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GEODEMOGRAPHIC RISKS IN PETROŞANI BASIN (I)

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ABSTRACT. – Geodemographic Risks in Petroşani Basin (I). During the last decades, geodemographic risks became more and more debated, including such issues as the depopulation of certain areas, the overpopulation, the demographic ageing, the massive emigration and others. One of these risks, namely the demographic decline, is analyzed at the level of Petroşani Basin, mainly between 1966 and 2011. One notices that the population numbers in the area were relatively low until the mid 19thcentury, when the intensive stage of habitation started because of the development of mining activities. This stage continued throughout the 20th century and the number of inhabitants increased until the 1992 census. Then there was a significant drop in population numbers, at a rate of -12.3% between 1992 and 2002 and -17.7% between 2002 and 2011. The causes of this demographic decline are mainly the massive emigration, as a result of the restructuring of mining activities, but also the decrease of the birth rate and the increase of the mortality rate, as consequences of demographic ageing.

Keywords*: geodemographic risks, demographic decline, Petroşani Basin.*

1. INTRODUCTION

During the latest decades, demographic risks (as named by sociologists and demographers) or geodemographic risks (as called by the geographers) are more and more debated in the international scientific literature. This notion is rather difficult to define and there is no unanimously accepted opinion regarding the meaning of demographic risks. For instance, the demographic risk is considered "*… an extreme social process (phenomenon), dangerous for the individual and for the society, as a whole*" (Surd, 2004, p. 184), which may have economic and social effects, including fatalities, as in the case of natural risks.

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Another definition of demographic risks refers to "*diffuse actions and behaviours, difficult to describe and to assess in detail*" (Rotariu, 2004, p. 174). The quoted author considers that one may talk about a demographic risk only if a process or phenomenon that happens with regard to the population has consequences that may be classified as "dangerous", "hazardous" or "risky" for that population. In the absence of objective and universal criteria to assess if a certain demographic evolution has negative or positive consequences on the society, two types of situations are considered when demographic risks may be involved: a) when there are large-scale processes which, if maintained for a long period, might threaten the existence of the population itself; b) when there are demographic processes and phenomena which negative effects especially in terms of economy (for example, the emigration of a certain population category might have negative economic consequences) (Rotariu, 2004).

Some scientific papers concerning specific spatial units define the demographic risk as the "*incapacity of certain human communities, variable in number, to capitalize their space of control and belonging to a level of sufficiency (self-sufficiency), therefore becoming on the whole supported and/or dependent communities. The direct consequence, easy to notice and to quantify, is the rapid and massive emigration*" (Surd *et al*, 2007, p. 75).

Taking into account the facts mentioned above, one may include in the category of demographic risks processes such as overpopulation, low fertility, demographic ageing (Rotariu, 2004), underpopulation, characteristic for certain spatial units (Surd *et al*, 2007), the accelerated growth of the young population share (in the less developed countries) (Benedek and Schultz, 2003). Very often, demographic risks are caused by an excessive emigration, especially of the young population or of those who are more educated, from certain areas. This fact creates important imbalances that have deep effects on the affected regions, such as: the deterioration of the geodemographic structures, the deterioration of the infrastructure and public services due to the decrease in demand, the deterioration of the territorial structures in the areas generating migrants, as they become more and more monofunctional, focusing mainly on agricultural activities (Benedek, 2002), as well as the depopulation and the demographic decline of villages. Others risks may be added to these, as they are often identified at national level: the increase in the crime rate, divorce rate, unemployment rate, work accidents rate, collective work conflicts rate, infant mortality rate (which is a very sensitive indicator in the indirect assessment of the level of economic development), as well as the feminization of the population (Surd *et al*., 2007, Surd, 2004).

Some authors talk about demographic spasms (Cocean, 2010), defined as those *„processes, with fundamentally negative evolutions […] that constrain*

sustainable territorial development, drawing limits in its path, beyond which the demographic system becomes unable to support" (Potra, 2015, p. 98). According to the same author, there are two situations at global level which generate demographic spasms. The first one is linked to overpopulation, at the level of certain continents (Africa, Latin America, Asia), where the excessive population growth is not correlated with the level of resources. The second one is related to the subpopulation or better said the demographic decline, a phenomenon which is characteristic for the continents that are rich in resources (Europe, North America) but affected by an accelerated decrease in the number of inhabitants, which hinders a sustainable economic development.

Starting from the list of these risks, as well as from other studies of our own (Mureşan, 2014, Mureşan and Boţan, 2014) which we used as a model, we tried in this paper to highlight one of the demographic risks which is the most acute in many Romanian regions: the demographic decline and its main result, depopulation. This process was and still is generated especially by a high emigration of the population from certain areas, either as a result of the industrial restructuring which took place after 1989, or as a result of the decrease in living standards, or (in fact, a consequence of those stated above) as a result of a lack of viable alternative for development. There are also other causes of demographic decline, such as the decrease of the birth rate and the increase of the mortality rate.

2. METHODOLOGY

2.1. Data

In order to make the proposed analysis, we used statistical data provided by the population censuses, focusing mainly on those from 1966, 1977, 1992, 2002 and 2011. Basically, the numerical evolution of the population was assessed according to the censuses, highlighting several indicators which reflect the dynamics of the number of inhabitants (Vert, 1995):

(i) *The absolute growth for the entire period*, calculated according to the formula:

$$S_a = P_2 - P_1$$

where S_a = the absolute growth of population for the given period; P_1 = the number of inhabitants at the beginning of the period; P_2 = the number of inhabitants at the end of the period.

(ii) *The growth rate for the entire period*. It was calculated according to the formula:

$$R_c = \Delta P/P_1 x100 = (P_2-P_1)/P_1 x100 = (P_2/P_1 -1)x100$$

where R_c = the growth rate for the entire period; P_1 = the number of inhabitants at the beginning of the period; P_2 = the number of inhabitants at the end of the period; ΔP = the absolute growth for the entire period.

(iii) Given the fact that the different stages of the analyzed time period are not equal and therefore do not allow a useful comparison, we also calculated the mean annual growth rate, using the following formula:

$$R_{mas} = S_m/P_1 x100$$

where R_{mas} = the mean annual growth rate; S_m = the mean annual growth ($=\Delta P/n$; n = the number of years in the time period); P_1 = the number of inhabitants at the beginning of the period.

2.2. Study area

Petroşani Basin represents a very well individualized geographical unit, part of the Southern Carpathians. It is located on the upper Jiu Valley and it is surrounded by Parâng and Vîlcan Mountains to the South and Retezat and Şureanu Mountains to the North (Badea *et al*, 1987). Within these limits, it covers an area of 260 km^2 and represents "one of the most typical areas of relative geographical discontinuity in the Southern Carpathians" (Mihăilescu, 1963, p. 239) (fig. 1).

Apart from these physical-geographical limits, one should also take into consideration the limits according to the economic field of the basin or the functional-economic limits (Cândea, 1996), due to the historical process of human capitalization on the mountain slopes bordering the basin. According to this category of limits, the basin has an area of 1,032 km^2 (Costache, 2010) and belongs administratively to Hunedoara County, comprising the territory of seven administrative units (six towns and a commune): Petroşani, Petrila, Aninoasa, Lupeni, Vulcan, Uricani (urban units) and Băniţa.

Coal mining activities represent the main economic feature of the basin, which also influenced the evolution of the number of inhabitants, especially during the 20th century. After an intensive exploitation of these resources, especially during the socialist period, the process of restructuring the mining industry began in 1997, having a negative impact on the population in this area.

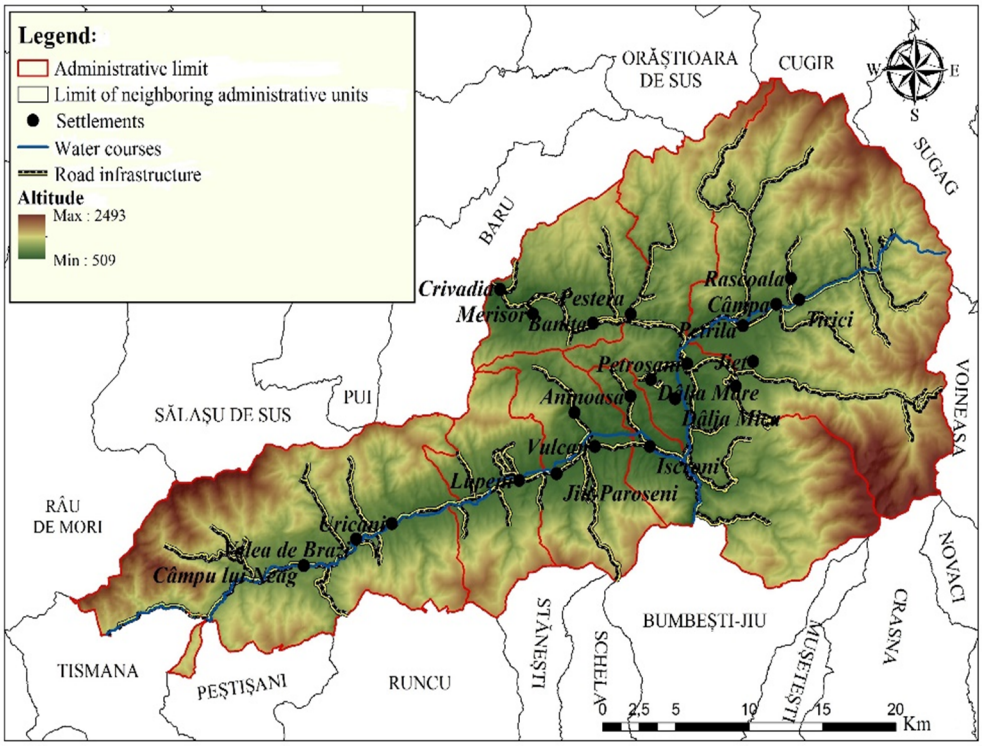

Fig. 1. The geographical location of Petroşani Basin and its settlements

3. THE DEMOGRAPHIC DECLINE OF THE SETTLEMENTS AS A RISK FACTOR IN PETROŞANI BASIN

The first documents that attest the existence of certain settlements in the basin date from 1462 (Vulcan), 1493 (Câmpu lui Neag) (Suciu, 1967, 1968), as well as from 1499, when Petrila, Maleia (a hamlet of Petroşani), Rotunda, Morişoara and again Câmpu lui Neag are mentioned as "places for grasslands, hay fields and crops" (Tufescu, 1964, p. 37, Badea *et al*, 1987). Among them, Rotunda and Morişoara disappeared as settlements but are preserved as place names (Cândea, 1996). During the 14th and 15th centuries, Petroşani Basin was not well inhabited, functioning more like an economic appendix of Haţeg Basin (Gruescu, 1972, Cândea, 1996). However, as Conea shows (cited by Badea, 1971), there was a much older population in the basin, whose existence was favoured by the safeguarding position, on one hand, and the fast and secure connections

between the basin and the surrounding mountains and the areas South of the Carpathians, on the other hand. For the next two centuries, the basin remains relatively low populated, as in the first half of the 18th century (1733) there were only 405 inhabitants (Tufescu, 1964). However, since the middle of the 18th century, the *pastoral stage of habitation* has begun and led to the numerical increase of population and the emergence of new settlements due to the arrival of incomers from over the mountains, from Haţeg Basin, Sibiu mountain area and other parts (Tufescu, 1964). They founded new settlements as free colonists (Alexandrescu, 1995, Badea *et al*, 1987): Lupeni, Petroşani, Livezeni, Paroşeni, Bărbătenii de Sus, Uricani. Therefore, the population of the region numbered 976 inhabitants in 1750 but at the beginning of the 19th century (1818) it reached 2,250 inhabitants (Badea *et al*., 1987, Tufescu, 1964). The 1850 census shows a population of more than 7,800 inhabitants for Petroşani Basin, which means an increase of more than threefold in only 32 years.

In the second half of the 19th century, coal mining led to the economic development of the basin, which is reflected in the population increase. The first mines opened at Petrila and Dâlja - 1840, at Lonea in 1869, followed by Aninoasa (1890) and Lupeni (1892) (Badea, 1971). The need for labour force triggered the *second habitation stage, the mining one* (Tufescu, 1964). It is characterised by an accelerated increase of the number of inhabitants, as a result of the immigration of working people both from abroad (Cândea, 1996, Costache, 2010), and from other Romanian regions. The number of inhabitants increased by almost four times between 1850 and 1900, reaching 28,750 people, and it almost doubled during the next ten years, as the 1910 census recorded about 50,000 inhabitants.

Overall, during the 20th century the evolution of the population maintained its increasing trend. First, this happened because of the intense migratory flows, oriented towards the basin. Then, after 1948, there were the specific economic and demographic policies of the socialist state, which intensified very much the coal production (which generated migration) and stopped the abortions by decree no. 770 of 1966.

In 1930, the population of the basin numbered 66,753 inhabitants. However, in the next years, due to the 1929-1933 economic crisis and the start of World War II, some of the mines were closed down and the coal production stagnated. As a result, the number of inhabitants decreased by more than 15,000 people (Badea *et al*, 1987). After 1950, nevertheless, there was a substantial population increase, reaching 95,000 inhabitants in 1956 and more than 130,000 in 1966, so *a new stage of habitation was initiated* (Tufescu, 1964). The urbanization process also intensified: in 1948 there was only one town in the basin (Petroşani), but other three settlements were given the town status in 1956 (Petrila, Lupeni and Vulcan). For this reason, this new habitation stage

was called *the urban stage* (Alexandrescu, 1995). The numerical increase of population was mainly due to the positive migration balance, to which one should add the natural growth; for instance, between 1950 and 1960, more than 13,000 people settled in the basin, while in the next decade, 1960-1970, the number of new settlers increased to 54,000, as a consequence of economic development and diversification (Alexandrescu, 1995). However, after 1975, the migration balance became negative and the population increase was determined only by the natural growth (Badea *et al*, 1987).

Between the 1966 and 1977 censuses, the population numerical evolution remains positive, even if the increase of the number of inhabitants is low. The absolute growth for the entire period is 6,681 inhabitants, resulting a rate of increase by only 5.1% or an annual average rate of 0.51%. These low values are determined by the fact that many of the settlements in the basin, especially the rural ones, but also the villages belonging to the towns (also having a rural character), started to register a decrease in their population. This was probably due to the migration within the basin, but also due to demographic ageing. At the level of administrative units, only three out of seven registered an increase in the number of inhabitants: Petroșani (8.5%), Petrila (1.5%) and especially Vulcan (30.4%). The population decreased in the other administrative units, and the highest values were recorded in Aninoasa (-26.2%) and Băniţa (-20.8%).

Until 1992, the number of inhabitants continued to increase in the basin, even at a higher rate, by 23.5%, reaching at 168,853 inhabitants at the 1992 census. The highest increasing values were registered at Uricani (74.6%) and the city of Petroșani (about 29%), followed by the town of Vulcan (20.4%). However, at the same time, there was a decrease in the rural areas: Băniţa experienced a demographic decline as its number of inhabitants decreased by 12.4%. These variations may be also due to the intra-regional migrations, as the rural population moved to the urban centers, in this case especially those where industrial and mining activities intensified.

The situation changed radically after 1992. The social and economic changes in Romania were deeply felt in this area, which started to register a more and more accelerated demographic decline. The start of industrial restructuring triggered the process of population decrease in numbers. This meant a decrease by 20,000 people between 1992 and 2002 for the entire basin, which meant a negative rate of -12.3% or an average annual rate of -1.23%. All the administrative units recorded a decrease in the number of inhabitants. The smallest decrease was recorded this time in Băniţa commune, which had less industrial activities to be affected by restructuring. The urban centers of the region registered relatively similar values, ranging from -6.7%

at Lupeni and -20.3% at Uricani. At the level of each settlement, the situation was the following: out of the 22 settlements, only five experienced a positive trend in their demographic evolution. The highest value was recorded in Câmpa, a village belonging to the town of Petrila (23.6% or 147 people). The other settlements registered a higher or lower decrease in the number of inhabitants. The values ranged a lot from -0.1% at Iscroni (part of Aninoasa) to -38.0% at Valea de Brazi (part of Uricani), but they may be grouped in three classes: between 0 and -10% (Iscroni, Câmpu lui Neag, Lupeni, Jiu – Paroşeni), between -10,1% and -20% (most of them, 11 settlements, including Petroşani, Petrila, Dâlja Mare, Dâlja Mică, Vulcan, Aninoasa etc.) and below -20% (Uricani and Valea de Brazi) (fig. 2). In several administrative units, all the included settlements recorded a negative demographic evolution: in Petroşani, Aninoasa and Uricani.

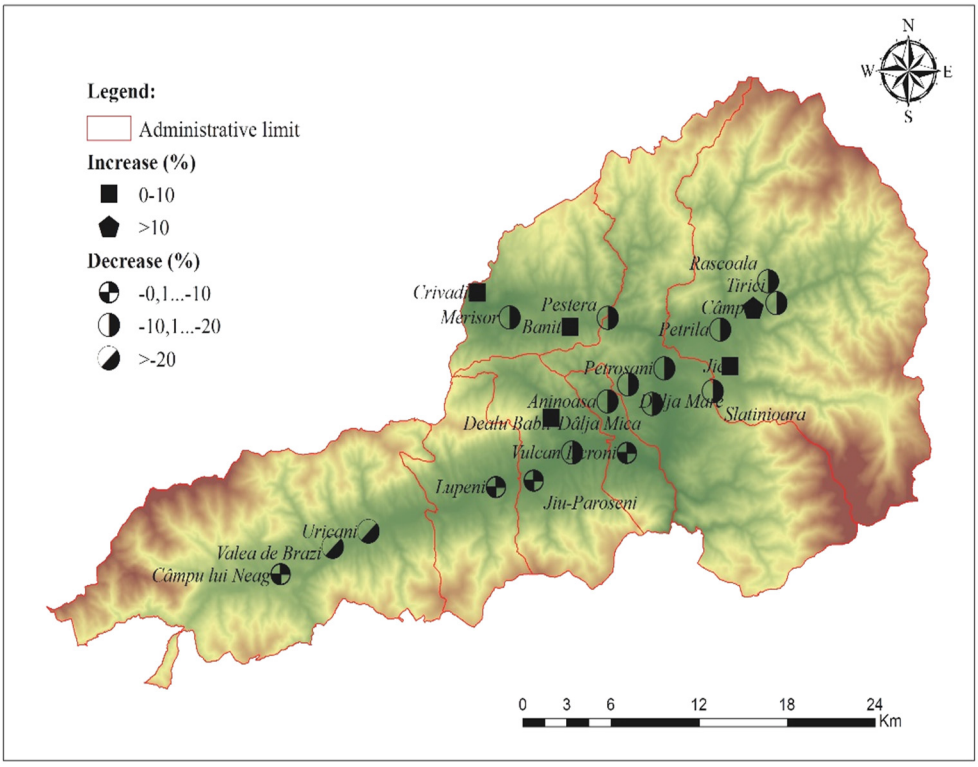

Fig. 2. The numerical evolution of population in Petroşani Basin between 1992 and 2002.

Although there are no precise data for each year in this period for all the settlements in the basin, one may state that the factors which laid at the basis for this reduction in the number of inhabitants are represented on one hand by the decrease in the birth rate and the increase of the mortality rate, and on the other hand by outmigration. The birth rate had a negative trend between 1990 and 2002, while the mortality rate increased, reflecting the similar evolution at national scale, as well as the socio-economic changes at local level (for instance, the migration of the labour force caused by restructuring in the field of mining affected mainly the young population, therefore influencing the population natural dynamics) (Costache, 2010). Two moments should be highlighted in the evolution of the natural growth: the liberalisation of abortion (lower values of the natural growth in 1991-1992) and the mining restructuring (which determined a new decrease of the natural growth rate between 1999 and 2002) (Costache, 2010). The migration rate remained positive in Petroşani Basin until 1997, when the restructuring of mining activities began. After 1997, the migration values became negative. This fact is explained by the remigration of those who remained unemployed to their original (native) regions, as well as the possibility for migration in search for a place to work in Romania or abroad (Costache, 2010).

The demographic decline highlighted for the 1992-2002 period continued even at a higher pace between 2002 and 2011. For the entire basin, the number of inhabitants decreased by about 26,000 people, so there was an even higher rate of decrease compared to the previous period, -17.7%, or an average annual rate of almost -2%. Again, all the administrative units recorded a decrease in the number of inhabitants, which is (with one exception, that of the town of Uricani) deeper than in the previous period. The highest decreasing values were recorded in the cities of Lupeni (-23.7%), Vulcan (-18.8%) and Petroşani (-17.8%), but all the administrative units recorded values below -10%. The analysis was also made at the level of the 22 settlements. It came out that, compared to the previous period, only three settlements recorded a relatively important increase in the number of inhabitants: Câmpa (Petrila) 37.6%, Peştera (Petroşani) 25.5% and Jieţ (Petrila) 7.3%. The other 19 settlements continued their demographic decline. The values ranged between 0 and -10% (5 settlements, such as Valea de Brazi, Dâlja Mare, Dâlja Mică etc.) to below -20% (Răscoala -21%, Dealu Babii -22.2%, Lupeni -23.7%) and even below -50% (Slătinioara -51.2%). It came out that most of the settlements recorded values of the decrease rate between -10% and -20% - 10 settlements, including the urban centres Vulcan -19.0%, Petroşani -17.8%, Aninoasa -14.6%, Petrila -14.4% and Uricani -12.4% as well as the rural settlements and the villages that are part of urban administrative units (fig. 3).

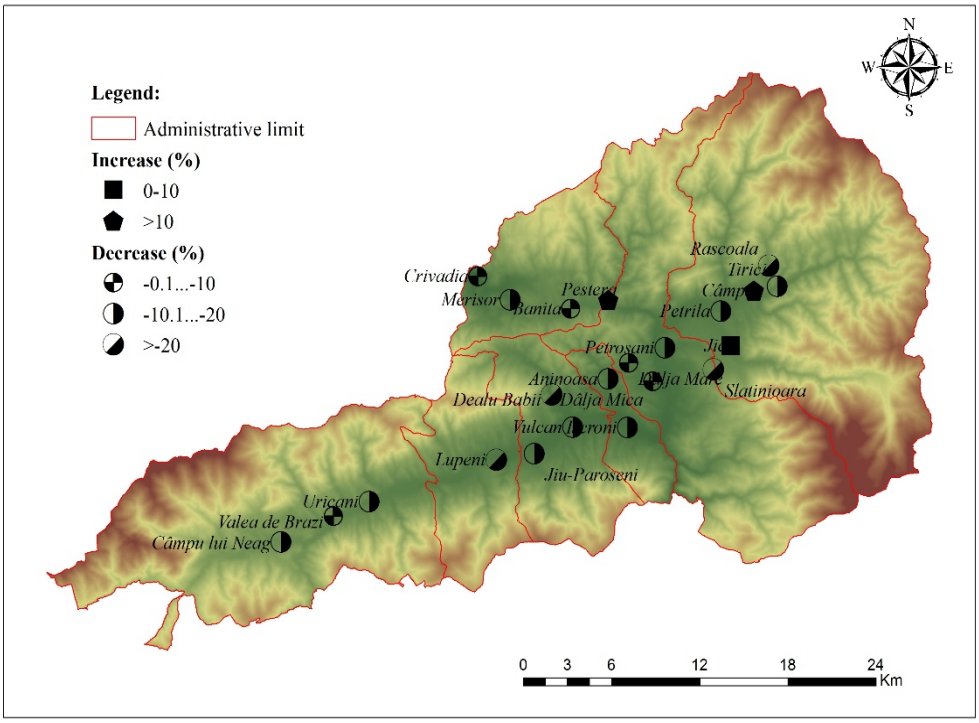

Fig. 3. The numerical evolution of population in Petroşani Basin between 2002 and 2011.

4. CONCLUSION

This study represents an attempt to highlight one of the demographic risks frequently recorded in Romania after 1990: the demographic decline of the settlements, which may ultimately lead to the depopulation of larger or smaller areas. The analysed territory is Petroşani Basin, a well-defined natural region at Romanian level, but also a region that has distinctive economic features due to the presence of mining activities for almost a century and a half. If the region was rather weakly populated in the past (until the middle of the 19th century), the opening of the first mines and the expansion of coal mining triggered a high increase in population, especially in the urban centres.

At the level of the entire basin, one notices that between 1966 and 1992 there is a difference in terms of population change between the urban centers, characterized by a demographic increase, and the villages belonging to the urban administrative units, which experienced a demographic decline, as a

result of demographic ageing and outmigration. However, for the period between 1992 and 2011, this difference is no longer valid. As shown, after 1992, the change of the political system and the transition to the market economy led to a decrease in the number of inhabitants in all the mining urban centres of the region. The reasons for this general demographic decline are tightly linked to the economic evolution of these settlements: the restructuring of the industrial and mining activities generated high values of unemployment, a decrease of the living standards and intense outmigration. These specific causes may be added to others, met also in other parts of Romania, such as the decrease of the birth rate and the increase of the mortality rate, a consequence of demographic ageing.

Petroşani Basin, unlike other Romanian mining regions (such as the Land of Moți), is not threatened by depopulation. However, the demographic decline registered during the last decades may be considered as a risk factor. The risks are linked first of all to the continuation of the outmigration process and the acceleration of demographic ageing, as well as to the changes in the socio-economic structure, because those who choose to leave the settlements of the basin, especially the urban centres, are the young people and the adults.

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