

**Sorinel Ionel BUCUR**

*Institute of Agricultural Economics, Romanian Academy, Bucharest  
bucursorinelionel@yahoo.com*

## STRUCTURAL VOLATILITY OF THE RURAL SYSTEMS. CASE STUDY: SOUTH-MUNTENIA REGION<sup>1</sup>

### ABSTRACT

Located on the third place in terms of size among the eight development regions of Romania, the region South-Muntenia consists of seven counties, featuring high heterogeneity from the point of view of their characteristics and also from the perspective of their rural system volatility. Based on these considerations, this approach aims at highlighting the volatility of rural systems at regional level in terms of identifying sustainable local development alternatives. Taking into account the different evolution rate of the local rural systems, we consider the intervention of policy makers as opportune, both in terms of shaping the strategic regional development priorities and mainly in terms of the effective collaboration with the local authorities in order to identify the activities generating gross value added in the rural area.

**Key words:** volatility, rural system, development region.

**JEL Classification:** R10, R11, R12.

### 1. INTRODUCTION

The approach to rural system sustainability in a certain development region has acquired an increased importance from at least two perspectives, i.e. the local potential development and the interaction between the component economic-social and environmental systems. From this point of view, the structural volatility of local systems has special importance from the perspective of identifying certain local development niches, in close connection with the available resources.

### 2. STATE OF KNOWLEDGE

The main changes produced at the level of sectoral performance has been the object of many debates in time, both in the academic environment and in the

<sup>1</sup> This work was supported by the project “Interdisciplinary excellence in doctoral scientific research in Romania – EXCELLENTIA” co-funded from the European Social Fund through the Development of Human Resources Operational Program 2007–2013, contract no. POSDRU/187/ 1.5/S/155425.

business and decision-making environment having in view the identification of regional development alternatives, which could contribute to gross value added increase and to the improvement of the local population's living standard. The present paper completes the analyses made by other studies, trying to capture the main changes produced at systemic level in one of the eight development regions of Romania, namely the region South -Muntenia.

The present approach can represent a starting point in the identification of certain local sustainable development alternatives, also through the attraction of funding sources from European funds, at the new 2014-2020 horizon.

### **3. MATERIAL AND METHOD**

In order to measure the systemic volatility in the post-accession period, the present approach was based on the data supplied by the National Institute of Statistics (NIS), through the Tempo-online data base. For the analysis of the available data, well-known statistical methods were used, of the type of comparisons, dynamics and structures, the results being presented both under table and under graphic representation form. We must also mention that in case of the value indicators, meant to reveal the sectoral performance level, statistical data from Eurostat at NUTS 3 level were used.

From the methodological point of view, the analysis focuses on the post-accession period, the upper limit being adjusted in relation to the statistical data availability at regional/territorial level. We must specify that for measuring the system volatility, the present approach had in view economic, technical and transport infrastructure as well as environmental indicators.

### **4. RESULTS AND DISCUSSIONS**

#### **4.1. THE ECONOMIC SYSTEM – EVOLUTIONS AND STRUCTURAL VOLATILITIES OF SPECIFIC INDICATORS**

*From the economic perspective*, the present approach has in view the following indicators: civil active population, labour resources, activity and employment rate, gross value added obtained in the agricultural sector. These indicators were selected because they have a high volatility degree, influencing the sectoral performance and the local economy sustainability. Representing the potential labour force supply, in relation to the civil population and the registered unemployed, the civil active population decreased by 3.4% in the 8-year period throughout the region South-Muntenia, following its involution in most counties of the region (Table 1).

Table 1

Evolution of the civil active population in the region South-Muntenia  
in the period 2007/2014 (thousand persons)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	9093.7	9150.4	9120.1	8998.3	8826.5	9063.4	9042.9	8910	-2.0
MACROREGION THREE	2512.4	2568.6	2530.7	2510	2483.6	2534.5	2545.8	2514.9	0.1
REGION SOUTH-MUNTENIA	1280.3	1266.5	1280.3	1265.9	1234.7	1270.4	1263.6	1236.3	-3.4
Argeş	272.7	269.1	266.8	260.6	256.2	265.7	265.3	259.1	-5.0
Călăraşi	106.5	106.8	106.7	109.8	105.9	108.8	107.6	104.4	-2.0
Dâmboviţa	214.2	210.2	211.1	211.5	206.7	212.8	210.7	204.6	-4.5
Giurgiu	91.7	92.2	93.2	93.1	92.8	95.4	93.7	93.1	1.5
Ialomiţa	108.1	105.3	109.7	106	103.9	107.2	105.7	104.3	-3.5
Prahova	315.7	314.4	319.7	313.6	301.4	305.4	307.6	301.8	-4.4
Teleorman	171.4	168.5	173.1	171.3	167.8	175.1	173	169	-1.4

Source: Calculations on the basis of NIS data, 2015.

The same decreasing trend can be also noticed at the level of the available labour sources<sup>2</sup>, down by 7.3% per total region South-Muntenia in the year 2014 compared to 2007 (Table 2).

Table 2

Evolution of the available labour resources  
in the region South-Muntenia in the period 2007/2014 (thousand persons)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	13772.7	13747.4	13875.9	14047.6	14047.7	14033.7	13997.9	2597.7	-8.5
MACROREGION THREE	3555.7	3553.8	3587.4	3634.6	3626.8	3621.8	3599.2	3441.8	-3.2
REGION SOUTH-MUNTENIA	2049.3	2043.2	2063	2087.8	2085.6	2078.8	2068.8	1899.4	-7.3
Argeş	401.8	399.9	403.7	410.9	412.5	411.5	410.4	378.5	-5.8
Călăraşi	191.2	191.4	193.8	196.3	195.9	195.5	194.8	181.8	-4.9
Dâmboviţa	336.3	336.8	341.3	347	348.2	348.3	347.8	326.3	-3.0
Giurgiu	169.6	169.8	171.8	174.6	175.3	177.3	177.1	170.9	0.8
Ialomiţa	178.7	178	180	182	181.2	180.5	179.6	162.3	-9.2
Prahova	528	526	529.9	533	530.9	527.3	524.2	470.2	-10.9
Teleorman	243.7	241.3	242.5	244	241.6	238.4	234.9	209.4	-14.1

Source: Calculations on the basis of NIS data, 2015.

<sup>2</sup> The labour resources on January 1 represents the population category that has the necessary physical and intellectual capacities enabling it to carry out a useful work in one of the national economy sectors. The labour resources include: the population of working age, capable to work, as well as the persons under and over the working age who are currently active.

Following the involution of the two above-mentioned indicators, the activity rate, calculated as percentage ratio of the active civil population to the labour resources diminished by 0.6% per total region South-Muntenia in the year 2014 compared to the moment of accession to the EU; an even more significant depreciation was attenuated as a result of the increases from the counties Ialomița, Prahova and Teleorman (Table 3).

Table 3

Evolution of the activity rate of labour resources in the period 2007–2014 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	63.4	63.6	60.6	59.6	59.6	61.1	60.9	66.9	3.5
MACROREGION THREE	68.2	69.9	66.3	65.2	65.6	66.9	67.4	69.8	1.6
REGION SOUTH-MUNTENIA	59.3	58.8	56.2	55.3	55.4	56.9	56.5	58.7	-0.6
Argeș	64.6	64	59.8	58.6	58.6	60.6	60.1	64.4	-0.2
Călărași	53.1	52.9	49.9	51	50.6	51.6	50.7	52.7	-0.4
Dâmbovița	60.3	58.9	56.6	55.8	55.5	56.5	55.6	57.7	-2.6
Giurgiu	51.7	51.8	50.3	48.8	49.9	50.6	49.6	50.7	-1.0
Ialomița	56.4	56.2	54.1	52.5	53	54.8	54.4	59	2.6
Prahova	57.5	57.5	55	53.8	53.5	54.7	55.3	60.8	3.3
Teleorman	65.2	64.2	63.1	62.6	63.2	66.4	65.7	71.7	6.5

Source: Calculations on the basis of NIS data, 2015.

The labour employment rate, determined as percentage ratio of the civil employed population to the labour resources was down by 0.6% per total region South-Muntenia in the eight-year period, as a result of the negative trend in four counties (Table 4).

Table 4

Evolution of the employment rate of labour resources in the period 2007-2014 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	63.4	63.6	60.6	59.6	59.6	61.1	60.9	66.9	3.5
MACROREGION THREE I	68.2	69.9	66.3	65.2	65.6	66.9	67.4	69.8	1.6
REGION SOUTH-MUNTENIA	59.3	58.8	56.2	55.3	55.4	56.9	56.5	58.7	-0.6
Argeș	64.6	64	59.8	58.6	58.6	60.6	60.1	64.4	-0.2
Călărași	53.1	52.9	49.9	51	50.6	51.6	50.7	52.7	-0.4
Dâmbovița	60.3	58.9	56.6	55.8	55.5	56.5	55.6	57.7	-2.6
Giurgiu	51.7	51.8	50.3	48.8	49.9	50.6	49.6	50.7	-1.0
Ialomița	56.4	56.2	54.1	52.5	53	54.8	54.4	59	2.6
Prahova	57.5	57.5	55	53.8	53.5	54.7	55.3	60.8	3.3
Teleorman	65.2	64.2	63.1	62.6	63.2	66.4	65.7	71.7	6.5

Source: Calculations on the basis of NIS data, 2015.

As regards the gross value added, as expression of the sectoral performance level, the European statistics supplies information by each component county of the region South-Muntenia. Thus, in the period 2007–2012, the sectoral gross value added increased by about 34% per total region; this increase was generated by the positive trend in 5 out of seven counties, while in the other two counties the sectoral value decreased, i.e. in Argeş (-2.7%) and Dâmboviţa (-25.1%) (Table no. 5).

The positive trend of the gross value added obtained in agriculture reveals that the agricultural sector can represent one of the local development driving engines, by production diversification and development of certain related activities generating added value.

Table 5

Evolution of the gross value added in agriculture in the period 2007–2012 (mil.euro)

	Region South-Muntenia	Argeş	Călăraşi	Dâmboviţa	Ialomiţa	Giurgiu	Prahova	Teleorman
2007	927.44	188.32	85.24	287.02	65.06	75.5	127.96	98.34
2008	1513.79	207.79	242.79	257.86	181.94	231.77	192.28	199.37
2009	1167.17	194.93	183.19	192.08	148.64	148.78	150.29	149.27
2010	1259.15	182.85	177.29	236.36	157.14	184.44	146.79	174.28
2011	1648.18	238.75	274.04	261.02	184.87	253.31	180.37	255.81
2012	1241.85	183.21	214.14	214.94	119.64	197.74	134.44	177.74
2012/2007 (%)	33.9	-2.7	151.2	-25.1	83.9	161.9	5.1	80.7

Source: Calculations on the basis of Eurostat data, 2015.

#### 4.2. THE TECHNICAL TRANSPORT INFRASTRUCTURE AND ENVIRONMENTAL SYSTEM IN THE REGION SOUTH-MUNTENIA – BASIS OF LOCAL SUSTAINABLE DEVELOPMENT

The technical and transport infrastructure plays a main role in the development process of any territorial unit, being an asset for the areas in which this is developed, or, on the contrary, an impediment to a potential local investment process. Per total region South-Muntenia, *the total length of public roads* increased by 4% in the 8-year period, from 12360 km (2007) to 12856 km (2014), which means an annual average growth rate by only 0.5% (Table 6).

Table 6

The length of public roads in the region South-Muntenia and by component counties (km)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	80893	81693	81713	82386	83738	84185	84887	85362	5.5
MACROREGION THREE	13250	13464	13472	13562	13597	13666	13727	13734	3.7
REGION SOUTH-MUNTENIA	12360	12574	12582	12672	12707	12750	12832	12856	4.0

Table 6 (continued)

Argeş	3131	3384	3384	3448	3476	3481	3479	3479	11.1
Călăraşi	1348	1317	1318	1324	1320	1311	1355	1355	0.5
Dâmboviţa	1873	1865	1865	1868	1868	1867	1879	1879	0.3
Giurgiu	1139	1139	1143	1156	1159	1160	1158	1177	3.3
Ialomiţa	1155	1155	1155	1155	1155	1170	1176	1176	1.8
Prahova	2189	2189	2192	2196	2205	2236	2233	2234	2.1
Teleorman	1525	1525	1525	1525	1524	1525	1552	1556	2.0

Source: Calculations on the basis of NIS data, 2015.

Out of the total length of public roads, about 80% are represented by the county and communal roads, on a slightly increasing trend at regional level, the only exceptions being represented by the counties Prahova and Teleorman (Table 7).

Table 7

Evolution of the share of county and communal roads in roads total (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	80.1	79.7	79.8	79.9	80.1	79.9	79.8	79.8	-0.3
MACROREGION THREE	76.6	77.0	77.0	77.1	77.2	77.0	76.8	76.8	0.2
Region SOUTH-MUNTENIA	77.4	77.8	77.8	78.0	78.0	77.9	77.9	77.9	0.5
Argeş	81.3	82.7	82.7	83.0	83.2	83.1	83.1	83.1	1.8
Călăraşi	62.8	62.3	62.2	62.2	62.1	62.5	63.1	63.1	0.3
Dâmboviţa	80.7	80.6	80.6	80.7	80.7	80.7	80.9	80.9	0.2
Giurgiu	73.0	73.0	73.1	73.1	73.2	73.2	73.1	73.6	0.5
Ialomiţa	69.5	69.5	69.5	69.5	69.5	70.3	69.9	69.9	0.4
Prahova	86.6	86.6	86.6	86.7	86.7	85.5	85.6	85.6	-1.0
Teleorman	74.4	74.4	74.4	74.4	74.5	74.4	73.9	73.7	-0.7

Source: Calculations on the basis of NIS data, 2015.

Compared to the year 2007, a noticeable trend can be noticed in the region South-Muntenia, i.e. the modernization of communal roads mainly with light coatings. As regards the length of operated railways, in the period 2007–2014 no major investments were made, the length of railway lines remaining constant, at 1251 km at regional level. Out of total length of operated railways in total region South-Muntenia, only 36.1% is represented by electrified lines, a significant increase being noticed in the county Giurgiu (25.5%) (Table 8).

Table 8

Share of electrified railway lines in total railways (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
REGION SOUTH-MUNTENIA	35.1	35.1	35.1	35.1	35.1	35.1	36.1	36.1	1.0
Călăraşi	78.2	78.2	78.2	78.2	78.2	78.2	78.2	78.2	0.0
Dâmboviţa	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	0.0
Giurgiu	51.1	51.1	51.1	51.1	51.1	51.1	76.6	76.6	25.5
Ialomiţa	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	0.0
Prahova	69.1	69.1	69.1	69.1	69.1	69.1	69.1	69.1	0.0
Teleorman	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	0.0

Source: Calculations on the basis of NIS data, 2015.

The technical infrastructure in the period 2007–2014 was characterized by the following trends:

Significant increase of the sewerage network length by 28% in the year 2014 compared to 2007, from 2320 km (2007) to 2972.6 km (2014). As expression of the improvement of the population living standard, the most important increases are found in the counties Teleorman, Dâmbovița and Giurgiu, the only exception being represented by the county Argeș, where the sewerage network length decreased by about 10% (Table 9).

Table 9

Evolution of the sewerage network length at regional level (km)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	19355.5	20364.4	20953.3	21977.5	23137.2	24789.8	26559.6	28659.5	48.1
MACROREGION THREE	4540.4	4598.3	4693.7	4942.3	4762.6	5060.4	5428.8	6015.6	32.5
REGION SOUTH-MUNTENIA	2320.3	2317.6	2418.5	2604.5	2386.1	2606.5	2806.3	2972.6	28.1
Argeș	759.4	775.5	818.7	877.7	600	623	650.9	687.3	-9.5
Călărași	150.9	150.9	170.8	170.8	171.2	196.9	202.7	232.9	54.3
Dâmbovița	217.5	232.5	257.4	255.9	262	301.6	327.8	339.6	56.1
Giurgiu	160.7	178.4	176.3	176.3	176.3	200.4	255.6	256.3	59.5
Ialomița	160.9	161.3	177.2	185.6	192.6	219.3	224	228	41.7
Prahova	676.2	622.8	624.8	707.2	753	834.3	907.7	907.4	34.2
Teleorman	194.7	196.2	193.3	231	231	231	237.6	321.1	64.9

Source: Calculations on the basis of NIS data, 2015.

The sewerage network was present in 45 localities in the urban area and in 72 localities in the countryside in the year 2014. As indicator of preservation and protection of natural resources, the number of inhabitants connected to the sewerage and wastewater treatment systems increased by 13.7% in the period 2006-2014 per total region South-Muntenia, the most significant increase being found in the county Prahova, by 36.5%, the increases in the remaining counties ranging from +0.5% (Călărași) to 12.3% (Giurgiu).

Although the connection to the sewerage and wastewater treatment systems is increasing, only about one-third of the inhabitants in the region South-Muntenia benefit from these services, while by counties the differences are quite significant. Except for the counties Argeș and Prahova, where the share of the population connected to the modern sewerage systems exceeds the regional average, the share of the other five counties oscillates around 20% (Table 10).

Table 10

The share of population connected to the sewerage and wastewater treatment systems in total population in the period 2006–2014 (%)

	Region South-Muntenia	Argeş	Călăraşi	Dâmboviţa	Ialomiţa	Giurgiu	Prahova	Teleorman
2006	24.6	39.7	21.3	18.6	16.8	20.4	25.0	18.9
2007	26.1	39.1	21.6	19.5	17.5	19.5	30.8	19.2
2008	25.8	38.0	19.7	18.2	18.3	19.8	31.1	19.6
2009	25.9	38.6	19.7	18.4	18.5	20.9	31.1	18.8
2010	26.5	39.5	20.1	19.2	18.6	21.8	31.3	19.3
2011	26.6	38.9	20.6	18.6	18.7	20.8	32.5	19.9
2012	27.2	40.0	21.2	19.8	18.9	21.8	32.3	20.3
2013	27.9	39.9	21.5	20.1	19.2	21.9	34.3	21.2
2014	29.0	43.0	22.1	20.5	19.5	21.4	35.2	22.3

Source: Calculations on the basis of Tempo-online data, NIS, 2015.

From the point of view of the natural gas supply network, the period 2007–2014 is characterized by a noticeable increasing trend both at regional level (34.8%) and by component counties (Table 11).

Table 11

Evolution of the natural gas supply network length at regional level (km)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 (%)
TOTAL	30737.8	31926.8	33338.4	34725.7	35680.7	36771.8	37311.2	37890.3	23.3
MACROREGION THREE	7827.6	8345	8668.7	9333.6	9584.3	9917.6	10179.5	10294.2	31.5
REGION SOUTH-MUNTENIA	4715.8	4992.8	5194.5	5418.4	5816.5	6080.5	6304.5	6355.5	34.8
Argeş	821.2	852.7	921.3	957.9	1068.1	1140.5	1163.5	1177	43.3
Călăraşi	127.8	143.5	171.2	186.2	211.8	233.6	246.1	250.6	96.1
Dâmboviţa	1082.8	1237.5	1271.1	1332.1	1455.6	1484.8	1512.7	1517.3	40.1
Giurgiu	112.8	111.8	123.5	143.1	156.9	249.8	334	351.1	211.3
Ialomiţa	265.1	266.8	285.6	291.5	292.5	309.9	318.4	322.5	21.7
Prahova	2158.6	2212.8	2250.4	2260.4	2388.6	2417	2486.2	2502.5	15.9
Teleorman	147.5	167.7	171.4	247.2	243	244.9	243.6	234.5	59.0

Source: Calculations on the basis of NIS data, 2015.

By residence areas, 44 localities from the urban area and 123 localities from the rural area are connected to the natural gas supply network.

The investments in the drinking water supply network led to the increase of the network length by about 39% at regional level; compared to the year 2007, the total length of the water supply network increased from 9187.5 km (2007) to 12,751.7 km (2014); in the year 2014, only 48 localities in the urban area and 364 localities in the rural area of the region South-Muntenia were connected to the drinking water supply network.



Even though the public utilities network had the tendency to increase in the period 2007–2014, this increase is still insignificant compared to the local development needs from the regional economy sustainability perspective.

## 5. CONCLUSIONS

In relation to the economic system, the period 2007–2014 is characterized by a high volatility level that was generated, on one hand, by the significant oscillations of the input indicators, with direct effect upon the resultative indicators, as well as by factors of subjective nature, which more or less directly contributed to the increase of the structural volatility coefficient.

The oscillating evolutions at the level of the technical-transport infrastructure and environmental system inevitably influence the potential of attracting community funds and the general local economic development level.

Starting from the above-mentioned considerations, to approach the complex development of a heterogeneous region from the point of view of its component counties characteristics involves a certain difficulty induced by the natural question: how can pluriactivity be generated in an area with so different systemic specificities?

Even if, at first sight, the issue might be considered as marginal, in reality, at least two “essential agents”, namely agriculture, as such, and the rest of the national economy have participated to the complex development of the rural area.

Agriculture, because, having reached the performance stage, becomes capable to generate surplus supply to the local consumption needs, available for redistribution in other deficient areas or for processing. The national economy, in the sense that through different non-agricultural activities developed in the rural area, it also generates alternative incomes for the surplus agricultural population.

Starting from the premise that the regional development, in general, and the rural development in particular, are almost exclusively based on local initiatives, we consider that through the identification of development opportunities in the agri-food sector, we can practically establish the milestones of the complex systemic development in the region South-Muntenia.

In this sense, we consider that among the priorities of the complex systemic development of the rural area from the region South-Muntenia, derived from the rural priorities at national level, at least three can be mentioned, with direct impact upon performance and sustainability, namely:

- Acceleration of the process of small and medium-sized farm restructuring and their transformation into viable farms from the economic point of view and the improvement of the economic performance of farms and of the agro-processing sector, in order to increase the market integration of quality products and for import substitution;

- The maintaining and improvement of the natural environment quality by the sustainable management of natural resources and by the fight against climate change;
- The diversification of the economic activities, job creation, development of infrastructure and services for the improvement of the quality of life in the rural areas.

#### REFERENCES

1. Ghețău, Vasile, (2003), *Situația demografică a României – avantaj ori handicap în perspectiva integrării?* În volumul: Dezvoltarea economică a României, Editura Academiei Române, București.
2. Grigorescu, Constantin, (1996), *Îmbătrânirea demografică în România – trecut, prezent și perspective*, Economistul nr. 781/7.
3. \*\*\*Tempo-online database, NIS, Bucharest, 2014.
4. National Regional Development Strategy 2014–2020, Ministry of Regional Development and Public Administration, Bucharest, 2013.
5. National Rural Development Program for the period 2014–2020, Ministry of Agriculture and Rural Development, Bucharest, 2014.