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GEODEMOGRAPHIC RISKS WITHIN THE APUSENI MOUNTAINS

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ABSTRACT. – Geodemographic Risks within the Apuseni Mountains. The territorial system of the Apuseni Mountains can be considered a critical region from a geodemographic viewpoint. At present, the system is characterised by severe geodemographic risks, which are due to two major processes, namely significant output of population who chooses to exit the system (massive emigration, mainly young and adult age groups) and high decrease in birth rate, due to emigration. These processes determine the main geodemographic risks in the area namely, on one hand, depopulation and *the geodemographic decline of the settlements* and, on the other, *the population ageing* process. The first of these two phenomena is studied within the Land of Moţi through an analysis done on two elements: population evolution between 1992 and 2011 and the geodemographic size of the settlements. The results show a decrease in the number of inhabitants in all the studied territorial-administrative units and in the majority of the settlements which make up these units. Meanwhile, there is an increase in the number of small villages (with less than 200 inhabitants) and especially of those with less than 50 inhabitants. Some of these are under risk of disappearing in the near future, if this downward trend will continue.

Keywords: *geodemographic risk, emigration, depopulation, geodemographic decline, geodemographic potential.*

1. INTRODUCTION

The concept of *demographic risk* (as demographers call it) or *geodemographic risk* (as geographers call it) seems rather ambiguous and more difficult to define in comparison with the concept of *natural risk*. Starting from the present meanings of the concept of risk, T. Rotariu (2004) highlights that the initial sense — to be found in the dictionaries and that has a limited significance as it refers mainly to 'any human action which can harm its producer' (2004: 173) — is broader in everyday speech and in the scientific milieus. In the latter the term is not referring to a certain action but to a series of 'undefined actions and behaviours, which are difficult to be described and define in detail' (T. Rotariu, 2004: 174). The author considers that in both cases the concept of risk refers to the negative consequence a certain action or behaviour, of a person or of a group of people, might have. Therefore the above-mentioned author is of the opinion one can talk about demographic risk only if a process or phenomenon affecting the population has the type of consequences that can be considered 'dangerous', 'perilous', 'risky' for that

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population. But how can a consequence be labelled as dangerous, perilous, or risky? The author says one should find some objective and universal criteria based on which possible demographic evolutions might be assessed in their negative or positive consequences upon the society. As such criteria lack, T. Rotariu considers that there are two cases in which a consequence can be perceived as a risk for the population. These are: a) processes — significant in their dimension — which if prolonged in time can put in jeopardy the population's life; b) demographic processes and phenomena with consequences negatively affecting other areas of social life (where we can apply the above-mentioned labels of risk), for example economy (if a certain category of population emigrates, economy may be affected in a negative way). Considering all of the above, T. Rotariu (2004) enumerates and analyses three of the demographic risks which are frequently taken into account and mentioned in scientific papers or even in political discourses, namely the risk of over-population, the risk of sub-fertility and the risk of demographic ageing.

V. Surd (2001: 184) defines demographic risk as 'an extreme social process (phenomenon), dangerous for man and society at large'. The consequences of the demographic risks are not only economy and socially-related but, in extreme cases, they can be represented by the number of victims — as in the case of natural risks (V. Surd, 2001).

As there is the threat of over-population, V. Surd *et al.* (2007) also considers another risk — that of under-population — at least in the case of some territorial units, delineated on physical or political and administrative criteria. V. Surd (2001) adds on the list of demographic risks affecting a nation: the crime rate, the divorce rate, the unemployment rate, the rate of workplace accidents, the rate of workplace conflicts, infant mortality (an indicator which is very sensitive in showing indirectly the level of economic development), as well as the risk of feminisation (the latter referring strictly to the area of the Apuseni Mountains).

J. Benedek and E. Schulz (2003) associate the demographic risks to demographic transition and they perceive the following risks: the pronounced increase in population in less-developed countries; a pronounced increase in the young population share in less-developed countries and the process of demographic ageing, which mainly affects developed countries. The latter are also affected by another risk, namely by a process of medium and long-term decrease in population. This is due to a growing decrease in fertility, following the economic and social-cultural changes in those societies.

J. Benedek (2002) is of the opinion that demographic risks are also generated by massive and selective emigration (affecting the young and highly-educated segment of the population) in certain areas. This will lead to a negative change in the geodemographic structures and to a deterioration of public infrastructure and services, following the lowering of the demand threshold. Therefore there appears a tendency to functional mono-structuring, as these areas affected by emigration become predominantly agrarian or, at the most, spare land (J. Benedek, 2002).

T. Rotariu (2004) considers that talking about demographic risks means talking about probabilities. This means it is not enough to realize the consequences of the actions and behaviours and to issue value judgements upon them (if they are positive or negative); instead one should assess the probability of these consequences to be produced.

Integrating the concept of demographic risk in a pragmatic context applied to determined areas, Surd et al. (2007: 75) defines it as 'the incapacity of some numerically fluctuating communities of exploiting efficiently (in order to be self-sufficient) the area they control and which belongs to them. All in all they become supported and/or dependent communities. The direct, evident and quantifiable consequence of this lies in the rapid and massive migration of exodus type.' This will lead to the depopulation of the area and its geodemographic decline.

Such a process started in the Apuseni Mountains even from the second half of the 20th century and it consisted mainly in emigration. The other component of the geodemographic decline — the decrease in the fertility rate (sub-fertility) — was not active from the start; on the contrary, the geodemographic balance was re-established due to a higher rate of female fertility, if compared to the nearby territorial units (Mureş-Arieş river corridor, the Western Plain) (V. Surd *et al*, 2007). Only starting with the '80s and especially after the '90s the growth rate become negative and, along with emigration, it contributes to the geodemographic decline in the Apuseni Mountains.

The Apuseni Mountains can be perceived as a region experiencing a crisis, from a geodemographic viewpoint, as there are severe geodemographic risks. These result from two major processes: significant population output (massive emigration, affecting mainly young and adult population) and a dramatically reduction in birth rate, also as a consequence of emigration. These processes generate the main geodemographic risks in the Apuseni Mountains namely, on one hand, depopulation and ***the geodemographic decline of settlements*** and, on the other, a ***process of demographic ageing***.

These phenomena need to be carefully analysed, both overall and in detail — by analysing small territorial units which can make up patterns of evolution for the studied phenomena.

The area considered in the present paper and advanced as a pattern of geodemographic evolution, as reflecting the decline of population, focuses on the Land of Moţi as it was defined in the study *Ţara Moţilor. Studiu de geografie regională – The Land of Moţi. Study of Regional Geography* (C. N. Boţan, 2010). The Land of Moţi is defined based on geographical, economic, ethnographic, social, historical, mindset-related elements and occupies the central part of the Apuseni Mountains, namely the upstream area of Arieş River, being roughly delineated by the high ridges around it. It is altogether included in Alba County. The region includes two towns (Abrud and Câmpeni), the settlements which are part of them, and 14 communes with their belonging villages.

2. THE RISK OF DEPOPULATION. THE GEODEMOGRAPHIC DECLINE OF SETTLEMENTS

The Apuseni Mountains have registered an almost continuous increase in population until the mid 20th century (the 1941 Census marks the demographic peak in the region). Some areas even had population in excess and therefore some inhabitants migrated towards regions which registered a geodemographic deficit (Banat area, the Western Plain etc.) or to industrial towns (thus ensuring the workforce needed there) or even to other continents (U.S.A.) (I. Plăiaş, 1994, I. Bolovan, 1998, quoted by Magdalena

Drăgan, 2011). Nevertheless starting with the period 1940–1950, population started to diminish almost without a stop. The phenomenon intensified starting with the 1966 census and continued after 1990. Consequently in 2010 the population in the Apuseni Mountains counted three quarters less than the population in the 1956 census. The population loss during the period 1956–2010 was 28.7% (Magdalena Drăgan, 2011). Depopulation affects the entire mountainous area, rural areas being mostly affected and, out of these, the very small ones (some of them located up high in the mountains) counting under 50 inhabitants or even less. These are under risk of disappearing in the near future.

The population decrease was mainly due to *emigration*, at least until the '80s. Even starting from the beginning of the 20th century, the migration rate has been negative in the mountainous area. This has always been exceeded by the positive growth rate until the '50s, thus ensuring an increase in the number of inhabitants. During the period 1966–1980 the phenomenon of emigration (affecting the people living in the mountains) increased as living became more difficult in the area. The productivity potential of the land is low, the climate is harsher and therefore agriculture has less favourable conditions. Emigration was also stimulated by the lack of public facilities and transport infrastructure. The pull factor was represented by the forced process of industrialisation in towns (located in the region or those at the periphery of the mountains) and by the process of collectivisation, which affected the depressions located on the fringe of the mountains (Magdalena Drăgan, 2011). Starting with 1980, and more after 1990, *the growth rate* has been negative and, along with the migratory rate, determined a continuous and obvious decrease in the number of inhabitants.

After the analyses made on the regional system of the Apuseni Mountains the conclusion was that the rhythm of the depopulation process is more intense in the high mountain area (over 800m in height), which is perceived by the young population as a hostile environment. Other areas characterised by intense depopulation are those where mining activities were affected by the industrial restructuring processes.

The Land of Moți, the area studied for this paper, is characterised by a geodemographic evolution similar to that of the Apuseni Mountains. Between 1850 and 1941 there was an increase in the number of inhabitants (with a short period of significant decrease during 1910–1920 due to the human losses in the First World War), while the 1941–2011 period is characterised by a continuous decrease in the number of inhabitants (C.N. Boţan, 2010). The evolution of the number of inhabitants varies in the urban areas as compared to the rural ones. Thus the two towns of the studied region experienced a positive geodemographic evolution until 1992 (with some fluctuations in the case of Abrud during 1850–1956); afterwards a negative trend followed in the context of a generalised economic decline. In rural areas the demographic decline started in 1941 (1941 Census) and has continued to this day (C.N. Boţan, 2010).

Depopulation within the mountainous area is analysed using two indicators: *the total number of inhabitants over time* and *the geodemographic size of the settlements*.

The analysis of ***the total number of inhabitants*** at territorial unit level focused on the period 1992–2011. Our aim was to highlight the tendencies which marked the last two decades and the present situation. We used the statistical data from the last three censuses (1992, 2002 and 2011).

The Land of Moţi registered 50,033 inhabitants at the 1992 Census; 31,101 (31.2%) of these lived in urban areas and the rest (68.8%), totalling 34,426 inhabitants, in rural areas. The region registered a decrease in population (by 9.3%) until 2002, reaching 45,376 inhabitants; 14,275 of these (31.5%) lived in urban areas and 31,101 (68.5%) in rural areas. As it can be seen, urban population rate increased slightly during this period (even though absolute figures show a decrease in population) emphasising a more severe geodemographic decline in the rural areas of the region. It is indeed true that the two types of areas (urban and rural) had different evolutions. Urban areas, represented by two towns, Abrud and Câmpeni, are characterised by 8.5% decrease in population number, slightly more pronounced in Câmpeni (9%) as compared to Abrud (7.9%), as the latter is still defined by its industrial activities.

Rural areas are characterised by 9.7% decrease between 1992 and 2002, yet some communes were affected more than others by the geodemographic decline. Thus four communes (out of 14) lost more than 15% of their total number of inhabitants: Vidra (-19.6%), Avram Iancu (-15.9%), Scărişoara (-15.4%) and Bucium (-15.3%). Other four communes registered reductions between -10.1% and -15% and five communes registered smaller declines (under -10%). Nevertheless, in 2002 Horea commune registered a positive evolution as its number of inhabitants increased, even if just by 1.5%.

There were 39,055 inhabitants in the Land of Moţi in 2011, marking a decrease (of about 14%) in the number of inhabitants as compared to 2002, more pronounced than in the previous period. The decrease in population was severe both in urban areas (13.9%) and in rural ones (14%). As compared to the 1992–2002 period, the more pronounced decrease in the urban areas was mainly due to the fact that Abrud town lost some of its inhabitants (-18.1%) once the mines closed down and people emigrated.

12,293 (31.5%) people lived in towns and 26,762 (68.5%) in the rural areas. As one can see, the shares are approximately the same as the ones in 2002, which emphasises a more pronounced decline in urban areas, as compared to the previous period. This can be explained by a more pronounced geodemographic decline in Abrud after 2006 and not by an attenuation of the geodemographic decline within rural areas.

When referring to territorial-administrative units, all communes and towns in the analysed area registered reductions in the number of inhabitants between the last two censuses (fig. 1). Câmpeni town lost 10.6% of its geodemographic potential registered in 2002. Both reductions (in the case of Abrud and in the case of Câmpeni town) are higher during 2002—2011 as compared to the previous period.

In rural areas the territorial-administrative units with mining activities experienced the greatest reductions in population once the mines were closed down and population emigrated. We can mention here Roşia Montană commune, which reduced the number of its inhabitants by more than a quarter (31.4%) out of the 2002 total. It is followed by Bucium commune, with 18.9% decrease. Sohodol commune lost a great deal, namely -17.1%. Other seven communes registered losses between -10% and -15%: Vidra -13.9%, Vadu Moţilor -13.5%, Poiana Vadului -12.7%, Ciuruleasa -12.5%, Avram Iancu -12.3%, Bistra -10.4% and Scărişoara -10.2% (some of these communes being located in the high mountainous area). The other communes (Horea, Arieşeni, Gârda de Sus, and Albac) registered smaller declines in the number of inhabitants, under 10%.

When comparing the two time intervals (1992–2002 and 2002–2011), one can notice that the number of inhabitants in the Land of Moţi did not have uniform and constant evolution.

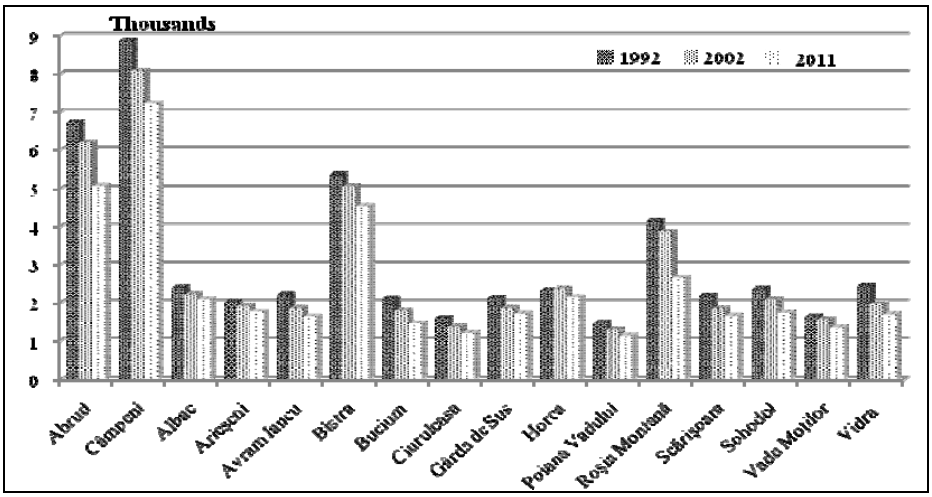

Fig. 1. Population evolution in the Land of Moţi between 1992 and 2011.

Some of the territorial-administrative units registered more pronounced reductions in the first period, due to the high numbers registered in emigration; afterwards the phenomenon reduced its intensity: Vidra (-19.6% during 1992–2002 as compared to -13.9% during 2002–2011); Scărişoara (-15.4% in the first period and -10.2% in the second). On the contrary, other communes experienced a pronounced decline after 2002, related in part to the industrial activities and their decline: Roşia Montană (-31.4% during 2002–2011 as compared to -6.6% during 1992–2002), Bucium (-18.9% as compared to -15.3%), Vadu Moţilor (-13.5% as compared to -4.7%), Sohodol (-17.1% in 2002–2011 as compared to -12.1% in the previous period); not to talk about Horea commune, characterised by positive figures in the first period and then by negative ones (1.5% in 1992–2002 and -9.6% during 2002–2011). Overall the process of reduction in population number was more pronounced after 2002, as we have already stated.

If we focus on the period 1992–2011 — the entire period analysed — and the whole region, we can conclude the following (table 1):

- all the analysed territorial-administrative units experienced a reduction in the number of inhabitants; the Land of Moţi as a whole registered a decline by 21.9% (from 50,033 inhabitants in 1992 to 39,055 in 2011); the decrease was pronounced both in urban areas (-21.2%) and in the rural ones (-22.3%);
- the high decrease in urban areas was mainly due to the fact that Abrud town lost a significant number of inhabitants (-24.5%) following the restructuring of industrial activities;
- there are six communes in the rural areas which registered a decrease by more than a quarter in population numbers as compared to the 1992–2002 period (fig. 2);
- the most pronounced decrease was registered by Roşia Montană (-35.9%) and Bucium (-31.3%) following the closing of the mines and the massive layoffs. Other four communes follow, with shares lower than -25%: Vidra (-30.8%), Sohodol (-27.1%), Avram Iancu (-26.2%) and Ciuruleasa (-25.1%);

- the smallest decrease was registered in the communes which lie in the northern part of the Land of Moți, as they have tourism potential; thus tourism activities have kept the population at work in the area: Horea (-8.3%), Arieșeni (-12.5%), Albac (-13.1%) and even Bistra (-15.3%).

Table 1

Population evolution in the Land of Moți during the period 1992–2011

No.	Settlement / Year	1992	2002	2011	Decrease in 1992–2011
1	Abrud	6729	6195	5072	24.6
2	Câmpeni	8878	8080	7221	18.7
	Urban areas	**15607**	**14275**	**12293**	**21.2**
3	Albac	2403	2220	2089	13.1
4	Arieșeni	2017	1921	1765	12.5
5	Avram Iancu	2217	1865	1636	26.2
6	Bistra	5361	5066	4540	15.3
7	Bucium	2115	1792	1454	31.3
8	Ciuruleasa	1599	1368	1197	25.1
9	Gârda de Sus	2130	1865	1714	19.5
10	Horea	2336	2371	2143	8.3
11	Poiana Vadului	1466	1304	1139	22.3
12	Roșia Montană	4146	3872	2656	35.9
13	Scărișoara	2187	1850	1661	24.1
14	Sohodol	2371	2085	1729	27.1
15	Vadu Moților	1634	1558	1348	17.5
16	Vidra	2444	1964	1691	30.8
	Rural areas	**34426**	**31101**	**26762**	**22.3**
	Total	**50033**	**45376**	**39055**	**21.9**

The analysis went further to examine individual settlements in order to have certain geodemographic features in detail. We focused on two years, 1992 and 2011, by considering the data from the 1992 census and the 2011 census, respectively. We analysed urban and rural settlements separately (296 settlements are part of the rural areas, while 26 belong to urban areas, totalling 322 settlements).

When we consider the two towns and the belonging settlements, we can conclude that there were both moderate decreases in the number of inhabitants (no more than 30% in 10 settlements) and more pronounced reductions (30-50% for 13 settlements), while three villages belonging to Câmpeni town registered even a slight increase in the number of inhabitants.

When we consider the 296 rural settlements, most of them (93%, 275 settlements) registered a decrease in the number of inhabitants. Only two settlements stagnated (their increase was 0%) and 19 settlements (6.4%) registered an increase in the number of population. The interval of decrease is very large, yet the major part of the settlements experienced a moderate decrease. Thus, approximately half of the villages (135, or 49%) registered a reduction between 0 and -30%; 88 villages (32%) registered reductions between -30 and -50%, while 52 settlements (19%) registered the most pronounced reductions: between -50 and -100%. In the case of three settlements the losses were 100% between 1992 and 2011: Medrești (Sohodol commune) lost its 6 inhabitants from 1992; the village of Bordeștii Poieni (Vidra commune) had 12 inhabitants in 1992 and none in 2011 and Poieni village (Vidra commune) is registered with no population at all even since the 2002 Census, losing its previous 15 inhabitants. Other examples of pronounced reduction in

the number of inhabitants are: Joldișești (Sohodol commune) counts only 11% out of the 1992 population (there were 18 inhabitants in 1992 and 2 in 2011); Bunta village (Roșia Montană commune) with 14.6% (it decreased from 41 to 6 inhabitants); in Corna village (Roșia Montană commune) the population in 2012 represented slightly less than 40% of the total number of inhabitants in 1992 (the number decreased from 358 to 138 inhabitants); in the village of Roșia Montană (Roșia Montană commune) the population in 2011 represented less than half of the population in 1992, namely 39.7% (from 1,556 inhabitants in 1992 to 618 in 2011) etc.

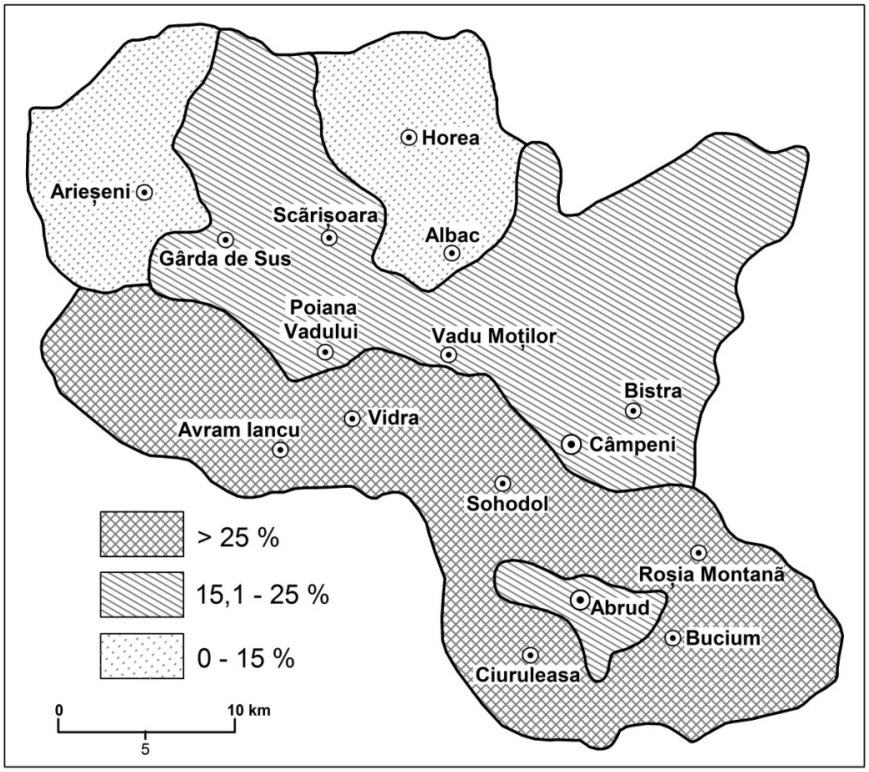

Fig. 2. Population evolution in the Land of Moți during the period 1992–2011.

Depopulation and the geodemographic decline of the settlements have unfavourable consequences also on their geodemographic potential. The decline is emphasised by the growing number of very small villages. The Apuseni Mountains are characterised by many villages with a small ***number of inhabitants***; there are many very small villages, with less than 200 inhabitants; the major part of the villages have less than 50 inhabitants; the number of villages with few inhabitants grows proportionally to altitude. If we focus on the Land of Moți, in 2011 there were 275 rural settlements (almost 93%), out of a total of 296, with less than 200 inhabitants. The following cases are relevant in this sense: all 30

villages of Bucium commune count less than 200 inhabitants and all 39 villages included in Vidra commune are very small villages. Moreover, out of the 275 very small villages, almost half of them (45%, 133 settlements) count less than 50 inhabitants; 18 villages, out of the 30 villages part of Bucium commune, count less than 50 inhabitants; 23 villages, out of the 39 of Vidra, count less than 50 inhabitants and two of them have no inhabitants at all; in Avram Iancu commune 32 villages, out of the total 33, count under 200 inhabitants and 24 count under 50 inhabitants. The settlements with less than 50 inhabitants form a category of settlements under the most significant demographic risk, as they are affected the most by geodemographic ageing, following the emigration of the young and adult population. Therefore these settlements are the most vulnerable and under threat of disappearing — their disappearance is sure to happen in the future (P. Cocean, 2004, C. N. Boţan, 2008).

We want to emphasise the fact that the number of these very small villages grew in time, during two decades, between the two censuses of 1992 and 2011, respectively. In 1992 there were 296 rural settlements and 261 (88%) were very small villages; they totalled 275 (93%) in 2011. If we focus on villages with less than 50 inhabitants, their number grew from 84 (28%) in 1992 to 133 (45%) in 2011.

The Land of Moţi is not the only area experiencing such reductions in the number of inhabitants as other settlements in the Apuseni Mountains are in the same situation: Mogoş commune (Alba County) has 17 villages (out of the total 21) with less than 50 inhabitants; Ceru-Băcăinţi commune (Alba County) has 9 villages (out of 10) with less than 50 inhabitants and Râmeţ commune (Alba County) has 9 settlements (out of 13) with less than 50 inhabitants.

All of the above show the critical state the regional system of the Apuseni Mountains is at in geodemographic terms. In the near future the risk for this area of the Apuseni Mountains is to have rural settlements with no population at all.

3. CONCLUSIONS

Depopulation and the geodemographic decline in the Apuseni Mountains augmented in the last 20 years. Even though the present study presents only a pattern of geodemographic evolution, which characterises the Land of Moţi, it emphasises certain geodemographic features and it shows the trend of the whole territorial system. The tendency after 1992 has been a continuous decrease in the number of inhabitants and it was more than half a century ago that this trend started. The population decline increased after 2002, as it was amplified by the restructuring processes within the mining activities. These affected many rural and urban settlements (Abrud town, Roşia Montană and Bucium communes). The communes which are made up of many very small villages were much affected as they do not have a minimum of public facilities and because of adverse climatic conditions they lost the major part of their inhabitants (Vidra and Avram Iancu communes).

These centrifugal geodemographical tendencies must be integrated within the general transitional period, they must be linked to the closing up of the mines and the end of industrial activities within the Apuseni Mountains. All these determined high unemployment rates, a decrease in income and therefore in living standards.

At present, the geodemographical decline is the one factor which has the highest negative effect on the functionality of the whole territorial system of the Apuseni Mountains (C. N. Boţan, 2010).

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