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# RECONFIGURATION OF ROMANIA'S RURAL SPACE FROM THE PERSPECTIVE OF HUMAN CAPITAL AFTER THE ACCESSION TO THE EUROPEAN UNION

## ABSTRACT

Rural human capital is a key driver of economic growth and sustainable rural development. The requirements of the European Green Deal, as well as the current international phenomena (health, military, humanitarian, as well as economic and ecological crises) bring new challenges for the human capital, which must acquire new theoretical and practical skills in a very short time.

In the present paper, the author aims to design a territorial picture of the social dimension of rural human capital after Romania's accession to the European Union that would benefit both the academic environment and the decision-makers. For this purpose, a set of relevant indicators for the chosen topic were selected, also depending on the availability of data. The source of data was official statistics; data were processed using Excel and SPPS. The obtained results highlight that educational and healthcare deficiencies in the rural areas have led to an underdeveloped human capital, poorly connected to the local and regional labour market, and there are huge discrepancies between the urban and rural area, as well as across different rural areas.

**Key words**: rural area, human capital, rural development.

**JEL Classification**: J24, O11, R23.

## 1. INTRODUCTION

Currently, there is a great emphasis on innovation in all fields, which is not possible in the absence of a developed human capital. Unfortunately, education and healthcare in the Romanian rural areas feature critical disparities, which are reflected in a low development level of human capital, with direct repercussions in the weak support of rural economy, also representing the main obstacle in the implementation of innovative techniques and technologies.

The two main components of human capital, *i.e*. health and education, analysed in the present paper, have been addressed in the literature, and the first to highlight their importance for the human capital are the economists Gary Becker (1964) and Theodore Schultz (1981), as well as their predecessors (Grossman and

Kaestner, 1997; Barro and Sala-i-Martin, 2004) and a series of international organisations such as OECD and the World Bank. Human capital is defined through:

- Educational and training level refers to both formal education (from primary to tertiary education), and to informal learning (lifelong or on-the-job training). The skills and competences include technical "know-how" as well as soft skills (creativity, problem-solving, communication);
- Health level is considered the foundation on which all the other abilities are built. In other words, a healthy individual is more productive, can work longer and has a higher learning capacity.

The present paper will address the health and formal education of rural human capital, without addressing the skills and competence part, for which there are no available data.

## 2. STATE OF KNOWLEDGE

The whole world is fully getting aware of the importance of human capital in economic growth and sustainable development. Economic growth is not generated only by physical capital and allocated labour, but increasingly depends on knowledge and innovation, which will transform traditional inputs into new, innovative products with much higher added value (Ederer *et al.*, 2011).

In the current period, citizens must constantly adjust their learning behaviour in order to adapt to change, human capital being the main determinant in innovation, in increasing productivity and competitiveness (Dumitrache, 2015). The pace necessary for the accumulation of knowledge and skills has accelerated much more in recent decades, and the requirements are quite high, with an emphasis on novelty and innovation.

In view of the new European requirements for achieving climate neutrality (European Green Deal, 2019), a human capital is needed that can actively contribute to ecological changes (development of new technologies and solutions to support the green transition). The European Green Deal requires the creation of a significant number of green jobs for the labour market, in areas such as renewable energies, sustainable constructions, organic agriculture, electric transport and waste management. These jobs will require well-trained human capital, capable of applying innovative solutions to reduce carbon emissions and protect the environment (Sanchez-Reaza *et al*., 2023).

The current phenomena generated by health, military, humanitarian, as well as economic and ecological crises, raise new challenges for the human capital, which must acquire new academic and practical skills in a relatively short period of time (knowledge and skills appropriate to new technologies in various fields) in order to adapt to new requirements and increase resilience in the face of new

changes (Chetty *et al*., 2020; Fuchs-Schündeln *et al*., 2021; Becker and Ferrara, 2019; Heckman and Mosso, 2014).

The post-pandemic period and the war on Romania's border have highlighted a series of social and economic vulnerabilities, which has underlined the need to strengthen rural communities to cope with major events that may arise (World Bank Group, 2023).

The discrepancies between urban and rural areas should not be overlooked either, with a less developed human capital in rural areas, which makes it necessary to implement measures for human capital development in order to adapt to new challenges. Notable differences are also noticed across different rural areas that have different development levels, which highlights the existence of human capital with different knowledge and skills from one area to another (Ianoș *et al*., 2024).

## 3. MATERIAL AND METHOD

The methodology used in the paper followed a sequence of steps: the first step was the consultation of specialised literature and the selection of indicators specific to rural human capital (health and education), the second was the identification of their availability, followed by the extraction of the statistical data necessary for the calculation of the selected indicators at county, regional and country level for the Romanian rural area. The source of data was the official statistics (NIS Tempo-Online database), and data were processed using the Excel and SPPS software programmes; the free programme provided by Eurostat was used for the elaboration of maps. The obtained results allowed a comparative analysis between counties and regions, and between rural areas depending on the degree of rurality, as well as an evolutionary analysis.

The main objective of the paper is to create a dynamic picture of the two basic components of human capital. The main working hypotheses were the following: the improvement of the values of selected indicators in the analysed period 2007–2023; the existence of considerable differences in the values of the indicators depending on the degree of rurality.

## 4. RESULTS AND DISCUSSIONS

### 4.1. RURAL HUMAN CAPITAL – HEALTH DIMENSION

The health dimension of human capital reflects the health status of the population, which determines the ability of individuals to work, learn and participate in social and economic life (Grossman, 1972; World Health Organization, 2010; World Bank, 2023).

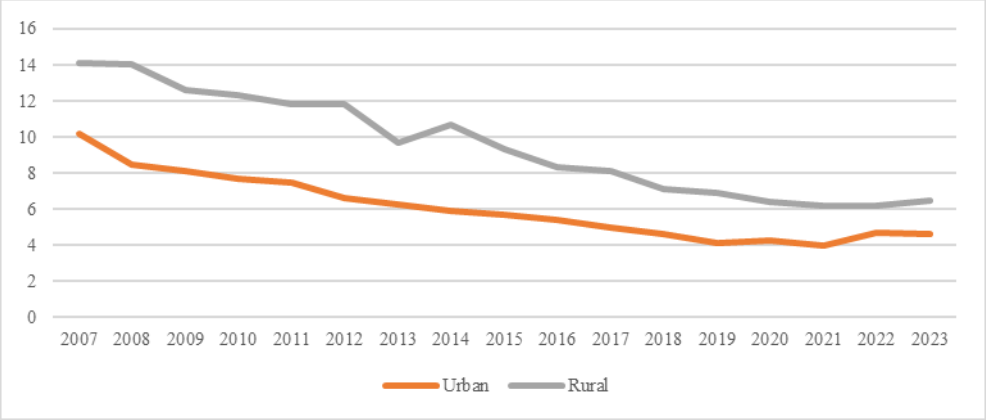
***Infant death rate*** is an important indicator for assessing the health status of a society. The infant death rate is the number of deaths of infants under one year of age per 1,000 live births, in a specified period.

At national level, the trend of this indicator decreased in the analysed period, which was also the case in rural areas. The rural/urban discrepancy is also obvious for this indicator, even though it has been significantly reduced in recent years. Thus, the difference between urban (4.6‰) and rural (6.5‰) areas was 2 percentage points in 2023, compared to 4 percentage points in 2007 (urban 10.2‰, rural 14.1‰).

Among the main factors that explain the higher values in the rural area, the following are worth mentioning:

- low access to quality prenatal and neonatal healthcare services; difficulties in transferring to maternity hospitals with neonatal intensive care units; higher rates of prematurity and low birth weight in certain communities; poor healthcare infrastructure; long distances to hospital.
- socio-economic determinants: poverty, lower educational level of mothers, poor housing conditions (Ţarcă *et al*., 2021).

In the period 2007–2023, infant death rate decreased from 14.1 ‰ to 6.5‰, yet even in these conditions it continues to be the highest in the European Union (3.3‰).

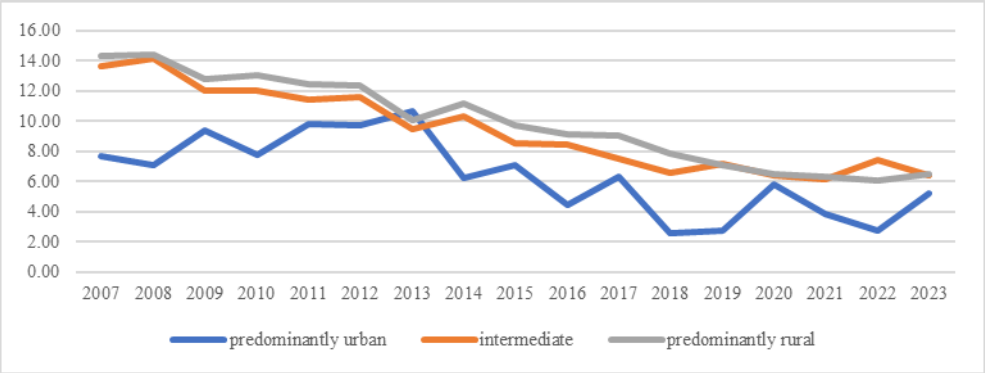



*Source:* NIS, Tempo-Online.

Figure 1. Infant death rate by residence areas (‰), in the period 2007–2023.

Depending on the degree of rurality, intermediate and deep rural areas had a similar decreasing trend in terms of infant death rate, the difference between them being relatively small, in the analysed period. In contrast, in the predominantly urban area, infant death area had a low value, *i.e.* 7.70‰ in 2007, compared to the other two (intermediate rural 13.65‰ and predominantly rural 14.30‰). The evolution fluctuated, quite atypical compared to the other areas, and very close

values were reached in 2023: thus, the infant death rate was 5.20‰ in predominantly urban areas, 6.37‰ in intermediate rural areas and 6.51‰ in deep rural areas.




*Source:* NIS, Tempo-Online.

Figure 2. Infant death rate by degree of rurality (‰), in the period 2007–2023.

*Table 1*

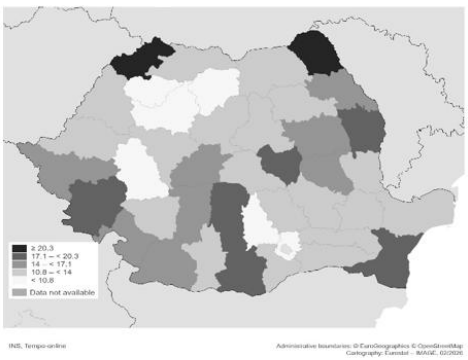
Infant death rate in the rural area by development regions, in the period 2007–2023 (‰)

| | Nord-Vest | Centru | Nord-Est | Sud-Est | Sud | București-Ilfov | Sud-Vest | Vest | Total |
|---|---|---|---|---|---|---|---|---|---|
| 2007 | 13.00 | 13.72 | 16.62 | 13.88 | 13.37 | 7.70 | 14.02 | 13.83 | 13.90 |
| 2008 | 13.67 | 14.00 | 13.38 | 15.78 | 14.30 | 7.10 | 14.50 | 14.78 | 14.14 |
| 2009 | 13.17 | 12.53 | 12.83 | 12.52 | 11.79 | 9.40 | 13.16 | 11.45 | 12.43 |
| 2010 | 10.75 | 10.98 | 14.17 | 14.90 | 13.07 | 7.80 | 11.06 | 13.65 | 12.54 |
| 2011 | 10.95 | 12.93 | 12.73 | 13.05 | 11.67 | 9.80 | 12.52 | 10.08 | 12.01 |
| 2012 | 11.17 | 11.30 | 12.20 | 13.73 | 12.57 | 9.70 | 12.56 | 10.63 | 12.03 |
| 2013 | 9.70 | 10.30 | 9.73 | 10.00 | 9.73 | 10.70 | 11.38 | 7.48 | 9.85 |
| 2014 | 9.32 | 11.27 | 11.02 | 12.90 | 11.24 | 6.20 | 10.46 | 9.08 | 10.74 |
| 2015 | 9.90 | 9.07 | 10.00 | 9.63 | 7.96 | 7.10 | 10.34 | 8.00 | 9.22 |
| 2016 | 8.67 | 8.67 | 8.15 | 10.27 | 8.69 | 4.40 | 8.16 | 10.05 | 8.80 |
| 2017 | 8.87 | 8.33 | 7.87 | 9.30 | 7.57 | 6.30 | 8.30 | 9.60 | 8.42 |
| 2018 | 8.03 | 6.52 | 8.68 | 8.38 | 7.41 | 2.60 | 5.92 | 5.73 | 7.24 |
| 2019 | 7.72 | 8.08 | 6.13 | 9.95 | 5.87 | 2.70 | 6.76 | 4.80 | 7.03 |
| 2020 | 7.18 | 8.87 | 5.67 | 6.48 | 5.53 | 5.80 | 6.48 | 4.18 | 6.41 |
| 2021 | 7.47 | 6.55 | 6.28 | 7.45 | 5.00 | 3.80 | 5.76 | 4.60 | 6.16 |
| 2022 | 7.85 | 7.52 | 6.32 | 7.73 | 5.41 | 2.70 | 4.54 | 6.40 | 6.47 |
| 2023 | 8.25 | 6.77 | 6.40 | 7.47 | 5.20 | 5.20 | 5.04 | 5.85 | 6.43 |

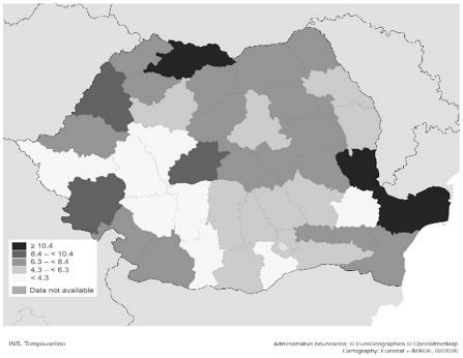
*Source:* NIS, Tempo-Online.

Overall, the country's development regions follow the national trend of constant decline in infant death rate, with the following ranking of regions in the year 2023: Sud-Vest region 5.04‰, Sud region 5.20‰, București-Ilfov 5.20‰,

Vest region 5.85‰, Nord-Est region 6.40‰, Centru region 6.77‰, Sud-Est region 7.47‰, Nord-Vest region 8.25‰.




*Source:* NIS, Tempo-Online.
Map 1. Infant death rate in the Romanian rural area in the year 2007.



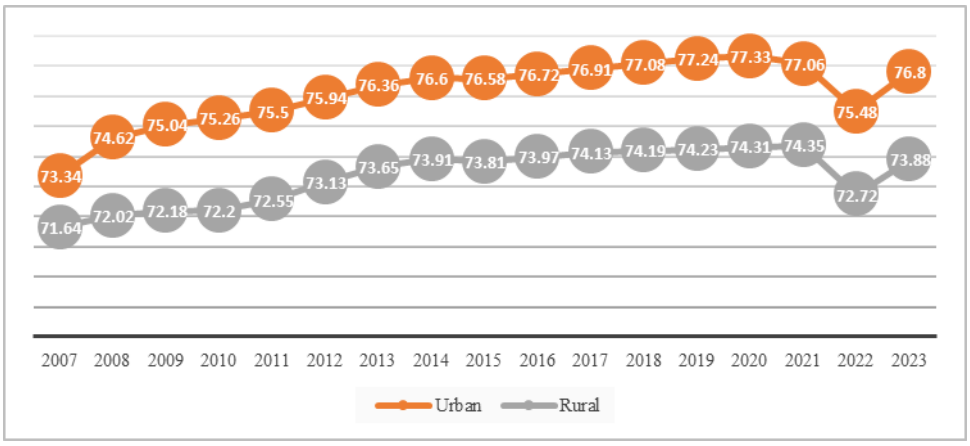

*Source:* NIS, Tempo-Online.
Map 2. Infant death rate in the Romanian rural area in the year 2023.

The infant death rate evolution was positive in all counties, the gap between counties also narrowed, but their hierarchy changed.

***Life expectancy*** in rural areas is lower than that in urban areas, throughout the analysed period. Among the factors that generate a lower life expectancy in rural areas the following can be mentioned: limited access to healthcare services (limited access to hospitals, clinics and specialist doctors can delay the diagnosis and treatment of diseases, affecting life expectancy); socio-human factors (lower level of education, lower income and poorer housing conditions negatively influence access to healthcare services and, implicitly, life expectancy). There are also a number of favourable factors that resulted in the increase in life expectancy in rural areas, in the analysed period, namely: a more active lifestyle (regular physical activities and healthy eating) or lower pollution in rural areas.

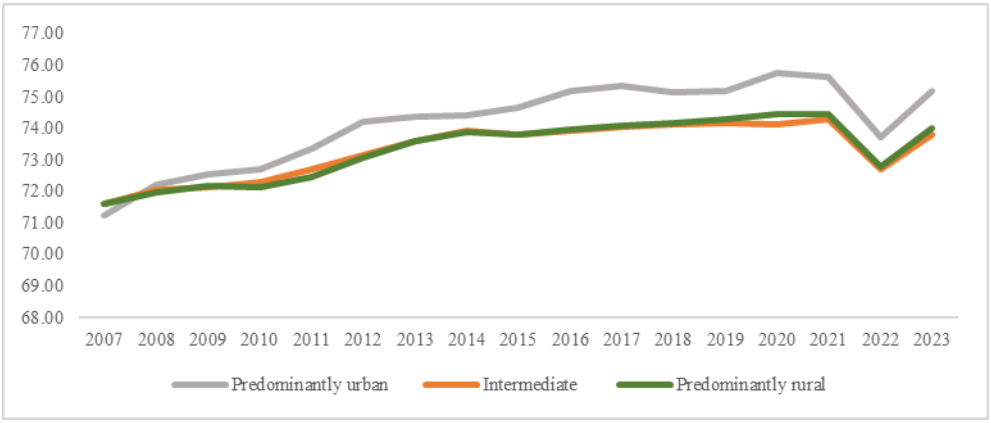
The pandemic period (2019–2022) came with a decline, sharply decreasing life expectancy nationwide, and this trend was noticed in both urban and rural areas; following this decline, life expectancy resumed its upward trajectory in both residence areas.

The increase of life expectancy in rural areas, in the period 2007–2023, from 71.61 years in 2007 to 74.01 years in 2023, was mainly determined by the increase in living conditions and improvement of healthcare services, as a result of the modernisation of rural area in recent years.

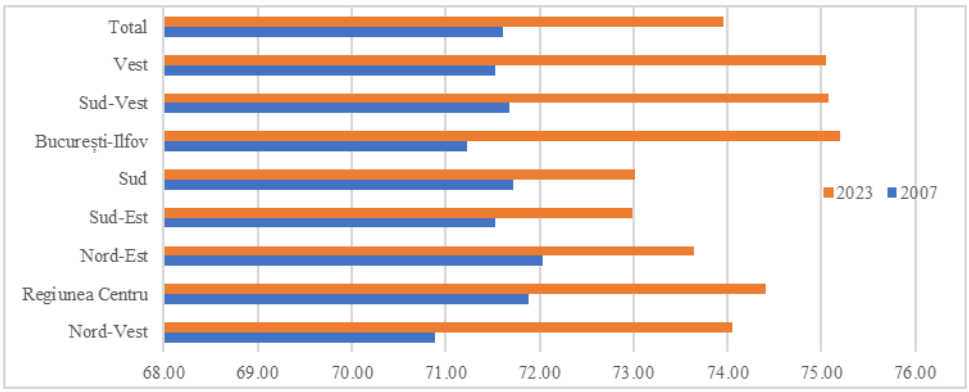



*Source*: NIS, Tempo-Online.
Figure 3. Evolution of life expectancy, by residence areas, in the period 2007–2023.

However, there are obvious territorial discrepancies. Depending on the degree of rurality, predominantly rural and intermediate rural areas do not show significant differences in average life expectancy, following the same overall increasing trend, while life expectancy in predominantly urban areas has got closer to the level reached by urban areas. This can be explained by the proximity of urban poles that generate higher incomes, better living conditions (technical and municipal infrastructure, housing), easier access to education and specialised and emergency healthcare services.



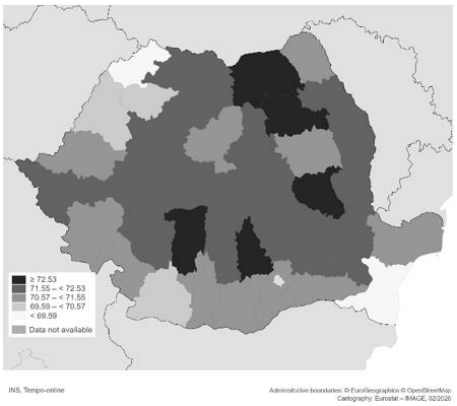

*Source:* NIS, Tempo-Online.
Figure 4. Evolution of life expectancy by degree of rurality, in the period 2007–2023 (years).



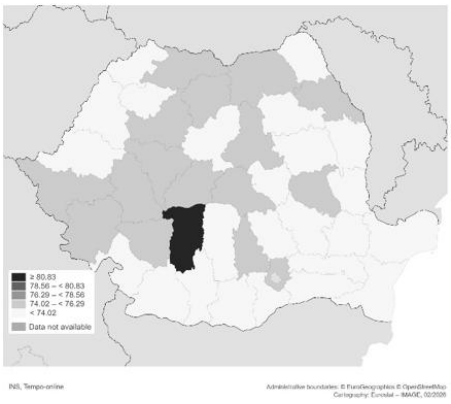

*Source*: NIS, Tempo-Online.
Figure 5. Evolution of life expectancy by development regions, in the period 2007–2023.

The rural areas in Romania's development regions with the highest average life expectancy values, in the year 2023, are București Ilfov (75.20 years), Sud-Vest (75.07 years) and Vest (75.06 years) with values much higher than those of the national rural area (73.96 years); the regions with the lowest values of life expectancy are Sud-Est (72.99 years), Sud (73.02 years) and Nord-Est (73.65 years). In the period 2007-2023, an increasing gap between regions can be noticed, and even changes in their positions in the ranking.

Life expectancy considerably increased in the analysed period, in all counties (except for Brăila county), and the differences between counties also increased, but most of them have values within the lower age groups. The favourable evolution of this indicator can be also seen from the fact that the minimum value in the year 2023 was much above the maximum value in 2007.




*Source:* NIS, Tempo-Online.
Map 3. Life expectancy in the Romanian rural area in the year 2007.




*Source:* NIS, Tempo-Online.
Map 4. Life expectancy in the Romanian rural area in the year 2023.

***Access to family medicine*** in rural areas in Romania represents one of the most important and persistent problems of the healthcare system, being an indicator of the social dimension of human capital and equity in healthcare.

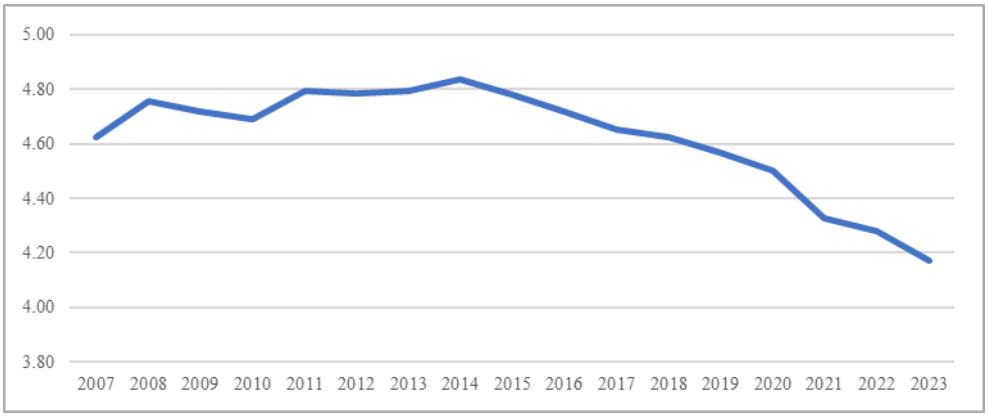
Access to family medicine services in rural areas is marked by significant inequities compared to urban areas. The current situation highlights a shortage of family physicians, a fact also confirmed by the Save the Children Romania organisation, which shows that family doctors serve 1.4 times more patients in rural areas than in urban areas. The number of inhabitants per family doctor is 50% higher in rural areas than in urban areas (2,312 inhabitants/family doctor in rural areas compared to 1,157 inhabitants/family doctor in urban areas).

Less than half (47%) of Romanian localities do not have sufficient family doctors, and 328 communes have no family doctors at all. The distribution of healthcare units and physicians in Romania is uneven between rural and urban areas, and mobile healthcare services provided directly in communities can make the difference between early detection of diseases and severe complications.

The remote, isolated areas represent a medical safety problem, as in these areas access to healthcare services is extremely difficult (Save the Children Romania Organisation, 2024).

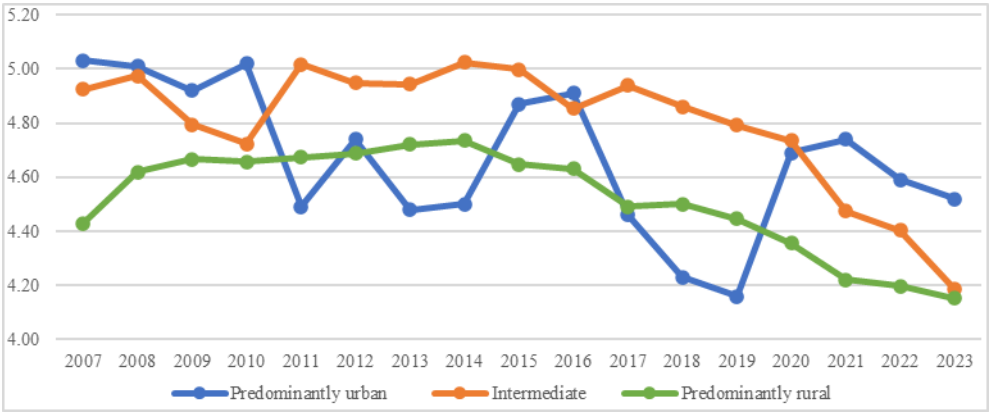
The number of family medicine offices in rural areas is by approximately 51% lower than in urban areas. In the year 2023, there were approximately 13.7 thousand family medicine/independent offices operating in urban areas, while in rural areas there were only 793.

The trend of the indicator number of family doctors per 10,000 inhabitants in rural areas decreased, which denotes a constant worsening of access to family medicine by overloading healthcare professionals. This indicator had a slight positive evolution until 2014, to constantly decrease afterwards.



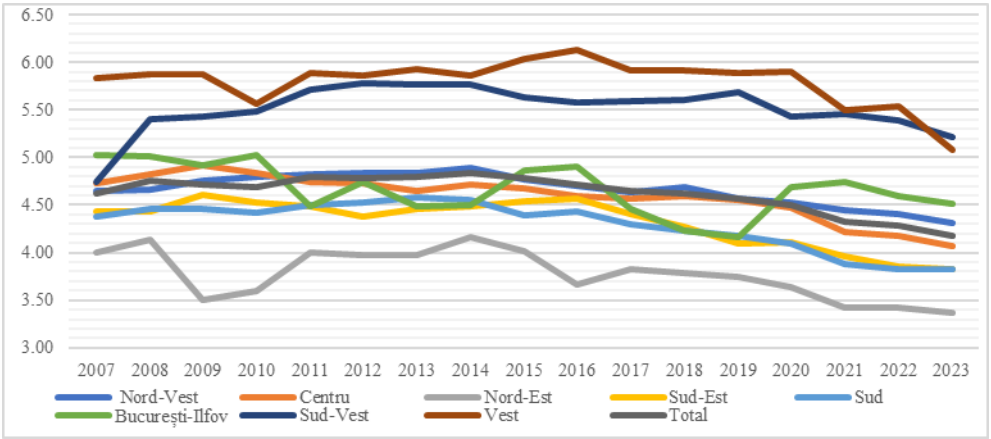

*Source:* Author's processing based on NIS Tempo-Online data.

Figure 6. Evolution of the number of family doctors per 10,000 inhabitants in the rural area, in the period 2007–2023.



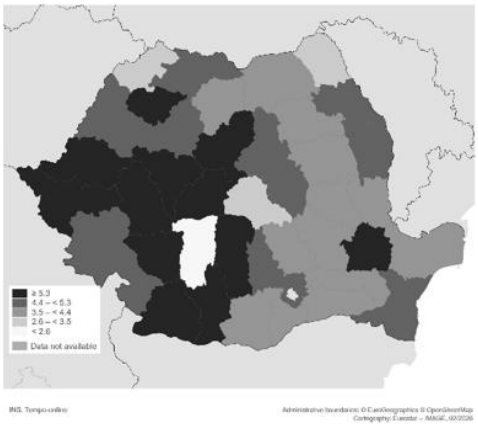

*Source:* Author's processing based on NIS Tempo-Online data .
Figure 7. Evolution of the number of family doctors per 10,000 inhabitants, by degree of rurality, in the period 2007–2023.

Depending on the degree of rurality, intermediate and deep rural areas started from different values (4.92 and 4.43 doctors/10,000 inhabitants, respectively) in 2007, which were favourable for intermediate areas that approached the value of predominantly urban areas (5.03). There followed a sinuous trend for predominantly urban areas (justified by possible fluctuations in medical staff) and a decreasing trend for the other areas after 2014, with the intermediate areas having a more pronounced negative trend, while in 2023 the values of these two areas became equal, being surpassed by predominantly urban areas.

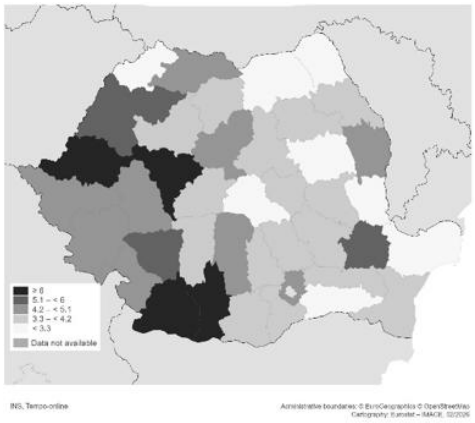



*Source:* Author's processing based on NIS Tempo-Online data.
Figure 8. Evolution of the number of family doctors per 10,000 inhabitants in the rural area, by degree of rurality, in the period 2007–2023.

The following regions had the highest workload of family doctor in the year 2023: Nord-Est (3.37 doctors/10,000 inhabitants), Sud (3.82) and Sud-Est (3.83). The leading region was Sud-Vest (5.22), which was also the only region with a slightly increasing trend in 2007. București region ranked the 2nd in 2007, and reached the 3rd place in the ranking in 2023, after the most fluctuating evolution among all development regions.




*Source:* Author's processing based on NIS Tempo-Online data.
Map 5. Number of family doctors per 10,000 inhabitants in the Romanian rural area in the year 2007.




*Source:* Author's processing based on NIS Tempo-Online data.
Map 6. Number of family doctors per 10,000 inhabitants in the Romanian rural area in the year 2023.

The difference regarding the number of family doctors per 10,000 inhabitants is even greater between counties than between development regions. There are counties with an excessive overload on family doctors (Brașov 2.38, Satu Mare 2.58, Călărași 2.80, Botoșani 2.87, Bacău 2.94) and counties that are in the best position (Arad 6.93, Alba 6.61, Olt 6.47, Dolj 6.09).

*Table 2*

Social dimension indicators – health – by degree of rurality, in 2007 and 2023

| | | **Degree of rurality** | | | |
|---|---|---|---|---|---|
| | | **Predominantly urban** | **Intermediate** | **Predominantly rural** | **Total** |
| Social dimension – Health | | | | | |
| Infant death rate (‰) | 2007 | 7.70 | 13.65 | 14.30 | **13.90** |
| | 2023 | 5.20 | 6.37 | 6.51 | **6.43** |
| Average life expectancy | 2007 | 71.23 | 71.62 | 71.61 | **71.61** |
| | 2023 | 75.20 | 73.81 | 74.01 | **73.96** |
| Population's access to family medicine | 2007 | 5.03 | 4.92 | 4.43 | **4.62** |
| | 2023 | 4.52 | 4.19 | 4.15 | **4.17** |

*Source:* Author's calculations based on NIS, Tempo-Online official statistical data.

In the analysed period, there was a significant loss in the number of family doctors per 10,000 inhabitants in rural areas, and some counties got downgraded to the lower part of the ranking characterised by an overload on family doctors.

The analysis of population health indicators by degree of rurality highlights two directions, one characteristic to predominantly urban areas that have indicator values above the national rural average and above the average of the other areas.

Among the indicators selected to characterise the health dimension, 2 indicators with positive developments in the analysed period stand out, namely infant death rate and average life expectancy. At the same time, the access to family medicine indicator has depreciated. Thus, it can be concluded that it was not access to medical services that generated the improvement of the 2 indicators that reflect the health and well-being of society, but other factors contributed to this positive development, of which the most important would be the following:

- *infrastructure development and improved living conditions*, such as access to drinking water and sanitation, which has drastically reduced the incidence of infectious and parasitic diseases; electrification and natural gas supply have improved thermal comfort and reduced the risk of respiratory diseases caused by poor heating on wood or coal;
- *education and changes in the lifestyle*, which have directly influenced longevity through awareness of risks; rural people are now more informed on the harmful effects of smoking, excessive alcohol consumption and an unbalanced diet;
- even *changing working conditions in rural areas*, such as agriculture mechanisation that has reduced strenuous physical labour, which in the past had prematurely worn out the body and increased the risk of serious work accidents.

## 4.2. RURAL HUMAN CAPITAL – EDUCATION

Today's society is based on information and technology, and without proper education of the population, the Romanian society will not be able to evolve and support economic growth and sustainable development in the future.

Education adds value to human capital, both formally (through the education system) and informally (on the job, through various training and development courses) (Dumitrache, 2015). While in the case of formal education, measuring the educational stock is relatively simpler, through the enrolment rate, graduation rate, number of schooling years, as well as measuring the knowledge, skills and aptitudes acquired through education by a person (PISA tests), on the other hand, in the case of non-formal education (knowledge, skills, aptitudes acquired at work) there is no agreed method of measuring it.

Measuring educational human capital would be useful for developing more efficient educational policies, for a better allocation of funds for education, for the

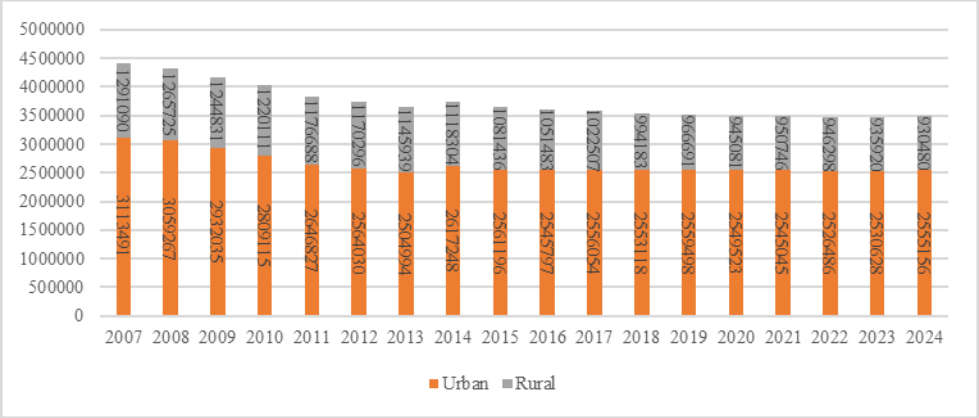
economic environment, considering the important role of an educated human capital for economic growth. In this paper, only data on formal education will be taken into consideration, as there are no official data on informal education.

**Formal education dimension**

At national level, the largest part of the school population (73.0% in 2023–2024) is found in urban areas. Therefore, the rural school population represents a significantly lower share (27%).

The evolution of the rural school population is influenced, on the one hand, by the dynamics of the rural population and, mainly, by the decrease in the young population due to the negative demographic trend: population decline, migration of the young population from rural areas, negative natural increase, decrease in birth rate, etc.; and on the other hand, by the socio-economic context which, in rural areas, is not favourable to encouraging participation in education and continuation of studies due to the lack of occupational prospects.

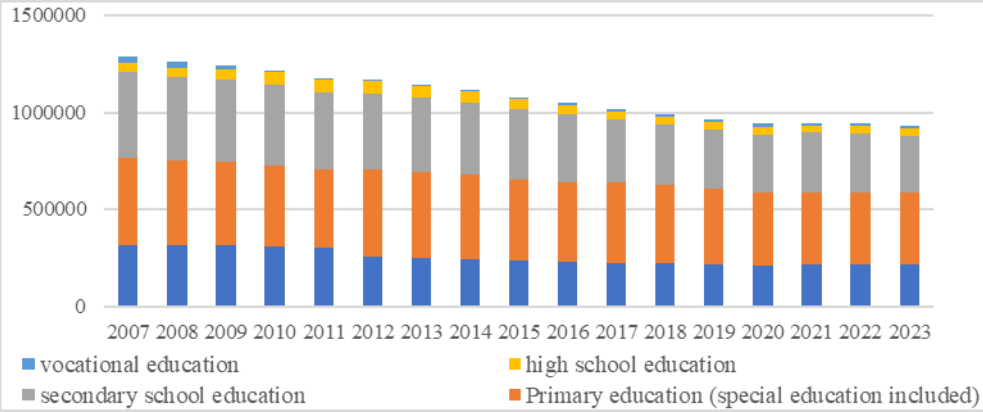
The rural school population decreased considerably, in the period 2007–2023, by 355,170 students (-27.51%); preschool level -31.67%, primary level -17.14%, secondary school level -33.68%, high school level -18.87% and vocational level by -63.98%.




*Source:* Author's processing based on national statistical data (NIS Tempo-Online).

Figure 9. School population based on residence areas, in the period 2007–2023.

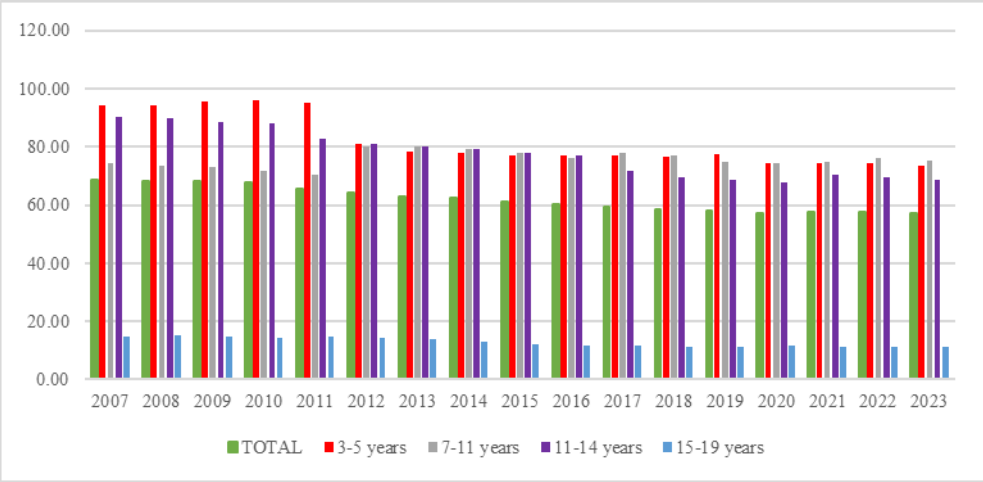
The structure of the school population remained approximately the same during the analysed period, namely: pre-school education 24.70%, primary education 34.80%, secondary school education 34.00%, high school education 3.90% and vocational education 2.60%.




*Source:* Author's processing based on national statistical data (NIS Tempo-Online).
Figure 10. Evolution of school population, by education levels, in the rural area, in the period 2007–2023.

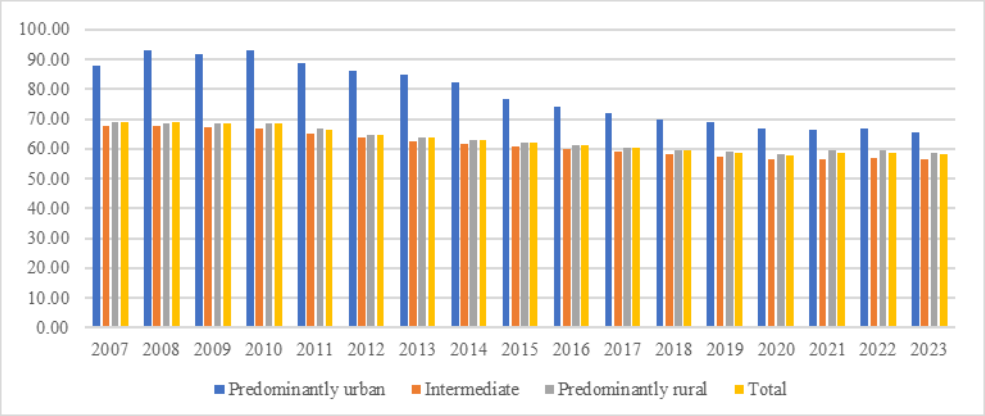
***School enrolment rate*** is another important indicator for assessing participation in education and the challenges faced by the education system. The rural school enrolment rate indicator trend decreased, in the analysed period, from 69.06% in 2007 to 58.17% in 2023. This situation denotes an increase in the rate of non-participation in formal education, which highlights the serious, even dangerous, situation of the Romanian education.

After the graduation of secondary school, when most students leave school, those who continue their studies are getting more oriented towards vocational education, as compared to other educational forms. And continuing their studies in higher education is rather an exception.



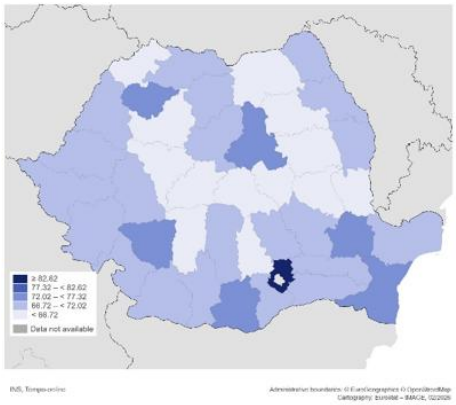

*Source:* Author's processing based on national statistical data (NIS Tempo-Online).
Figure 11. Rural school enrolment rate by age groups, in the period 2007–2023.

This trend is also found across development regions. An exception is București-Ilfov region, which had a slightly increasing trend until 2010, to significantly decrease afterwards, yet remained higher than the average of the other regions.

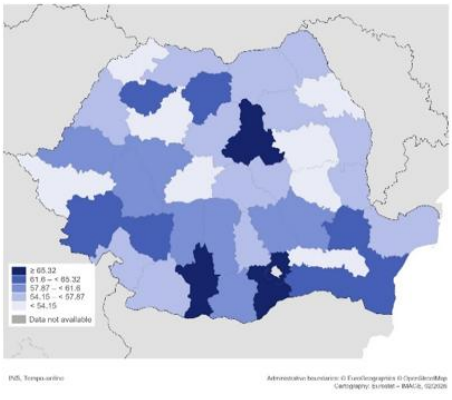



*Source:* Author's processing based on national statistical data (NIS Tempo-Online).
Figure 12. Evolution of the rural school enrolment rate (%), by degree of rurality, in the period 2007–2023.

At county level, a significant decrease in the rural school enrolment rate can be noticed in all counties. The minimum in 2007 is higher than the maximum in 2023, which highlights the substantial worsening of the educational situation in rural areas.



*Source:* Author's processing based on NIS Tempo-Online data.
Map 7. School enrolment rate (%) in the Romanian countryside in the year 2007.



*Source:* Author's processing based on NIS Tempo-Online data.
Map 8. School enrolment rate (%) in the Romanian countryside in the year 2023.

*Early school leaving* in Romania declined, but remained high compared to the European Union average. In 2023, Romania had a dropout rate of 16.6%, while the dropout rate in the rural area was 27.5%, which denotes the vulnerability of students in these areas, the main causes being poverty, lack of motivational support from the family that also has a low level of education, poor conditions in rural areas and lack of adequate educational resources (Iliescu D. coord., 2024).

A gradual decrease in school dropout in rural areas was noticed in the period 2007–2019. The early school leaving rate in rural areas (Eurostat indicator) decreased from approximately 25–26% in 2007 to 18–19% in 2019. This trend was due to educational interventions and public investments supported by European funds (ESF, POSDRU, POCU). The main factors that had a positive contribution would be the following: "*High School Money*", "*School Supplies*", "*Bread roll and Milk*", "*School after School*", "*Second Chance*" schemes; investments in rural school infrastructure (EAFRD and ESF funds); increase in the number of school minibuses; decrease in temporary seasonal migration between 2015–2019 (partial stabilisation); non-formal education projects carried out by NGOs in disadvantaged areas (Eurostat, 2020; UNICEF and Ministry of Education, 2019).

After 2019, a sharp increase in school dropout took place (the effect of the COVID-19 pandemic and the educational crisis). In the period 2021–2023, Romania once again became the country with the highest school dropout rate in the EU (over 16%, compared to the European average of 9%). In rural areas, the rate rose again to over 20%, according to Eurostat and the Ministry of Education.

The main cause for this increase was school closure and the transition to online education in the pandemic period, which generated a number of negative effects due to low access to digital devices and stable internet (35-40% of students had this problem) (UNICEF Romania, 2021; World Bank, 2022).

The school dropout rate in rural areas decreased until 2019, when it reached a minimum, to increase afterwards, to reach one of the highest values in the EU.

School dropout has a series of negative consequences both at individual and collective level (at the level of the whole society). School dropout limits opportunities for professional and personal development and reduces the chances of insertion into the labour market, in the conditions of lower incomes due to the lack of education and vocational training (Iliescu, 2024).

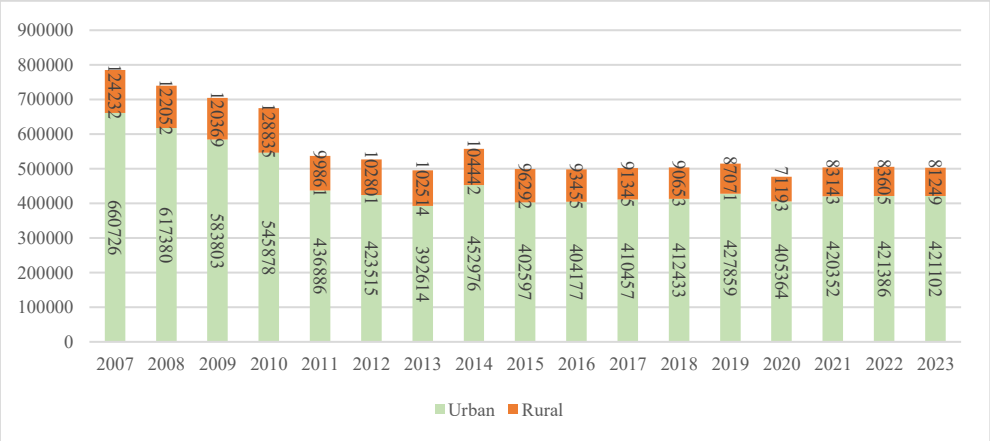
After the accession to the European Union, the number of ***graduates*** in rural Romania decreased, this being the cumulative result of several factors, among which the following would stand out as the most important:

- *Massive migration of rural population* (village depopulation), manifested through internal migration, but also through external migration that occurred, especially, as a result of labour market liberalisation. Migration generally affected the young population, which has generated changes in the age structure, the increase of elderly population and the decrease of the young/school population (World Bank, 2018; Eurostat, 2023). Birth rate

declined constantly occurred after 1990, as well as after 2007, migration being the main cause of the birth rate decrease (Eurostat, 2022);

- *The educational infrastructure is deficient*, and many schools in the rural areas have been closed or merged, and the long distances to other schools and the lack of school transportation have perpetuated absenteeism and early school leaving (Ministry of Education, 2023*;* European Commission, 2020*)*;
- *The low economic and motivational context* has perpetuated poverty and school dropout in rural areas. In many rural areas, families are facing persistent poverty and a lack of local economic opportunities, which leads many students to leave school to work (in agriculture, construction, or abroad), which reduces the number of graduates, especially from high school and vocational education. After 2007, the increase in income from abroad also had a paradoxical effect: for some young people, working abroad became a more attractive alternative than continuing their studies (World Bank, 2022*;* OECD, 2022).
- *The lack of educational retention policies adapted to the rural environment* makes school unattractive for students and teachers. Investments in training rural teachers have been modest, and teacher turnover (commuting) has affected the quality of the educational process (UNICEF & Ministry of Education, 2019; European Commission, 2023).

These phenomena, encountered especially in rural areas, had a direct impact on the stock of rural human capital, which gradually eroded, also amplifying significant gaps between different rural areas.




*Source:* Author's processing based on national statistical data (NIS Tempo-Online).

Figure 13. Evolution of graduates by residence areas, in the period 2007–2023.

***The number of graduates*** significantly decreased nationwide in the first part of the analysed period, between 2007 and 2011, after which it remained at about

the same level. In the period 2007–2023, the decline in the number of graduates reached 36%, with the same rate of decrease in both urban and rural areas. In terms of concentration of the number of graduates, the discrepancy by residence areas is obvious; thus, the rural area had only 16.17% of the total number of graduates nationwide in 2023, and the urban area 83.83%.

In pre-university education, 74.70% of the total number of graduates at national level are found, with major differences between urban areas (69.83%) and rural areas (99.95%), which highlights the low share of those who continue their studies in tertiary education: 30.17% in urban areas and only 0.05% in rural areas.

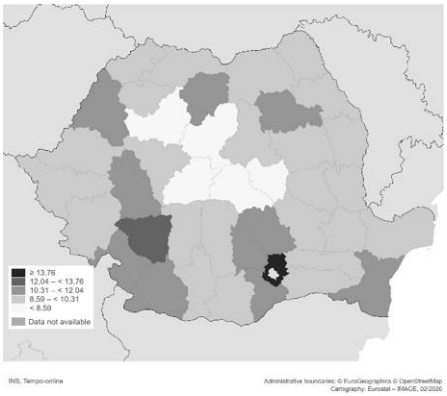
The very critical situation is represented by the fact that a very low share of the rural school population continued their studies after secondary school, *i.e.*, only 14.63%, compared to 64.11% in urban areas, in 2023.

*Table 3*

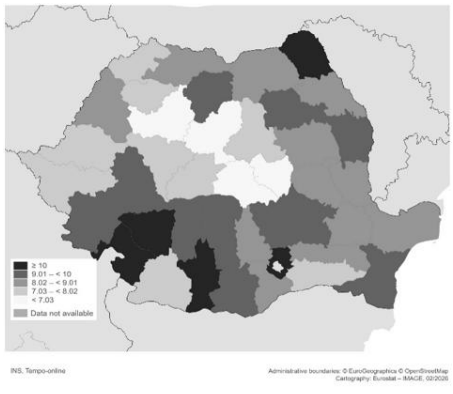
Secondary education graduation rate, by residence areas (%)

| | **Total** | **Urban** | **Rural** |
|---|---|---|---|
| 2014/2015 | 86.1 | 100.6 | 74.2 |
| 2015/2016 | 85.5 | 101.3 | 72.5 |
| 2016/2017 | 81.8 | 96.1 | 69.1 |
| 2017/2018 | 82.1 | 96.7 | 69.4 |
| 2018/2019 | 83.0 | 97.1 | 69.8 |
| 2019/2020 | 84.3 | 101.7 | 67.4 |
| 2020/2021 | 65.6 | 78.4 | 53.0 |
| 2021/2022 | 75.7 | 90.0 | 61.4 |
| 2022/2023 | 76.3 | 91.1 | 61.4 |

*Source*: Ministry of Education (2024).




*Source:* Author's processing based on NIS Tempo-Online data.
Map 9. Share of graduates (%) in total school population, in the Romanian rural area, in the year 2007.

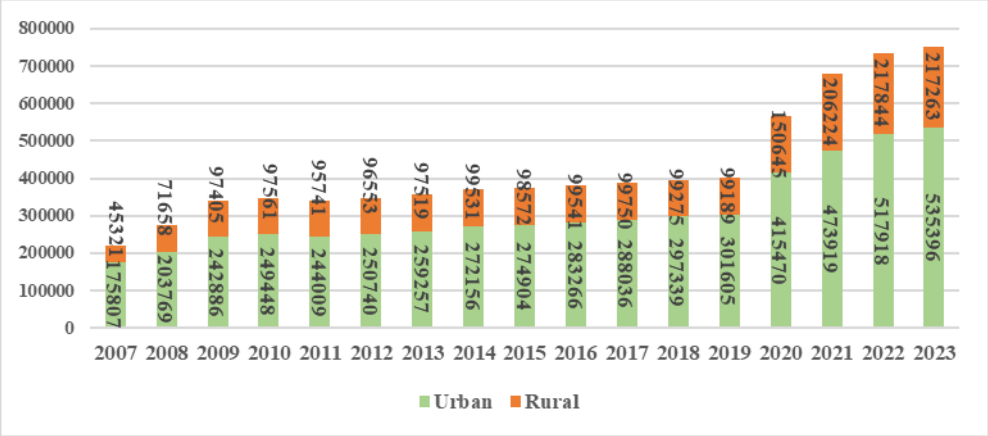



*Source:* Author's processing based on NIS Tempo-Online data.
Map 10. Share of graduates (%) in total school population, in the Romanian rural area, in the year 2023.

At county level, a decrease in the share of graduates in rural areas can be noticed in all counties, and increasing discrepancies between counties.

The secondary school graduation rate in rural areas has a tendency to remain stable after the shock caused by the pandemic (61.4%), but at a considerable difference compared to urban areas (91.1%). This fact appears as a result of school dropout which is more frequent in rural areas, but also as a result of students' migration from rural areas to urban schools as an option for better quality education. The migration of the school population phenomenon occurs mainly from rural peri-urban areas.

The number of ***PCs in school units*** has experienced the most spectacular increase, 221,128 units in 2007 to 752,659 units in 2023. The growth was even greater in rural areas than in urban areas, as in 2007, the share of school computers accounted for 20.49% of national total, to reach 28.87% in 2023.




*Source:* Author's processing based on national statistical data (NIS Tempo-Online).

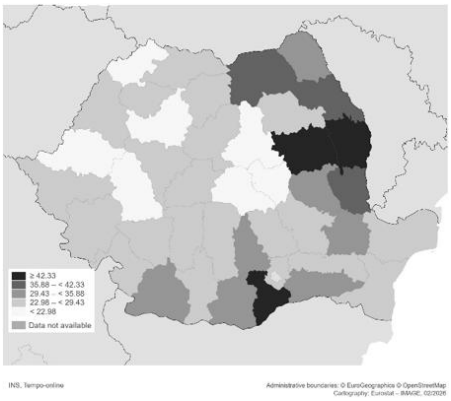
Figure 14. Evolution of school PCs by residence areas, in the period 2007–2023.

The indicator ***number of students per PC*** decreased significantly in the analysed period, from 28.50 students/PC in 2007 to 4.72 students/PC in 2023. Two periods of increase in the number of PCs in schools can be noticed, namely 2007–2009, a period of significant endowments from European funds, and 2019–2021, another period with significant endowments as a result of the pandemic and the need to support online education.

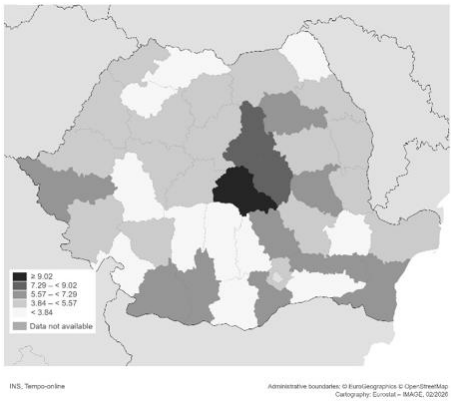
One could notice the improvement of indicator in the case of all counties, most of them being in the favourability zone.

School endowment with personal computers in the rural area, after Romania's accession to the European Union (2007), has been largely supported through European funds.

The Regional Operational Programme (ROP) 2007–2013 was one of the main funding sources for school equipment, immediately after the accession.




*Source:* Author's processing based on NIS Tempo-Online data.
Map 11. Number of school students per PC, in the Romanian rural area, in the year 2007.




*Source:* Author's processing based on NIS Tempo-Online data.
Map 12. Number of school students per PC, in the Romanian rural area, in the year 2023.

In the period 2014–2020, the Competitiveness Operational Programme (COP) financed projects to improve ICT infrastructure, including the purchase of tablets and IT equipment necessary for online education, intended for students and teachers, including those from rural regions.

The Regional Programmes (RP) 2021–2027 have priorities focused on education and can be accessed by local authorities to modernise school infrastructure and provide digital technologies and IT equipment in pre-school, primary, secondary and high school education units in rural areas.

Currently, the National Recovery and Resilience Plan (NRRP) 2021–2027 is another major source of funding for the modernisation of school infrastructure and digitalisation; through the component C15 – Education, a significant budget of about 3.6 billion euros is allocated for investments in education. This measure aims to equip thousands of schools (5,846 schools have been approved for funding), including educational units in rural areas. The equipment includes, among others, IT equipment (PCs, laptops, tablets), interactive displays, and the equipment with ICT labs and smart labs (SmartLab).

The administrative-territorial units (local councils), which have rural schools under their subordination, are the main beneficiaries of these funds and are in charge of acquisitions and endowments.

***Paradoxically, improving digital access has not translated into improving school performance – which confirms that equipment, without didactic quality and pedagogical support, remains an unused resource.***

For the rural area, a series of policies and programmes have been implemented in recent years that have had a positive impact, but this is not enough to bring about significant changes. Among these, the most important would be: "*Motivated Teachers in Rural Areas*" (Teach for Romania) – training and support

for young educators; "*High School Money*" – financial support for students from disadvantaged backgrounds; "*School after School*" and "*Second Chance*" – to reduce dropout and narrow educational gaps; NRRP – Component C15 Education – digitalisation, school infrastructure and vocational training.

However, these programmes are fragmented and unevenly distributed. To improve performance, a coherent strategy is needed that combines: investments in rural educational infrastructure, continuous training for teachers, socio-economic support for students, and early school counselling and guidance.

*Table 4*

Social dimension indicators – education – by degree of rurality, years 2007 and 2023

| | | Degree of rurality | | | |
|---|---|---|---|---|---|
| | | **Predominantly urban** | **Intermediate** | **Predominantly rural** | **Total** |
| **Social dimension** | | | | | |
| ***Education*** | | | | | |
| School enrolment rate | 2007 | 87.92 | 67.89 | 69.00 | **69.06** |
| | 2023 | 65.37 | 56.52 | 58.87 | **58.17** |
| Number of students/PC | 2007 | 27.09 | 28.01 | 28.85 | **28.50** |
| | 2023 | 4.55 | 5.22 | 4.42 | **4.72** |
| Share of graduates in school population | 2007 | 15.48 | 9.80 | 9.80 | **9.94** |
| | 2023 | 10.37 | 8.46 | 8.78 | **8.70** |

*Source:* Author's processing based on national statistical data (NIS Tempo-Online).

Depending on the degree of rurality, the values of education indicators reveal a much greater difference between the predominantly urban area and the other areas (intermediate and predominantly rural). In the case of intermediate and predominantly rural areas, the indicators values are very close.

Among the indicators selected for the social dimension component – Education, two indicators with negative developments stand out, which highlight the general trajectory of Romanian rural education, namely school enrolment rate and share of graduates in the school population. The third analysed indicator highlights an accelerated endowment of schools with PCs in the analysed period, but which has had no impact on the general trend of Romanian rural education.

The decrease of the values of these indicators (school enrolment rate and share of graduates in the school population) is the result of a vicious circle between poverty and lack of opportunities. The Romanian rural education is facing deep structural and socio-economic challenges.

Among the main factors that lead to reduced participation in education in rural areas, the following are worth mentioning:

- *Economic factors/poverty*. Poverty is the main critical driver of school dropout; although schooling is free of charge, the costs of transportation, clothing, supplies and food are often difficult to bear by low-income families. Many children are withdrawn from school or are frequently absent to help with field work or animal care, giving up education for the immediate survival of the family.

- *Geographical isolation***.** The physical distance between home and school becomes an important impediment to continuing studies. The merging of school units has forced school students to commute long distances, which negatively influences participation in the educational act. The lack of school minibuses or the poor condition of the roads over winter leads to chronic absenteeism, which culminates in school dropout.
- *Quality of education and human resources.* There is a major qualitative gap between rural and urban education. In the rural areas, there is a high fluctuation of teaching staff, with many rural schools relying on substitute or unqualified teachers, as full-time teachers prefer to work in urban localities. Rural schools often lack labs, libraries, and stable internet access, which limit the attractiveness of the learning process and its relevance to the modern labour market.
- *Cultural factors and family environment.* There is a direct correlation between parents' education and the duration of children's schooling. In rural areas, parents with only primary education place less importance on their children's education.

## 5. CONCLUSIONS

From the analysis carried out on the social dimension of Romanian human capital, it was possible to observe the dichotomous evolution between the health component and the education component. The positive evolution of health indicators is not the direct result of the improvement of the healthcare system, but is rather based on other principles, including the development of infrastructure and the improvement of living conditions, education and lifestyle changes, and changes in working conditions in rural areas. While education indicators show a negative trend that is the direct result of deep structural problems of both the education system (poor quality of facilities and of educational act), and precarious economic conditions (poor motivation and material support for continuing studies).

***Deficiencies in education and healthcare in rural areas result in a poorly developed human capital. Strengthening this dimension is essential for rural economy growth and for supporting sustainable rural development and reducing rural-urban disparities.***

Following the analysis, *a series of recommendations are outlined to improve rural human capital*.

For the *health dimension*, the following directions are targeted: providing incentives for rural family doctors, introducing mobile primary healthcare units (financing can be provided through the NRRP – C12 and the Health Programme 2021–2027); creating a national rural telemedicine platform that connects rural family doctors with specialists from county and university hospitals (possible financing through NRRP – C7 Digital Transformation and C12 Health); integrating

healthcare services into integrated community centres for vulnerable people that bring together in the same physical space the community nurse, the health mediator, the social worker and, periodically, the family doctor (financed through the Social Inclusion and Dignity Programme 2021–2027); implementing primary prevention programmes specifically addressing rural communities: nutritional education, screening for prevalent chronic conditions (diabetes, hypertension, cervical cancer), vaccination and maternal and child hygiene.

For the *education dimension*, the following directions are targeted: providing incentives for teachers in rural areas (financing through the Education and Employment Programme – ESF+); mandatory and funded remedial interventions (financing from the state budget); reforming the school transport system (financing through NRRP C10 Local Fund), introducing an integrated support package for vulnerable rural students; creating rural school consortia – groups of educational units that share resources, specialised teaching staff and infrastructure (financing through NRRP – C15); curriculum adapted to the rural context and the green economy; a system for the individualised monitoring of learning pathways (financing through NRRP C7 and the reforms in C15).

The main funding sources identified for the period 2021–2027 are: NRRP C12 Health/C15 Education; ESF+ Education and Employment Programme; Health Programme – EAFRD/NSP; ERDF Regional Programmes. Theoretical allocation would be approximately 17 billion euros, but the estimated rural absorption rate does not exceed 20%. The main problem in low rural absorption is represented by potential beneficiaries who do not have the capacity to access and implement the funds. ***In the absence of local absorption capacity, funds will continue to be allocated according to administrative capacity, not according to actual social needs – perpetuating the territorial inequalities that they target to correct.***

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