STUDIA UBB GEOGRAPHIA, LXIX, 1, 2024 (p. 57-70)
(RECOMMENDED CITATION)
DOI:10.24193/subbgeogr.2024.1.04

SOCIO-ECONOMIC IMPACT OF NATURAL POPULATION DYNAMICS IN BISTRIȚA-NĂSĂUD COUNTY BETWEEN 2000 AND 2020

Adina-Maria PATIȚA[1]

ABSTRACT. Socio-Economic Impact of Natural Population Dynamics in Bistrița-Năsăud County between 2000 and 2020. Natural population dynamics is a topic that is largely dealt with at national level, but little analysed on a smaller scale (at county or basic administrative-territorial unit level), which could provide an opportunity for a more in-depth analysis and highlight possible areas where the situation is different from that existing at national level. Over time, the changes that have occurred in the natural dynamics of the population in Romania have highlighted numerous changes and shifts at the societal level, influencing either positively or negatively its subsequent trajectory. The aim of this paper is to capture the demographic evolution of Bistrița-Năsăud County and to outline the current situation. The focus will also be on capturing the impact of the current demographic evolution, an impact noted at territorial, demographic, social and economic level. Furthermore, possible solutions will be proposed to solve the emerging problems.

Keywords: *population, birth rate, mortality, marriage rate, divorce rate, Bistrița-Năsăud County, impact, solutions*

1. Introduction

Demographic issues have become more and more studied lately due to the problems that have arisen in this respect, namely demographic ageing, but there is no concrete approach at county or administrative-territorial unit level, thus providing more of an overview than a picture that takes into account each

[1] *Babes-Bolyai University, Faculty of Geography, 5-7 Clinicilor Street, Cluj-Napoca, Romania, e-mail: adinamariapatita@gmail.com*

county. One of the counties analysed from this point of view is Bistrița-Năsăud, a county for which a great deal of information is provided in terms of economic development, but less in demographic terms. However, it is demographics that actually influence the economy positively or negatively.

At the national level, the situation is not very encouraging. The birth rate is lower than the death rate, which has a negative impact on the country's demography and economic development. The situation is similar in Bistrița-Năsăud county, which is a major problem in the ongoing development of Bistrița society, and has repercussions at national level.

The analysis is carried out over the period 2000-2020 as the period of the 2000s is the period when many changes occurred in all respects as a result of the fall of the communist regime and the return to democracy. Demographically, the situation has been very dynamic during this period, which is why it is even more important to address this subject.

The purpose of this paper is to shed light on the economic and social impact of these birth and death rates on the county's population, i.e. what changes in these two demographic indicators can lead to.

In order to carry out this study, statistical data available on specialized websites were consulted and indirect interactions were held with people in municipalities where exceptional situations are captured in order to complete a questionnaire to notice their perception of the situation.

Thus, this paper can provide a first, more concrete picture of the natural population dynamics by focusing on one of Romania's counties, namely Bistrița-Năsăud. Thus, the analysis will aim at capturing the way in which the four main indicators evolve: birth rate, mortality rate, marriage rate and divorce rate, to which natural balance, infant mortality and stillbirth rate can be added.

Focusing on the way in which these indicators evolve, graphs and cartograms will bring to light valuable and necessary information for the knowledge of the territory from this point of view, but more than that, we will try to draw an alarm signal to the authorities in order to stop the evolution of demographic ageing manifested by increasing mortality rate and decreasing birth rate.

2. Natural dynamics. Concept

The term natural dynamics is complex precisely because it is one of the key demographic elements underlying the evolution of society. This complexity is due to the increases and decreases that take place, influencing the whole structure of the population and highlighting its degree of development (Vert, 2001).

In fact, natural population dynamics is nothing more than population reproduction itself, the ability of the human being to contribute to the emergence of another human being, a cycle of life that repeats itself day after day, year after year. Even if, in principle, we are talking about people who contribute to reproduction, this movement also illustrates people who no longer show any vital signs (Petri, 2002).

At the heart of natural dynamics are the two biological events that cause it: births and deaths. These two allow the population to renew itself each year by the disappearance of old generations and the emergence of new ones (Vert, 2001).

The continuity of society and population is due to the natural dynamics which, through the interplay of two biological events, makes this possible. In the context of a higher birth rate and lower mortality, society continues to move forward, whereas in the case of a higher mortality and lower birth rate the situation changes, with the population becoming smaller and smaller (Inomjonova, 2022).

If from a numerical point of view the population can remain relative without undergoing much change, the natural dynamics drives society in such a way that the changes that take place can be easily noticed precisely in order to be able to tell whether or not their effect is a beneficial one on the society at the time (Vert, 2001).

Society is seen as a system in which there are inputs and outputs, each with its own impact. Inputs are represented by the birth rate (births) and outputs by mortality (deaths) (Petri, 2002).

From another perspective, we can understand that in order for the population to be numerically evolved, it is not enough for the birth rate to be high and the mortality rate to be low. Moreover, *"The analysis of reproduction must be much more detailed: a mother must give birth to at least one daughter who will continue reproduction in the future"* (Vert, 2001, p. 52).

In other words, the mother must give birth, or at least it would be necessary to give birth to a daughter who, in her fertile period between the ages of 15-49, will help to maintain the continuity of the generations through the emergence of new ones, and the descendants will be more numerous in numerical terms. The greater the number of daughters, the greater the chance of generations renewing themselves, but as the number decreases reproduction becomes increasingly unlikely and uncertain leading to a demographic decline (Vert, 2001).

The small changes that birth and death rates can undergo have enough capacity to generate huge changes in the structure of the population so that the situation takes on totally different turns, the initial situation being different from the resulting one (Peter, Bradshaw, Shaw, & Sidaway, 2008).

In order to be able to determine exactly how birth and death rates have evolved, the difference between the two indicators is analysed, which is called

the natural population balance. Moreover, other demographic indicators such as fertility, fecundity, infant mortality, stillbirth, morbidity, nuptiality and divorce are directly related to the two biological events (Vert, 2001).

The term birth rate is understood to be one of the basic elements of the natural demographic balance and is an essential demographic phenomenon at the biological, social, political, cultural, health and legislative levels, which is concerned with the total number of live births during a given period (month, year), and this total number is related to the average population of an administrative-territorial unit and expressed per thousand inhabitants (Cristea, şi alţii, 2020).

Man has a somewhat higher degree of intervention and control over births than mortality, which is why the changes that occur can be very short in time, and an essential characteristic of births is their very great variability over time. A good example of this is the year 1967 for Romania, when the birth rate jumped remarkably, leading to a doubling of the population (Ungureanu & Muntele, 2006).

Another element directly related to birth rate is fertility. According to Alexandru Ungureanu and Ionel Muntele, they define fecundity as *"The average number of children born to a woman in a given population during her lifetime"*. In fact, fecundity means the capacity of the population or of a couple to contribute to the reproduction process through the number of children they can have (Raboca & Surd, 1989). For this reason, a woman has the physiological capacity to conceive a maximum of 20 children, which generally applies within the population regardless of the geographical region studied, race, ethnicity, factors influencing her (Vert, 2001).

Alongside birth rate and fertility, fertility plays an important role, another element that influences birth rate positively or negatively. Fertility means the very manifestation of fertility as measured by the total number of live children born (Raboca & Surd, 1989).

Depending on marital status, one can consider legitimate (within marriage) and illegitimate (outside marriage) fertility, which can be addressed to each age group (Tihan, 2004).

Mortality is the demographic phenomenon that refers to the total number of deaths per thousand inhabitants of a given territory at a given time, expressed as the average population. It is an essential demographic element which determines the number of people leaving the population, the age structure, the health status of society, the efficiency of health services and how they could be improved (Nicolae, 2012).

Infant mortality is one of the first indicators to contribute to the final analysis of mortality. It is defined as the ratio of newborn deaths up to the age

of one year to the total number of live births in that year expressed per 1 000 population (Vert, 2001). This indicator is measured by the infant mortality rate (Cochino, 2005).

Morbidity is another key component of mortality and illustrates the health status and degree of illness of the population during a year. If the phenomenon of interest is morbidity, the event we will consider is the occurrence or presence of disease defined as a change in health (***, 2018).

Last but not least, the last indicators of natural dynamics addressed are nuptiality and divortiality.

The marriage rate is the ratio of the total number of marriages to the average population expressed per thousand inhabitants in a given territory in a calendar year (Biroul National de Statistica a Republicii Moldova, 2022).

From a legislative perspective, the age of marriage is as follows: 18 years for men, this age being already reached, and 16 years for women. There are certain exceptions to this, namely that the female population aged 15 and over may take part in the act of marriage, for a well-founded reason. However, situations can also vary, with religions allowing marriages at an even younger age, 12-14 (Trebici, 1979).

According to statistical data from 2019, Romania ranks among the top countries in terms of nuptiality with a value of 6.6‰ (Institutul National de Statistica, 2021).

Divortiality is the last indicator of natural dynamics and refers to the total divorces in relation to the average population and expressed per thousand inhabitants of a given territory (Biroul National de Statistica a Republicii Moldova, 2022).

Following on from the above, it is the natural dynamics of the population that provides the most information on the physical well-being of the population by means of certain indicators, the phenomenon of births and deaths being directly related to the state of health of the human population (Petri, 2002).

3. Data and Methods

The methodology used in this study is diverse, considering several methods and means by which the results were obtained.

In the first instance, graphical and cartographic representations play an important role in carrying out the study and a deeper analysis of the situation. The graphical representations were made in Excel, Microsoft Office Professional Plus 2019. They have been created for each year in the range 2000-2020 and for each demographic indicator and phenomenon with the help of statistical

data collected from the website of the National Institute of Statistics, more specifically from Tempo Online. In the same vein, another program was used alongside Excel, namely ArcMap 10.8, to design the cartographic materials. These were made in order to capture the evolution and dynamics between 2000-2010 and 2010-2020.

In order to complete the study, some field trips were also made, more specifically, a trip to the Public Health Department of Bistrița and to the Regional Statistics Department of Bistrița-Năsăud. These trips were carried out in order to obtain statistical data to complete the study and analysis at county level and, in the same vein, some complementary bibliographic resources were also obtained, touching on other areas directly related to demography, an example being medical geography. In order to carry out a more comprehensive analysis at county level, a questionnaire was also carried out to capture the various opinions that different communities have on the evolution of the population over the last 20 years. In this respect, the questions asked referred to possible underlying causes and consequences, and potential solutions were proposed to support communities with demographic problems, those where birth rates are lower than death rates, or in the case of communities with higher divorce rates than marriage rates. It was distributed online through the respective community groups or individuals from those communities were appointed as representatives and then those individuals distributed to other groups. In order to ensure the accuracy of the information, a question was asked at the beginning of the questionnaire to confirm that the respondents were indeed from communities belonging to Bistrița-Năsăud County.

4. Results and Discussions

At the level of Bistrița-Năsăud County, the demographic situation shows an ageing population, which means that mortality is higher than birth rate (Fig.1, Fig.2)

In this sense, there are certain factors that influence this evolution of the society of Bistrița, but at the community level there are also certain impacts, either positive or negative, that determine how progress will take place in the coming period.

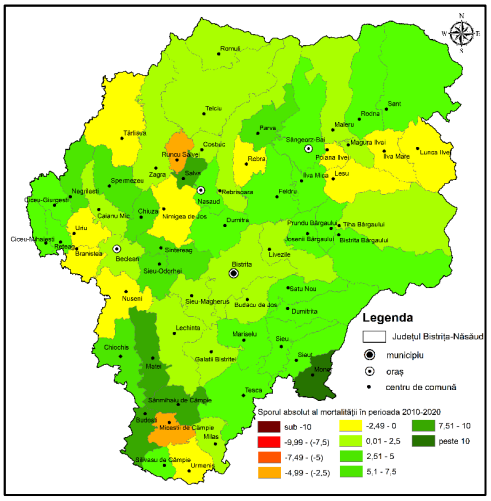

Fig. 1. Absolute birth rate increase 2010-2020
Data source: Tempo Online

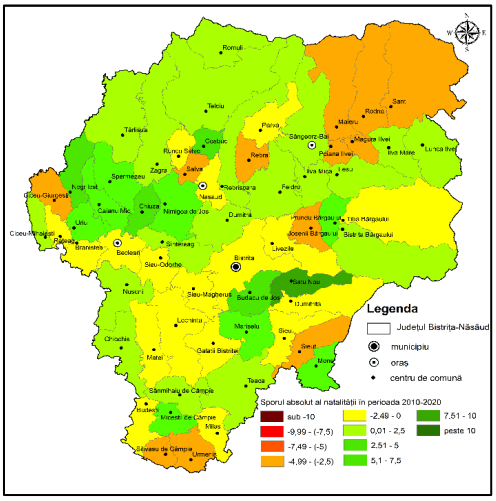

Fig. 2. Absolute increase in mortality between 2010-2020
Data source: Tempo Online

The first type of impact we can identify is at the socio-economic level, which is also essential for the development of society from an economic and social point of view. According to the research carried out, in Bistrița-Năsăud County, several types of impacts can be seen in this respect. Following the questioning of the communities, the most felt impact is that of a decrease in the workforce, identified by about 47% of respondents. A mortality rate higher than the birth rate leads to a reduced number of young people, which creates a discrepancy between the active and inactive population. In the north-eastern part of the country, in the communities of Ilva Mare, Ilva Mica, Poiana Ilvei, Măgura Ilvei, Leşu Ilvei, Lunca Ilvei, Sângeorz-Băi, Rodna, Maieru and Şanţ, the active population has high proportions in three of the ten communities listed, namely in Ilva Mare (52%), Poiana Ilvei (54%) and Lunca Ilvei (75%). In the other areas, the active population is very low, reaching a proportion of only 23 % (Gal Lider, 2022). In the southern area, in communities such as Budeşti, Miceştii de Câmpie, Milaş, Sânmihaiu de Câmpie, Silivaşu de Câmpie, Teaca, Galaţii Bistriţei, the labour force situation is the same. The number of employees decreased by 4.68%, from 1026 persons employed in 2004, to 978 persons in 2014. In 2011, the number of employed people in the region was 606. Of this number, 72.6% worked in agriculture (Gal Progres Transilvan, 2021). At the county level, the elderly population continues to be the most active in the agricultural sector, even though age no longer permits it. The situation remains similar even in the eastern region of the county in communities such as Bistrița-Bârgăului,

Budacu de Jos, Cetate, Dumitrița, Josenii Bârgăului, Prundu Bârgăului, Tiha Bârgăului, Livezile, Șieu, Șieuț, Monor, Mărișelu (Federatia pentru Dezvoltarea Zonei Rurale, 2018).

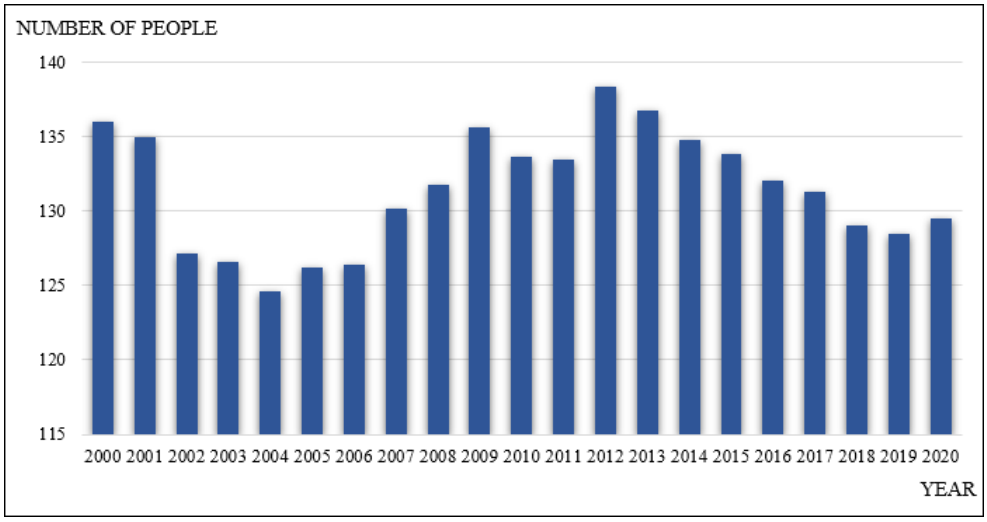

Fig. 3. Evolution of the workforce in Bistrița-Năsăud County between 2000-2020
Data source: Tempo Online

Another consequence reported from an economic point of view is the reduced number of jobs, a consequence noted by about 36% of the respondents to the questionnaire. In the first instance, this may be due to the low number of young people in the population, which means that funds are no longer attracted and investments are no longer made, as the vast majority of activities are in the agricultural sector, and these activities are carried out by older people, thus perpetuating traditional work. This highlights the poor development of even agriculture, the basic sector, with subsistence and semi-subsistence farming. The following can be highlighted for the whole county, especially in the southern region (Gal Progres Transilvan, 2021). The context is similar even in the eastern part of the county, where the decrease in the labour force is blamed on the small size of the young population, which represents a threat to society in Bistrița (Gal Lider, 2022). According to Fig.3, the labour force has fluctuated over the 20 years of analysis, with various fluctuations being observed. At the beginning of the 2000s, it started to decrease due to massive migration both to urban areas and especially to the outside world. There was a slight attempt to solve the situation in 2006 and 2007, and then, from 2012 onwards, there was no further increase but only a decrease until 2019 inclusive. This decrease can be attributed to the economic crisis that broke out in 2008, which was also felt in Romania.

The low number of pupils in educational institutions is another consequence that stands out in this context. This type of effect was illustrated by about 36% of respondents. Low birth rates and high mortality rates result in a low number of children, and this inevitably has a knock-on effect on education. Of course, this is not the only reason for this, as the low number of pupils also leads to a low number of teachers, investments in this area will no longer be made and there is a risk of illiteracy, school drop-outs and, not least, an imbalance in economic sectors. In the southern part of the county, the number of children enrolled in kindergartens has decreased, with the number of children enrolled in 2014 being 32.7% lower than in 2004 (Gal Progres Transilvan, 2021).

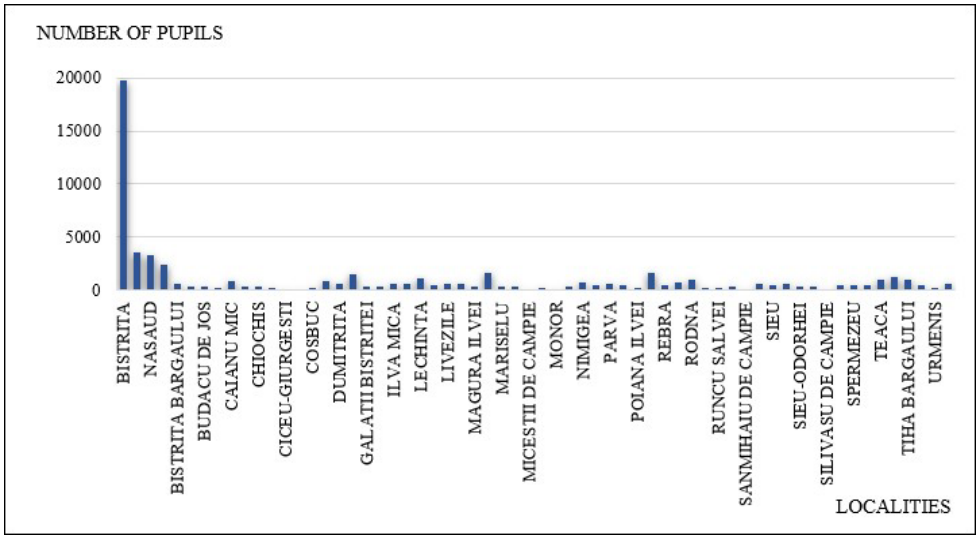

Fig. 4. Number of pupils in educational institutions in 2005
Data source: Tempo Online

According to Fig.4, one can notice that the number of students in 2005 at the county level is low. The urban centres are the exception, because the number of students is slightly higher, the city of Bistrița having the highest number of pupils.

In 2016 (Fig. 5), one noticed the same situation as in 2005, with the highest values in the city of Bistrița and the other three urban centres, while in the other areas the decrease was continuous.

Analysing the two illustrated graphical representations (Fig. 4, Fig. 5), one may remark that the values are high in communities such as Feldru, Maieru, Prundu Bârgăului, Teaca, Telciu, Tiha Bârgăului. However, a more detailed

study of the evolution between the two periods of the year in terms of values shows that the trend is downward. Thus, according to the data of the National Institute of Statistics, in Feldru, in 2005 the number of children was 1564, and in 2016 it was 1424; in Maieru, in 2005 the registered value was 1658, and in 2016 it was 1486; in Prundu Bârgăului in 2005 the number of pupils was 1679, while in 2016 it was 1178; in Teaca the number of pupils was 992, while in 2016 it was only 939, and in Tiha Bârgăului the situation was the same, in 2005 there were 988 pupils, while in 2016 there were only 866. Moreover, these values can be completed by the decrease in the number of school units over time.

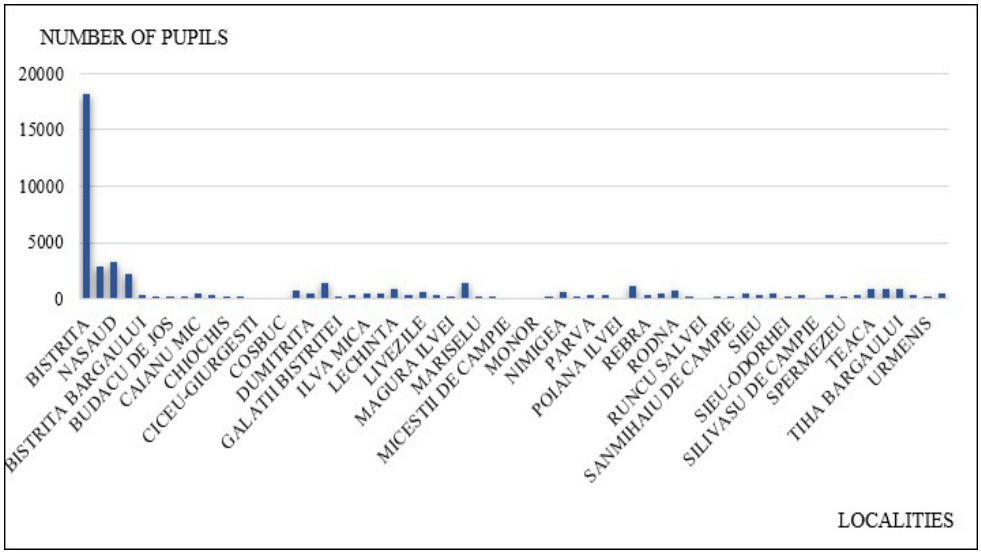

Fig. 5. Number of pupils in educational institutions in 2016
Data source: Tempo Online

Thus, in Feldru, if in 2000 there were 11 schools, in 2016 there were only 4 schools; in Maieru the situation is similar, the year 2000 shows 7 schools, and in 2016 there are only 2; in Prundu Bârgăului the downward trend is maintained, the year 2000 showing the existence of 5 schools, and in 2016 there is only one school; Teaca presents the same situation, there is a decrease from 9 educational institutions in 2000 to only one educational institution in 2016; Telciu presents a similar situation, from 11 educational institutions in 2000 to only one in 2016, and last but not least Tiha Bârgăului, where the situation is still decreasing, from 13 educational institutions in 2000 to only 2 in 2016 (Chira, 2018).

Also in this socio-economic context, one can add as an impact the high number of unemployed people and the high number of pensioners, an impact directly related to the low number of jobs and the dominance of the elderly population.

The high number of unemployed people is a result of low employment and weak economic development. In Bistriţa-Năsăud County this situation is found mainly in the southern area where, over the years, the number of unemployed has increased. In 2011, the number of unemployed registered a value of 771 people, 165 people more than the number of employees (Gal Progres Transilvan, 2021).

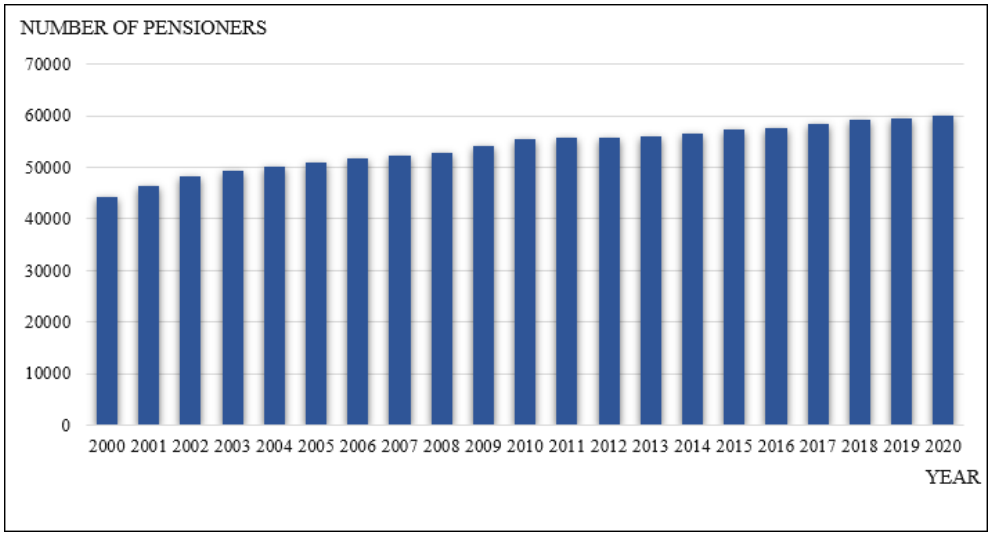

Fig. 6. Total number of pensioners in Bistriţa-Năsăud County, 2000-2020
Data source: Tempo Online

According to Fig.6, the number of pensioners does not fluctuate sharply, but is in a continuous evolution over the 20 years of analysis. This highlights the dominance of the phenomenon of demographic ageing, which is gradually taking hold in society and which, from an economic point of view, creates problems in the distribution of income and investment, part of which is needed to care for the elderly and ensure a decent living.

Other consequences resulting from the evolution of the county's natural movement concern nuptiality and divortiality. Within the area analysed, nuptiality is higher than divortiality, but there are also fluctuations, which means that decreases can also be noticed, but not significant. The trends of both influence the development of society, causing certain effects that are, of course, captured at the socio-economic level.

According to 58% of the respondents to the questionnaire, this context highlights the fact that the presence of a greater number of couples is also a great support in the maintenance of children or the child. This shows that the financial situation is an important element in this respect, and even more so in the case of two-parent families, where both members of the couple are present. The care of the child or children is not concentrated solely in the hands of the father and mother, but represents help from both sides which facilitates harmonious growth.

While birth rates are lower than death rates, one would assume that divorce rates should be higher than marriage rates, but at the county level the situation is different, i.e. divorce rates are lower than marriage rates. This can be attributed to three assumptions. The first hypothesis is that there are many marriages among adults, as Romania is already a country where marriages are no longer carried out at a young age, so the emphasis is no longer on traditions and customs, but rather on adapting to new social developments. The second hypothesis can be put down to fertility problems of either one or both members of the couple. At the same time, even though it is a high percentage of marriages, couples, especially women, prefer not to conceive children precisely in order to focus on their professional life, their personal life being less important.

In order to redress the situation, to increase the birth rate and decrease the mortality rate, and to maintain an upward trend in the marriage rate and a downward trend in the divorce rate, the questionnaire proposed possible solutions that could be applied.

The most popular solutions offered are the following: increasing the standard of living by increasing the number of jobs, investing in different areas of activity; developing the medical system to Western standards; a healthy lifestyle which involves a balanced diet without emphasis on animal fats and stress; investing time and resources in one's own education and health; carrying out campaigns to inform the population about the situation in which they find themselves precisely in order to raise awareness and take action to stop the situation from worsening; providing more capital for each newborn child; increasing allowances; offering vouchers to cover the cost of school supplies; focusing on high quality health and social care; making medical tests free of charge so that they can be carried out regularly; increasing the number of young people on account of reduced migration; making certain medical procedures free of charge for children under 18; self/partner awareness; moral, spiritual, sexual, psychological education; couple therapy/psychological counselling done for free or paid; improving economic situation; avoiding domestic violence by having more police stations; good communication between partners; avoiding as far as possible some consumption (of prohibited

substances/alcohol); the opportunity to own a home in the first years of marriage; changing people's mentality and behaviour so that humility, respect, trust, empathy, and moderation prevail in a family.

5. Conclusions

Analysing the situation of Bistrița-Năsăud County from the perspective of the evolution of the natural dynamics, it can be deduced that the population is regressing, the segment between 0-19 years is continuously decreasing, and the elderly population, over 60-65 years is in a slight progress. This inevitably leads to an accentuation of demographic ageing, which means a declining economy. As society gradually settles down, it undergoes numerous changes and shifts, which highlights a functional imbalance.

These demographic changes in the society of Bistrița, besides being influenced by certain factors, generate a number of negative consequences, from economic and social to territorial and demographic ones. These include the low number of inhabitants, demographic ageing, changes in the structure of the population by age group and gender, the distribution of the population in urban and rural areas, the low distribution of the labour force, the shortage of jobs, the low number of pupils in educational institutions and the high number of pensioners.

All of the above can predict the evolution of the county in the coming period, and according to the nature of these consequences and the current situation, it is possible to get a clear idea of the coming years from this demographic perspective.

In order to create a relative balance or an attempt to keep the situation under control, several solutions have been proposed, all of which have as their central point the economic development of society through the creation of jobs as a result of investment, the development and modernisation of various areas of activity which, to a certain extent, offer people security (education, health, administration), to which can be added the education of the population from certain psychological, moral, spiritual, and sexual perspectives, and the creation of a healthy lifestyle without excesses.

These proposed solutions would need to be implemented in a timely manner to help stop this decline or at least keep it under control. Even if it is impossible to apply all of them, it would help if at least some of them are considered, since the results they can have are visible after a long time.

Therefore, all the information presented throughout this paper leads to the conclusion that the current demographic situation of Bistrița-Năsăud County is leading the local society towards a functional decline, the impact of which has been noted from so many points of view, making its mark significantly, and everything is unfolding rapidly and surely.

REFERENCES

1. ***. (2018), *Morbiditate. Boli transmisibile și netransmisibile ca probleme de sanatate public,* Bucuresti, Romania, Retrieved from https://umfcd.ro/wp-content/uploads/C-4-Morbiditate.BT_.BNT_.pdf
2. Biroul National de Statistica a Republicii Moldova. (2022), *Populatie si demografie*, Republica Moldova, Retrieved from https://statistica.gov.md/files/files/Metadate/Populatia.pdf
3. Chira, L. (2018), *Atlas statistico-descriptiv al localitatilor judetului Bistrița-Năsăud*, Bistrița, Romania, Editura Institutului National de Statistica, Retrieved 2023, from https://Bistrița.insse.ro/
4. Cochino, E. A. (2005), *Capitolul 2. Elemente de demografie*, Romania, Retrieved from https://umfcd.ro/wp-content/uploads/2016/11/cap2.pdf
5. Cristea, C., Matei, E., Galan, A., Ursu, C., Dima, C., & Georgescu, D. (2020), *Raportul National al Starii de Sanatate a Populatiei,* Bucuresti, Institutul National de Sanatate Publica, Retrieved from https://insp.gov.ro/2021/12/29/raportul-national-al-starii-de-sanatate-a-populatiei-2020/
6. Federatia pentru Dezvoltarea Zonei Rurale (2018), *Strategia de Dezvoltare Locala*, Romania, Retrieved from https://birgau-calimani.ro/
7. Gal Lider (2022), *Strategie de Dezvoltare Locala*, Romania, Retrieved from https://galbn.ro/
8. Gal Progres Transilvan (2021), *Strategie de Dezvoltare Locala*, Romania, Retrieved from https://progrestransilvan.ro/stiri-si-noutati/
9. Inomjonova, D. (2022), *Demographic transition, natural movement of the population*, *Galaxy International Interdisciplinary Research Journal*, 291-293, Retrieved from https://internationaljournals.co.in/index.php/giirj/article/view/2139
10. Institutul National de Statistica (2021), E*venimente demografice în anul 2020*, Bucuresti, Romania, Retrieved from https://insse.ro/cms/sites/default/files/field/publicatii/evenimente_demografice_in_anul_2020.pdf
11. Nicolae, I. (2012), *Romania. Populatie, Asezari, Economie,* Bucuresti, Editura CD PRESS, Retrieved from https://public-view.bcucluj.ro/
12. Peter, D., Bradshaw, M., Shaw, D., & Sidaway, J. (2008), *An introduction to human geography,* PEARSON Prentice Hall.
13. Petri, D. (2002), *Bistrița-Năsăud. Starea de sanatate în mediul real,* Cluj-Napoca, Editura supergraph.
14. Raboca, N., & Surd, V. (1989), *Geografia populatiei și asezarilor,* Cluj-Napoca, Pentru uzul studentilor, Retrieved from https://public-view.bcucluj.ro/
15. Tihan, E. (2004), *Anatomia populatiei. Concepte cheie în sociologie, demografie, politici sociale,* Focus Opinfo.
16. Trebici, V. (1979), *Demografia,* Bucuresti, Editura Stiintifica și Enciclopedica, Retrieved from https://public-view.bcucluj.ro/
17. Ungureanu, A., & Muntele, I. (2006), *Geografia populatiei,* Iasi, Editura SEDCOM LIBRIS, Retrieved from https://public-view.bcucluj.ro/
18. Vert, C. (2001), *Geografia populatiei. Teorie și metodologie,* Timisoara, Editura Mirton, Retrieved from https://geografie.uvt.ro/wp-content/uploads/2015/07/Geografia-populatiei_teorie-si-metodologie.pdf