THE DEMOGRAPHIC DEVELOPMENT OF RURAL LOCALITIES IN THE SOUTH MUNTENIA REGION-CASE STUDY- TWO COMMUNES IN CALARASI COUNTY, ROMANIA

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Abstract

An opportunity for the rural environment is the sustainability of agricultural activities, a concept that has recently emerged in rural areas, which is difficult to implement, as development in these areas is not uniformly achieved and requires significant investment to achieve sustainable village development. The purpose of the study was to identify the factors affecting population decline in the two regions studied to find solutions that could help to stop the decline. Data collection was carried out in accordance with current law (Law 544/2001), where birth, mortality and natural growth rates were determined and calculated using SPSS software, Pearson coefficients. The development of a landscape monitoring platform involving local authorities, academia, and business is an absolute necessity. It is absolutely necessary to develop a platform for monitoring the countryside, involving local authorities, the academic world and the business world. In this way, authorities can identify the localities where investments are needed to develop these areas.

Key words: South-Muntenia region, rural localities, population, Romania

INTRODUCTION

Calarasi County is located in the South-East of Muntenia region, to the left of the Borcea arm and the Dunăre river. The county has an area of $133,22 \text{km}^2$, a population of 65,181 inhabitants with a density of 551.79 inhabitants/km^2[8].

According to Iova (2013), Calarasi County in 2012 was agriculturally rich, with 84% of the county's surface being represented by land, agriculture being the county's basic activity [13]. The revival of the rural environment from an economic perspective can be achieved through the revival of crafts and traditions of the area, as well as tourism, construction and financial transactions [18], [19].

The demographic analysis of the countryside can provide information on demographic change, causes, and solutions to mitigate demographic decline [11].

According to Dumitru (2019), the South-Muntenia region shows a decreasing population trend in the period 2014-2018, although it ranks second nationally in terms of population, in 2018 the decrease was 4% compared to the population recorded in 2014 [4]. According to Dumitru (2021), with Romania's accession to the European Union, the rural environment has seen many changes due to the support measures allocated. Even through these measures, the development of areas where there are natural resources is difficult to achieve due to dysfunctional infrastructure [3, 17]. An opportunity for the rural environment is the sustainability of agricultural activities. This term has recently emerged in rural areas and is difficult to implement because the development of these areas has not been uniformly achieved and substantial investment is needed to achieve sustainable development in villages. Improving sustainable behavior in rural areas

can be achieved by training young people to produce food whilec onserving natural resources [6]. In terms of food security, the most favoured countries are those with agricultural potential that can supply large quantities of agricultural products and food beyond their national needs. These countries, including Romania, have a rich agricultural potential. This comparative advantage represented by Romania is under used because, according to estimates by national and international experts and institutions, about 70% of the total demand for food, Romania's current market profile can cover the import of suchproducts [7], [5].

În recent years, people's diet has changed due to global challenges, among them we can mention the need for food increases with the changing diet of emerging populations. With biofuel production, as well as the impact of climate change on agriculture, food production, and supply, even in the EU is no longer an issue, food security has become an issue at a highly vulnerable EU level [1], [16]. Food insecurity in both the medium and long term is one of the food security issues, given the progress in climate change, the main global concern is: land, water and other agricultural resources, population growth, increasing market and trade vulnerabilities and poverty in many areas, especially in rural areas [12]. Given the need to increase agricultural production by 70% by 2050, action is needed to ensure food security in the way that the world can reach the right level of food. Solutions could be to encourage and fund agricultural research to find solutions which are environmentally friendly and suitable to maintain human health [22, 24].

The analysis of the global food security situation is based on a comparison of global food security levels, disparities between agricultural production and importance in different developing and developed countries. It compares the share of major sectors, taking into account, highlighting disparities and uneven distribution of agricultural production, the main sources of food security [9, 21].

Organic farming can be an opportunity for rural development, with an emphasis on the idea of process rather than product per se

when it comes to organic farming; sustainable development can positively influence renewable energy and rural development through the integration of biological cycles [2]. Youth entrepreneurship must be stimulated to encourage the creation of innovative businesses, promote a culture favourable to entrepreneurship and the development of SMEs and medium-sized enterprises. The important role of education in promoting attitudes and facilitating entrepreneurial behaviour that started in elementary schools is now well known [14, 23]. The aim of the study is to identify the factors influencing the demographic decline in the two localities analysed, with a view to find solutions that could contribute to halt the demographic decline.

MATERIALS AND METHODS

Steps that led to the determination of the two localities:

1.Identification of the development region with the highest proportion of rural population in the total. Therefore, at the 2020 level, it was identified as the South-Muntenia region (Figure 1) [20].

2. Identification of the county in the South-Muntenia Region with the highest value of agricultural production, taking into account that agriculture is the main activity of rural localities. Therefore, at the 2020 level, Calarasi County was identified (Figure 1)[10].

3.Taking into account the main aspect that influences the demographic evolution, the localities with the highest birth rate have been identified (Figure 1).
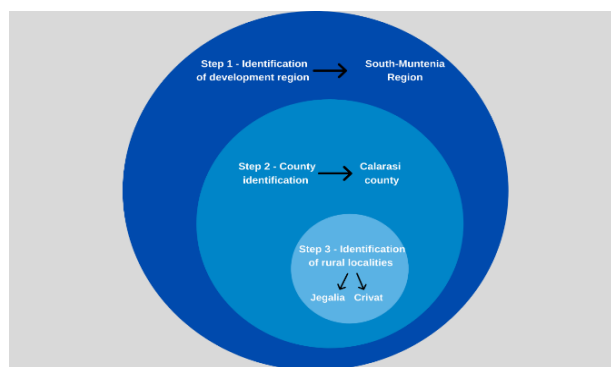

Fig. 1. Steps underlying the selection of the two rural localities analysed
Source: ownprocessing [10, 20].

The paper is based on official data provided by the municipality of Jegălia and Crivăț by means of law 544/2001, with the help of which the following indicators were calculated [15]:

- Birth rate RGN $= \frac{D}{P}*100$, where

N - number of newbirths;
P - population.

- General mortality rate RGN = D/P*100, where:

D - number of deaths;
P – population.

- Natural surplus SN = RN - RGN, where:

RN - birth rate;
RGN - overall death rate.

Additionally, using the SPSS statistical processing program, the Pearson coefficient was calculated and the relationship between variables was determined.

$$R = \frac{\sum(x-\overline{x})(y-\overline{y})}{\sqrt{\sum(x-\overline{x})^2 \sum(y-\overline{y})^2}}$$

RESULTS AND DISCUSSIONS

The population of Jegălia commune shows a downward trend according to the information provided by the Jegălia townhall. In 2015, the commune had a population of 4,503 inhabitants, reaching in 2020 a population of 4,095 inhabitants, representing a decrease by 9%. Contrary to the population trend, the number of households is increasing during the analyzed period, so in 2019 a number of 1,682 households was reached, increasing by more than 60% compared to 2015 (1,032 households) (Table 1).

The number of newborns fluctuated during the period under review, the average for the period was 53 newborns, and in the case of deaths, the average was 24 deaths, with a positive natural increase. The number of people receiving social assistance shows a decreasing trend, from 48 in 2015 to 34 people in 2020. The number of dispensaries has been constant from 2015 to 2019, with 2 dispensaries unitsregistered in Jegălia commune, and another dispensary will be established in 2020 (Table 1).

Comparing the number of inhabitants per household, it is found that in 2015 one household had the highest number of inhabitants in the period under analysis, that is, 4 inhabitants/household, while in 2020 there were only about 2 inhabitants/household.

Table 1. Main demographic indicators of Jegălia commune

An	Population	Number of households	Number of newborns	Number of deaths	Number of people on social aid	Number of dispensaries	Number of economic agents	Economic agents agriculture
2015	4,503	1,032	61	22	48	2	27	6
2016	4,407	1,580	52	20	45	2	32	6
2017	4,315	1,611	61	35	36	2	43	8
2018	4,279	1,638	39	28	37	2	40	9
2019	4,229	1,659	46	17	37	2	35	11
2020	4,095	1,682	63	23	34	3	35	11

Source:processed data, provided by the Jegălia commune.

The birth rate shows increased values in the period 2015-2020; thus in 2018, Jegălia commune presented 9.11 live newborns, the lowest number, while in 2020 it registered 15.38 live newborns, representing the highest number in the period 2015-2020. Regarding mortality, in 2015, the overall mortality rate was 0.49, while in 2020 it reached 0.56, meaning an increase by 14%. The number of people who receive social assistance as a percentage of the population is increasing, with a percentage of 8.3% in 2020, down by 2.36% compared to 2015 (10.66%).

Table 2. Main demographic indicators of Jegălia commune

An	Place/ households	Birth rate %	Overall mortality rate, %	Natural rate of return, %	% people Social aid/population
2015	4.36	13.55	0.49	13.06	10.66
2016	2.79	11.80	0.45	11.35	10.21
2017	2.68	14.14	0.81	13.33	8.34
2018	2.61	9.11	0.65	8.46	8.65
2019	2.55	10.88	0.40	10.48	8.75
2020	2.43	15.38	0.56	14.82	8.30

Source: processed data, provided by the Jegălia commune.

The natural increase recorded by Jegălia is positive in the period 2015-2020, in 2015 the natural increase was 13.06%, reaching 14.82% in 2020, an increase by 1.76% (Table 2).

The population of the commune of Crivat decreases in the period 2015-2020, thus, in 2015 there were 2,243 people, reaching in 2020 a population of 1,943 people, representing a decline by 13%. Furthermore, the number of households decreases by 3% in 2020 (896 households), compared to the number of households registered in 2015 (930 households) (Table 3).

Table 3. Main demographic indicators of the Crivat commune

An	Population	Number of households	Number of newborns	Number of deaths	Number of people on social aid	Number of dispensaries	Number of economic agents	Economic agents agriculture
2015	2,243	930	14	38	50	1	35	3
2016	2,243	930	11	33	47	1	40	6
2017	2,200	912	14	35	44	1	47	8
2018	2,160	903	9	29	38	1	48	8
2019	1,943	896	11	30	31	1	51	8
2020	1,943	896	12	30	28	1	63	8

Source: processed data, providedby The Crivăț commune.

In the Crivăț commune, the number of newborns and deaths oscillates during the period under analysis, the birth rate being lower than the death rate, and the natural increase being negative. The number of people receiving social assistance decreases significantly, in 2020 the number of socially associated persons was 28, down by 44% compared to the number of socially assisted persons in 2015 (50 persons). In the Crivat commune, only one dispensary was registered in the period 2015-2020 (Table 3).

From the above table it can be seen that the number of inhabitants of Crivăț in relation to the number of households shows a period average of 2.32 inhabitants/household, in the first 3 years thenumber remained constant (2.4 inhabitants/household), reaching 2.17 inhabitants/household in 2020 (Table 4).

The birth rate of Crivat is positive in the period 2015-2020, in 2015 the birth rate was 6.24 live births, in 2018 it was the lowest number of live births, namely 4.17. Subsequent years show increases, reaching 6.18 live births in 2020.

The overall mortality rate is also positive; in 2015 it was 1.69%, reaching 1.54% in 2020, meaning a decrease of 0.15%.

In the period 2015-2020, in terms of natural increase, the Crivat locality shows positive values, in 2015 it was 1.69%, and in 2020 it reached 4.63% (Table 4).

Table 4. Main demographic statistical indicators of the Crivat commune

An	Place/ households	Birth rate	Overall mortality rate	Natural rate of return	% people Social aid/population
2015	2.41	6.24	1.69	4.55	22.29
2016	2.41	4.90	1.47	3.43	20.95
2017	2.41	6.36	1.59	4.77	20.00
2018	2.39	4.17	1.34	2.82	17.59
2019	2.17	5.66	1.54	4.12	15.95
2020	2.17	6.18	1.54	4.63	14.41

Source: processed data, provided by the Crivăț commune.

Analyzing the Pearson correlation coefficient for the dependent variable as the population of Jegălia commune, and the independent variables as the number of households, number of newborns, number of social associations, number of dispensaries, number of economic agents and number of economic agents operating in agriculture, results in weak links and strong links directly proportional and inversely proportional.

Correlating the dependent variable population and the independent variable number of people receiving social assistance results in a weak relationship, with a Pearson coefficient of 0.911. In terms of strength, the link is strong, thus the decrease in population directly influenced the decrease in the number of people receiving social assistance.

For the dependent variable population and the independent variable number of economic agents operating in agriculture, a Pearson coefficient of -0.911 shows a weak, inversely proportional relationship (Table 5).

Table 5. Main demographic indicators of Crivat commune

		Population	Number of households	Number of newborns	Number of deaths	Number of people on social aid	Number of dispensaries	Number of economic agents	Economic agents agriculture
Population	Pearson Correlation	1	-0.78	0.052	-0.012	.911*	-0.725	-0.482	-.927**
	Mr (2-tailed)		0.067	0.922	0.982	0.012	0.103	0.333	0.008
	N	6	6	6	6	6	6	6	6
No. of households	Pearson Correlation	-0.78	1	-0.356	0.133	-.814*	0.293	0.711	0.655
	Mr (2-tailed)	0.067		0.488	0.802	0.049	0.574	0.113	0.158
	N	6	6	6	6	6	6	6	6
No. of newborns	Pearson Correlation	0.052	-0.356	1	0.187	0.117	0.471	-0.248	-0.192
	Mr (2-tailed)	0.922	0.488		0.723	0.825	0.346	0.636	0.716
	N	6	6	6	6	6	6	6	6
No. of deaths	Pearson Correlation	-0.012	0.133	0.187	1	-0.357	-0.089	0.743	-0.117
	Mr (2-tailed)	0.982	0.802	0.723		0.487	0.867	0.091	0.825
	N	6	6	6	6	6	6	6	6
No. of pers. socially assisted	Pearson Correlation	.911*	-.814*	0.117	-0.357	1	-0.48	-0.784	-.860*
	Mr (2-tailed)	0.012	0.049	0.825	0.487		0.335	0.065	0.028
	N	6	6	6	6	6	6	6	6
No. of dispensaries	Pearson Correlation	-0.725	0.293	0.471	-0.089	-0.48	1	-0.029	0.542
	Mr (2-tailed)	0.103	0.574	0.346	0.867	0.335		0.957	0.266
	N	6	6	6	6	6	6	6	6
No. eco. ag.	Pearson Correlation	-0.482	0.711	-0.248	0.743	-0.784	-0.029	1	0.405
	Mr (2-tailed)	0.333	0.113	0.636	0.091	0.065	0.957		0.425
	N	6	6	6	6	6	6	6	6
Ag echo. Agri	Pearson Correlation	-.927**	0.655	-0.192	-0.117	-.860*	0.542	0.405	1
	Mr (2-tailed)	0.008	0.158	0.716	0.825	0.028	0.266	0.425	
	N	6	6	6	6	6	6	6	6

*. Correlationissignificant at the 0.05 level (2-tailed).
**. Correlationissignificant at the 0.01 level (2-tailed).
Source: Own results.

When analysing the dependent variable number of households with the independent variable number of people receiving social assistance, a weak relationship results with a coefficient of 0.814. The relationship is inversely proportional, the number of households shows an increase over the period analysed, while the number of people on social assistance decreases (Table 5).

Analyzing the dependent variable population and the independent variable number of households, a weak Pearson coefficient relationship is shown.

The relationship between the two variables is directly proportional (0.872), so the number of households decreases due to the population reduction (Table 6).

Regarding the analysis of the dependent variable population and the number of people on social assistance of the independent variable, the coefficient is closely related, directly proportional (0.961). Thus, the number of people on social assistance decreases due to the reduction in population.

The Pearson coefficient resulting from the analysis of the dependent variable population

and the independent variable number of economic agents shows a weak, inversely proportional relationship.

The strength of the link is strong, so although the population decreases, the number of economic agents increases (Table 6).

Table 6. Main statistical indicators of Jegălia commune

		Population	Number of households	Number of newborns	Number of deaths	Number of people on social aid	Number of dispensaries	Number of economic agents	Economic agents agriculture
Population	Pearson Correlation	1	.872*	0.248	0.676	.961**	.c	-.852*	-0.584
	Mr (2-tailed)		0.023	0.635	0.141	0.002		0.031	0.223
	N	6	6	6	6	6	6	6	6
No. of households	Pearson Correlation	.872*	1	0.394	0.796	.944**	.c	-.882*	-.821*
	Mr (2-tailed)	0.023		0.439	0.058	0.005		0.02	0.045
	N	6	6	6	6	6	6	6	6
No. of newborns	Pearson Correlation	0.248	0.394	1	.837*	0.414	.c	-0.253	-0.463
	Mr (2-tailed)	0.635	0.439		0.037	0.414		0.629	0.355
	N	6	6	6	6	6	6	6	6
No. of deaths	Pearson Correlation	0.676	0.796	.837*	1	.823*	.c	-0.727	-0.796
	Mr (2-tailed)	0.141	0.058	0.037		0.044		0.102	0.058
	N	6	6	6	6	6	6	6	6
No. of persons in social assistance	Pearson Correlation	.961**	.944**	0.414	.823*	1	.c	-.931**	-0.733
	Mr (2-tailed)	0.002	0.005	0.414	0.044			0.007	0.098
	N	6	6	6	6	6	6	6	6
No. of dispensaries	Pearson Correlation	.c	.c	.c	.c	.c	.c	.c	.c
	Mr (2-tailed)								
	N	6	6	6	6	6	6	6	6
No. eco. ag.	Pearson Correlation	-.852*	-.882*	-0.253	-0.727	-.931**	.c	1	0.775
	Mr (2-tailed)	0.031	0.02	0.629	0.102	0.007			0.07
	N	6	6	6	6	6	6	6	6
Ag echo. Agri	Pearson Correlation	-0.584	-.821*	-0.463	-0.796	-0.733	.c	0.775	1
	Mr (2-tailed)	0.223	0.045	0.355	0.058	0.098		0.07	
	N	6	6	6	6	6	6	6	6

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
c. Cannot be computed because at least one of the variables is constant.
Source: Own results.

CONCLUSIONS

Halting or slowing the decline of the population in rural areas seems beyond remedy, especially as state interventions are timid. There are very few quality economic activities that generate jobs, which prevents young people from staying in these areas. At the same time, without significant contributions to local budgets, local authorities cannot make investments for their citizens or bring investors to the area.
The localities in the low land areas (such as the ones analysed) do not offer the possibility of tourism or leisure activities, so economic activities are mainly agricultural. A solution

in this sense can be found in family farms through government incentives, which have a social effect by keeping young people in the countryside, as well as an economic effect by creating viable jobs.
It is absolutely necessary to develop a platform for monitoring the countryside, involving local authorities, academics and the economy. In this way, authorities can identify the localities where investments are needed to develop these areas. The academic world, through research based on the available data, can also come up with solutions to remedy any problems detected, and last but not least, the academic world can identify the localities

where they can invest, based on criteria determined by them.

REFERENCES

[1]Alecu, I. 2001, Management of agricultural holdings, Publisher Ceres, Bucharest, 112-116.

[2]Alexandri, C. Luca, L. 2016, Food And Nutrition Security In Romania In The Post accession Period, Scientific Papers Series Management. Economic Engineering In Agriculture And Rural Development, 16 (2), 11-18.

[3]Andrea, F., Iancu,T., Miroslav, R., Banes, A., 2021, Food Consumption and Ways to Ensure Food Security in Romania, Shifting Patterns of Agricultural Trade, Springer, 305-333.

[4]Bazga, B., 2012, Prospects for food security in Romania, Procedia Economics and Finance 3, 1262 - 1267.

[5]Bostan, I., Onofrei, M., Gavriluță, A.F., Toderașcu, C., Lazăr, C.M. 2019, An Integrated Approach to Current Trends in Organic Food in the EU. Foods 2019, 8, 144. https://doi.org/10.3390/foods8050144.

[6]Coman, N. C., Tudor,V. 2019, Demographic analysis of South Muntenia Region Scientific Paper Series Management, Economic Engineering in Agriculture and Rural Development, 19 (2), 75-80.

[7]Dumitru, E. A., Ursu, A., Tudor, V.,C., Micu, M.M., 2021, Sustainable Development of the Rural Areas from Romania: Development of a Digital Tool to Generate Adapted Solutions at Local Level, Sustainability 2021, 13, 11921, https://doi,org/10,3390/su132111921.

[8]Dumitru, E.A., Micu, M.M., Tudor, V.C., 2019, Conceptual Approaches Regarding The Romanian Rural Area. Scientific Papers. Series "Management, Economic Engineering In AgricultureAnd Rural Development", Vol. 19(2), 121-128.

[9]Dumitru, E.A., Stoica, D.G., 2020, Impact Of Coupled Support On Surfaces And Productions Of Main Crops That Benefit From This Type Of Support. Scientific Papers. Series "Management, Economic Engineering In AgricultureAnd Rural Development", Vol. 20(4),153-160.

[10]Iancu, T., Petre I.L., Tudor, V.C., Micu M.M., Ursu, A., Teodorescu, F-R, Dumitru E.A. 2022, A Difficult Pattern to Change in Romania, the Perspective of Socio-Economic Development. Sustainability. 2022; 14(4):2350. https://doi.org/10.3390/su14042350.

[11]Ion, R. A. 2020, Socio-Economic Implications Of Fertilizers Use In Agriculture - Food Security And Safety Approaches, Scientific PapersSeries Management, Economic Engineering in Agricultureand Rural Development, 20 (1), 2536-2560.

[12]Ion, R. A., Popescu, G.C., 2013, Food security: changes and trends on world agricultural markets, Competitiveness of agro-food and environmental economy, 96-103.

[13]Iova, A. R., 2013, The Analysis Of The Potential For The Economic Relaunch Of Călărași County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 13(2), 199-204.

[14]Kitturmath, M. G., Suradkar, D. D., Bharamagoudar, M.V., Thombr B. M., 2014, Study Of Demographic Profile And Attitude Of Rural Youth Towards Rural Development Activities, Trends In Biosciences, 7 (11), 1043-1046.

[15]Law No. 544 of 12 October 2001 on free access to information of public interest.

[16]Micu, M. M., Dumitru, E. A., Vintu, C. R., Tudor, V. C., Fintineru, G., 2022, Models Underlying the Success Development of Family Farms in Romania, Sustainability 2022, 14, 2443, https://doi,org/10,3390/su14042443.

[17]Mihalache, F. 2013, A critical analysis of the development of agriculture and rural areas, based on the NRDP 2007-2013, Quality of Life, 14(3), p. 277-294.

[18]Nancua, D. V., Guran-Nicab, L., Persu, M., 2010, Demographic Ageing In Romania's Rural Area, Human Geographies, Journal of Studies and Research in Human Geography, 33-42.

[19]Păun, F., 2014, Studies regarding the situation of rural development in Prahova County and the managerial measures which need to be taken, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 14(1), 273-276.

[20]Petre, I. L., Ion, R. A., 2019, The Impacts of the Investments in Agriculture on Economic Growth in Rural Communities in Romania, Ekonomika Poljoprivreda-Economics of Agriculture, 66(4), 955-963.

[21]Roman, T., Manolică, A., Voznenko, N. 2015, Study On The Factors That Influence The Development Of Entrepreneurship Among Romanian Students, Proceedings Of The 9th International Management Conference "Management And Innovation For Competitive Advantage".

[22]Rusu, M. 2017, Rurality and competitiveness typologies: analysis at country level in Romania, Scientific Papers Series Management, Economic Engineering in Agricultureand Rural Development, 17(1), 367-374.

[23]Sterie, C., Dumitru, E.A., 2020, Research On The Evolution Of The Number Of Agricultural Holdings In The Period 2002 – 2016. Scientific Papers. Series "Management, Economic Engineering in Agricultureand rural development", Vol. 20(3), 579-582.

[24]Tudor, V.C., Dinu, T.A., Vladu, M., Smedescu, D., Vlad, I.M., Dumitru, E.A., Sterie, C.M., Costuleanu, C.L., 2022. Labour Implications on Agricultural Production in Romania Sustainability 14, no. 14: 8549. https://doi.org/10.3390/su14148549.