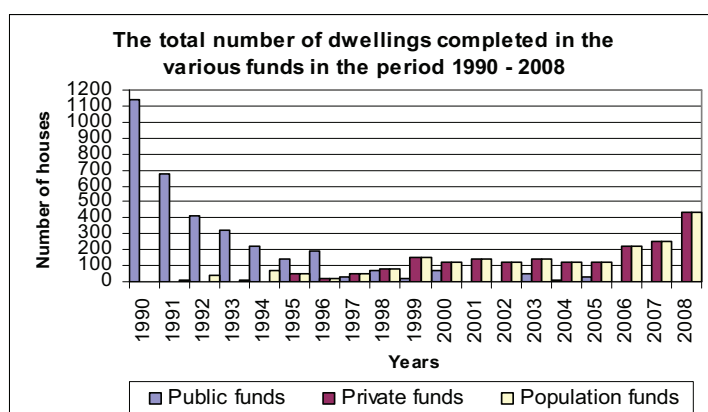


Fig. 3 – The total number of dwellings completed in the various funds – the 1990 – 2008 period



Fig. 4 – Housing built with private funds and funds of the population (photo: A. Nedelea)

We can notice a decrease in the number of dwellings built with public funds up to zero as we approach the year 2008. This is due primarily to the lack of public funds and low purchasing power. The housing completed with public funds recorded during the analysis an increase of 429 apartments, from 4 houses completed in 1990 to 433 homes completed in 2008. Dwellings completed from private funds have appeared in 1995, when 47 homes were completed and they continued until 2008 when a total of 433 dwellings were recorded. Analyzing Figure 3, we can observe the numerical coincidence of homes completed from private funds with public funds dwellings completed during 1995 - 2008. In these two categories, we include both blocks of flats built by companies and then sold to residents and P 1 and P 2 type housing built on the outskirts of the blocks of flats neighborhoods from the owners' funds (Figure 4), thus influencing the habitable surface extension of the municipality.

**2.2. The dynamics of the habitable surface.** The habitable surface defined by Law 114/1996, represents the total built-up accommodation area consisting of the bedroom and the living room areas. Figure 5 highlights the evolution of the total habitable area in the period 1990 to 2008, surface which consists of private habitable space and state-owned habitable space.

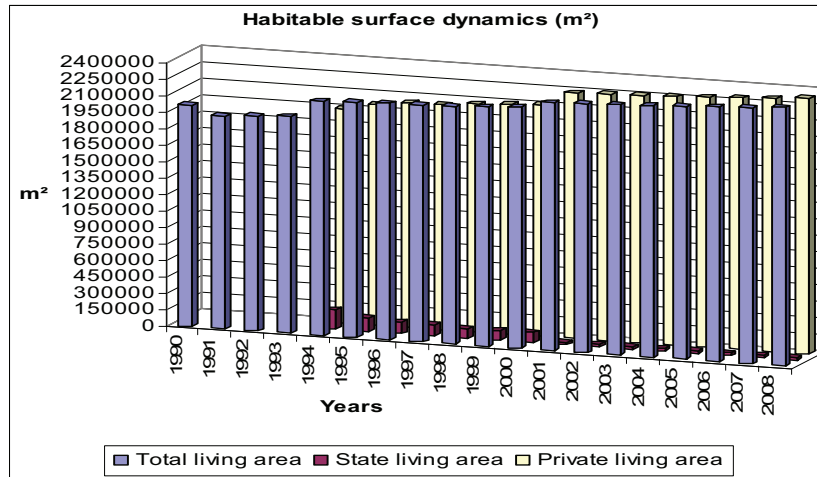


Fig. 5 – Habitable surface dynamics (m<sup>2</sup>)

The total living space had a positive development in the analyzed period, thus the value of 2,192,833 square meters recorded in 1990, increased to 338,891 square meters, reaching 2,358,174 square meters in 2008. For both types of habitable

surface, both private and state-owned, there were no data on their evolution between 1990 and 1993. From 1994 until 2008, according to the data provided by the Arges County Statistics Office, the two types of habitable areas have a different pattern. State habitable surface has, for the analyzed period, a significant reduction of 151,879 sq m, from 177,277 in 1994 to 25,398 sq m in 2008. This was due both to the reduction of funds for housing construction and to the low purchasing power of the population. Private dwelling area recorded an increase of 379,267 sq m, from 1,953,509 in 1994 to 2,332,776 sq m recorded in 2008. As shown in Figure 5, a faster growth of the private habitable area began in 2001 and continued until 2008. The main reason were the residential neighborhoods consisting of multi-storey blocks built by certain construction companies and the neighborhoods of houses owned by people who wanted to avoid the congestion in the city.

**2.3. The dynamics of green spaces.** Green areas represent all planted flower, shrub and tree species formation, arranged in the form of parks, public gardens and public squares, land of the sports bases and facilities, while the urban green space system configurations represent all the green spaces of the building and non building land. Parks have a multifunctional role, important for improving the living environment, preventing pollution and soil erosion, for water conservation, mitigation of noise, increasing the amount of oxygen, improving the microclimate, etc.

Green spaces in the city of Pitesti are deficient in relation to the number of inhabitants and the built-up area. According to the standards developed by experts, it is recommended that the green spaces within an area should occupy at least 10% of the city, and the ratio should be of 25 to 30 square meters per capita. In the city of Pitesti, in 2007, green areas had a ratio of 6.45% of the total area of the city, meaning approximately 14.28 square meters per capita. This value, compared to other localities, is satisfactory, but if you need to take into account the new recommendations of the European Union, it becomes an unfavorable situation for the city of Pitesti, because the optimal area of green space per capita should be of 50 m.

Figure 6 shows the evolution of the green area in the period 1993-2008, indicating that for the 1990 to 1992 period, there were no data available. Thus, between 1993 – 1997, we have the same amount of green area, 255 ha respectively, followed in 1998 by the increase to 273 ha, this being the highest value recorded in the period, and from that year until 2008, the green area was reduced to a value of 261 ha.

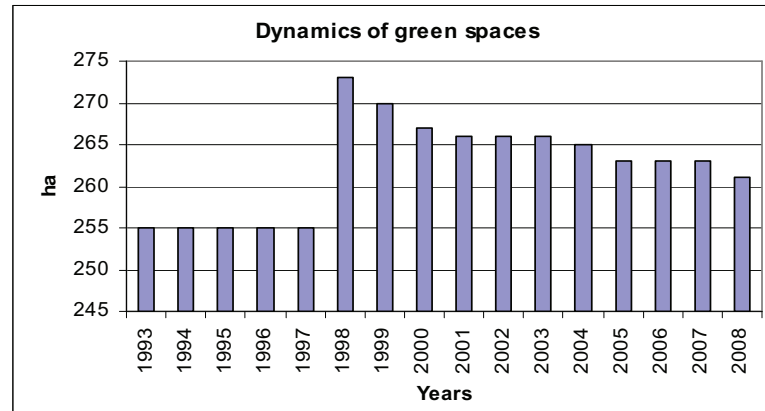


Fig. 6 – Dynamics of green spaces (ha)

This reduction of 12 ha within 10 years, is due primarily to the replacement of green areas with buildings for the headquarters of institutions, offices and also homes and parking lots (fig. 7).



Fig. 7 – Removal of green spaces and assembling of the constructions (photo: A. Nedelea)

For the year 2008, a map of the Pitesti green space was made, for each neighborhood, according to the number of people in that location (fig. 8).



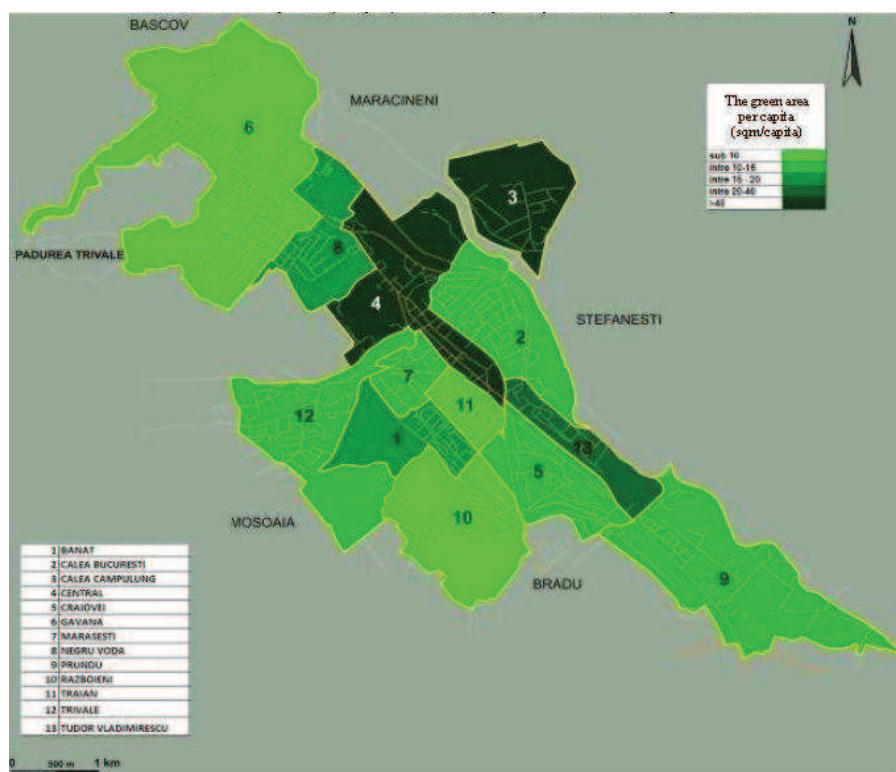


Fig. 8 – Area of green spaces per capita per neighborhoods in 2008 ( $\text{m}^2/\text{inhabitant}$ )  
(source: [www.primariapitesti.ro](http://www.primariapitesti.ro))

Looking at Figure 8, one can see the 13 districts of the city and the area of green space associated with each neighborhood compared to the number of inhabitants. Thus, districts with the largest surface of green space per capita are Calea Câmpulung and Central, where the green space area exceeds  $40 \text{ m}^2$  and neighborhoods with the lowest area of green space per capita of under  $10 \text{ m}^2$ , Gavana, Războieni and Traian. The remaining districts recorded values between  $10\text{-}40$  meters of green space per capita. As a result, only three districts have more than  $20 \text{ m}^2$  of green space per capita, while the other ten districts have less than  $20$  square meters. Within each neighborhood, the surface of green space is actually influenced both of the area actually allocated to the green space and the number of people in the neighborhood. The area of green space per capita provided for by the EU standards is of at least  $20$  square meters, a value which local authorities must

provide by the end of 2010. The European Union has set a minimum average of 26 m<sup>2</sup> of green space per capita and the World Health Organization recommends at least 52 square meters.

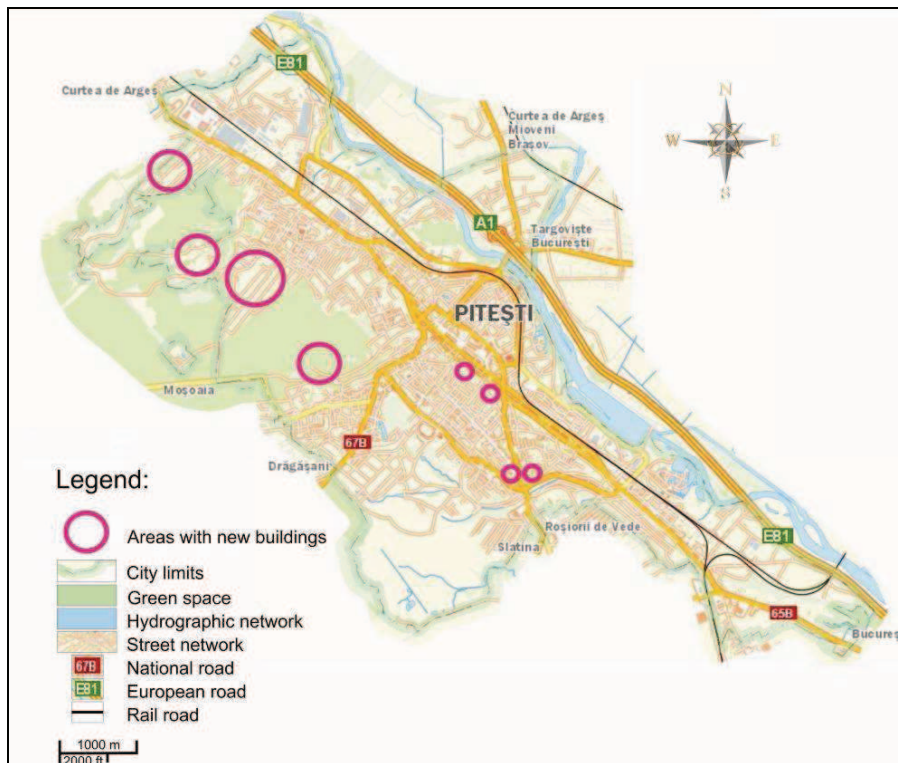


Fig. 9 – Map of the recently constructed buildings in the city of Pitesti  
(source: processed after [www.primariapitesti.ro](http://www.primariapitesti.ro))

In the city of Pitesti, measures should be taken regarding the green space area for the neighborhoods that have a lower value than the established European standards.

The increasing number of buildings built in the area, influences both the increasing number of vehicles (particularly for going to work) as the concentration of CO<sub>2</sub> emitted into the atmosphere and the amount of residual waste, bulky, hazardous waste, etc. Many people chose to live on the outskirts of the residential zoning as air pollution and noise pollution (noise) are reduced, and because of the

lack of traffic congestion, aspects that are seen in a more pronounced way within the built space.

The location of the new buildings (Figure 9), both within the built space (buildings mainly meant as headquarters for the institutions, offices) and the periphery (especially buildings for private housing), has influenced, on the one hand, the reduction of areas occupied by the green spaces in the residential zoning and on the other hand the extension of built-up area. As shown in Figure 9, the areas occupied by newly constructed buildings are located mostly in the west of the city neighborhoods Gavan and Trivale, and a smaller proportion in the central area. On the left bank of the Arges River, new buildings belong to the locality neighboring the city of Pitesti, that is Ștefănești town, and only a small area belongs to Pitesti City.

Sound or noise pollution is that form of environmental degradation produced by noise and sounds. Noise pollution is caused mainly by motor vehicles, whose number has grown dramatically in recent years. To reduce the noise produced by vehicles and the concentration of CO<sub>2</sub> inside the municipality, detours are necessary.

The soil quality in the city of Pitesti is mainly affected by:

- Inadequate waste management;
- Road traffic with noxae released in the air (both gaseous and solid);
- Forced urbanization led to the replacement of the initial purpose of land;
- Industrial development of the municipality in particular until the year

2001;

To see Pitesti people's opinion, we have developed a questionnaire consisting of 20 questions, a sample was applied to a city population of 104 persons, and two of the questions related to green spaces, both to their existence and to the need for green spaces.

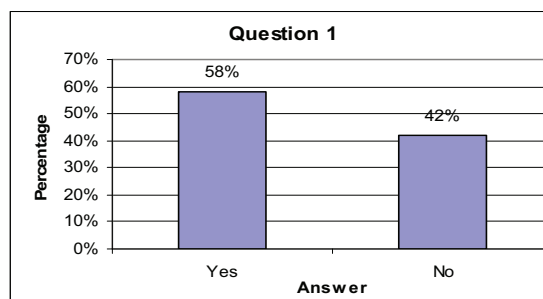


Fig. 10 – Answers to Question 1

Thus, for the question "In the neighborhood where you live, are there enough parks, green spaces and playgrounds for children?" we recorded the following responses: 58% positive responses and 42% negative responses (Figure 8).

The difference of 16 percent between the two choices is not enough; therefore, we can say that there are neighborhoods where there are enough green spaces and neighborhoods where there are not or they are insufficient, and, in this case, measures should be taken to create such spaces.

For the second question "Do you think the creation of such spaces is necessary in this location?", the results were as follows: 85% positive responses and 15% negative responses (fig. 11).

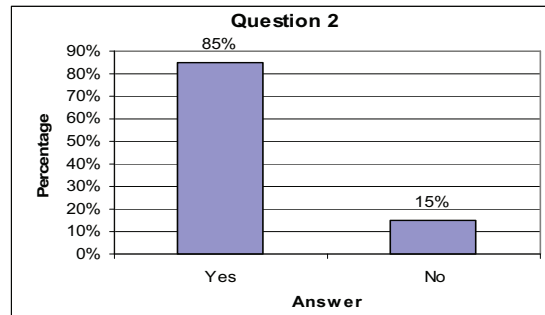


Fig. 11 – Answers to Question 2

Figure 11 illustrates how necessary it is to establish such facilities at the neighborhood level, therefore, 85% of the answers were Yes and 15% believed they were not necessary. The surveys were conducted at neighborhood level and, after analyzing the results, in most neighborhoods green spaces and playgrounds for children should be created, as they are lacking or they are insufficient.

### Conclusions

After analyzing the results, we concluded that the reduction of the existing green space in the city is due both to the buildings with residential purpose and to office buildings, mostly funded from the private and public funds. With the increasing number of private dwellings from private funds, the private living space also increased. Especially in the west outskirts of the city, many housing buildings have emerged, thus influencing the amount of built space. In some places of the central area, green space was removed to make way for office buildings and headquarters of institutions that led to the reduction of green space area at the neighborhood and city level. Based on the questionnaires conducted and on the

analysis of the collected data, we observe that most people agree with the creation of green spaces in their district, fact that proves their absence or their insufficiency.

Therefore, to comply with the rules imposed by both specialists and by the European Union, in the city of Pitești, steps should be taken for extending the areas occupied by green spaces.

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