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ALTITUDINAL DISTRIBUTION OF POPULATION AND SETTLEMENTS IN THE CARPATHIAN MOUNTAIN SPACE. CASE STUDY: ROMANIAN CARPATHIANS

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Abstract : The purpose of this study is to carry out a statistic on the altitude distribution of population and settlements in the Romanian Carpathians. These mountains are inhabited from the earliest historical periods. They offered the continuity of the Paleolithic population to the contemporary. 7 altitudes classes, respectively 56-100 m, 100-200 m, 200-300 m, 300-500 m, 500-750 m, 750-1000 m and 1,000-1,500 m were established for the achievement of the research. The data used for the study were those of the last 20th Century Census (1992) and the data of the last 21st Century Census (2011). Also, for some incursions in the explanation of demographic phenomena regarding the demographic evolution of settlements, the census of 1880, 1900 and 1930 were used. After processing data through the ArcGis 10.3 and Microsoft Excel 2013, a series of dysfunctions resulted. The Romanian Carpathians depopulated in the period 1992-2011, with about 435,000 inhabitants. All 7 elevation classes decreased demographical, with weights between 10%-27%. The majority of the population is located between 500-750 metres, which is lost to the highest numerical demographic, about 150,000 inhabitants. Under percentage ratio, the largest demographic decrease was 27% for settlements between 56-100 meters altitude. As a consequence, the space of the Romanian Carpathians faces risk demographic phenomena, such as depopulation.

Key words: distribution, altitude, demography, settlements, Romanian Carpathians, Carpathian Mountain Space

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INTRODUCTION

The purpose of the study was to carry out a statistic on the altitudinal distribution of the population and settlements in the Romanian Carpathians. These mountains have been a place of life for man since the Paleolithic period, with continuity and cycling in their anthropization until the contemporary period. The diversity of basement resources has trained allohtone populations, which have been driven by the mirage of riches. The population expanded from the lowest altitudes, from the terraces of the hydrographic courses to the highest mountain altitudes, to over 1,000 meters altitude. The Romanian Carpathians are divided into three major groups: the Eastern Carpathians, the Southern Carpathians and the Western Carpathians. In their territory there are 2,320 localities, distributed unequal altitude (figure 1).

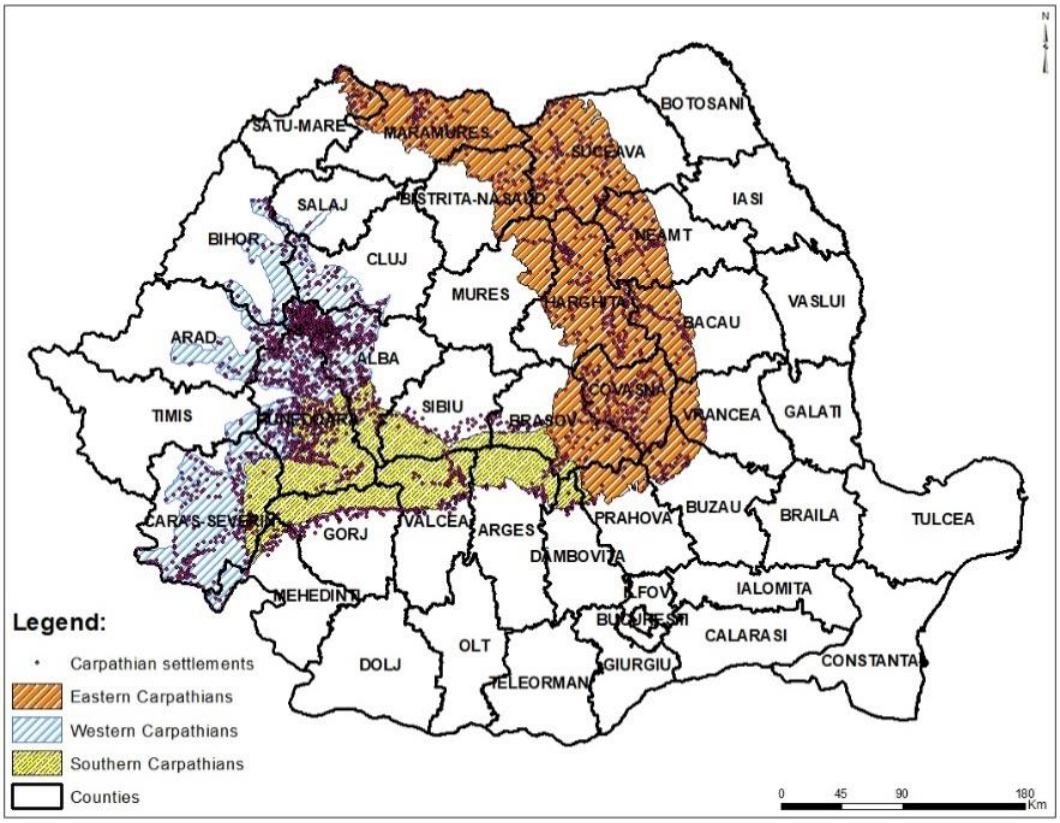

Figure 1. Geographical location of the Romanian Carpathians
(Source: own study)

Basically, this would be a first article aimed at the study of the population and settlements for the entire space of the Romanian Carpathians, in one ensemble, after the end of socialism in 1989. Studies on the carpathian demographic and habitats have been achieved, especially for smaller carpathian territories as dimensions, such as depression (Alexandrescu, 1995; Popa-Bota, 2003; Seer, 2004; Niță, 2007; Constantin, 2011; Holircă, 2014). Also, population and settlements research has shown interest for romanian researchers, with a considerable number of studies focused on various territories (Bizerea, 1970;

Herman, 2008, 2009; Ionescu, 2009; Lung, 2018; Lung & Mureşan, 2018; Lung & Gligor, 2018; Maier, 2001; Misachevici, 2012; Rațiu, 2008; Surd, 1993; Stroia, 2001; Tănasă, 2007). The research of settlements and population was and is a topical topic for researchers from other countries (Findlay, 2003; Josipovic & Repolusk, 2003; Živković & Pavlović, 2006; Arsenović et al., 2009; Prioux & Mazuy, 2009; Kerbler, 2015; Djurkin, 2018).

MATERIAL AND METHODS

The first step consisted in the morphological delimitation of the Romanian Carpathians. The limit was obtained after the geomorphological map (Posea & Badea, 1984). Through the ArcGis 10.3 program, the map on the geographical position of the Romanian Carpathians was carried out. The same program was used to reclassify the digital elevation model. To be able to correctly extract the settlements for each elevation step, a reclassification of the digital elevation model was performed. It was only after this process that the correct altitudes and the classification of settlements on the 7 altitudinal steps could be obtained. 2,320 localities of different sizes were incorporated within the limit obtained. After obtaining the altitudes classes, it was passed to the generation of maps on the geographic distribution of settlements for each altitude step.

The next step consisted in procuring statistical data from the National Institute of Statistics for the two census of 1992 and 2011. The data processing was done with Microsoft Excel 2013, following a few graphs on numerical population evolution, percentage decreases and settlement weights on established altitude classes. Data from the census of 1880, 1900 and 1930 were also used to explain demographic evolutions.

RESULTS AND DISCUSSIONS

For the altitudinal distribution of the population and settlements in the Romanian Carpathians we have established 7 altitudinal classes. The 7 classes are: 56-100 m, 100-200 m, 200-300 m, 300-500 m, 500-750 m, 750-1000 m and 1,000-1,500 m.

In the first altitudinal step (56-100 m) 22 localities were identified. In 1992, the 22 had a population of 42,214 inhabitants. Of the total population of 42,214 inhabitants, 28,520 was the urban population incorporated into three localities: Orşova, Moldova Veche and Măceşti, the rest was a rural population. Only two settlements were small in size with less than 500 inhabitants: Divici (382 inhabitants) and Cozla (182 inhabitants). Nine localities included medium-sized settlements with population between 501-1,500 inhabitants (Şuşca, Bârza, Radimna, Dubova, Belobreşca, Şviniţa, Liubcova, Coronini, Pojejena). The population of the medium settlements was 8,357 inhabitants. Berzasca and Eşelnița were the only two localities to be positioned among the large settlements of more than 1,501 inhabitants, with a population of 1,619 inhabitants, respectively 3,154 inhabitants. Of the 22 localities, 6 (Tişovița, Plavişevița, Drencova, Jupalnic, Tufari, Coramnic) had no inhabitant due to the fact that the waters of the lake of accumulation of Iron Gates, covered households, the population being displaced to the other localities from proximity. Also, some localities like Jupalnic and Coramnic were allied to the urban town of Orşova.

By 2011, the population in this altitude step fell to 30,811 inhabitants. Under the report of the inhabitants, the decrease was 11,403 people, and from a percentage point of view was 27%. The urban population of the three localities

decreased to 2011, to 19,505 inhabitants (Orşova, Moldova Veche, Măceşti). The loss of 9,015 people compared to 1992, meant 31%. The number of small localities increased from 2 to 5 (Şuşca 450, Dubova 410, Divici 281, Cozla 86, Drencova 4). Drencova is a new settlement with the repositioning of the river after the rise of the Danube level, following the construction of the reservoir flooded the old settlement. The herd of medium-sized localities was 9, together with 7,510 inhabitants. Eşelniţa was the only large-scale locality with 2,565 inhabitants, down from 1992 by 18%.

From Figure 2 we can see that the settlements in the first altitudinal step are geographically positioned in the lowest hypnosometric part of the Romanian Carpathians, between 56-100 m. Thus, they are grouped in the depressed region in the immediate proximity of the Danube, advancing north on a short distance to the Timiş-Cerna corridor. The settlements were placed on the terraces of the Danube and other smaller tributaries of the river. The population of localities has occupied and still deals with fishing activities, being the main occupation of the demographic component.

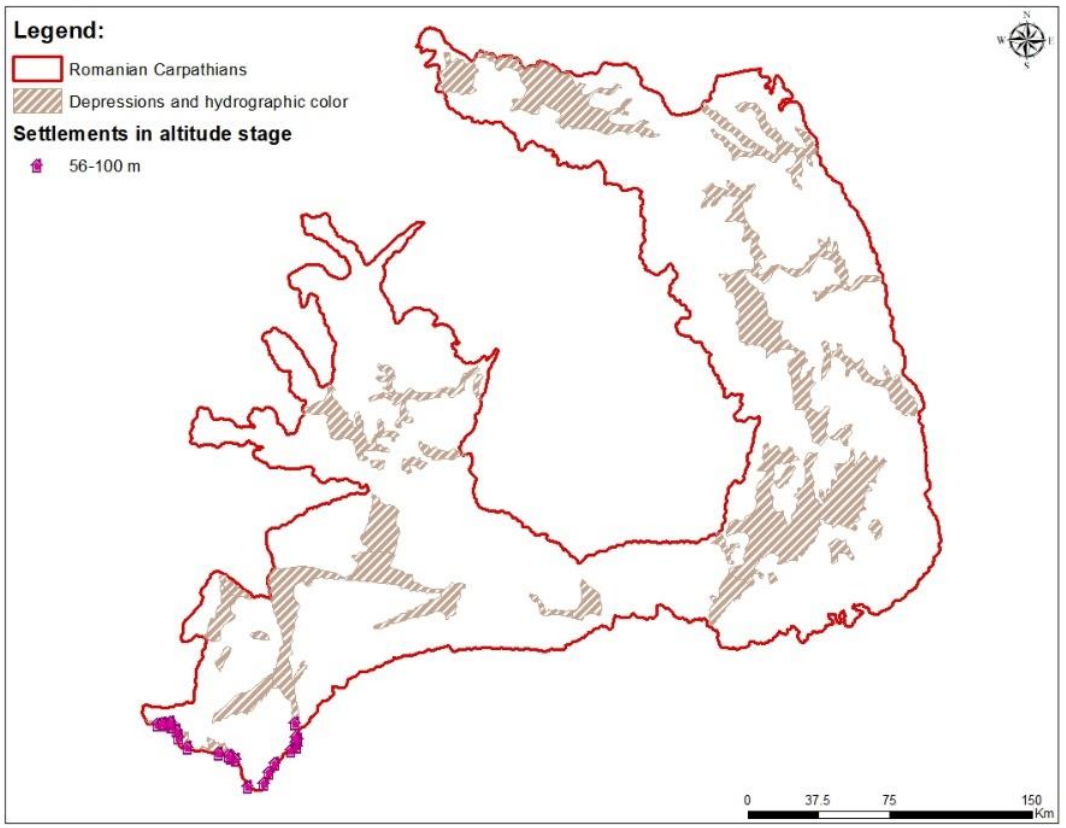

Figure 2. Distribution of settlements between 56-100 meters altitude
(Source: own study)

Although it is not the subject of the present study, we would like to mention that the settlements have undergone during the XVIII-XIX centuries, the colonizing stress. The Habsburg authorities wanted to intensify the population of the mountain space, colonizing in the south of Banat Mountains, on the banks of

the Danube, a number of allohtone populations. Families of german descent were brought to Radimna and Pojejena, and the romanian population was displaced to Belobresca and Liubcova. In the perimeter of Divici, ethnic Italians were colonised. All the domestic populations received from the benefits authorities such as tax exemptions, farmland and others (Ţintă Aurel, 1972).

In 1992, in the altitude gauge of 100-200 meters, they lived 181,823 persons in 76 localities, of which 122,418 (67%) in the urban areas of the 14 localities (Deva, Bocşa, Simeria, Băile Herculane, Moldova Nouă, Pecinişca, Câlnic, Moniom, Jupa, Sântandrei, Sântuhalm, Uroi, Saulesti, Stejar). The number of small localities that had less than 500 inhabitants was 26, cumulating a population of 7,383 people. The herd of medium-sized settlements was slightly lower than that of small settlements. A population of 19,172 people was registered at the level of 21 localities. The largest flock of the rural population in the altitude gauge 100-200 meters for the year 1992, was 28,140 people. This population was comprised in the territory of 12 large localities (Cămârzana, Mehadia, Topleţ, Caraşova, Bătârci, Tărna Mare, Tur, Oraşu Nou, Boineşti, Gherţa Mare, Sichevița, Vama). Very large settlements, with a number of inhabitants over 4,000 people, were represented by a single locality, Bixad from Satu-Mare County which had 4,710 inhabitants.

After 19 years, the carpathian altitudinal step between 100-200 metres, losing 33,671 people. In 2011, the population was 148,152, registering 18% decrease. The urban population decreased from 1992 with 24,686 people reaching 92,347. The percentage decrease in the urban population was 24%. If 19 years ago, the number of small settlements was 26, in 2011, their number increased to 30. Out of the 30, we can mention 5 that had fewer than 50 inhabitants (Aliceni 41, Cruşoviţa 41, Valea Sicheviței 36, Cameniţa 11, Ogaşu Podului 7). In 2011, there is no more large-scale settlement. The number of large settlements decreased from 12 to 11, and the decrease was demographical. The population decreased by 30%, from 28,140 to 19,567 inhabitants.

Localities between 100-200 m occupy marginal and marginal Carpathian territories (figure 3). A first compact group of settlements can be identified in the northwest of the Romanian Carpathians, specifically in the Oaşului Depression. Instead, the rest of the settlements no longer form a habitational group so gathered, being distributed on the southern and western margins of the Banat Mountains and in the south and southwest of the Apuseni Mountains. Basically, the settlements in the southwest of Apuseni revolate around the mountain of the Zarands, respectively in the Mureş corridor.

The number of settlements increases considerably for the altitudinal step of 200-300 metres, reaching 281 localities. In 1992, the 281 owned a population of 487,531 inhabitants. 68% and 334,921 people lived in the urban area of the 34 localities (Batiz, Bârcea Mare, Bârcea Mică, Brad, Caransebeş, Căciulata, Călan, Călanu Mic, Cărpiniş, Ciclova Montana, Cireşa, Cristur, Geoagiu, Hunedoara, Lancrăm, Nădăştia de Jos, Nădăştia de Sus, Negreşti-Oaş, Ohaba Streiului, Orăştie, Oţelu Roşu, Peştişu Mare, Răcăştia, Reşiţa, Sâncrai, Sântamaria de Piatra, Sighetu Marmaţiei, Simeria Veche, Strei, Streisângeorgiu, Strei-Sacel, Ţerova, Valea Sângeorgiului, Vinerea). 142 localities are of small size having less than 500 inhabitants, and from these 16 localities had in 1992 under 50 inhabitants (Boina 47, Boinita 18, Brestelnic 16, Căoi 11, Cicleni 33, Driştie 35, Dumeşti 24, Furcşoara 48, Gialacuta 30, Liborajdea 4, Lucacevăţ 43, Martinovăţ 22, Prislop 26, Valea Oreviţa 7, Valea Ravensca 43, Valea Mare de

Criş 10). 85 localities are of medium size with population ranging from 501-1,500 inhabitants. Between 200-300 metres altitude, were in the year 1992, 20 large localities with population between 1,501-4,000 inhabitants (Băiţa, Bozovici, Călineşti-Oaş, Câmpulung la Tisa, Certeju de Sus, Certeze, Dognecea, Glimboca, Nădrag, Obreja, Racşa, Remeţi, Sarasău, Săpânţa, Slatina-Timiş, Târşolţ, Teliucu Inferior, Vadu Izei, Valea Hotarului, Vinţu de Jos) together with 48,186 inhabitants.

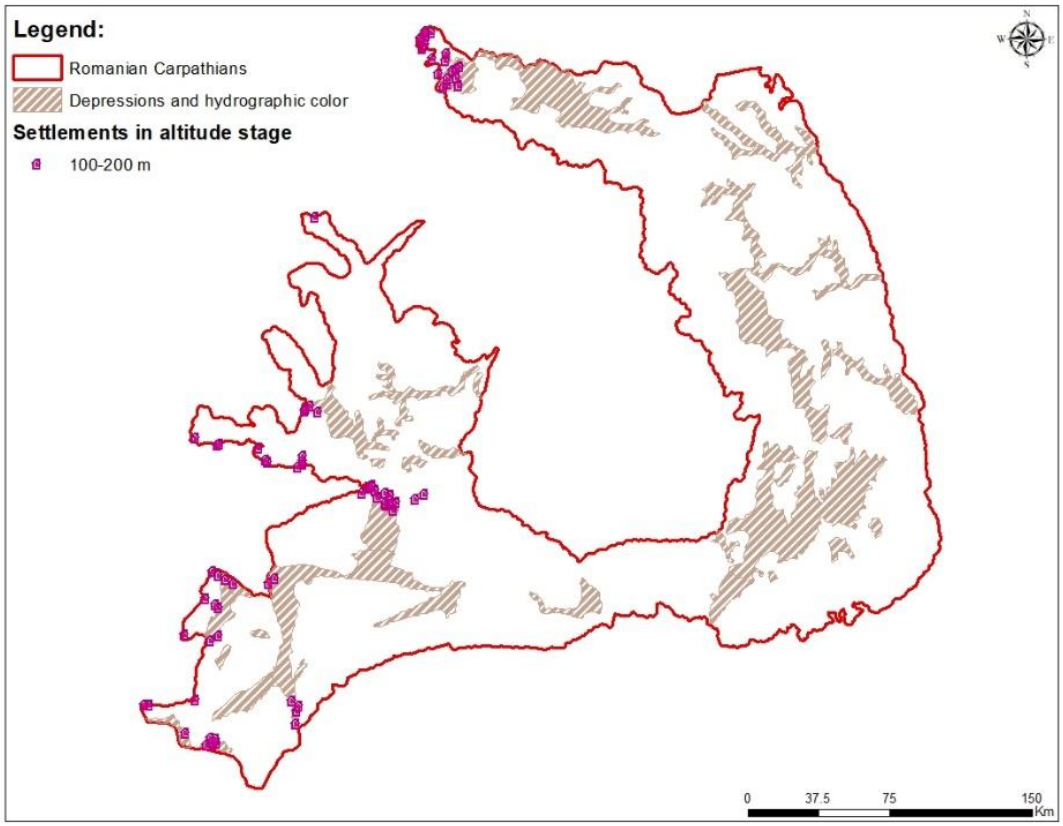

Figure 3. Distribution of settlements between 100-200 meters altitude
(Source: own study)

In the population and housing census in the year 2011, the population located between 200-300 metres decreased by 100,689. The decrease was 20%, reaching 386,842 inhabitants. The population in the urban area decreased between 1992-2011 and 22%, reaching 258,618 inhabitants, respectively a weight of 66%. The population of settlements of less than 500 inhabitants increased by 41 localities in the 19 years, reaching 183. It is a visible depopulation of rural settlements in this altitudinal step. Of the 183 small settlements, 20 had in 2011, population below 50 inhabitants, and two localities registered 0 inhabitants (Boiniţa şi Valea Oreviţa). The large settlements remained roughly the same as in 1992.

Settlements between 200-300 m extend to Carpathian depression (figure 4). In the north of the Carpathians, the settlements extend from the Oaşului Depression to the north-western parts of the Maramureş Depression. The largest

aggrits are located in the Mureş corridor between Sebeş-Deva and the Hunedoara Depression, with the southern branch of the Haţegului Depression. The second visible habitat agitation, is in the Gurahonţ-Hălmăgiu Depression in the Apuseni Mountains space. In the territory of the Banat Mountains we observe three depressions in which there are groups of settlements something more significant (Caransebeşului Depression, Reşiţei Depression, Bozovici Depression).

And in the territories of these depressions there were demographic mutations due to the stages of colonization carried out by the authorities of those times. In the period 1736-1737, from Oltenia they migrated to Caransebeş about 50 families of Bulgarian Catholics, who identified themselves as the pauliceni. In order to support them, the Caransebeş authorities sent a letter to the Viennese Court requesting the agreement to grant agricultural land for 13 families of pauliceni. At Dognecea, were brought in the period 1727-1733, about 100 miners who had to activate in the mines of Dognecea and Moldova. To attract the miners, the administration gave them money in advance, granted them land to build houses and to practice agriculture (Ţintă, 1972).

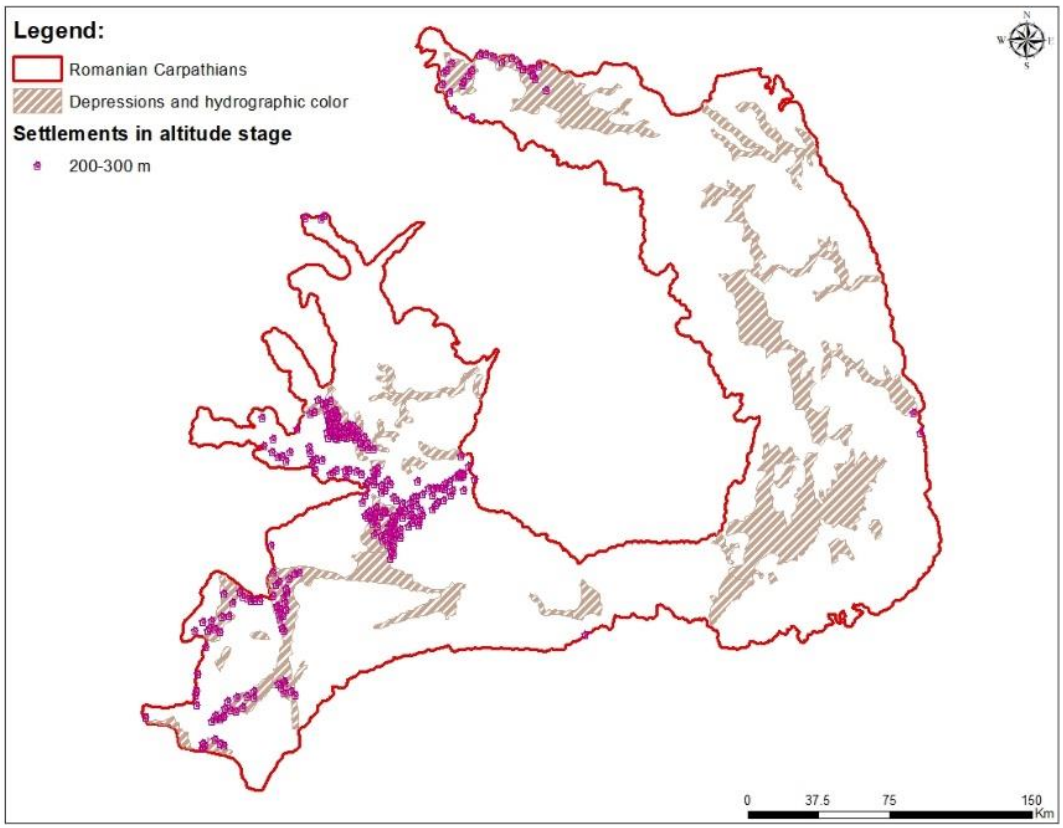

Figure 4. Distribution of settlements between 200-300 meters altitude
(Source: own study)

The hypnosometric gear between 300-500 metres, incorporates 504 localities. Their population was in 1992 of 513,079 inhabitants. In the 46 cities lived 185,635, representing 36% of the total population positioned between 300-500 meters altitude. The Cugir was the largest urban settlement with 28,780

inhabitants, and the smallest urban locality was Corbu with 56 inhabitants of Vâlcea County. 252 are small settlements below 500 inhabitants, being the most numerous. In 1992, the majority of the carpathian population between 300-500 meters lived in small settlements. 35 had fewer than 50 inhabitants. The number of large settlements that had between 1,501-4,000 inhabitants was 48. The very large settlements of over 4,000 inhabitants were in number 6. Of the 6 settlements, 5 (Bârsana, Ieud, Rona de Sus, Ruscova, Vişeu de Jos) are positioned in the Maramureş County, and one in Bistrița-Năsăud County (Maieru). The level of the higher economic and social status of Maramureş County led to agglutination of the demographic component in rural settlements of very large size. The total population of the 6 is 29,665 inhabitants, accounting for 5% of the total population of the year 1992 of the altimetry floor of 300-500 metres. 152 the settlements were of medium size, being the most numerous after small settlements. Many of the medium-sized ones were to decline demographics, and in 2011 they found themselves among small settlements.

The altitude threshold of 300-500 metres was depopulated between 1992-2011 and 16%. The numerical loss was 85,772 people, reaching 42,7307. Both in 1992 and 2011, the 300-500-metre gauge encapsulated the second largest demographic in the Romanian Carpathians. We note for the year 2011, the decline in urban populations at 147,234. Urban settlements depopulated by 20% compared with the year 1992. Also, the number of large settlements decreased from 1992 to 36, and the very large ones from 6 to 4. From 1992 to 2011, there were two settlements that lost the inhabitants wholly (Bratova from Caraş-Severin County and Copaci in Hunedoara County).

Climbing to altitude, we see that settlements extend more, encompassing wider Carpathian territories (figure 5). The Depression of Maramureş are almost entirely contained, and descending to the Carpathian Curvature, we can identify several new settlements. This time the settlements are positioned on the eastern marginal parts of the Eastern Carpathians. They comprise the eastern extremity of the Bistriței and Trotuş corridor. Basically, there are settlements formed along the river courses, close to the contact between the Carpathians and the Subcarpathian. At these altitudes appear the first localities positioned in the Depression of Brasov, specifically in the Baraolt depressionary compartment. Similar example is the Depression of Loviştei and the corridor of Lotrului, the herd of localities being lifted. Haţegului Depression is fully comprised of settlements, forming a visible habitational group. We can also note the growing dispersion of settlements in the Apuseni Mountains, comprising deformation regions and the eastern part of the Arieşului corridor.

The most effective population of the Romanian Carpathians is between the altitudes of 500-750 meters. The 816 localities hold a population of 1,434,365 inhabitants. Urban area consists of 62 urban settlements, in which 849,336 inhabitants live. The population in the urban environment represents 59% of the total population recorded between 500-750 meters altitude in the year 1992. The largest city in the demographic point of view is positioned in the carpathian curvature of the Romanian Carpathians. Braşov had in 1992, a total of the population of 323,736 inhabitants. At the opposite side, the smallest urban locality was Tirici from Hunedoara County with only 79 inhabitants. Settlements under 500 inhabitants dominate with 430 localities, of which 145 were in 1992 below 100 inhabitants. These localities under 100 inhabitants were at the beginning of the depopulation phenomenon, following the census of 2011, the

population of settlements that had less than 100 inhabitants to grow more. The number of large settlements with population between 1,501-4,000 people is 89. The population held by large settlements in the year 1992 was 212,186, 14% of the total population located between 500-750 meters altitude. In 1992, there were 18 localities of very large size with over 4,000 inhabitants, positioned between 500-750 meters altitude (Teşila, Rucăr, Ghimbav, Prejmer, Zagon, Feldioara, Ghelinţa, Zemeş, Ciumani, Joseni, Remetea, Bistriţa Bârgăului, Prundu Bârgăului, Rodna, Săcel, Moisei, Poienile de sub Munte, Repedea). All 18 very large localities are geographically positioned within the Eastern Carpathians and have together 97,964 inhabitants, representing 6% of the total population of the altitude threshold of 500-750 meters.

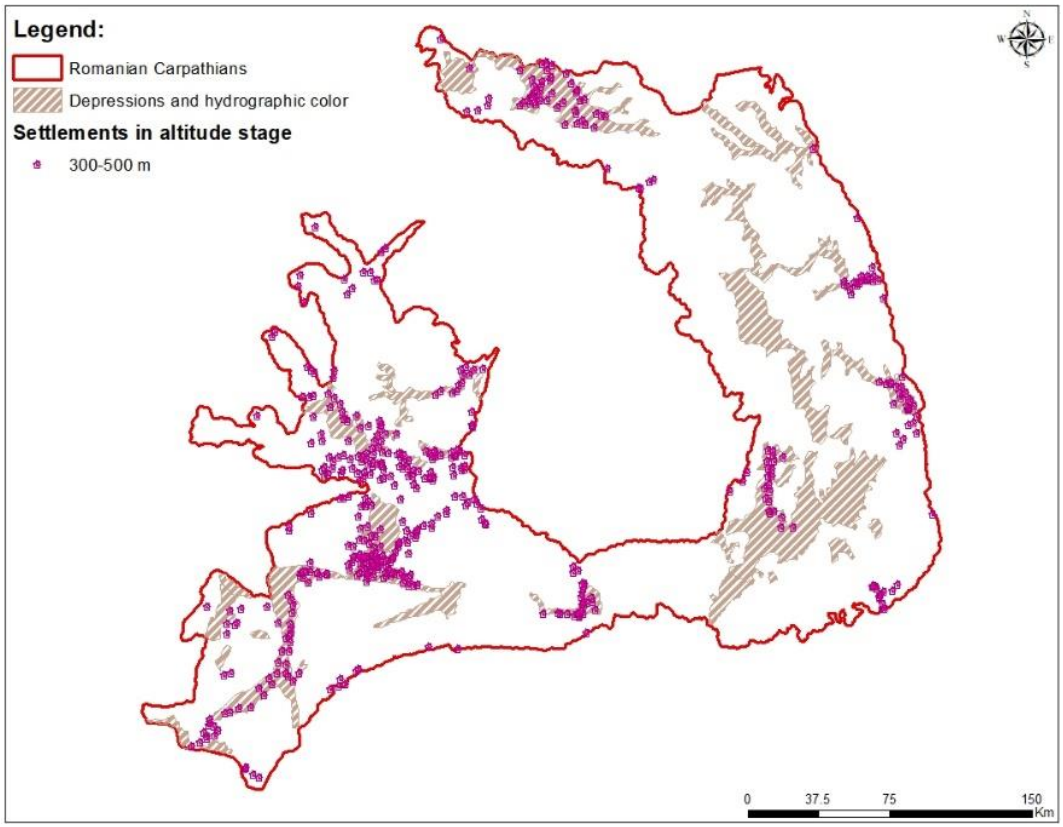

Figure 5. Distribution of settlements between 300-500 meters altitude
(Source: own study)

Until the second census of the 21st century, the population decreased by 10%, reaching 1,284,216 inhabitants. The loss of 10% meant a numerical demographic decrease of 150,149 inhabitants. Given the fact that it is the altitudinal step that cantonates the highest demographic in the Romanian Carpathians, the population decrease of 10% is the smallest compared to the other altitude steps. The urban population decreased by 14% reaching 726,366 inhabitants. Also, the share of the urban population reported in the total population in 2011 decreased from 1992 to 59% to 56%. Small-scale settlements were in 2011, 439, of which 182 under 100 inhabitants, and 9 had 0 inhabitants

(Buneşti, Geamăna, Gresia, Ibru, Mosoru, Roşia, Sasa, Tâmboreşti, Valea Uzului). The large settlements lost from 1992, 10 localities, being recorded in 2011, 79. The population held by the 79 large-scale settlements in 2011 was 186,112 inhabitants. Compared with 1992, the registered decrease was 12%, losing 26,074 inhabitants. The very large localities that had over 4,000 inhabitants remained predominantly the same as in 1992. The exception is, two localities, Budila and Sânpetru who have passed from the large settlements, among the very large settlements in 2011. Teşila fell demographically by 11% in the 19 years, passing among large settlements in 2011. Thus, there were 19 settlements, which had in 2011, a total population of 100,185 inhabitants, registering 2% increase compared to 1992.

At these altitudes, the majority of the Carpathian population lives (figure 6). Moreover, the distribution of settlements is a fairly uniform one, comprising each group of the Carpathians and almost every depression and river corridor. We note that this time the abundance of settlements is erected in the Eastern Carpathians, from the northern and southern deities and lanes. The habitat nuclei are predominantly carried out in the customs-Moldovian depression, descending towards the upper corridor of Bistrita, northern Giurgeu Depression. We note that the Ciucului Depression is completely covered, as well as the Depression of Brasov, with the density being somewhat higher in the eastern and central part. We can also see that the centre of the Apuseni Mountains is densely covered by settlements, being carried out in the upper basin of the Arieşului. The vast Petroşani coal basin comprises urban mining agglomerations, which we want to bring some important demographic data on the operation of mining activities.

The Austro-Hungarian authorities were very interested in the mining of this region, so they made demographic infusions. The colonised alohton population resulted in significant demographic increases in very short periods of time. From table 1 we can see that the demographic evolution of the administrative units constituting the Petroşani Depression (Petroşani coal basin) is an important one.

Table 1. Demographic evolutions in Petroșani Depression
(Source: data processed after the NIS, Rotariu et al., 2011; Rotariu et al., 1999; Rotariu et al., 1997)

Administrative unit	Year 1880	Year 1900	%	Year 1930	%	Year 2011	%
Petroșani	5,755	11,152	+93	18,211	+63	37,160	+104
Petrila	3,226	4,497	+39	10,496	+133	22,692	+116
Vulcan	2,030	3,016	+48	14,053	+365	24,160	+71
Lupeni	1,244	5,393	+333	15,093	+179	23,390	+54
Aninoasa	738	1,070	+44	5,318	+397	4,360	-18
Uricani	1,677	1,306	-22	1,848	+41	8,972	+385
Bănița	1,331	1,776	+33	1,734	-2	1,211	-30
Total	16,001	28,210	+76	66,753	+136	121,945	+82

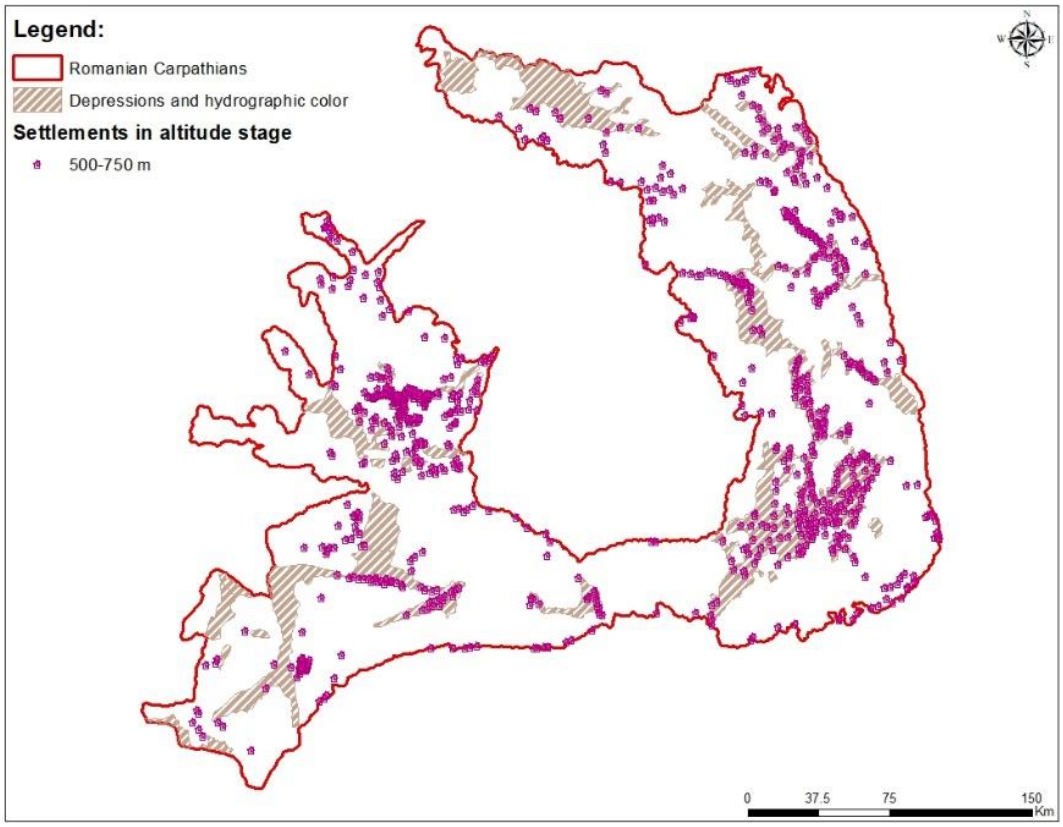

Figure 6. Distribution of settlements between 500-750 meters altitude
(Source: own study)

Between 750-1,000 metres altitude there are 475 localities. At the last census of the twentieth century, they had a population of 247,444 inhabitants. The urban population between 750-1,000 metres was 1992, 97,156 inhabitants, incorporated in the space of 22 localities. The share of the urban population was 39%. Both the largest (Gheorgheni 21,289 inhabitants) and the smallest (Visafolio 12 inhabitants) Demographical settlement were positioned in the Eastern Carpathians. With this hypnosometric floor they begin to dominate small settlements, especially those under 100 inhabitants and under 50 inhabitants. It is the altimetric gear from which the villages of the Apuseni Mountains begin. Thus, small settlements below 500 inhabitants are in number 366, representing 76% of the total settlements situated between 750-1,000 meters altitude. Of these, 87 were between 50-100 inhabitants and 107 had under 50 inhabitants. The demographical total of the 366 localities was 1992, 46,140 inhabitants. Localities under 50 inhabitants had 2,895 inhabitants, and those between 50-100 had 6,055 inhabitants. The 107 localities with fewer than 50 inhabitants began from 1992, an extensive process of depopulation. Moreover, in 1992 there were registered four settlements with 0 inhabitants (Merişor and Surduc from Covasna County, Văseşti in Alba County, Iesle and Coasta Gubei in Suceava County). The number of medium-sized settlements with population between 501-1,500 inhabitants was 69. They incorporated in 1992, a population of 51,204 people, and 20% of the total population between

750-1,000 metres. 33,054 persons lived in 1992, in 15 localities of large size. In 1992, between 750-1,000 meters there were 3 very large localities whose population passed 4,000 inhabitants (Ditrău, Jina, Sândominic). The urban population reached 72,873, decreasing by 24%, compared to the last 20th Century Census. In 2011, the situation of small settlements between 750-1,000 meters was much changed. There were no fewer than 378 localities under 500 inhabitants, of which 173 with a population of less than 50 inhabitants and 70 with population between 50-100 inhabitants.

Their population was 2011 to 38,578 inhabitants, down by 17%, compared with 1992. The number of localities with fewer than 50 inhabitants increased considerably in the 19 years, with 66 localities, from 107 to 173. Instead, localities with population between 50-100 inhabitants fell from 87 to 70, so the population of 17 localities fell below 50 inhabitants. The population of 173 small localities was in 2011 of 3,791 inhabitants, increasing by 30% compared to 1992. The population of localities that had no inhabitant in the 2011 Census increased from 1992. From 4 localities reached 21 (Ciumița, Dragu-Brad, Făgeţel, Furduieşti, Haiduceşti, Hosasău, Inceşti, Lăpuşna, Lindenfeld, Preveciori, Goteşti, Medreşti, Mesteacăn, Petreni, Ticera, Țoci). The population of 70 settlements that had between 50-100 inhabitants decreased by 14% to 5,196 inhabitants in 2011. The number of large settlements decreased to 13, and the demographical population decreased by 8%. Settlements with population over 4,000 inhabitants were Ditrău, Sândominic who retained their positions as in 1992 and Băile Borşa. The Jina entered the large settlements, after during the 19 years lost 13% of the population. The total population between 750-1,000 metres altitude decreased between 1992-2011 and 18%.

This time, the dynamic component again occupies only a few territories (figure 7), extending to high mountain spaces such as the Poiana Rusca Mountains, the Şureanu Mountains and the Harghita Mountains. By far the most visible core of settlements is positioned in the Apuseni Mountains space, where the very small villages with scattered structure dominate. In the Eastern Carpathians, the settlements are grouped more comapct in the Dornelor Depression and Giurgeului Depression.

The least populated throughout the period was the altitudinal step of 1,000-1,500 meters. However, the number of settlements is high at these altitudes 146 localities. Most of them are villages of the Apuseni Mountains, representing the continuity of the distribution of villages from the previous altitudinal step. In 1992, the total population contained in this altitudinal step was only 32,084 people. The population in the urban area was 6,384 inhabitants, comprised of 5 urban localities. Thus, urban settlements concentrated 20% of the total population. The specificity of these altitudes is given by the dominance of settlements below 500 inhabitants. Another specificity is given by the permanent dwelling character, and the settlements between 1,000-1,500 meters altitude face high isolation. One of the major causes of isolation can be said to be the lack of transport infrastructure, reduced accessibility due to high altitude. Also, geomorphological restrictivity occurs through the degree of fragmentation, declivity and fragmentation density. Geomorphological restriction is required as a disperise factor of settlements by geographical position, large distance between households. Basically, these small-scale localities have a scattered structure, depending on the morphological, hydrice, edaphic conditions. Of the total of 146 settlements, not less than 130

were under 500 inhabitants in 1992. Of these, 38 had less than 50 inhabitants, and 35 had between 50-100 inhabitants. The population incorporated by the 38 was in 1992 of 1,075 inhabitants (3%), and the 35 had 2,621 inhabitants (8%). In 1992, the population of the 130 small localities was 14,913 inhabitants, representing 46% of the demographical population between 1,000-1,500 metres. The village of Mărişel in the Apuseni Mountains was the only large size, with 1,951 inhabitants, the rest being middle-sized localities.

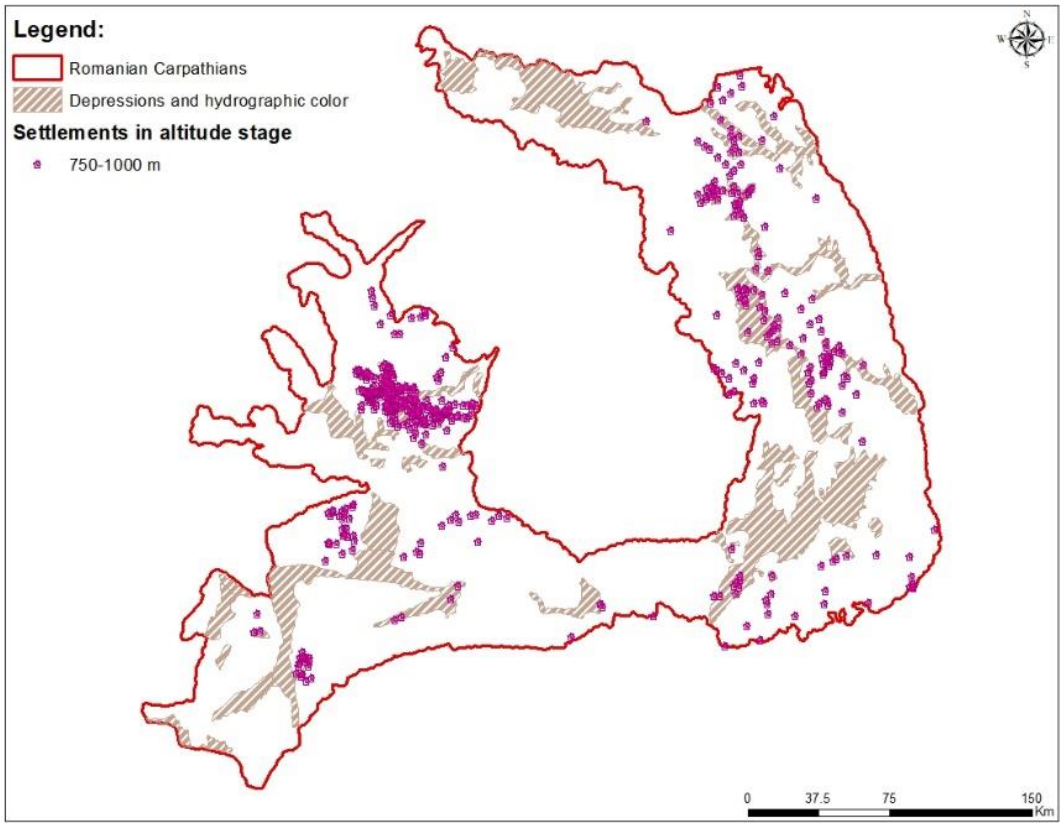

Figure 7. Distribution of settlements between 750-1000 meters altitude
(Source: own study)

By 2011, the population at these altitudes decreased by 26%, registering 23,573 inhabitants. The urban population decreased sharply by 39% in the 19 years, reaching 3,892 inhabitants. The gradual loss of tourist function resulted in the progressive depopulation of urban localities. Compared to 1992, the number of small localities increased to 134, with localities that have completely depopulated with 0 inhabitants (Bordeştii Poieni, Crinţ, Hărăşti, Poieni in Alba County and Şesuri in Suceava County). This time, there was no large locality, the one in 1992, passing among the medium-sized.

This last altitudinal step of the Romanian Carpathians is characteristic of mountain villages in the Apuseni Mountains (figure 8). Basically, these villages have a permanent dwelling character, having a high degree of isolation. The lack of access infrastrucutation makes the winter season access to these settlements very difficult or even impossible. The settlements at these altitudes in the other

mountain groups have a more seasonal character, with the function of shelter when people climb with animals to grazing.

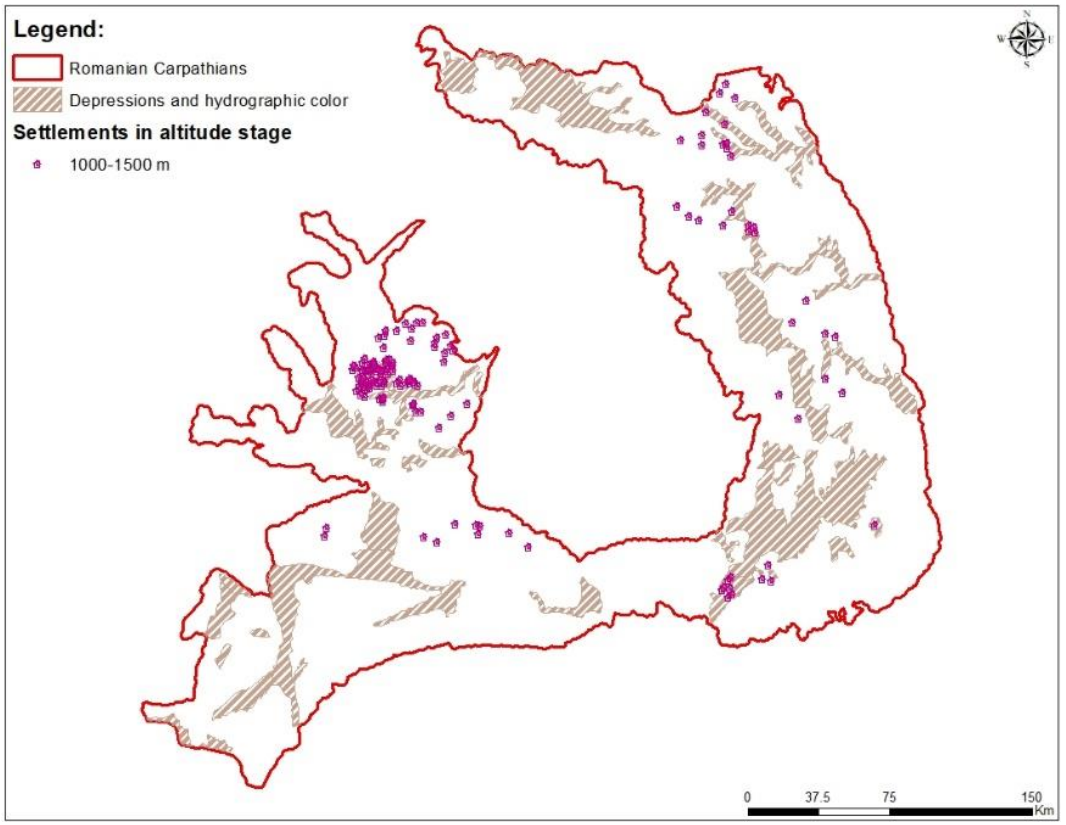

Figure 8. Distribution of settlements between 1000-1500 meters altitude
(Source: own study)

CONCLUSIONS

The Romanian Carpathians depopulated in the period 1992-2011, with about 435,000 inhabitants. Each of the 7 altitudinal classes decreased numerically in the period 1992-2011 (figure 9). The 7 altitude classes decreased demographical, with weights between 10%-27% (figure 10). The majority of the population is located between 500-750 metres, which is lost to the highest numerical demographic, about 150,000 inhabitants. 35% of the localities of the Romanian Carpathians are located between 500-750 meters. It is worth noting that the large share of 21% have localities positioned between 750-1,000 meters altitude (figure 11). Under percentage ratio, the largest demographic decrease was 27% for settlements between 56-100 meters altitude. They have a share of only 1% of the total carpathian settlements. Both urban and rural areas are systematically depopulated between 1992-2011. As a consequence, the space of the Romanian Carpathians faces risk demographic phenomena, such as depopulation.

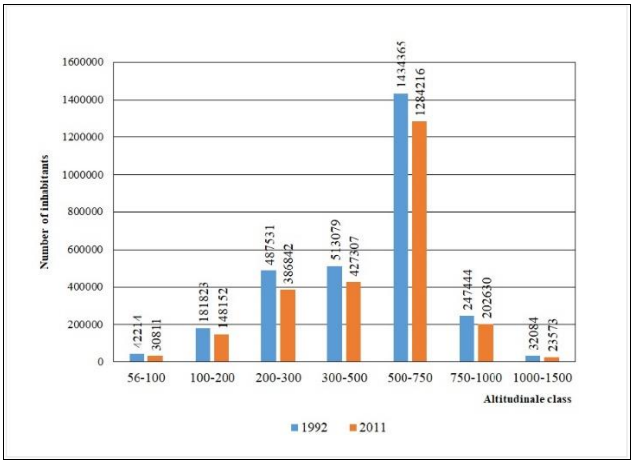

Figure 9. Numerical evolution of the population on the 7 elevation classes
(Source: data processed after the NIS)

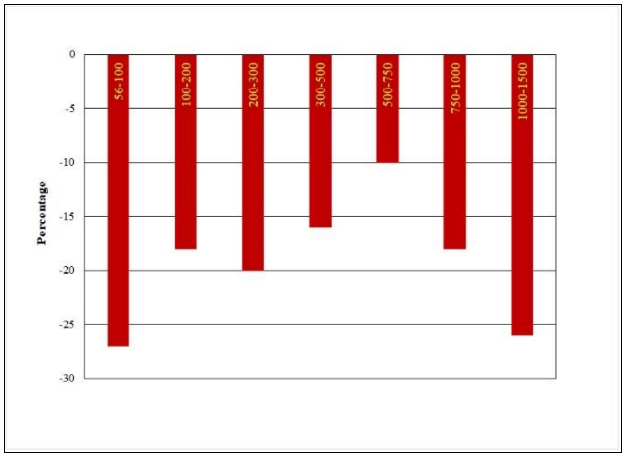

Figure 10. Percentage evolution of the population on the 7 elevation classes from 1992 to 2011
(Source: data processed after the NIS)

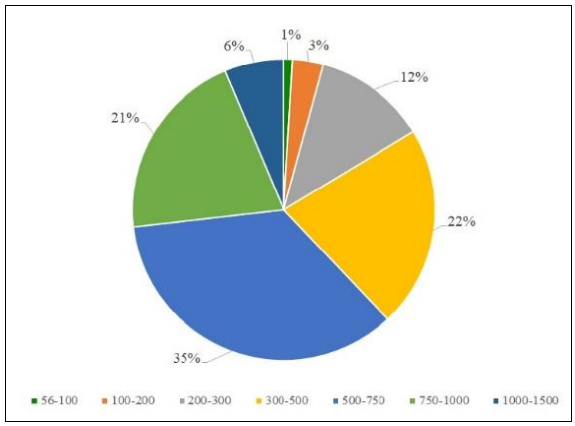

Figure 11. The share of settlements on the 7 altitude classes
(Source: own study)

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URBAN RESILIENCE – A FIRST STEP TOWARDS THE CITY OF THE FUTURE

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Abstract : As complex forms of human settlement, cities have known an unprecedented development in recent years. This has made it necessary to find new ways of preserving them during the journey they undertake. As such, policies of designing, managing, using and controling urban utility systems in general and policies of risk management in particular have begun juggling more and more often with a new concept – urban resilience. Compared to the old concept of durable urban development, urban resilience is much more comprehensive because not only does it englobe the former, but it also helps complete it with aspects regarding the management of risks associated to potential urban disturbances.

Key words: city, resilience, urban resilience, urban development, urbanism, sustainability, durable urban development

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INTRODUCTION

Among the consequences of current global developments is an increase in economic, social and ecological pressure on urban systems. Changes in the global environment in recent years have made it necessary to rethink the concept of durable development and adopt a new concept – resilience, which is applicable not only to the environment, but also to other forms of territorial organization. At first, it was no easy task to use this concept in the field of urban geography because it was still an unknown element and geography was forced to work with interpretations from the field of natural sciences, while social sciences often limited themselves to simply evaluating vulnerabilities (Donovan and Oppenheimer, 2015). Over time, the concept gained momentum and started being used in both scientifical and political environments as efforts to monitor and measure urban resilience increased. Urban resilience means the optimal way of changing mentalities and of introducing prioritization in

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urban development policies. The concept of urban resilience cannot be singular – it demands the connection of objectives and activities from different departments so that a common denominator can be reached with regards to the durability, viability, cohesion, robustness and development of cities. This new concept and the way it is applied in the urban space is all the more important because, in a world in constant development, the discrepancies between the rural and urban environments have become more and more clear and the preference is more and more visibly leaning towards the city, which offers its inhabitants life conditions superior to those in the rural environment. The concept in itself is a broad one, as it encompasses various types of phenomena, such as efficient functioning, efficiently adapting to less favorable conditions, overcoming shocks and normal functioning after they occur. Alongside resiliency we should emphasize security and safety and not forget that the crucial elements of this approach are citizen responsibility and the efficiency of the intervention forces.

URBAN RESILIENCE, FROM CONCEPT TO REALITY

Cities nowadays are true motors of economic development, offering opportunities and, at the same time, facing numerous problems they have to solve. Cities worldwide are trying to improve their resilience in order to be able to overcome the stress and shocks awaiting them due to global climate changes and threats of every kind. Improving resilience is all the more important as cities today are not mere isolated entities, but rather complex systems integrated in urban regions in such a way that material and human resources from much larger areas depend on them (Bogunovich, 2009). The fact that the population often shows a preference for the city – which, in comparison to the village, thus becomes economically and socially richer – turns building resilient cities into one of the crucial components of urban planification. This is all the more important as only resilient cities will have the ability to survive and prosper during this period of climate change and shocks of every kind. Due to the complexity of urban systems, it is somewhat difficult to analyze urban resilience as a singular system. However, it is well-known that more and more urban administrations consider improving resilience as one of the most important strategies on the path to development. Improving the resilience of these systems is strongly linked to the balanced development of four essential components of the system: metabolic flows, social dynamics, built space and governance networks (Resilience Alliance, 2007). Cities can be thought of as a multitude of contested spaces that generate a wide variety of urban services: transport, housing, medical assistance, work places and financial markets (Harvey, 1996). The preference for the urban environment is also a result of the essential part that cities play as centres of innovation, able to capitalize upon their potential for innovation in a variety of ways and build their own system of resilience against shocks and uncertainties. The preference for the urban environment involves a continuous growth of the population in cities, which in the 21st century is a true challenge for sustainability. In order to withstand the challenges it faces, the city often is in need of finding solutions to the risks and threats it is confronted with on a daily basis. The most practical solution is urban resilience, which proves to be the only method of analyzing the risks and major threats that urban systems face. As such, in the public, local and

central administration, the concept of resilience has recently become an imperative of the governance and territorial administration policies. This is especially due to the shift from planning on the basis of scientific progress, an approach of the 60's and 70's, to planning for an unexpected and uncertain future, such as the one forecast by the resilient approach (Bonß, 2016). Resilience has become increasingly important as cities have started fighting more (and more frequently) against the effects of climate change, while at the same time trying to counteract the effects of economic, social and political changes.

For the city, resilience means not only the ability to recover after suffering shocks, but also to reduce the impact of these shocks and to minimize the effort it puts into recovering, as well as the ability to face unlikely and unexpected situations. Usually, shocks that can affect big cities are severe and sudden events that have a powerful impact on their structures. In order to overcome them, a partnership between public, civil and private authorities is advised. When building and improving upon resilience, a rigorous urban and scenic planification is necessary, which in turn requires identifying the main processes and disturbances which the cities are likely to face, as well as identifying the frequency and intensity of these events (Vale and Campanella, 2005). One of the most common ways of improving resilience is biodiversity, to which we can add physical, social and economic diversity.

In recent years, the concept of resilience has become increasingly prominent, including in the field of urban geography (Muntele et al., 2018). This is due especially to the fact that cities nowadays must be able to not only withstand natural catastrophes (earthquakes, floods, fires etc.), but also to overcome the daily challenges they face (traffic, pollution, energy waste etc.). The concept of resilience has only been recently introduced in scientific research specific to geographical analysis. This is because the global, national and local evolutions have an increasingly greater impact on regions in general and urban centres in particular. Ethymologically speaking, the term "urban resilience" comes from the Latin "resilio, -ire", which means "to jump back, to contract, to recoil, to ricochet" (Klein et al., 2003). On the other hand, resilience demands a new way of thinking about sustainability, as it directly depends on adapting to changes that are unexpected and unknown until the moment they come forth. In the literature in our field of interest, one of the most common definitions of resilience is: the ability of a regional economy to withstand, absorb or overcome an economic shock that is external to that region (Simmie and Martin, 2010). A second concept has been introduced alongside resilience – vulnerability. The two have become almost unexpendable when analyzing the way urban systems respond to stimuli caused by the changes, shocks and hazards an urban system faces. Although seemingly opposed to one another, the two concepts are strongly linked and complementary. Sometimes, resilience is synonimous to reducing vulnerabilities or to increasing the cities' ability to adapt to the changes they are submitted to. As a human and geographical subsystem, the city is submitted to eight types of vulnerabilities: economic, social, ecological, organizational, attitudinal-motivational, political, cultural, physical (Wisner, 2009). Starting from the various definitions given to resilience, we can say that urban resilience means the ability of urban systems to remain stable or to quickly recover when facing disturbances, as well as to adapt to changes. The mention must be made that the urban system is conceptualized as being complex and adaptable, as it is

made out of socio-ecological and socio-technical networks that stretch on more than one spatial scale (Meerow et al., 2016).

Over time, the concept of resilience started being used more and more often in urban planning, so that today it is used frequently both in discourse and in literature, where it has become one of the academic attempts at evaluating a city's potential lifespan in the context of the transformation of economic, social and political structures imposed by the requirements of an increasingly uncertain and unpredictable future (Pelling, 2003). Conceptually speaking, urban resilience can be defined as the ability of a city or a system to oppose oncoming shocks or attacks of any nature (Agudelo-Vera et al., 2012). However, when considering the complexity of the functions of the urban system, the definition given by Resilience Alliance seems much better-suited: the degree to which cities are capable of tolerating changes before reorganizing around a new set of structures and processes (...), a flexible society capable of adapting in the face of uncertainty, at the same time capable of capitalizing on future opportunities (Resilience Alliance, 2007). This definition somewhat changes the initial assumptions, in the sense that it is not compulsory for a system to return to its initial state or a state of balance, but instead is offered the possibility to adapt and transform to a state that will later allow it not only to work at optimal parametres, but also to survive future changes (Folk et. al., 2010).

For cities, resilience is all the more important as the shocks that urban centres face are many and different. As such, cities nowadays need to face not only climate changes, but also economic, political and social changes. In this context, urban resilience focuses on four major directions: ecological urban resilience, urban risks and a decrease in risks of disaster, urban economy resilience, promotion of resilience through urban governance institutions (Leichenko, 2011). Adapting and overcoming these shocks depends fundamentally on the measures adopted by urban centres, with the urban development policy being very important. In this context, urban architects, engineers and transport experts must take into consideration the permanent adaptability of the urban infrastucture so that it can withstand the challenges it faces, the most important being the numerical increase of the population and the frequent climate changes.

RESEARCH RESULTS

Despite the fact that a consensus has not yet been reached regarding the definition and measurement of urban resilience, two essential aspects have been agreed upon: 1. cities must resist to a wider variety of shocks and stresses in order to withstand climate changes; 2. in an effort to react to climate changes, resilience must be combined with urban development and sustainability (Leichenko, 2011).

One of the numerous shocks that cities must face is global warming and the climate changes it generates. This shock does not come by itself, but rather is usually accompanied by shocks of economic, ecological and political nature. Urban centres have the task of adopting the necessary measures to adapt to all these shocks and to surpass moments of crisis, which represent a true management challenge for the administration of cities whose duty is, among others, to manage urban development policies in order to withstand such challenges. When talking about the challenges posed by extreme meteorological phenomena, we can say that the resilience of cities is directly and strongly

influenced by the quality of the buildings, the efficient territorial planification and the extent of urban infrastructure and services. We must admit, however, that, in order to successfully counteract extreme meteorological phenomena, an essential role is played by early warning systems on the one hand, and the existence of an efficient intervention system on the other.

As a whole, the urban resilience policy is a complex field that develops constantly and is characterized by a series of significant challenges associated to the systems of urban governance, political pressures, threats and changes the city has to face.

CONCLUSION

The first conclusion we can draw from this paper is that urban resilience is the concept that allows cities to search for and find systemic solutions in order to confront and overcome the vulnerabilities and risks they face.

The second conclusion is that the category of resilient cities can only include cities capable of evolving, planning and acting so that they are permanently ready to respond to the dangers they face.

The third conclusion is that resilient cities are clearly superior to non-resilient cities when it comes to durable development and protecting their inhabitants.

The final conclusion is that it is imperious for policies that focus on long term urban resilience to take into account the future characteristics of cities and strive to achieve the objectives of resilience on a daily basis, not just when facing a disaster.

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THE ECONOMIC CAPACITY OF THE MOST DEVELOPED NATION: NORWAY

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Abstract: Norway has been a period of the world's most developed nation, remaining at the top five in the world. The heavily exploited natural resources and well-engineered economic processing activities have created a prosperity paradise from Norway, surpassing economic or military even states with a population of 40 times more.

Key words: production, natural resources, population, geopolitics, first place

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INTRODUCTION

Norway has a population of only 5.3 million people, as well as the population of German cities such as Berlin, Hamburg, Frankfurt, Stuttgart or Essen, under half the population of the French city of Paris or a quarter of the Turkish city of Istanbul (Diaconescu and Lung, 2018; Diaconescu, 2016; Diaconescu, 2018a). It is a low population in 2018, only 119 in the world with the most populated states, a very low population if we take into account that every five years the population of some states increases by 5 million inhabitants such as: Niger, Afghanistan, Mozambique, Angola, Sudan or Iraq, or in only three years, such as the states: Uganda, Mexico, the Philippines or Bangladesh, in only two years as in the states: USA, Ethiopia or DR Congo. Nigeria's population grows every year with 5 million inhabitants and the population of India with 15 million people (Diaconescu, 2017).

Nothing stands on its surface not much better, ranking 62 in the world, much of this area is at high altitudes and in polar and sub-polar regions very cold (Soft, 2009 p. 84-85). For those population density remained only 15 inh./km^2, low population density than at the Earth 51 inh./km^2, the world 209 barely ranks among countries with the highest density of population, with the in 2018, 112 states with a density of more than 100 places / km^2, of which 73 with over 200 places / km^2 (Woldometers.info, 2018). Basically, the surface does not

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give Norway an important geopolitical value and the number of inhabitants is even more disadvantaged. Despite these lows, Norway managed through an efficient exploitation of its rich resources, a system of processing raw materials better tech, to win a valuable geopolitical, being one of the great nations of the world now, a national economy that ranks 29th in the world, surpassing any of the states on the continent of Africa and the 13th in Europe (26th place among the most populated European countries).

PRODUCTION AND PROSPERITY

Unlike many countries in the region, such as Ireland, the Netherlands, Sweden and Finland, whose residents have worked hard for economic growth of their nations, the five million Norwegians have come to exceed the economic power, countries like: Romania with 20 million workers, Colombia with 49 million, Philippines with 106 million, Bangladesh with 166 million, Nigeria with 196 million or Pakistan with 201 million inhabitants, helped by natural factors (Staşac and Stupariu, 2010).

Norway has an area of 323,000 km^2, reaching with all the islands held at 386,000 km^2 (slightly larger than the size of Germany or Japan) whose territory is home to a population of approximately 5.3 million inhabitants, of which nearly 3.0 million are the country's labor force (Sehic, 2008, p. 80). A quarter of the country's surface is covered by 8 million cubic meters of forest, which has developed a strong pulp and paper industry and is also a major timber producer. Agriculture is practiced in the south, where they raise cattle and growing potatoes and oats, which occupies 2% of the labor force and on which has developed food industry.

Being a predominantly mountainous country with a rainy climate stretching across the Atlantic-Arctic rivers, the rivers are short, fast and flowing. The hydro-energetic potential was well appreciated, reaching a share of 96% of total energy (the first in terms of hydro power production in Europe), which is 148 million GW/h being ranked 29 among the countries with the highest the production of electricity on Terra (one and a half times the production of Romania), reaching the second largest electricity per capita in the world (after Iceland), with 30,000 kW/h, recalling the fact that this energy has the lowest cost of production compared to thermoelectric or nuclear energy (Diaconescu, 2018b). Based on this, it imports large quantities of bauxite from which it obtains aluminum (the 7th aluminum producer on Terra) which exports it to Sweden, using it in the aerospace industry. Although it is only 62th in the world as an area, it is an elongated and narrow country, ranked 7th in the world and the first in Europe after the length of the coastline, which has 22,000 km (more than the distance between the North Pole and the South Pole) on a distance from the north to the south of just 2,600 km, due to both the famous fjords and the 150,000 islands (besides the islands near the shore, also holds: The North Svalbard Archipelago, Jan Mayen Island near Greenland, the island Bouvet in the southern Atlantic Ocean, claiming much of the Antarctic continent: Queen Maud's land of 2.5 million sq km), and in the south-eastern Pacific Ocean or the South Ocean holds the island of Peter I (Taylor, 2010, p. 54; Gâştestescu and Cioacă, 2013, p. 105-106, 328; Gifford, 2005, p. 150-151).

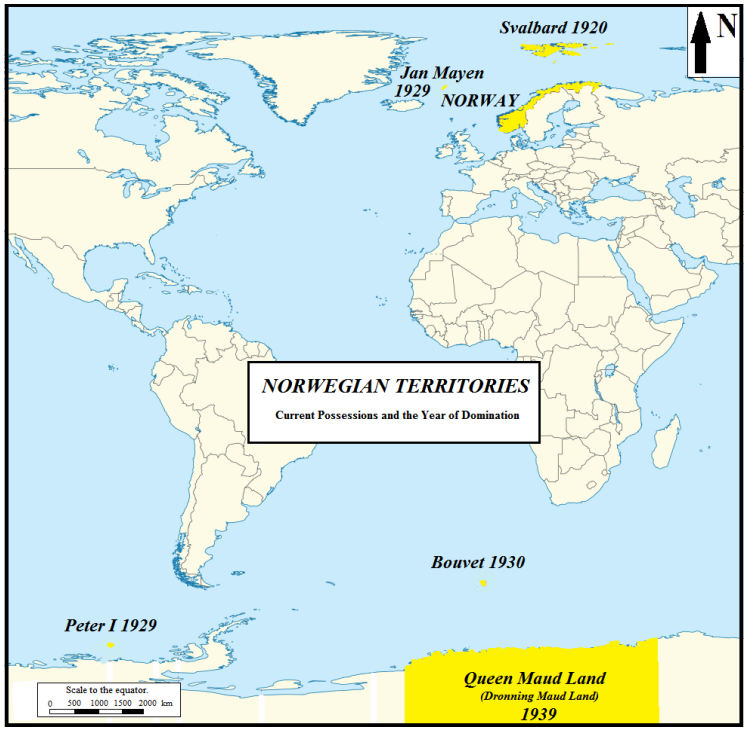

Figure 1. The territory of Norway and all possessions owned by it
Source: MCMXC, 1990; Gardner and Berenson, 1989

Due to the extended seaside, it has developed the shipbuilding industry, currently holding 10% of the world's oil fleet and among the first 15 states in the maritime fleet as well as the sixth ship-exporter worldwide, with which it also transports other states or regions of the same state that do not have naval capacity, playing the role of a taxi of the seas. The surface of the territorial waters reaches 800,000 km^2 for the Exclusive Economic Zone and the total area of the fishing area is 1,900,000 km^2, which is six times the area of Norway. The fish richness of these waters led to fishing with their own vessels, Norway exporting 12.0 billion tonnes of fish in 2017 (the second after the EU and China), while developing the canned fish industry which substantially increases its profit, from seas and seas collecting algae or shells. However, marine areas are far too large and rich in fish, so it gives fishing rights to other states (such as Poland, which are sufficient Baltic Sea waters to catch up with domestic needs), a practice that brings extra income.

Holding 8 million hectares of pine forest mostly with great financial value, which operates eight million cubic meters, and in the south is one million hectares of arable land well cultivated (Anton and Peneş, 2008, p. 39, 57).

In 1960 oil reserves were discovered in the North Sea (estimated to be 0.9 billion tonnes, the second in Europe as reserves after Russia), reaching a production of 1.7 million barrels per day (the second producing in Europe after Russia, the 15th on the Terra and similar to the production of states such as Algeria or Iraq, whose income is predominantly from the sale of oil. The same amount is recorded by the United Arab Emirates, which built its oil revenues Among the most prosperous nations, buildings in the cities of Abu Dhabi and

Dubai are well known, which exceeds more than three times the quantity exploited by Romania and twice the production of the third producer in Europe, Great Britain (Roberts, 2008). Oil exports reach 1.4 million barrels per day, ranking 13th among world exporters (5th place before 2010). Natural gas reserves rank the country in 19th place, with annual production of 110 million cubic meters, being the world's 7th largest producer (the world's fifth in 2008) and a production equal to all EU countries (Peptenatu et al., 2005; Neguț et al., 2009, p. 69-71). Exports of natural gas reach over 100,000 million cubic meters, being the third largest exporter after Russia and Qatar. Norway ranks 11th among the countries with the largest oil reserves per capita worldwide and ranked first in Europe and the natural gas reserves per capita rank the northern state on the 7th place in the world and the first in Europe. These quantities of oil and gas make Norway the main export partner of the EU countries in their struggle to get out of dependence on oil and gas. Norway has developed many of its other well-known industries by processing textiles, chemicals, mining or metals, from which the production of foundry steel equals Japan's production and surpassed only by Russia and Germany in Europe. With more than 70% of the population with higher education, it has developed innovation centers, and Oslo is a highly respected financial and decision-making center in the world, being one of the main cities in the organization of international congresses, Norway being also a large data market (Bonnet, 2000, p. 145, 152). Tourism comes as a financial surplus, with the 3-5 million visitors a year, with the Lillehammer winter resort known (Neguț, 2004, p. 85-86). All these riches that are found both on the continent and on the islands or in the territorial waters, which are well exploited and besides that processed and exported as goods (not as raw material), as well as the development of an industrial capacity that even requires imports of raw materials to be processed, plus top industry that is known to be among the most profitable industries, all of which were made by only 3.0 million workers, in a country where winter brings sunny days less than 3 hours, the relief is injured and rainfall and fog are at home (Matei et al., 2005, p. 349-351).

CONCLUSIONS

There is a natural curiosity of any inhabitant of a poor or middle-income country, wondering what the economic development of some western states that have per capita income and over 50 or 100 times the income of their own country. Norway is such a curiosity that Gross Domestic Product per capita reaches the colossal amount of 80,000 US dollars in a year, averaging nearly 7,000 US dollars per month. By doing a brief analysis of the main natural resources exploited, the added value of the finished products, the industrial and agricultural quantity, compared to the only 3 million people trained in the workforce, there is an enormous work capacity, worthy of a state's production force over 100 million people, not just 5.3 million as the total population of Norway.

The amount of natural resources exploited as well as their processing, creating additional value (compared to many other states selling low-priced raw materials, without interfering at all with its processing) makes Norway a world-wide mega-industrialist, comparable to the economic power of in very populated nations such as Nigeria or Pakistan, each have 40 times more population compared to the Norwegian people. In addition to these revenues, Norway having excess energy resources has led to a policy of lowering prices for the population, electricity, heat and fuel at the pump, making life even more prosperous for its

own people. In addition to the economic potential of its energy or fish stocks, the naval fleet or its island territories extending to the southern Atlantic and Pacific Oceans, Norway also invests in the military arsenal (US $ 7 billion a year, a budget of almost equal to the military expenditures of Romania) being 36 military power of the world, comparable to the strengths of some states such as Argentina, the Netherlands or Mexico, and surpassing: Romania, Nigeria, Colombia, Denmark, Finland or Portugal, all of which to one of the most known and respected nations on the Earth, with geopolitical and economic importance far above the demographic potential of only 5.3 million inhabitants.

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THE CITY IN ITS STRUGGLE AGAINST URBAN SHOCKS OR THE ROAD TOWARDS THE RESILIENT CITY

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Abstract: The challenges Europe faces nowadays greatly affect cities as well. Globalization, climate changes, migration, demographic decline and energetic security are true shocks for urban centers. These shocks offer cities some of the most significant reasons to improve resistance and readily implement urban resilience policies. The implementation of said policies is necessary also due to the fact that cities nowadays are often blamed for the high level of greenhouse gas emissions that are a shock for the environment and for the inhabitants, who are forced to face them every day.

Key words: city, urban shocks, durable development, climate changes, urban competition, urban development, durable city, urban resilience

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INTRODUCTION

Human communities in general and urban communities in particular have been facing several risks in the last decades: risks that appear independently from the action/will of people and risks that are the direct and exclusive results of man and the way he chose to act at a certain point (Goudie, 2018; Herman, 2009).

The recent international crisis has had quite a large impact on cities due to its having generated, among other things, the greatest reduction in economic activity, in this sense becoming a real shock for cities that up to that point had been used to a certain rhythm of development. It is difficult to quantify the effects of the crisis upon the urban environment but they are without a doubt significant, especially since in the first half of the 21st century a global process of

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urbanization has begun. Not only have cities grown in number and size – they have turned into complex and multifaceted organisms (Borsekova and Nijkamp, 2018). The challenges raised by the crisis were seconded by the challenges posed by globalization, the latter being viewed as the phenomenon that led to irreversible urban transformations. Along with these problems of economic nature, the city nowadays is permanently under stress and faces shocks daily, the most important of which are environmental and political shocks.

To the extent in which shocks threaten the city at every moment, it is no wonder that one of the most frequently used terms has recently become urban resilience, based firstly on the identification, evaluation and management of risks that threaten modern cities. Urban resilience is directly proportional to the degree in which a city is vulnerable. Although relatively new as a concept, urban resilience has won more and more ground, as it completes durable urban development and represents the ability of cities to withstand the shocks they face. We should mention that, in order to become resilient, cities must first of all adapt to the challenges of urban competition. The road to competitive and resilient cities is not an easy one. It should be based on adopting a series of measures, such as constant investment in the electricity network, the creation of a smart urban transportation network, the improvement and expansion of water supply networks, measures for the prevention and protection against floods etc. Only by adopting these measures can cities today become resilient. For this purpose, by resilient we mean the ability of cities to recover from shocks or adapt to them, gaining benefits from their positive effects (Briguglio et al., 2009).

The modern city has surpassed the stage of being a mere settlement with buildings, infrastructure and people. It has become an increasingly complex space that poses many questions regarding environment quality, energy usage, social cohesion, transport infrastructure, public facilities etc. (Borsekova and Nijkamp, 2018). Although modern cities are usually subjected to the same types of risks/shocks, their ability to adapt and respond to challenges varies immensely. This is due to some crucial factors, such as: government, institutions, cultural habits, technology, wealth, urban planning (Borsekova et al., 2018). Therefore, a well-developed city with a government oriented towards progress will recover much easier than a less developed city.

This paper is aimed at studying the way in which shocks affect the normal activity of the city and at identifying the main measures that should be taken in order to reduce the negative consequences of stress and shocks on the natural development of cities by as much as possible. By shocks we understand the totality of challenges that cities nowadays are confronted with, from climate changes to economic changes, from the demographic to the energetic situation and from political crises to the acute crisis of space. However, we must not overlook financial shocks – the disturbances that arise directly from the financial sector and negatively affect the natural development of cities.

At the same time, we will try to sketch the road towards improving the resilience of cities so that they become competitive, real models of economic and social development for the present and especially for the future.

CONTEMPORARY URBAN SHOCKS AND THEIR CONSEQUENCES

The century we live in is an “urban century”, characterized by a continuous growth in the size of cities (Kourtit et al., 2014) which, despite the related challenges and disadvantages, concentrate an increasing number of inhabitants

and record a substantial increase in their average size (Caragliu et al., 2009). As complex forms of human settlement, cities nowadays face a series of stresses and shocks. The most frequent shocks are environmental in general and climatic in particular. The latter can be defined as unique and relatively recent challenges that threaten life and means of living (Dohertya et al., 2016). Climatic changes have become quite frequent in urban areas in recent years. They are generated by several factors, such as extreme temperatures, the alternation of hot days and very cold days, of draught and excess rain. We must keep in mind that climatic changes are not a singular phenomenon, but usually appear alongside other stresses that manifest themselves on an economical, ecological and political level (Leichenko, 2011).

In order to better understand climatic changes we have to mention that they should be seen as external environmental shocks that are not influenced by human activity (Sanchez et al., 2018) but nevertheless have an important impact on the people by affecting their health and, consequently, their standard of living.

Alongside the environmental shocks caused by climatic changes are those produced by tropical cyclones, monsoons and heat waves that affect urban areas, as well as other increasingly extreme – albeit of different frequency and scale – meteorological phenomena (Lejano, 2019). Such shocks, produced by increasingly frequent and severe meteorological phenomena, lead to the geographical and social isolation of the communities affected by said shocks. They also highlight the difficulties which the communities face when in need of emergency support for their members in order to overcome the shocks.

More often than not, climate changes manifest themselves as global warming, which leads to the degradation of natural ecosystems in the urban environment.

Another category of shocks that the modern city faces are economic shocks, which affect the urban economy on a micro and macro level. Economic shocks can appear on both the product and the service market, as well as on the work market or the financial market. This type of shocks is mainly owed to the rapid and volatile changes of the economic and social environment, while at the same time being a consequence of the economic crisis (Iordan et al., 2015). The main form in which economic shocks manifest themselves in the urban environment is the decrease in the number of economic agents. Economic shocks can include, among others, dismissals, economic recession, unexpected migration influx, aging of the population and all manner of other catastrophes (Borsekovaa et al., 2018).

The economic and demographic evolution of urban centers has highlighted the problems of the urban space, a space that proves increasingly insufficient to insure the optimal combination of living spaces, green spaces and traffic areas. Apart from the lack of space, the continuous growth of the number of inhabitants in urban centers raises another problem – the large number of inhabitants requires an increase in the resources allocated for development and maintenance (Dodman, 2009).

Apart from the problems generated by space, cities today face many other problems that prove to be real challenges (Herman et al., 2016; Lange and McNeil, 2004; Thornton, 2007). One of these problems is urban competition, which has recently become more and more fierce. It is seconded by the permanent resistance cities must put up against a wide variety of shocks, thus insuring they are ready to withstand climate changes on the one hand and urban development and durability on the other.

Alongside the shocks that happen independently from man's will are those owed exclusively to his activities. This category includes terrorism and cyber-attacks, which are increasingly frequent in urban centers (Sanchez et al., 2018).

Globalization, disasters and the population increase have also made their mark on the evolution of contemporary cities. In this respect, the most visible shocks are those owed to the fluctuation of population in the urban environment, which is predictable if we think that there has always been a certain correlation between population and economy in the sense that the human factor is directly responsible for the economic development of the city. The effects that disasters of every kind have on cities are manifold, as they affect the city in its totality: environment, economic development and social development.

Despite the stress and shocks they must face, the ability of cities to develop as centers for habitation, production and cultural development is positive (Borsekovaa et al., 2018).

IDENTIFYING THE MAIN MEASURES OF COMBATING THE EFFECTS OF SHOCKS

One of the most important challenges of our times is climatic change, whose impact is felt on a global level and affects not only people, but also nature and the economy.

Whatever their nature, shocks have a critical impact on cities, affecting not only the physical urban development, but also the topology, the use of lands, its economy and its society.

The effects of shocks can be overcome only if there is a permanent collaboration in this sense between local and national and/or international authorities.

A measure of good practice in combating the effects of shocks owed to climatic changes is the existence of international funds specifically assigned for the building and promotion of urban resistance in countries with low and medium income (Leichenko, 2011). In parallel, resistance to climate changes must also be promoted, combined with improvements in durability and urban development that should seek to solve all urban problems, regardless if we refer to environmental problems or habitation problems (Leichenko, 2011).

At the same time, we think sustained efforts should be made to significantly reduce global greenhouse gas emissions, thus reducing the severity of climate changes. It is worth mentioning that this will not be possible without a better understanding of the complex system of links between emissions from various sources and their impact on the city, region or country as a whole.

When discussing the shocks caused by extreme meteorological phenomena, the first measure we can take in counteracting their effects is identifying the vulnerable communities and connecting them to communication networks (Lejano, 2019). Another measure that must be taken when such shocks occur is creating special programs oriented towards the needs of vulnerable communities and a permanent interaction with the communities that are in danger, while at the same time overseeing that the resources these communities might need are provided to them.

On the other hand, there is a need for the good use of lands and a more careful managing of water supplies, in combination with the development of a platform for future planning and monitoring the interventions that are needed in order to adapt to climate changes (Dohertya et al., 2016).

The need to fight against shocks on an urban/national/European level is acknowledged by members of the European community who support improving

resilience in the face of environmental and economic shocks, of natural disasters and of disasters caused by man (The European Commission, 2017).

Economic shocks can only be overcome if scientists and political decision makers identify the means and methods of solving the problems in due time, so that they reduce the consequences of such shocks to a minimum.

CONCLUSIONS

The first conclusion we can draw from our study is that cities must take all the necessary measures in order to become resilient to as wide a variety of stress and shocks as possible. Only adopting urban policies meant to develop the city and increase its capacity to withstand shocks can lead to competitive cities, capable of facing all the challenges that rise nowadays. An essential role in this regard is played by the local administration that has the task, among others, to focus on urban planning, so that cities get closer and closer to the standard of resilient cities.

The second conclusion is that only an integrated approach of economic, social and environmental problems can be a successful method of obtaining a durable urban development. The structures of the urban systems, regardless if we are talking about lifestyle, infrastructure and built space, requires a gradual transformation as well as supporting/stimulating the transformation in order to obtain durability and to be able to withstand the challenges to come.

The third conclusion is that solving the problems generated by urban shocks goes beyond the borders of the city and, more often than not, requires the involvement of multiple factors. So, if some problems can be solved on a local level, others require the involvement of national and maybe even international organizations. Only a good collaboration between researchers, public actors and political factors can successfully overcome the effects caused by shocks in urban centers.

Another conclusion is that the resilience of the climate must be accompanied by constant efforts of promoting urban development; but this is near impossible without adopting new administration and governing policies for cities, policies that emphasize the demands of the market and, first of all, seek to improve the way in which urban centers meet current needs.

We cannot end without making the point that one of the most serious challenges that future urban policies will have to face will be the cities' recovery potential after an external shock occurs. Adopting a policy in this regard is all the more necessary as threats against cities are in constant growth, be it external meteorological conditions, population dynamics, wars or terrorism.

In an urban context where shocks and stress are owed in good part to the political and economic conditions, resilience appears more and more frequently as a reaction to risk, highlighting the need for a more intense preoccupation on the part of society regarding phenomena that control elements of urban evolution and generate risks.

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