

# Critical Aspects Regarding the Viability of Settlements in the Târnave Regional System

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HADRIAN-V. CONȚIU, ANDREEA CONȚIU

## 1. Introduction and Theoretical Background

**H**ISTORICAL, ARCHAEOLOGICAL, economic, sociological, ethnographic, anthropological and linguistic research, focusing on the Târnave regional system, has highlighted the continuous character of human habitation since ancient times and the liveliness of the Romanian population, on the basis of numerous arguments of historical, archaeological, philological and ethnographic nature.<sup>1</sup> On the other hand, the human settlements in this territorial system have experienced throughout history demographic, economic, cultural or spatial oscillations of varying magnitudes, beyond the unambiguous reality of their continuity. As a mental space, the village constitutes society's development matrix, fulfilling, over the centuries, the role of an axiological vector, a supplier of demographic "freshness," but also of the specificity of language and kin; its imbalances cause serious disturbances to the entire analyzed territorial system, as a consequence of the new globalizing and leveling context, not only from a numerical perspective, but also from the point of view of specificity (loss of traditions and customs).

The geodemographic potential of a settlement describes the parameters of its expression in a specific socio-economic and political context, and the individual is called upon to confer economic value to space, respecting the principle of sustainability. However, the smaller human communities, with serious imbalances between the major age groups and with an obvious ageing trend, face the imminent risk of disappearance, without having the chance to naturally restore the demographic deficit. This raises the question of the viability of these settlements and the question of whether capital infusion (human, financial or technical) is necessary or unjustified and inefficient.

Both the international and the Romanian scientific literature include a wide range of studies in the field of geodemographic structures. The studies include, among others, reviews of geodemographic imbalances in the wide context of geodemographic risk (P. Cocean,<sup>2</sup> J. Benedek,<sup>3</sup> I.-A. Pop,<sup>4</sup> T. Rotariu,<sup>5</sup> G. P. Pop and V. Bodocan,<sup>6</sup> L. Nicoară,<sup>7</sup> V. Surd, V. Zotic, V. Puiu and C. Moldovan,<sup>8</sup> G.-A. Mureșan and C. N. Boțan,<sup>9</sup> D. R. Philips, M. W. Rosenberg and A. E. Joseph<sup>10</sup> etc.), as well as factors that drive pop-

ulation decrease and the alteration of rural areas (J. Benedek and I. Török<sup>11</sup>, V. Zotic<sup>12</sup>, A. Karcagi Kováts and J. Katona Kovács<sup>13</sup>, N. Collins-Kreiner<sup>14</sup>, F. van der Schoot<sup>15</sup>, T. Kawashima and P. Korcelli<sup>16</sup> etc.). At the same time, the issues related to the viability of the population areas in Transylvania<sup>17</sup> and particularly in the Târnave regional system<sup>18</sup> did not benefit from extensive research, justifying the need for the current study. It becomes imperatively necessary for the local and regional authorities to implement a number of population regeneration programs for the vulnerable areas, following the latest global and European research that shows that in recent years Romania has had one of the highest rates of population decline. More than 1% of the Romanian villages have disappeared in the past 300 years and it is predicted that this percentage will double in the next decade. The population of the country is expected to drop by 22.1% until 2050.<sup>19</sup>

## 2. Methodology

**T**HE CHOSEN method was the comparative analysis, and the population was structured into three age groups, as follows: young people (0–14 years), adults (15–64 years) and elderly people (over 65 years), while adapting the formulas of various indicators to this distribution. Particular attention was paid to the calculation and analysis of the demographic ageing index distribution in the context of the decreasing trend of the population in the regional system, the share of “young” and “elderly” age groups, illustrated by the age pyramids of settlements and communes with a certain degree of risk from the point of view of viability, highlighting the magnitude of geodemographic risks and the vulnerability of the regional system.

## 3. Results and Discussion

### 3.1. The Age and Continuity of Human Settlements in the Târnave Regional System

**T**HERE ARE numerous archaeological discoveries in the Târnave regional system, which indicate the age and continuity of the population in this area, the region being inhabited since the Paleolithic (the discovery of a carved stone axe at Curciu, near Dumbrăveni,<sup>20</sup> the identification of some fragments of processed flint from the Upper Paleolithic at Hașag, Loameș village,<sup>21</sup> etc.). From the Neolithic there are traces of cultures such as *Petrești* (pottery painted in different colors; it covered almost the entire Transylvania, at Șeica Mică, Boarta—Șeica Mare commune, Păuca, Ghirbom, Bernadea, Mihalt, Obreja, Târnava etc.), Bodrogkeresztúr (Bernadea), Tiszapolgár-Românești (culture with unpainted ceramics, Mugeni).<sup>22</sup> From the Bronze Age there are numerous proofs of the existence of people who began to process metals: Coțofeni culture, at Boarta, Mugeni, Straja, Slimnic, etc.; the Wietenberg culture (named after the “settlement on Wietenberg Hill”—also called “Turkish Hill”—on the banks of the Târnava Mare River, near Sighișoara<sup>23</sup>),

at Şaeş, Sighișoara, Obreja, Bernadea, Sărățeni etc.; the Noua-Coslogeni cultural complex, at Blaj, Păucea, Sighișoara; bronze deposits and treasures at Sângeorgiu de Pădure, Biia etc.<sup>24</sup> The Iron Age is, as a rule, divided into two eras: Hallstatt and La Tène. There are numerous vestiges from the Hallstatt Era: fortified settlements (Mediaș), discoveries at Porumbenii Mari, Şona, Sângeorgiu de Pădure, the Mediaș settlement, the Mediaș group of fortified settlements (Mediaș, Şeica Mică, Şona), reinforced settlement (Sângeorgiu de Mureș), grooved pottery (Şona, Mediaș), Gáva culture (Mediaș), Basarabi culture (Chendu Mare).<sup>25</sup> La Tène Era abounds in archaeological finds: Dacian settlements and citadels at Sighișoara, Şeica Mică, Zetea (5<sup>th</sup>–1<sup>st</sup> century BC), fortifications at Şona (5<sup>th</sup>–4<sup>th</sup> centuries BC), Sărățeni, Cetatea de Baltă; Celtic discoveries (tombs at Mediaș and Cristuru Secuiesc, 6<sup>th</sup>–1<sup>st</sup> century BC; Celtic products at Mediaș, Brateiu; necropolises at Mediaș, Mugeni, Moşna, Dumbrăveni), settlements at Mediaș, Şeica Mică, Bogatu Român etc.

From the Geto-Dacian period, from the second half of the 2<sup>nd</sup> century BC until the beginning of the 2<sup>nd</sup> century AD, there are settlements (Bernadea, Bratei—*dava*—Ghindari, Firtuş), adornments (Şeica Mică, Mediaș), military settlements (Bernadea, Ghindari), settlements with military, economic, trade and craft production centers (Sighișoara).<sup>26</sup> After the Dacian-Roman wars, a part of Dacia was conquered, and numerous traces were found both in the rural and in the urban areas: a Roman fortress (Sărățeni, Inlăceni), a permanent auxiliary camp (Sighișoara—earthworks), a border fortress (Odorheiu Secuiesc), native Dacian settlements (Obreja, Slimnic, Boarta), Roman towers (Săcădat, Ocna de Sus, Firtuş), a villa rustica (Mugeni), warehouses for agricultural and craft tools (Obreja), cemeteries (Obreja) and Celtic elements (Sighișoara, Micăsasa), lead items ('frames for glass mirrors', Obreja), silver workshops, silver ornaments (Obreja), ceramics (Micăsasa; 26 kilns). The Romans were good road builders (for example, Vețca or Sărățeni on the Târnava Mică River, Şiclod). The Târnave rivers were also used for this purpose, via the Mureș River which passed by the town of Apulum. Regarding the age of the population, it is believed they were 35–36 years old, and life expectancy was 45 years.<sup>27</sup>

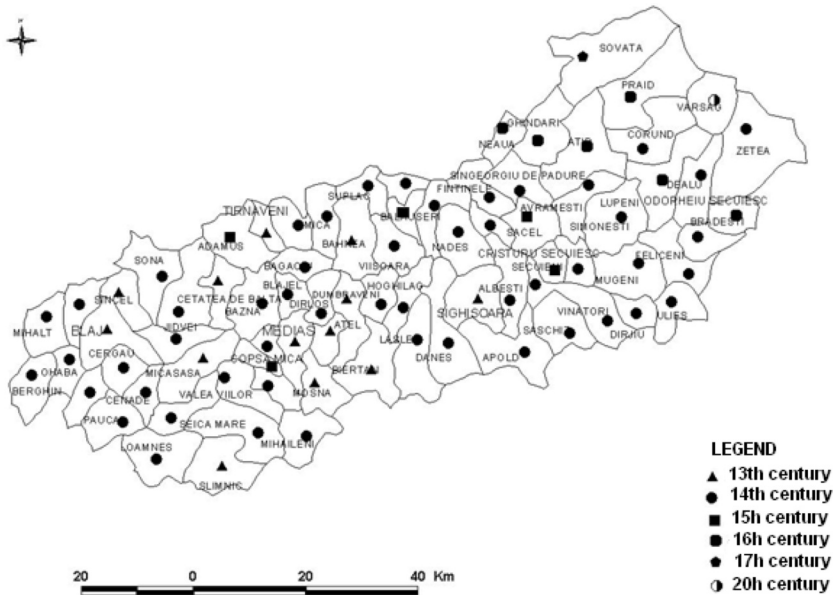
From the Romans to the end of the 1<sup>st</sup> millennium numerous traces of human settlements have been found. Thus, from the Roman Era we have fortifications (Odorheiu Secuiesc, Sărățeni), a fortress (Sighișoara), Dacian villages situated on the old settlement sites from the pre-Roman era (Slimnic, Şimonești), villages established in the Roman period (Obreja), autochthonous settlements (Mugeni); crafts were practiced at Micăsasa; coins were found at Berghin, Sighișoara, Crăciunel, Şeica Mică (5<sup>th</sup>–6<sup>th</sup> centuries), and from Feisa (near Blaj) we have a bronze button. In the 4<sup>th</sup>–6<sup>th</sup> centuries the population of villages grew and the towns were depopulated; some rural settlements continued to operate on the previous locations (for example, at Mugeni, Obreja, Ghirbom, Mugeni, Boarta, Mediaș); in the 4<sup>th</sup> century, rural settlements were set up at Bratei, Mediaș, and Laslea (there was a large cemetery at Bratei, and in Mediaș there was an incineration tomb). Traces of Daco-Roman Christianity from the pre-Aurelian era were found at Micăsasa and Biertan (bronze offering). Christian objects were also found in the vicinity of Cristuru Secuiesc and at Dumbrăveni, Feisa, Jidvei, and Sighișoara. After the Aurelian withdrawal, the free Dacians and the Carpians entered the former Roman territories (a grave or cemetery of the free Dacians settled on the Târnava Mare River was discovered). From the time of the barbarian migrations we have the Roman vestiges at Sighișoara and

Bratei; in the latter, agricultural tools from the 5<sup>th</sup> century were also found, and a Gepidian necropolis (inhumation cemetery). The post-Roman period is illustrated by the Daco-Roman settlement at Velt, and by Daco-Roman cemeteries and tombs at Târnăvioara (Copșa Mică) and Sighișoara. The urban settlements also had handicraft workshops that produced common objects, not “luxury or refined” items. From the Roman-Byzantine period, traces belonging to the Sântana de Mureș culture have been discovered at Rugănești, Luțița or Mugeni. Also, in the 5<sup>th</sup>–7<sup>th</sup> centuries, Bratei was a village of about 20–60 homes.<sup>28</sup>

In the studied region, the archaeological evidence proves the continuity of the natives between the years 900 and 1300, such as the Mediaș pre-feudal ceramics at Berghin, Boarta, Bratei, Mediaș, Șeica Mică or Târnavă.<sup>29</sup> During the Middle Ages society acquired a non-uniform character. In Transylvania, this was compounded by the heterogeneity of the populations that came into contact with the Romanians. In this context, the following territorial-administrative structures existed in the territory of interest: Târnavă County (with its center at Cetatea de Baltă, stretching south to the Târnavă Mare River, between Sighișoara and Blaj, and in the north, from Bălăușeri to Iernut; in the 12<sup>th</sup>–14<sup>th</sup> centuries there were 113 localities, the villages being known as *villa*, the fortresses as *castra* and the towns as *civitas*), the Odorhei Szekler seat (initially called Telegd, which was the most important of the seven Szekler seats), Szekler seats at Sighișoara (mentioned in documentaries between 1302 and 1349; in this century, the settlement had between 3,000 and 4,000 inhabitants) and later at Mediaș and Șeica Mică, as well as Romanian districts: “countries (*terrae*), knezates, voivodships and, later, zhupanates.”<sup>30</sup> In 1241 the Tatar invasion led to the destruction of some rural and urban settlements (Sighișoara and Mediaș were primary targets, suffering numerous damages). A quieter period followed (the feudal period from the 14<sup>th</sup> to the 15<sup>th</sup> centuries), with a quantitative and qualitative increase of the settlements, but, at the same time, with the disappearance of some, caused by the plague (1348–1349) or by departures from the region. With the departure of a certain part of the population, new localities appeared, with the same name as the locality of origin, accompanied by attributes such as Mare (great), Mic (little), Nou (new) (Ighișul Nou, Șeica Mare, Șeica Mică). The villages were named differently depending on certain factors: *villa* (village), *parva villa* (little village), *liberae villae* (free villages), *possesia* (domain), *praedium* (settlement), *terra* (land), *locus* (place). The village of the 14<sup>th</sup> century had 300–500 inhabitants, the peasants working in agriculture (plant cultivation and animal husbandry), but also with house and village crafts. The cities of the 15<sup>th</sup>–16<sup>th</sup> centuries developed under the shelter of their walls (with traces surviving in Sighișoara, Mediaș) due to historical constraints (peasant revolts, the Turkish threat). Peasant towns and fortified churches are specific to the landscape of the Târnavă regional system, being grouped around the stronger medieval fortifications: Mediaș (Axente Sever, Moșna), Sighișoara (Apold). In order to be a city, a settlement had to be a trade fair, to have administrative autonomy, economic and military privileges, and be surrounded by walls, its population being made up of craftsmen, traders and peasants fleeing from the feudal lands.<sup>31</sup>

The identification of the Dacian, Roman and pre-feudal traces of habitation, confirmed by the multitude of archaeological evidence discovered to date, is an indisputable argument for the continuity of the indigenous population over the millennia.

FIG. 1. THE TÂRNAVE REGIONAL SYSTEM: DOCUMENTARY ATTESTATION OF TOWNS AND COMMUNITY CENTERS



SOURCE: Andreea Conțiu, *Axele de gravitație regională ale Târnavelor* (Cluj-Napoca: Presa Universitară Clujeană, 2010), 152

However, the first documentary testimonies of the settlements date only from the 13<sup>th</sup> century, in the context of the political, administrative and religious organization of the Transylvanian area after the Western model of the second half of the 13<sup>th</sup> century, as well as due to the loss of historical documents. It should be specified that the date of the first documentary reference does not correspond with the age of the settlement, it only indicates the moment when it came under the system of legal-patrimonial relations. From the above we can clearly understand that most settlements were attested long after their formation (sometimes even after several centuries). The random nature of the records is also given by certain factors, such as the landforms, which often prevented the local authorities of that time from properly knowing the localities in the region (the isolation of the settlements).<sup>32</sup>

The data analysis (Fig. 1) shows that the first documented settlements in the Târnave regional system were three from Alba County: Cetatea de Baltă, Biia (both from 1202–1203) and Mănărade (1205). In this century (13<sup>th</sup>), 15.7% of all communes and towns were documented, usually located along the Târnave rivers, with a higher incidence on the Târnava Mare River (Sighișoara, 1280). Most settlements (66.3%, 55) were mentioned in the 14<sup>th</sup> century, given the increase in the number of documents still in existence. In the next century, only six (7.2%) communes and cities were registered, in the 16<sup>th</sup> century there were seven, and in the 17<sup>th</sup> and 20<sup>th</sup> centuries only one: Sovata (1602) and Vârșag (1907), among the easternmost localities of the region. The direction

of the process was from west to east and from the Târnave, along the tributaries, to the interior of the region.

At present, the Târnave regional system comprises a territory circumscribed by 4 counties, with 10 towns and 73 communes: Alba (one city and 13 communes), Harghita (2 towns and 18 communes), Mureș (4 towns and 22 communes) and Sibiu (3 cities and 20 communes). The considerable archaeological, historical, ethnographic, philological, cultural and habitat heritage supports the idea that the territory under consideration is one of the best examples of uninterrupted human habitation and activity.

### 3.2. Geodemographic Imbalances: Population Decrease and Ageing

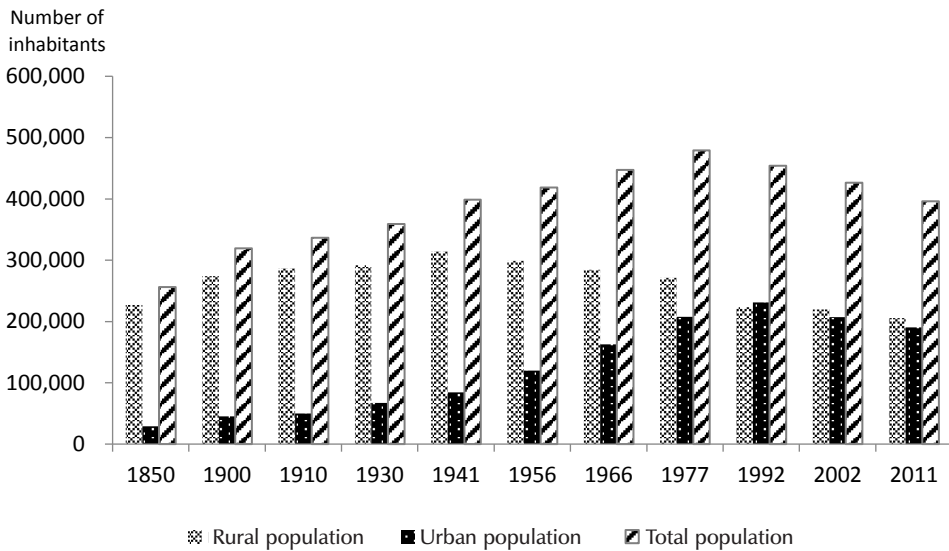
THE DEMOGRAPHIC features of a regional system, the natural dynamics of the population, the potential labor resources, the planning and the prognosis of its use, show a great level of dependence based on the structure of age groups, with the identified imbalances implying an increase in the regional system's vulnerability and an aggravation of geodemographic hazards: acceleration of ageing, feminization and population decrease, disfunctions regarding the viability of settlements, implicitly the disappearance of rural settlements or the increase in the number of deserted and / or endangered villages, socio-economic disfunctions. In the following part of the paper, the population decline in the studied region is highlighted, taking into account, as reference points, the population censuses of 1850, 1900, 1910, 1930, 1941, 1956, 1966, 1977, 1992, 2002 and 2011, particular attention being paid to the analysis of the demographic ageing index.

During the studied period, 1850–2011, population dynamics in the studied region (in the broader Transylvanian context and not only) was significantly influenced by several political/historical events: the establishment of Austro-Hungarian dualism, the two World Wars, the establishment of the communist regime, the prohibition of abortion (Decree 770 of 1966), family planning (after 1990), the free movement of persons outside the country, the removal of visas following the accession to the European Union, and so on.

It can be observed that *the total population* (Fig. 2) registered an increase (almost doubled) between 1850 (256,051 inhabitants) and the threshold year of 1977 (when it reached the maximum value of 479,027 inhabitants), followed by an accelerated decrease after 1992; after two decades, the population of the region reached the level registered at the end of the interwar period (395,947 inhabitants in 2011), due to the lifting of the abortion ban, very strong emigration (i.e., a large number of the German inhabitants left to Germany, their place being occupied mainly by the Roma population, which is the only one to show a significant natural increase), the decrease in the natural growth rate, and so on. In the case of the rural population, there are two periods with different geodemographic behavior: the period 1850-1941, when there was an increase in the rural population from 226,813 to 314,150 inhabitants, due to the high birth rate, justified by the need for helping hands in agriculture and then in industry, as well as the traditional society, and a slow decrease in the mortality rate due to the discoveries in medi-



FIG. 2. NUMERICAL EVOLUTION OF TOTAL, URBAN AND RURAL POPULATION  
IN THE TÂRNAVE REGIONAL SYSTEM (1850–2011)

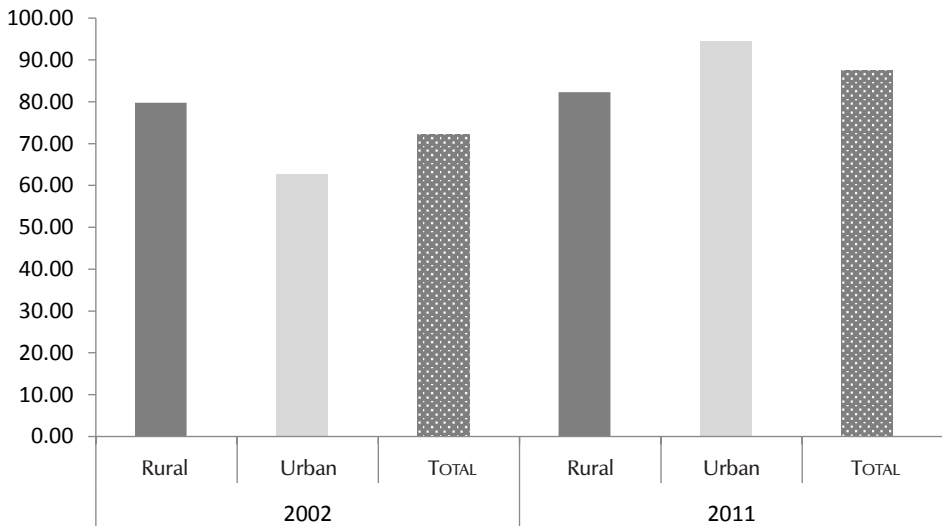


DATA SOURCES: Population censuses (1850–2011).<sup>33</sup>

cine and new drugs; the period 1941-2011, when the rural population decreased to 205,686 inhabitants in 2011 (with over 20,000 inhabitants less than 161 years ago) as a result of the rural exodus, caused by the emergence and development of the urban settlements, but also by the demographic ageing, negative natural growth and the intensification of emigration after 1990. A number of rural settlements have experienced dramatic decreases in the number of inhabitants; for example, Ghindari commune, Mureş County, decreased from 7,908 (1941) to 3,250 inhabitants (2011), Mugeni commune, Harghita County, from 7,749 (1941) to 3,491 (2011), Şeica Mare commune, from 7,053 (1941) to 4,470 (2011), Berghin commune, from 5,607 (1941) to 1,893 (2011), Ohaba, from 3,036 (1941) to 757 (2011), and Şona commune from 7,024 (1941) to 4,067 (2011), all three located in Alba County. The depopulation phenomenon is generally characteristic of the whole territorial system, but the most affected by it are the rural settlements, and especially the small ones, with less than 50 inhabitants, which face, in a not too distant future, the certainty of disappearance (most of the communes in the Alba and Harghita counties include villages in this situation). The urban population registered an increasing trend during 1850–1992, more pronounced in the second half of the 20<sup>th</sup> century, in the socio-economic and political context of the period (i.e. the rural exodus stimulated by the industrialization of the cities in the region or nearby, with a polarizing force), followed by a decrease (230,967 inhabitants in 1992 and 190,261 in 2011) due to industrial restructuring (closure of some non-performing or polluting industrial units), the reversal of urban-rural migration, negative natural growth, and so on.

The analysis of the geodemographic structures specific to the Târnave regional system comes to highlight the socio-economic, political, confessional, cultural, mentality changes etc. which have occurred in the Romanian space in general and in the studied territory, especially after the 1990s. In the literature, population ageing (fr. *vieillessement de la population*) is a geodemographic phenomenon that consists of a sustained increase in the share of elderly population in parallel with the decrease of the young, sometimes also of the adult, population, within the total number. The formula for calculating the homonymous index is obtained by comparing the elderly population (over 65 years) to the young one (0–14 years), and is expressed as a percentage (number of elderly persons per 100 young persons).<sup>34</sup> In this study, particular attention is paid to the analysis of the ageing index and the share of the young and elderly population in the Târnave regional system, taking into account, as reference points, the censuses of the population in 2002 and 2011 (Fig. 3).

FIG. 3. THE TÂRNAVE REGIONAL SYSTEM:  
DEMOGRAPHIC AGEING INDEX BY AVERAGE TYPES IN 2002 AND 2011



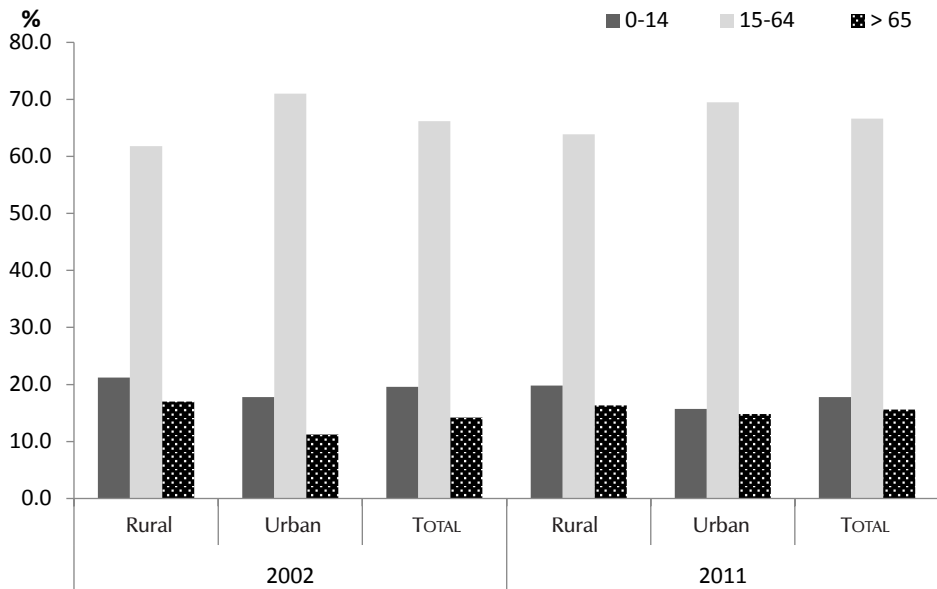
DATA SOURCE: Index calculated using data from the Population censuses of 2002 and 2011.<sup>35</sup>

Overall, in the Târnave regional system, between the last two population censuses, the ageing index registered an increase from 72.25 in 2002 to 87.46 in 2011, indicating the premise of a more pronounced geodemographic vulnerability at the level of territorial unit, the most critical area being the southwestern part. The average value of the demographic ageing index in the Târnave regional system for the period 2002–2011 is slightly below the national average, which was 79.8 in 2002 and 101.8 in 2011, given the increased number of Roma population, with high birth rates.

In the rural area of the studied region, over a decade (Fig. 4), there was a decrease in both the number and the share of the young population (below 14 years), from 21.2%



FIG. 4. THE TÂRNAVE REGIONAL SYSTEM: POPULATION STRUCTURE  
BY AGE AND AVERAGE IN 2002 AND 2011



DATA SOURCE: Population censuses from 2002 and 2011.<sup>37</sup>

in 2002 to 19.8% in 2011 (5,594 persons); also, the elderly group (over 65 years) declined slightly (both in number and share) from 17% in 2002 to 16.3% in 2011 (3,440 persons). Analyzing the evolution of the demographic aging index, there is an increase from 79.79 in 2002 to 82.31 in 2011. On the other hand, observing the situation at the beginning of the 20<sup>th</sup> century, it is obvious that the rural space was the main demographic factor sustaining births in the region (the proportion of the young population was 35.3% in 1910), a function that seems to have been lost today. The decline in the young population and the demographic ageing highlighted by the analyzed index (in 2011) is significant especially in the southwestern part of the Târnave regional system, which can be correlated with the pronounced demographic involution, characteristic to some administrative-territorial units such as Ohaba (the aging index has the highest value for the studied region—429.63), Berghin (199.23), Mihalț (180.76), Vețca (158.11), Dârjiu (153.67), Păuca (150.72), Micăsasa (136.25) etc. Looking ahead, we consider this problem/malfunctioning as extremely serious, and with inevitable consequences at demographic and socio-economic level, and not only.

A slightly different situation can be observed by analyzing the urban environment. Thus, within the total urban population of the Târnave regional system, the young population decreased (both in number and share) from 17.8% in 2002 to 15.7% in 2011 (7,017 persons); however, the elderly population increased from 11.2% in 2002 to 14.8% in 2011 (5054 persons), against the background of a very high ageing index of 94.47 (far exceeding the rural population; it was lower in 2002, at only 62.81). Among the

FIG. 5. THE TÂRNAVE REGIONAL SYSTEM: DEMOGRAPHIC AGEING INDEX DISTRIBUTION (2011)



DATA SOURCE: Index calculated using the data from the 2011 Population census.<sup>38</sup>

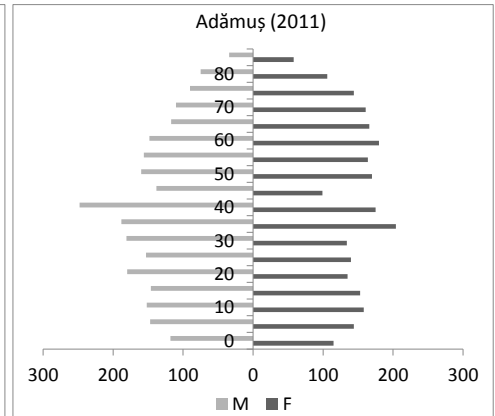
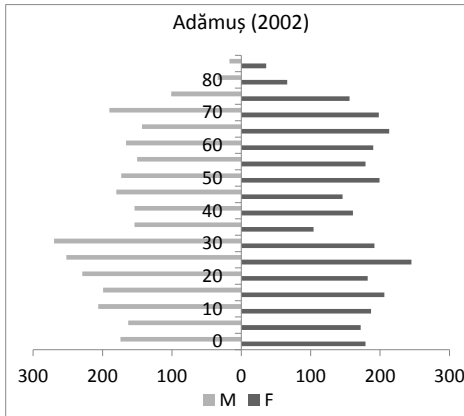
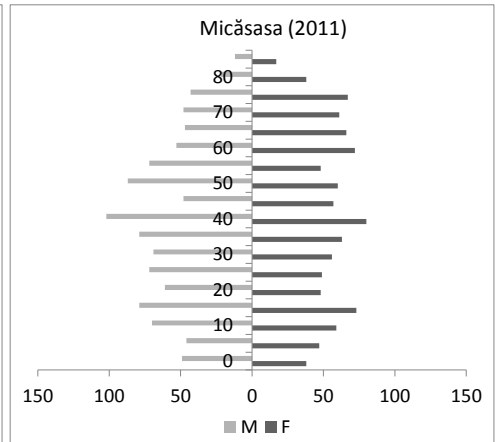
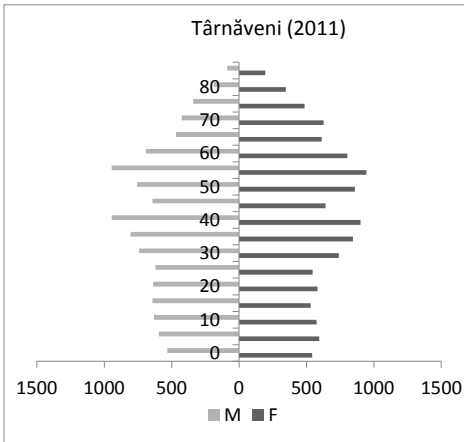
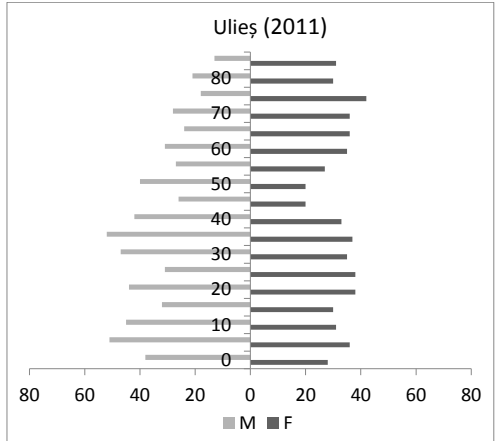
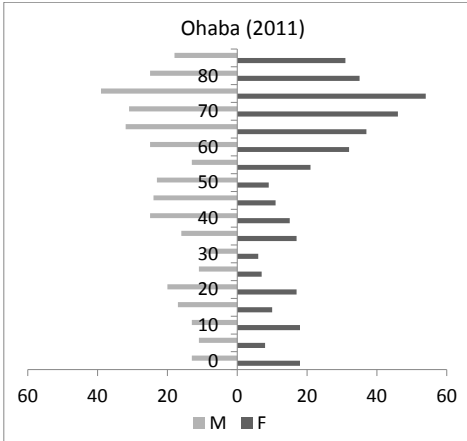
possible explanations, we can mention the strong decrease in birth rate, fertility; the increased emigration rate, which legally determines a demographic ageing trend in the areas of departure, affected by economic restructuring and by an increase in unemployment, forcing a part of the active population to emigrate in search of jobs. The phenomenon is accentuated by the return of a part of the population to the rural environment, for the same reasons, doubled by the high living costs and / or the impossibility of paying the financial obligations.<sup>36</sup>

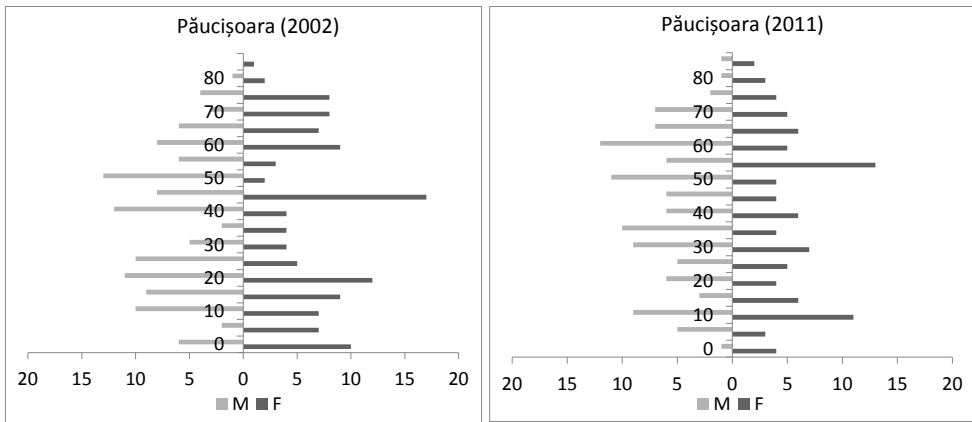
Analyzing the distribution of this indicator in the administrative-territorial units under study for the selected reference years, 2002 and 2011, we note that at the 2002 Census, for 12 of these units the ageing index was below 50 (young and very young population); after 10 years (2011—Fig. 5), only 8 of the administrative-territorial units of the regional system (out of 83) registered values below 50. Some examples are Brateiu commune, Sibiu County, where a possible explanation of the low values (27.24 in 2002 and 33.12 in 2011, respectively) is the high share of Roma population (32.21% in 2002, 36.84% in 2011), with a high birth rate, but also the proximity to Mediaș (8 km) and the appeal of cheaper rural lands for the young population; Apold (27.68 in 2002, 36.14 in 2011), where the share of the Roma population increased from 16.86% in 2002 to 21.89% in 2011; also the town of Coșșa Mică (33.90 in 2002 and 37.12 in 2011 respectively), where there is a slight revival of the young population, probably for the same reason as in the case of Brateiu commune (as a possible “dormitory town” for Mediaș, but also due to a slight increase in the Roma population: 7.26% in 2002, 11.16% in

2011). Most of the units have values above this threshold (elderly and very elderly population)—6 administrative-territorial units have more than 150, 24 of the total have more than 100, respectively 150 elderly people per 100 young people. The most dramatic cases are the ones of Ohaba, where there are over 400 elderly people per 100 youths, as well as Mediaş, where the demographic aging index rapidly increased from 66.75 in 2002 to 114.03 in 2011. The two censuses highlight the fact that the population of the region is experiencing a demographic decline with strong social and economic consequences.

The changes in population structure based on age and gender, highlighted by the construction and the comparative analysis of age pyramids (Fig. 6), also emphasize the demographic aging trend. We analyzed the age pyramids for the municipalities of Ohaba (Alba County), Ulieş (Harghita County), Micăsasa (Sibiu County), Adămuş and Târnăveni (Mureş County), as well as for the village of Păucişoara (Găneşti commune, Mureş County), which we considered representative for the studied phenomenon (all having a demographic ageing index of over 100). A visible phenomenon in a few cases (Târnăveni, Adămuş, Micăsasa) is the sharp numerical increase of the 40–45 years subgroup for 2011, under the socio-political determinations specific to the 7<sup>th</sup> decade of the 20<sup>th</sup> century (mainly, the effects of the restrictive legislative measures adopted in 1966 on pregnancy interruptions in the previous context of a decreasing birth trend, and caused a disturbance/rupture in the pyramid). The sudden drop in birth rates after 1990 (as a consequence of a causal complex: female emancipation, decrease in female fertility, emigration of the young and adult population, increase in the age at marriage, decrease in the number of traditional families, increase in education level, family planning, liberalization of abortion, use of contraceptive methods, etc.), resulted in a great narrowing of the pyramid base, a phenomenon present especially in the municipalities of Ohaba, Micăsasa, Ulieş and Păucişoara village, with a reduced number of the subgroup 5–9 years in 2002 and 0–5 years in 2011 respectively. In the case of Târnăveni and the communes of Ulieş, Micăsasa, Adămuş, the age pyramids are stationary. However, as far as the villages of Ohaba and Păucişoara are concerned, they are in a critical situation because the basis narrows a lot, and the segment of the adult population is also reduced, an increase in the elderly population being observed at the same time, and the pyramids being unbalanced. Also, when the birth rate is very low, natural growth and the migratory rate are negative, and the pyramid shape moves towards the regressive model. The phenomenon of demographic ageing in all cases (most obviously for Ohaba commune, which includes 4 villages, of which 2 are definitely deserted: Colibi and Măgherat; in Adămuş commune there is the case of Chinciuş village, with definitely deserted—in 2002 it had 17 inhabitants, of which only 7 were left in 2011), the consequences of which are numerous: the economic and social pressure on the adult population, the increase of dependency ratio, the obligation to allocate more resources for health and pensions, the increase in morbidity, etc.

FIG. 6. THE TĂRNAVE REGIONAL SYSTEM: AGE PYRAMIDS ILLUSTRATING THE PHENOMENON OF DEMOGRAPHIC AGEING





DATA SOURCE: Population censuses of 2002 and 2011.<sup>39</sup>

### 3.3. Degree of Viability of Rural Settlements

THE ISSUE of settlement viability may be at the intersection of several economic, social, political, cultural or psychological interests, both individual and collective. In time, the close relationship between man and the environment has varied, bringing about, on the one hand, a more intense demand for resources following overpopulation and, implicitly, an imbalance of this ratio and, on the other hand, a decrease in the anthropic impact, with settlements abandoned for reasons such as: poor infrastructure, reduced comfort, limited living resources etc., which are accompanied by the tendency towards population decrease, in the context of demographic ageing and negative natural growth.

Using the population number as a criterion (an agreed, tested and validated indicator in the Northwest PATR documentation), the rural settlements were divided into five viability classes<sup>40</sup>:

- 1, viable settlements (> 250 inhabitants);
- 2, settlements in the uncertainty phase (201–250 inhabitants);
- 3, rural settlements in the pre-disappearance phase (101–200 inhabitants);
- 4, endangered rural settlements (51–100 inhabitants);
- 5, rural settlements definitely deserted (<50 inhabitants).

In 2002 there were 355 human settlements in the Târnave regional system, 117 of which had a low viability degree, which represented 32.96% of the total localities, and in 2011 there were 353 human settlements that had a low viability, i.e. 33.43% of the total number of localities.

Using the census data from 2002 and 2011, the situation is as follows: in the first category (viable settlements), there were 67.04%, respectively 66.57% of all settlements (238, respectively 235 localities); the rest 32.96% and 33.43% respectively (117, and 118 localities respectively) are in different phases.

• *The settlements in the uncertainty phase* (with a high rate of youth emigration, but also with sporadic remigration from urban areas, especially of elderly population, as a result of retirement and of the inability to survive in cities, or due to their unemployment) included 5.07% of the total localities in 2002: Glogoveț and Lodroman (Valea Lungă commune), Alba County; Oțeni (Feliceni), Păuleni (Lupeni), Tărcești (Șimonești), Harghita County; Valea Albeștiului and Valea Șapartocului (Albești), Daia and Lepindea (Bahnea), Stejărenii (Daneș), Păucișoara (Gănești), Feleag (Vânători), Seleuș (Zagăr), Rora (Sighișoara), Căpeți (Sovata), Mureș County; Dupuș (Ațel), Valea Lungă (Dârlos), Roandola (Laslea), Sibiu County. In 2011, the share of these settlements increased to 6.52%; the following were added: Lupu (Cergău) and Secășel (Ohaba), Alba County; Șiclod (Atid), Firtănuș (Avrămești), Atia (Corund), Tibod (Dealu), Dejuțiu (Mugeni), Harghita County; Filitelnic (Bălăușeri), Rigmani (Neaua), Geacas (Alma), Mihăileni (Mihăileni), Veseud (Slimnic), Sibiu County; were left: Lodroman (Valea Lungă), Alba County; Oțeni (Feliceni), Păuleni (Lupeni), Tărcești (Șimonești), Harghita County; Lepindea (Bahnea), Stejărenii (Daneș), Păucișoara (Gănești), Feleag (Vânători), Mureș County; Dupuș (Ațel), Valea Lungă (Dârlos), Roandola (Laslea), Sibiu County.

• *The rural settlements in the pre-disappearance phase* (with characteristics such as the appearance of geodemographic structures favoring the disappearance, as well as economic deficiencies) accounted for 11.83% in 2002: Crăciunelu de Sus (Cetatea de Baltă commune), Alecuș (Șona), Alba County; Inlăceni (Atid), Andreeni (Avrămești), Fâncel, Tâmașu and Tibod (Dealu), Arvateni, Cireșeni and Teleac (Feliceni), Firtușu (Lupeni), Aluniș, Dejuțiu and Mătișeni (Mugeni); Becăș (Praid), Săcel (Săcel), Bentid, Cadaciu Mare, Cehetel, Medișoru Mare and Tîrdeni (Șimonești); Nicolești (Ulieș), Șicasău (Zetea), Harghita County; Vulcan (Apold), Bernadea and Cund (Bahnea), Coroi (Coroisânmartin), Cibul (Fântânele), Abud (Ghindari), Căpâlna de Sus (Mica), Măgheruș (Nadeș), Cloașterf (Saschiz), Sălașuri (Vețca), Venchi and Viilor (Sighișoara), Mureș County; Românești (Blăjel), Florești (Laslea), Chesler (Micăsasa), Moardăș, Răvășel and Șalcău (Mihăileni), Ștenea (Șeica Mare), Sibiu County. In 2011, their share declined slightly to 11.05%; the new additions were: Glogoveț (Valea Lungă), Spătac (Blaj Municipality), Alba County, and Daia (Bahnea), Aurel Vlaicu (Sighișoara), Mureș County; of the previous list, there remained: Crăciunelu de Sus (Cetatea de Baltă commune), Alecuș (Șona), Alba County; Inlăceni (Atid), Andreeni (Avrămești), Fâncel and Tâmașu (Dealu), Arvateni, Cireșeni and Teleac (Feliceni), Firtușu (Lupeni), Aluniș and Mătișeni (Mugeni), Becăș (Praid), Săcel (Săcel), Bentid, Cadaciu Mare, Cehetel and Medișoru Mare (Șimonești); Nicolești (Ulieș), Șicasău (Zetea), Harghita County; Vulcan (Apold), Bernadea and Cund (Bahnea), Coroi (Coroisânmartin), Cibul (Fântânele), Abud (Ghindari), Căpâlna de Sus, Măgheruș (Nadeș), Cloașterf (Saschiz), Sălașuri (Vețca), Venchi (Sighișoara), Mureș County; Florești (Laslea), Răvășel and Șalcău (Mihăileni), Ștenea (Șeica Mare), Sibiu County.

• *The endangered rural settlements* (with a rapid numerical decline and low self-sufficiency, requiring immediate support, prevention and conservation measures) amounted to 5.07% in 2002: Colibi (Ohaba), Făget (Valea Lungă), Spătac (Blaj municipality), Alba County; Medișoru Mic (Avrămești), Valea Rotundă (Dealu), Alexandrița (Feliceni), Satu Mic (Lupeni), Cădaciu Mic, Chedia Mică and Nicoleni (Șimonești), Iașu and Ighiu (Ulies), Harghita County; Sub Pădure (Gănești), Pipea (Nadeș), Sânsimion



(Neaua), Aurel Vlaicu and Șoromiclea (Sighișoara), Mureș County; Petiș (Șeica Mare), Sibiu County. In 2011, their share decreased to 3.97%; the new additions were: Turdeni (Șimonești), Harghita County; Căpeți (Sovata City), Mureș County; Românești (Blăjel) and Chesler (Micăsasa), Sibiu County; of the previous list: Valea Rotundă (Dealul), Satu Mic (Lupeni), Cădăciu Mic, Chedia Mică and Nicoleni (Șimonești), Ighiu (Ulieș), Harghita County; Sub Pădure (Gănești), Pipea (Nadeș), Sânsimion (Neaua) and Șoromiclea (Sighișoara), Mureș County.

• *The definitely deserted rural settlements* were 10.14% in 2002: Capu Dealului and Gorgan (Cenade), Cornu, Pădure și Pânca (Crăciunelu de Jos), Zărieș (Mihălț), Măghierat (Ohaba), Valea Sasului (Șona), Deleni-Obârșie and Fliștești (Blaj municipality), Alba County; Laz-Firtănuș and Laz-Șoimoș (Avrămești), Calonda (Corund), Sâncel (Lupeni), Bucin (Praid), Uilac (Săcel), Chedia Mare (Șimonești), Obrănești and Vasileni (Ulieș), Desag and Poiana Târnavei (Zetea), Harghita County; Chinciuș and Herepea (Adămuș), Bezidu Nou and Loțu (Sângeorgiu de Pădure), Jacu, Șapartoc and Valea Dăii (Albești), Ceie (Ghindari), Vaidacuta (Suplac), Angofa (Sighișoara), Mureș County; Sădinca (Loamneș), Văleni (Micăsasa), Mighindoala (Șeica Mare), Albi and Pădureni (Slimnic), Sibiu County. In 2011, their share increased slightly to 10.20%; the new entries: Colibi (44 inhabitants, Ohaba), Făget (34 inhabitants, Valea Lungă), Alba County; Medișoru Mic (46 inhabitants, Avrămești), Alexandrița (41 inhabitants, Feliceni), Iașu (48 inhabitants, Ulieș), Harghita County; Petiș (49 inhabitants, Șeica Mare), Sibiu County; Gorgan (8 inhabitants, Cenade), Cornu, Pădure and Pânca (8, 11 and 4 inhabitants, Bucerdea Grânoasă), Zărieș (4 inhabitants, Mihălț), Măghierat (11 inhabitants, Ohaba), Valea Sasului (10 inhabitants, Șona), Deleni-Obârșie (15 inhabitants, Blaj municipality), Alba County; Laz-Firtănuș and Laz-Șoimoș (39, respectively 48 inhabitants, Avrămești), Calonda (25 inhabitants, Corund), Sâncel (8 inhabitants, Lupeni), Bucin (4 inhabitants, Praid), Uilac (20 inhabitants, Săcel), Chedia Mare (21 inhabitants, Șimonești), Obrănești and Vasileni (12 and 33 inhabitants, Ulieș), Desag and Poiana Târnavei (7, respectively 39 inhabitants, Zetea), Harghita County; Chinciuș and Herepea (7, respectively 23 inhabitants, Adămuș), Jacu and Șapartoc (12, respectively 26 inhabitants, Albești), Ceie (46 inhabitants, Ghindari), Vaidacuta (17 inhabitants, Suplac), Bezidu Nou (24 inhabitants, Sângeorgiu de Pădure), Mureș County; Sădinca (20 inhabitants, Loamneș), Văleni (15 inhabitants, Micăsasa), Albi and Pădureni (each with 3 inhabitants, Slimnic), Sibiu County. All these settlements have common features: a high demographic ageing index, a high share of the elderly population (ageing population), negative natural growth and a decreasing demographic trend, a large number of abandoned households and a high share of unused agricultural land. It can be said that these have no chance of recovery, their degradation being extremely rapid, which means they are being considered for abolition and/or pooling.

Besides these, there are some settlements that completely disappeared (there were no inhabitants). In 2002 there were 3 of these (0.85% of the total settlements): Doptău (Șona), Alba County, Șașvereș (Praid), Harghita County, and Bârlibășoia (Albești), Mureș County; and in 2011 were 6 (1.70% of the total settlements): Flitești (Blaj municipality), Capu Dealului (Cenade), Alba County, Angofa (Sighișoara), Loțu (Sângeorgiu de Pădure), Valea Dăii (Albești), Mureș County, and Mighindoala (Șeica Mare), Sibiu County.

FIG. 7. THE TÂRNAVE REGIONAL SYSTEM: VIABILITY DEGREE OF HUMAN SETTLEMENTS (2011)



## 4. Conclusions

IT CAN be said that the geodemographic decline is one of the main factors with a negative impact on the functionality of the entire territorial system. The decline of the young population (if a hundred years ago the young population accounted for 35% of the total population, it represented only 17.8% in 2011) and the trend towards demographic ageing, as pointed out in the analyzed index (the population ageing index) and by the analysis of the young and elderly population share, are particularly significant in the southwestern part of the Târnavă regional system, which has experienced a strong demographic involution, specific for some administrative-territorial units such as Ohaba, Berghin, Mihalț, Vețca, Dârjiu, Păuca (all with a demographic ageing index of over 150). In light of this aspect, we consider this problem / disfunction as extremely serious, with inevitable consequences at demographic and socio-economic level, and not only. Also, the stationary shape of the current demographic pyramids heads toward a regressive model (already visible in the case of communes such as Ohaba), the significant share of adult population migrating to the pyramid's peak, with an immense pressure on the conscription of the potentially active adult population.

In conclusion, based on the analysis of the statistical data provided by censuses and the interpretation of the graphic and cartographic materials, some serious imbalances

may be observed in the structure of the population by age groups, imbalances which constitute geodemographic risk factors: the accelerated population ageing, which in turn leads to an increase in the pressure of the inactive population upon the active one and to stationary living standards, combined with a decrease in labor productivity and a declining population trend. These imbalances negatively affect the viability of the settlements, and implicitly lead to the disappearance of rural settlements or the increased number of deserted and / or endangered villages, socio-economic dysfunctions and so on. Therefore, there is a clear need for measures of an economic nature and for firm policies intended to stimulate birth rates, as well as the revitalization (and implicitly the modernization) of the rural space, the preservation and promotion of rural authenticity. □

## Notes

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18. Conțiu, 158–160; see also Ioan Raica and Adrian Raica, *Regiunea Târnavelor—natură și habitat* (Sibiu: Tipografia Universității Lucian Blaga, 2000).
19. Cf. European Commission, 2014, United Nations, 2015, apud Zotic et al., 102.
20. See <https://www.primariadumbaveni.ro/istoria/> (accessed 18 February 2017).
21. Cf. Sabin Adrian Luca, Zeno Karl Pinter, and Adrian Georgescu, *Repertoriul arheologic al județului Sibiu: Situri, monumente arheologice și istorice* (Sibiu: Editura Economică, 2003), 103, <http://arheologie.ulbsibiu.ro/publicatii/bibliotheca/rebsibiu/h-m/hasag.htm> (accessed 15 February 2017).
22. Cf. Ioan-Aurel Pop and Thomas Nägler, eds., *Istoria Transilvaniei*, vol. 1 (*până în 1541*) (Cluj-Napoca: Institutul Cultural Român, Centrul de Studii Transilvane, 2003), 37; P. Constantinescu-Iași et al., eds., *Istoria României*, vol. 1 (Bucharest: Editura Academiei Republicii Populare Române, 1960), pl. VII; Mircea Petrescu-Dîmbovița and Alexandru Vulpe, eds., *Istoria românilor*, vol. 1, *Moștenirea timpurilor îndepărtate* (Bucharest: Editura Enciclopedică, 2001), 156 (fig. 18); <http://patrimoniul.gov.ro/ro/monumente-istorice/lista-monumentelor-istorice> (accessed 18 February 2017).
23. Constantinescu-Iași et al., 112.
24. Cf. Petrescu-Dîmbovița and Vulpe, 226, 247, 274, 340, figs. 31, 35, 45, 66; <http://patrimoniul.gov.ro/ro/monumente-istorice/lista-monumentelor-istorice> (accessed 18 February 2017).
25. Cf. Pop and Nägler, 55–56, 58; Petrescu-Dîmbovița and Vulpe, 302, 312, 330, figs. 51, 62; Constantinescu-Iași et al., 145, 147; Mihai Bărbulescu et al., *Istoria României* (Bucharest: Corint, 2007), 24–26; <http://patrimoniul.gov.ro/ro/monumente-istorice/lista-monumentelor-istorice> (accessed 18 February 2017).
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28. Cf. Pop and Năgler, 141, 151, 181, 184–187, 190–191; Protase and Suceveanu, 557, 560–561, 563, 570, 573, 572–578, 583, 588, 590, 602, 618, 644, 794–796, figs. 70, 79, 80–81, 89; Constantinescu-Iași et al., 615, 621, 625, 632; Ioan-Aurel Pop and Ioan Bolovan, *Istoria Transilvaniei*, 2<sup>nd</sup> edition, rev. and enl. (Cluj-Napoca: Școala Ardeleană, 2016), 42; <http://patrimoniul.gov.ro/ro/monumente-istorice/lista-monumentelor-istorice> (accessed 18 February 2017).
  29. Pop and Năgler, 207.
  30. Ibid., 240–242, 244, 248.
  31. See Conțiu, 148–149; Elena-Doina Horhoi, *Calitatea mediului inconjunător în culoarul Târnavei Mari: Studiu geoecologic* (Oradea: Logos '94, 2001), 62–69.
  32. Conțiu, 149.
  33. Traian Rotariu et al., eds., *Recensământul din 1850: Transilvania* (Bucharest: Staff, 1996; Cluj-Napoca: Presa Universitară Clujeană, 2004); id., *Recensământul din 1900: Transilvania* (Bucharest: Staff, 1999); id., *Recensământul din 1910: Transilvania* (Bucharest: Staff, 1999); Sabin Manuilă, ed., *Recensământul general al populației României din 29 decembrie 1930*, vol. 9, *Structura populației României: Tabele selecționate din rezultatele Recensământului general al populației din 1930* (Bucharest: Editura Institutului Central de Statistică, n.y); Traian Rotariu et al., eds., *Recensământul din 1941: Transilvania* (Cluj-Napoca: Presa Universitară Clujeană, 2002); *Recensământul populației și locuințelor din 7 ianuarie 1992*, vol. 1, *Populație—Structura demografică*, vol. 2, *Populație—Structura social-economică* (Bucharest: Comisia Națională de Statistică, 1994); *Recensământul populației și locuințelor, 18–27 martie 2002*, vol. 1, *Structura demografică* (Bucharest: Institutul Național de Statistică, 2004); Population Census from February 1956, Population and Houses Census of March 1966, Population and Housing Census of January 1977, Population and Housing Census of 2002, data provided by the Statistics Directorates of Alba, Harghita, Mureș and Sibiu Counties; <http://www.insse.ro/cms/files/publicatii/pliante%20statistice/04-recensamantul%20populatiei.pdf> (accessed 31 January 2017); *Recensământul populației și al locuințelor 2011*, [www.recensamantromania.ro/wp-content/uploads/2013/07/sR\\_Tab\\_31.xls](http://www.recensamantromania.ro/wp-content/uploads/2013/07/sR_Tab_31.xls) (accessed 31 January 2017), <http://www.recensamantromania.ro/noutati/> (accessed 6 February 2017), <http://www.mures.insse.ro/main.php?id=441>, <http://www.mures.insse.ro/main.php?id=496> (accessed 6 February 2017); Conțiu, 94.
  34. Cf. Constantin Vert, *Geografia populației: Teorie și metodologie* (Timișoara: Mirton, 2001) 98; Vasile Surd, *Geodemografie* (Cluj-Napoca: Presa Universitară Clujeană, 2001), 90; see also Ronald John Johnston, Derek Gregory, Geraldine Pratt, and Michael Watts, eds., *The Dictionary of Human Geography*, 4<sup>th</sup> edition (Oxford: Wiley-Blackwell, 2005), 6, 163–164, 603–604.
  35. See note 33.
  36. H.-V. Conțiu and A. Conțiu, “Imbalanced Geodemographic Structures in Târnave Regional System. Case Study: Population Ageing,” *Riscuri și catastrofe* 16, 20, 1 (2017): 211–220.
  37. See note 33.
  38. See note 33.
  39. See note 33.
  40. Cf. Coccan, 63–64.

### **Abstract**

#### Critical Aspects Regarding the Viability of Settlements in the Târnave Regional System

This study highlights the decreasing demographic trend in the studied region, taking into account, as 11 reference points, the population censuses from 1850–2011, with particular attention given to the analysis of the demographic ageing index, as well as to the share of the young and elderly population, illustrated by the age pyramids of some localities and communes with a certain degree of risk from the point of view of viability. Serious imbalances are observed regarding the population structure by age groups, imbalances which are geodemographic risk factors (acceleration of ageing and decreasing demographic trend) and which cause malfunctions regarding the viability of settlements, implicitly the disappearance of rural settlements or an increase in the number of definite deserted and/or endangered villages.

### **Keywords**

viability degree of human settlements, demographic ageing index, population structure by age and environment, age pyramid, young population, elderly population