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Regional dimensions of rural development in Romania

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Abstract: *The National Programme of Rural Development for the period 2014-2020, established the modalities how to use the measures of LEADER program, by its already implemented infrastructure, as a certain number of Local Action Groups (LAGs) in each county. This paper presents the relative position of Romanian counties and of administrative development regions, in 2012, depending on the rural development stage and considering also the managerial approach through LEADER program, until 2014. The results are useful for the managers at county level and at administrative region level, but also at national level, preoccupied by the implementation of rural development programs. Using multivariate methods of descriptive analysis: Principal Components Analysis and classifying with Cluster method, in SPSS software, our paper offers also a scientific approach for comparative analyses. The conclusions are formulated based on the analyses "in mirror" at counties' level, and at administrative regions' level, using the results obtained with the two descriptive methods.*

Key-words: *rural development, county profile, Principal Components Analysis, Cluster method*

1. Introduction

According to NUTS (*Nomenclature of territorial units for statistics*, French language), the geographical economic classification within the EU Member States, Romania has 42 units at NUTS3 level - 41 counties and Bucharest area, 8 administrative regions at NUTS2 level, grouped in 4 macro-regions at NUTS1 level.

The national territory of Romania has a surface of 238,391 km² and a population of 21,356 million inhabitants. The NUTS territorial units are defined as geographical area delimited in according with established intervals of residential

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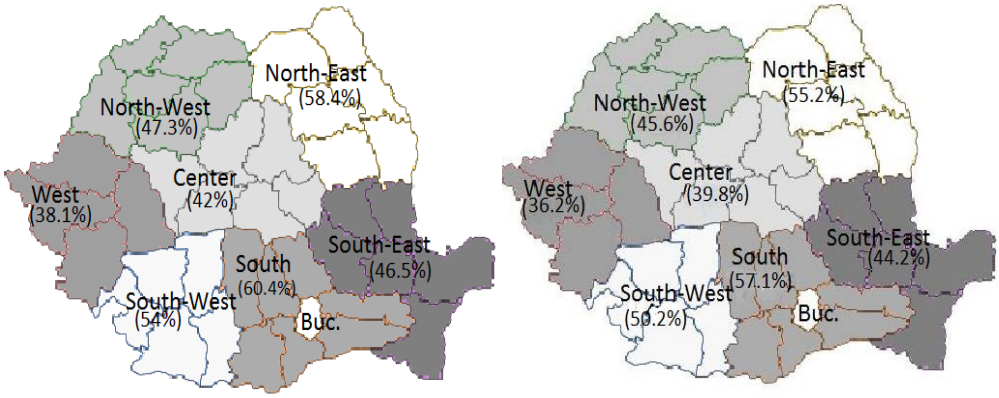
population size, and having an administrative authority. The population size for NUTS3 units is between 150,000 and 800,000 people. (http://ec.europa.eu/eurostat/documents/35209/35256/Urban_rural_poster_3levels_A1_Aug2013.pdf/06a732d8-b614-4c81-844e-c0a9e330aec0)

Romania has an equilibrate division of its territory, in the eight development regions NUTS2, as it follows: 14.33% North-West, 14.30% Centre, 15.46% for North-East, 15% South-East, 14.45% South, 12.25% South-West, 13.44% West, and only 0.76% for Bucharest – Ilfov (National Rural Development Programme - NRDP, 2014-2020).

Romania has had in 2012 a rural space of 207,522 km², as defined by the national law, representing 87% of its territory and 46% of Romanian population, living there. In 2013, the proportion of rural population at national level was 46.1% and in 2014, it decreased at 43.6%.

Bucharest has no rural population, but Bucharest area has had 10.2% in 2013 and 8.3% in 2014 (2014 Romanian Statistical Yearbook, http://www.insse.ro/cms/ro/content/anuarele-statistice-ale-Romaniei).

The rural population is not uniformly distributed within the development regions in Romania, as it can be seen in Fig. 1, for the years 2013 and 2014. In Fig. 1 there can be noticed the decreasing changes of rural population for all NUTS2 regions, in 2014.



Year 2013 Year 2014

Fig. 1. *The rural population proportions of Romanian NUTS2 regions in 2013 and 2014*

Compared with 2013, in 2014, the rural population proportions decreased in all the development regions. In descending order of rural population proportions of the NUTS2 regions is the same in 2014, as in 2013 and 2012. In 2014, some regions have greater weights of rural population, as: 57.1% in South region, 55.2% in North-East, 50.2% in South-West, followed by North-West with 45.6%, South-East with

44.2% and 39.8% in Center and West region with the lowest weight of rural population, with only 36.2% (2014 Romanian Statistical Yearbook, http://www.insse.ro/cms/ro/content/anuarele-statistice-ale-Romaniei).

Concerning the economic development of the administrative regions, the GDP per capita, expressed in Euro PPP/inhabitant in 2013, was less than 75% of the EU-27 GDP per capita average, in all administrative regions, except Bucharest-Ilfov, where it was 113%. So, the seven big administrative regions NUTS2, each having about 2.6 million inhabitants, in average, have had the condition to beneficiate by the European funding for rural development (Annex I - "Cover of regional aid by Member States for the period 2014-2020", at "Community Guidelines concerning the regional state aid for the period 2014-2020" adopted by European Commission at 28.06.2013).

The Romanian counties have rural areas with important development resources and rural potential, but still insufficient used.

The Local Action Groups (LAGs) is the infrastructure already developed through LEADER Program; it was built at county level, during the period 2007-2013. The mission of LAGs is to identify the local resources and to contribute to the implementation of the rural projects of local development strategies of rural communities.

2. Literature Review

The rural development statistics consider problems as: the higher unemployment risk, the labor force and the population ageing, but also the different development of some activity sectors – mainly in the rural areas and the economic unbalance between rural and urban medium.

The Romanian regional profile was described in the study "*Importance of rural areas and the regional profiles of EU Member States"* (Polgár and Duguleană, 2015, http://webbut.unitbv.ro/BU2015/Series%20V/BILETIN%20I/49_Polgar-Duguleana.pdf) according to the context baseline indicators of the Rural Development in the European Union - Statistical and Economic Information Report 2013, http://ec.europa.eu/agriculture/statistics/ruraldevelopment/2013/index_en.htm.

The theme "Importance of rural areas" in the Report 2013 of the Common Monitoring and Evaluation Framework (CMEF) for the Rural Development Policy over the period 2007-2013, contains two context-related baseline indicators: the first for the designation of rural areas, and the second for the importance of rural areas. (http://ec.europa.eu/agriculture/statistics/ruraldevelopment/2013/indicators_en.pdf)

The *Designation of rural areas* is based on the NUTS classification of the territorial units and on the urban-rural typologies of NUTS 3 level regions in EU, using the criteria of population and contiguity.

The *Importance of rural areas* uses four indicators about the territory, population, Gross Value Added and employment for each type of region: predominantly rural, intermediate and predominantly urban.

Agricultural policies in Romania are projected based on European funds in order to reduce the economic disparities between urban and rural mediums and in regional profile.

The allocation of the European funds in order to eliminate the disparities between urban and rural regions, and between the EU Member States should be the main purpose of European Agricultural Fund for Rural Development (EAFRD) – for implementation the agricultural policies at European Union level (Polgár K-D. and Duguleană L., *Importance of rural areas and the regional profiles of EU Member States,* http://webbut.unitbv.ro/BU2015/Series%20V/BILETIN%20I/49_Polgar-Duguleana.pdf).

European Agricultural Fund for Rural Development (EAFRD) has four axes as main directions of funding:

- 1st Axis for projects in agricultural and forestry sector and related processing industry to increase competitiveness and the economic importance of the territory,
- 2nd Axis comprising projects for supporting the land management, environment and countryside by increasing of the competitiveness of rural Small and Medium Enterprises,
- 3rd Axis for enhancement of life quality in rural areas by diversification of economic activities, promoting and preservation of local natural and cultural capital,
- 4th Axis is the LEADER Program to improve the governance level of administrative areas, by addressing the other three axes of EAFRD in an integrative and innovative way.

The LEADER Program named after the French expression for "Liaison Entre Actions pour le Développement de l'Economie Rurale", is a tool of Common Agricultural Policy; launched in 1991 with the purpose of implementing local development strategies for a sustainable development of rural communities.

The LEADER Program has a "*double role as a component fund of EAFRD, and also as a delivery mechanism for measures of the other three axes of EAFRD."* (Polgár and Duguleană, 2015, *Characteristics of LEADER Program for rural development in Romania*, http://webbut.unitbv.ro/BU2015/Series%20V/BULETIN%20I%20PDF/27_Polgar_K_D.pdf).

In European Union, the LEADER Program recorded five generations of timing for the following periods: LEADER I during 1991-1993, LEADER II for 1994-1999, LEADER+ during 2000-2006, followed by the periods 2007-2013 and 2014-2020.

The European Council's Regulation no. 1698/2005 approved for the period 2007-2013 the existence of a LEADER component as part of each National Rural Development Program (NRDP) of EU Member States.

In order to implement the local development strategies the LEADER funds are used to establish the Local Action Groups (LAGs). The Local Action Groups (LAGs) are public - private partnerships from rural areas, composed by the representatives of the public, private and civil sectors. The LAGs elaborate the local development strategies, based on the bottom-up principle, starting their processes of projecting the local development plans from the initiatives of local communities. (Polgár and Duguleană, 2015, *Characteristics of LEADER Program for rural development in Romania*, http://webbut.unitbv.ro/BU2015/Series%20V/BULETIN%20I%20PDF/27_Polgar_K_D.pdf).

In Romania, the implementation of LEADER Program and of the LAGs began in 2007-2013 by NPRD. During 2011-2012, the LEADER program has developed its physical infrastructure of 163 LAGs. The accepted LAGs cover 142,000 km² "*which represents 63% from the eligible territory and 58% from the eligible LEADER population*" (http://ec.europa.eu/agriculture/ruraldevelopment-2014-2020/index_ro.htm). The LEADER eligible areas are the villages and small towns with a population less than 20,000 inhabitants.

The LEADER Program management at local level is undertaken by the LAGs which establish the Local Development Plans based on the Local Development Strategies. The LAGs participate in the national competition for attracting funds for their territories. For the LEADER Program 2014-2020, the Ministry of Agriculture and Rural Development organized the selection of Local Development Strategies in a single public procedure. The financial allocations for the Local Development Strategies are proportionally established with the population covered by each LAG expressed in Euro/ capita and with the covered territory in Euro/km².

The results of LEADER Program in Romania were presented in the study "*Statistical coordinates of LEADER Program implementation process in Romania"* by Polgár and Duguleană (2015), in which the degree of implemented projects is analysed at counties' and administrative regions' level and for the Romanian historical regions, until the end of 2014 (http://webbut.unitbv. ro/BU2015/Series%20V/BULETIN%20I/50_Polgar-Duguleana_ SATISTICAL.pdf).

3. Methodology and data

The main objective of this study is to present and to explain in terms of influence factors, the economic and social differences of rural economic development between the Romanian counties and administrative regions. The results should be useful for the regional level managers in projecting the local development strategies. The LAGs may use the results to identify the ways of action and the measures of rural development included in National Rural Development Programme - NRDP, 2014-2020, to be encouraged for implementation by the rural actors, interested in the development of their rural communities.

The analyses envisage the two data dimensions at NUTS 3 (counties' level) and NUTS 2 (administrative regions' level).

In order to characterize the differences of social and economic development between the Romanian counties, we have considered some variables which envisage aspects of both mediums: urban and rural.

Almost all the considered variables for the 42 Romanian NUTS 3 territorial units are collected for the year 2012:

- the number of villages, the density of population expressed in number of inhabitants/km^2,
- the proportion of rural population as percentage of county population,
- the population natural increasing, in rates of births per 1,000 inhabitants,
- the life expectancy in rural medium, expressed in number of years and recorded at 20 October 2011,
- the weight of employees in agriculture, forestry and fishing in all employees of the county,
- unemployment rate (%),
- average net nominal monthly earnings in agriculture, forestry in lei/employee,
- the ratio of number of insurance pensioners/ number of employees,
- the proportion of agricultural area in total surface (%),
- the agricultural branch production in thousands lei, current prices,
- the meat production in tones live weight,
- the proportion of crop production in the agricultural production of the county,
- the proportion of animal production in the agricultural production of the county,
- the indices of net using of touristic accommodation capacity (%),
- the GDP/capita for each county in million lei, current prices.

The paper presents two kinds of multivariate methods of descriptive nature: Principal Components Analysis (PCA) and the cluster analysis. The results of PCA are used and recognized again as significant through the cluster method of describing data.

From all these variables, the PCA will keep only those which make difference between counties, respectively, administrative development regions.

The next undertaken approach includes some variables with managerial content about LEADER program implementation, at county, respectively, at development region level.

The cluster analysis is applied on the last variables which define the best PCA model, at county, respectively at administrative regional level.

The entire methodology is built on applying the two multivariate descriptive methods: Principal Components Analysis and Cluster method for all Romanian counties, and then a mirror analysis is undertaken for administrative development regions.

The conclusions reveal what factors are important for rural development of counties and as a consequence, at the administrative development region level.

4. Results and discussions

4.1. Characterizing the rural development of Romanian counties

The descriptive method of Principal Components Analysis in SPSS software was applied for two purposes, following the main objective of the paper: first, to describe in a comparative manner the rural development of the counties and second, to present in the same way, their rural management approach.

4.1.1. Counties' rural development profiles in Romania

Applying the factorial method of Principal Components to all the above mentioned variables, some of them that remained to explain close 79% of the whole variation between the Romanian counties are:

- the weight of rural population as percentage of county population (w_pop_rural),
- the proportion of agricultural area in total surface (w_agr_area),
- the proportion of vegetable production (w_prod_veg),
- the proportion of animal production in the agricultural production of the county (w_prod_anim),
- the GDP/capita in the county (GDP_county) and
- the ratio between the number of insurance pensioners and the number of employees (ratio_pens_emp).

These variables define two components which can be identified in Table 1 of the variables' correlation coefficients with each component, but also in the chart from Fig. 2. The first component characterizes *the county agricultural profile* and explains close to 42% of variation. The second component refers to *the county rural development* adds 37% to the explained variation.

The first component of *the agricultural profile* is defined at the right by the proportion of agricultural area in total surface (w_agr_area) with a medium intensity of correlation, 0.786 and the proportion of vegetable production (w_prod_veg) in a high measure of 0.941 and to the left side is the proportion of animal production in the agricultural production of the county (w_prod_anim), inversely and highly correlated with it.

Rotated Component Matrix[a]

	Component	
	1	2
w_pop_rural	,220	**,859**
w_agr_area	**,786**	-,003
w_prod_veg	**,941**	,169
w_prod_anim	**-,954**	-,141
GDP_county	,108	**-,847**
ratio_pens_emp	,193	**,859**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 3 iterations.

Table 1. *The correlation coefficients of variables with the two principal components*

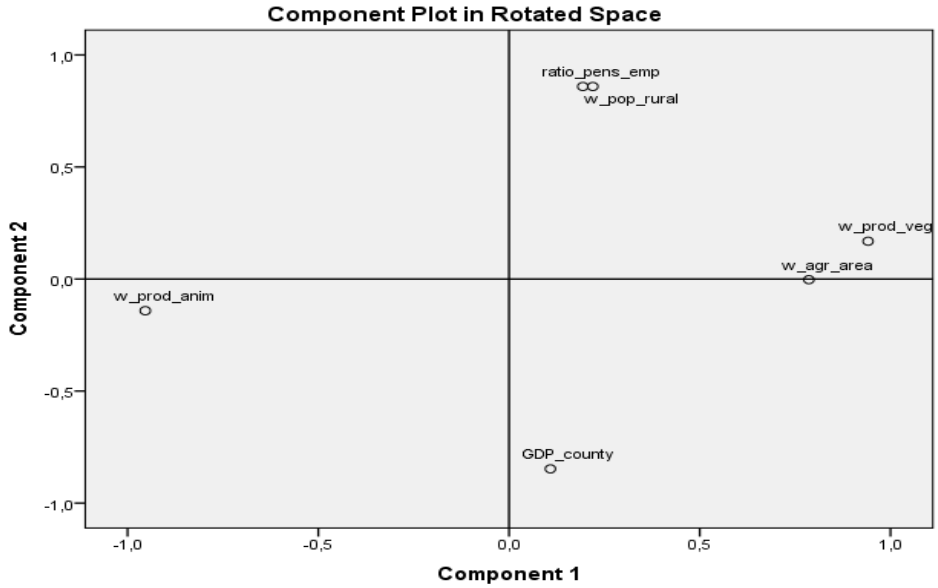


Fig. 2. *Principal components of agriculture and rural development, in 2012*

The meaning of the variables of the first component is that within a county, either the vegetable production, either the animal production can be more developped; the last one being the negatively correlated to the vegetable production and agriculture area. The animal growing conducts to the decreasing of the agriculture area for crops and vegetable production. The proportion of vegetable production (w_prod_veg) is

related to the proportion of agricultural area in total surface (w_agr_area) and the two variables appear together at the right side.

The second component opposes the county's GDP/capita (GDP_county) to the two variables which describe the life aspects in rural medium: the percentage of rural population in the county population (w_pop_rural) and the ratio of pensioners/employees (ratio_pens_emp). These last two variables are correlated with the second component in the same high measure, having the same value of the correlation coefficient of 0.859, in Table 1. The counties with high proportion of rural population have also high values of ratios pensioners/employees.

The distribution of these variables at both sides of the second component shows that the counties with high values of GDP/capita will have lower proportions of rural population and of lower values of the ratio of pensioners forone employee. On the contrary the counties having high proportions of rural population and a greater number of pensioners for one employee, have low values of GDP/capita. This component can be named as the *state of rural economic development*; all its variables are in the same high correlation.

The significance of this component is that the rural medium does not contribute to the economic development of the counties, on the contrary, for the data in the analysed year 2012, in Romania, the rural medium is an obstacle in the economic development way, at NUTS2 level.

The position of the two components is given by the way the variables are combined between them in describing the importance of rural development in Romanian counties, in 2012. The position of the two components is showing the importance in explaining the variation between the Romanian counties. The first component which explains 42%, is that of *county agricultural profile* and the second component with 37% of the rest of explained variation, is given by the state of *rural economic development*.

A conlcusion of this PCA is that in analysing the economic differences between the Romanian counties, the rural component is very important within the economic development framework, emphasizing the high importance of agricultural development – here is the first component of PCA. Another conclusion is that the Romanian counties having high levels of rural population, have also great number of pensioners and they will be less economically developed, having lower values of GDP/capita – the way as second component is defined by the data.

Eliminating the proportion of agricultural area in total county surface (w_agr_area), which is medium correlated with the first component of agricultural profile, in Table 1 and Fig. 2, the new obtained descriptive model is better than the previous one, explaining more than 85% from the whole variation of counties concerning the rural aspects envisaged by the two new components, in Fig. 3. The excluding of the mentioned variable has changed the importance of the two components, as can be seen in also in Table 2.

Rotated Component Matrix[a]		
	Component	
	1	2
w_pop_rural	**,848**	,259
w_prod_veg	,130	**,988**
w_prod_anim	-,106	**-,987**
GDP_county	**-,848**	,083
ratio_pens_emp	**,863**	,187

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 2. *The correlation coefficients of variables with the new principal components*

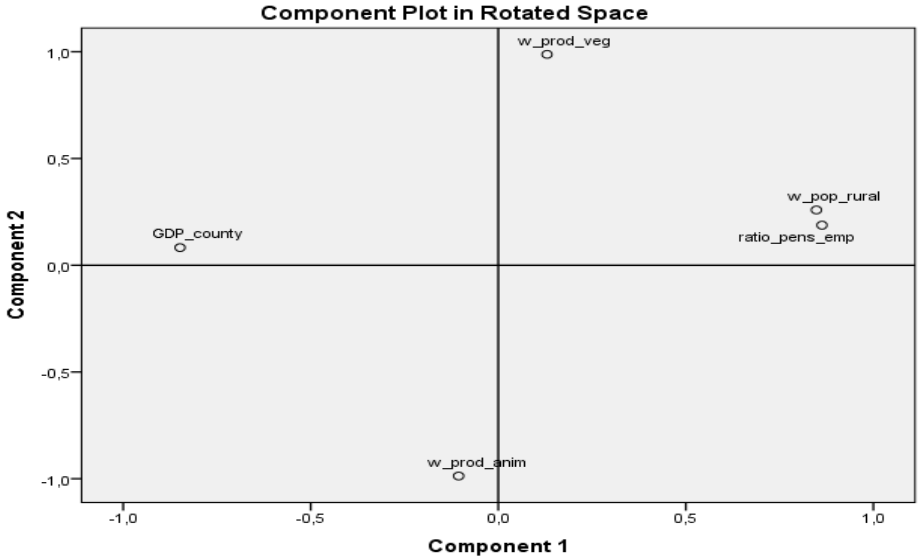


Fig. 3. *The components of rural and agricultural development, in 2012*

The rural economic development became the first component explaining 44% of variation, with the rural aspects expressed by the rural population proportion (w_pop_rural) and the ratio of pensioners/employees (ratio_pens_emp) - at the right side and the urban aspect at the left, by GDP/capita (GDP_county).

The agricultural profile is now the second principal component, explaining close to 41% and having clearly opposing with the same intensity of correlation, the

vegetable production (w_prod_veg) and the animal production (w_prod_anim), as it can be seen in Table 2.

Both components explain close in the same measure the two types of variation: determined by the economic governmental policies applied in rural and urban medium and by the climatic and geographical factors of the counties.

Bucharest was not considered in these analyses because it is an "outlier", having no rural population. The results of PCA are completed with the position of Romanian counties, presented in the chart from Fig. 4.

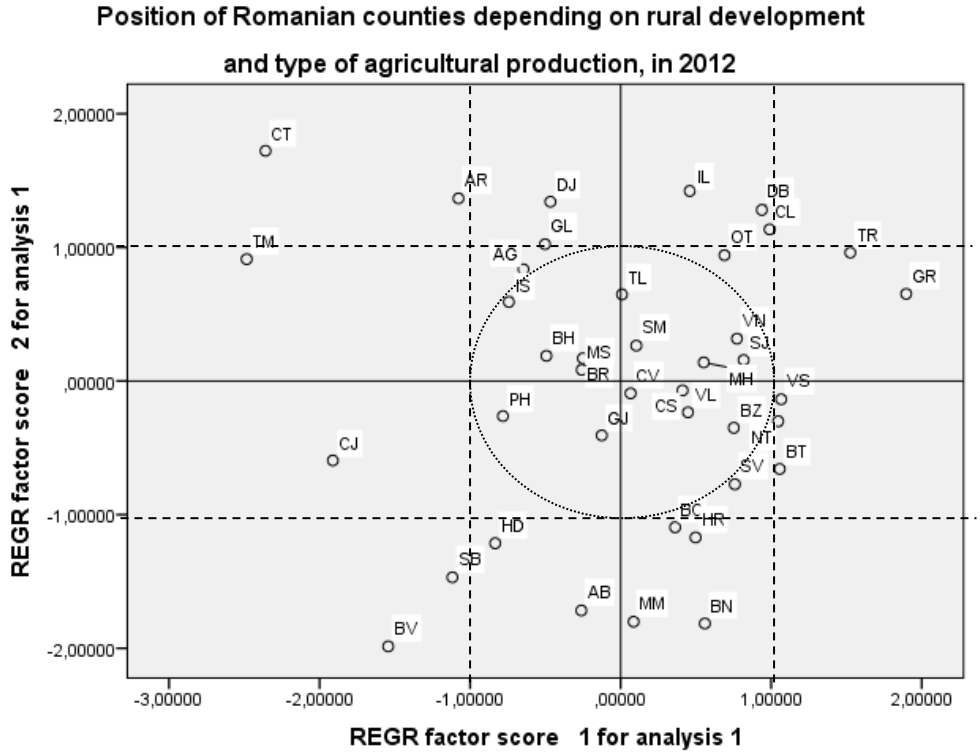


Fig. 4. *Characterizing the rural economic development of Romanian counties, in 2012*

The counties with large projections on an axis are representative for that component. The counties Giurgiu and Teleorman are characterized by high proportions of rural population and high values of ratio pensioners/employee. They are the poorest counties in Romania, being opposed to those having high values of GDP/capita. The richest counties, with high level of GDP/capita, are in order: Timişoara (TM), Constanța (CT), Cluj (CJ) and Braşov (BV), followed by Sibiu (SB) and Arad (AR).

The counties: Constanța (CT), Arad (AR), Dolj (DJ), Ialomița (IL), Dâmbovița (DB), Călărași (CL), and Galați (GL) are representative for large vegetable productions. At the other side, the counties: Brașov (BV), Bistrița-Năsăud (BN), Maramureș (MM), Alba (AB), Sibiu (SB), Hunedoara (HD), Bacău (BC) and Harghita (HR) have had large animal productions.

There is a large part of the counties placed at less than one standard deviation to the average of both components, meaning that they are placed close to the average level of both components. These counties marked within the circle are not very different between them, concerning the meaning of the two components.

The counties having high proportions of rural population and high values of the ratio of pensioners/employees are those placed in the first and the fourth frame. The greater projections are, on the first component at the right side, the poorer their economic situation was in 2012. In these counties placed in the first and the fourth frame, outside the interval of one standard deviation to the average of components, the rural development strategies must be applied in order to increase the living conditions of rural population.

4.1.2. Comparing the managerial approach of rural development in Romanian counties

We introduced the variables: the number of Local Action Groups (LAGs) and the number of implemented projects - which describe the managerial performance of rural development through LEADER program implementation until December 2014. We consider the county agricultural profiles as unchanged.

The best model explains 96.4% of all counties' variation and comprises the proportion of vegetal and animal productions in the agricultural county's production, the number of LAGs and number of eligible projects. The first principal component describes *the agricultural profile* and explains close to 51% of counties' variation. The second principal component defines *the European funding implementation*, being given by the number of LAGs and of number of eligible projects and explaining 45% of counties' variation. The simple correlation coefficients of the variables with the two components are presented in Table 3 and Fig. 5.

The chart from Fig. 5, called circle of correlations shows the proportion of animal production at the right of first component of *agricultural profile* and it is opposed to the proportion of crop production, at the left side. The negative correlation of these variables on the first component is also a normal one, because the counties having large living animal stocks have a reduced area for vegetal productions. For this reason the two variables are highly correlated with the first component, with correlation coefficients of 0.99, but with opposite signs, as seen in Table 3.

The managerial analysis of rural economic development became an analysis of managerial approach in agriculture. LEADER program has had also other

measures for rural development of non-agricultural nature, but the agricultural activities had priority in rural communities' development, during the analysed period 2012-2014.

Rotated Component Matrix[a]

	Component	
	1	2
w_prod_veg	**-,998**	,011
w_prod_anim	**,997**	,033
nr_lag	-,126	**,954**
nr_proj	,151	**,950**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization

Table 3. *The correlation coefficients of variables for the managerial approach*

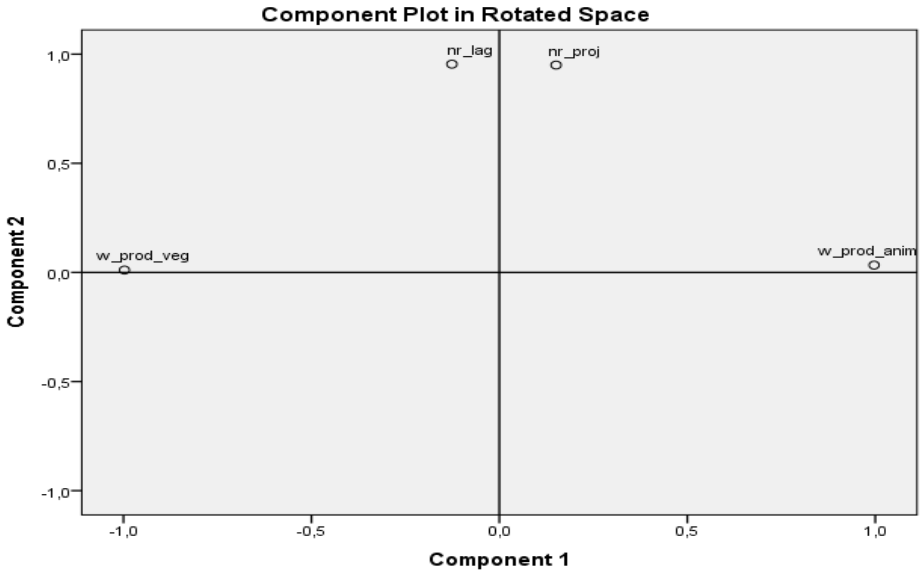


Fig. 5. *The components of agricultural management approach, in 2014*

The second component can be defined as that of *rural development management*. It has positively correlated the number of LAGs and the number of eligible projects. Their positive correlation is normal, because the LAGs purposes are to develop and help to implement projects of rural development. Being at the beginning, the LEADER program implementation situated at the positive side of the second

component - the rural development management, it has no opposed variable, because there are not immediate effects in the increasing the level quality of rural life.

The position of counties depending on the two components is presented in Fig. 6. The counties with high proportions of animal production which are placed at more than one standard deviation to a county average, are: Braşov (BV), Maramureş (MM), Bistriţa Năsăud (BN), Alba (AB), Sibiu (SB), Hunedoara (HD), Harghita (HR), Bacău (BC) - having a small number of LAGs and projects. The LEADER projects and its infrastructure of LAGs in the mentioned counties either were less, either not in the animal growing area or they have not yet produced the expected effects.

The representative counties for the crop productions, also placed at more than one standard deviation to a county average, but having low infrastructure of LEADER program are: Ialomiţa (IL), Constanţa (CT), Călăraşi (CL), Teleorman (TR) and Galaţi (GL). Arad (AR) and Dolj (DJ) are representative for vegetal production counties, but with a medium level of LEADER infrastructure.

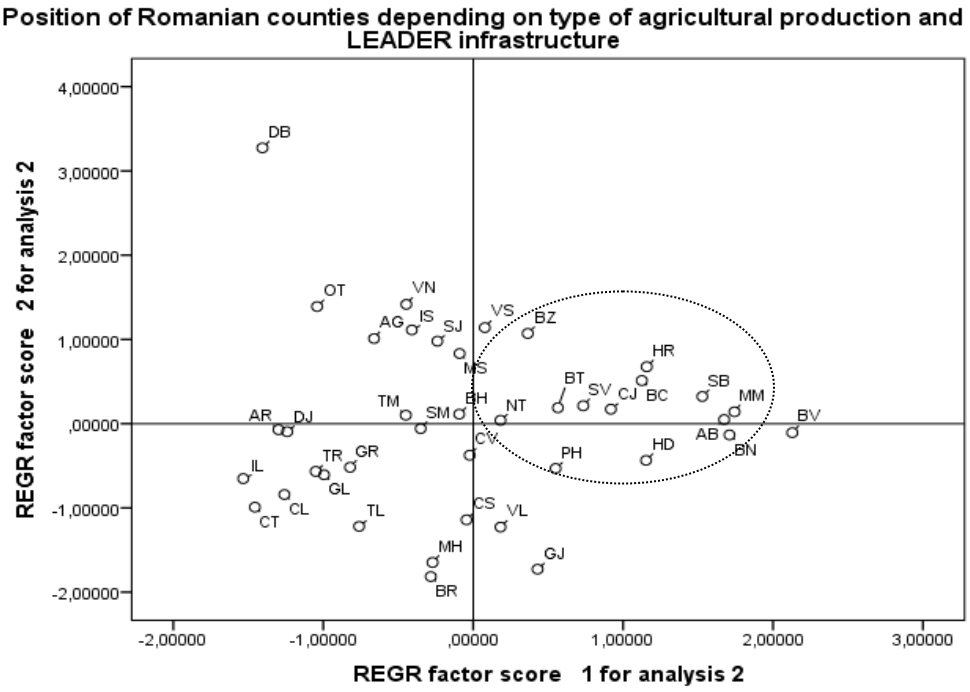


Fig. 6. *Counties' position on agricultural profile and LEADER implementation, until 2014*

County Dâmbovița is an ”outlier”, with a very good implementation of LEADER program, being also a county with large vegetal productions. This county has the greatest number of LAGs and the greatest number of implemented projects; it is representative for the second component, being situated at more than three standard deviations to the average level of the all Romanian counties.

Other counties which have beneficiated by agricultural development projects more than the average plus one standard deviation, were Vrancea (VN) and Olt (OT). Almost all counties are comprised in the interval of the average national level, plus and minus one standrad deviation. The counties with a very low level of implementing European funding projects are: Brăila (BR), Mehedinți (MH) and Gorj (GJ).

4.1.3. Clustering the Romanian counties after agricultural profile and managerial approach

Applying the cluster analysis using the variables defining the two components of the last PCA, from Fig. 5, we identified the characteristics of the two clusters of counties, presented in Table 4. The data in Table 4 define the average values of the components' variables for the two identified clusters.

There are not significant differences between the two clusters, related to the variables defining the component of agricultural profile. The vegetal production proportion is around 60% for all counties, between 59% for the counties in the first cluster and 63% for counties in the second cluster. The same conclusion can be formulated for the average of animal production proportion which is about 40% for the counties in the first cluster and 36% for counties in the second cluster.

Final Cluster Centers		
	Cluster	
	1	2
w_prod_veg	.59	.63
w_prod_anim	.40	.36
nr_proj	369	165
nr_lag	5	3

Table 4. *The characteristics of the two clusters of Romanian counties*

But the variables of the component of *rural development management* are quite different, dividing the counties in the two clusters, as with high managerial activity for those in the first cluster and with lower managerial activity for counties in the second cluster.

The number of LAGs is highly correlated with the number of implemented projects; we expected to have a greater number of projects in the counties with more

LAGs. The average number of LAGs for the counties in the first cluster is 5 with an average number of implemented projects per county about 370, compared with average number of 165 projects implemented in the counties having only about 3 LAGs within their territories.

Knowing that county Dâmbovița (DB) has 12 LAGs and 522 implemented projects from the starting of LEADER program until 2014 we can better understand its outstanding position in Fig. 6. At the opposite side, in Fig. 6, there are three counties, each with only one LAG: Brăila (BR) with 23 projects, Gorj (GJ) with 44 projects and Mehedinți (MH) with 61 projects.

Fig. 7 and Fig. 8 present the two clusters of Romanian counties. The first cluster comprises mostly all the counties placed in the first and second frames in the chart from Fig. 6, meaning the counties having the managerial variables of LAGs and projects number over the average level of all counties.

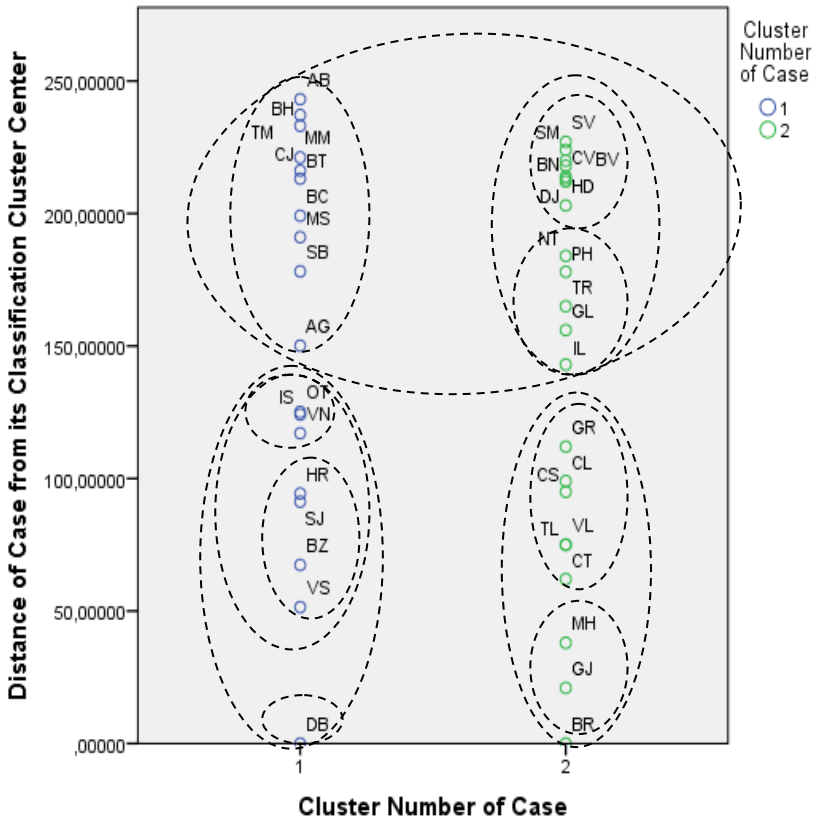


Fig. 7. *Romanian counties' clusters on managerial and agricultural profile, in 2014*

The second cluster contains mostly the counties situated in the third and fourth frames of the chart from Fig. 6, signifying those counties having the number of LAGs and of implemented projects, below the average level. The counties order in a cluster is described by the distance to the classification cluster center.

The counties in the first cluster begins from bottom-up with Dâmbovița county (DB) and the second cluster starts with Brăila county (BR), meaning that the separation in the two clusters is dictated mainly by the variables of managerial approach; it was said that a county's agricultural profile is quite similar for the two clusters: close to 60% of vegetal production and 40% of animal production.

In Fig. 7, we emphasized the groups of counties, at different distances, depending on how they result from the dendrogram obtained by applying the cluster method.

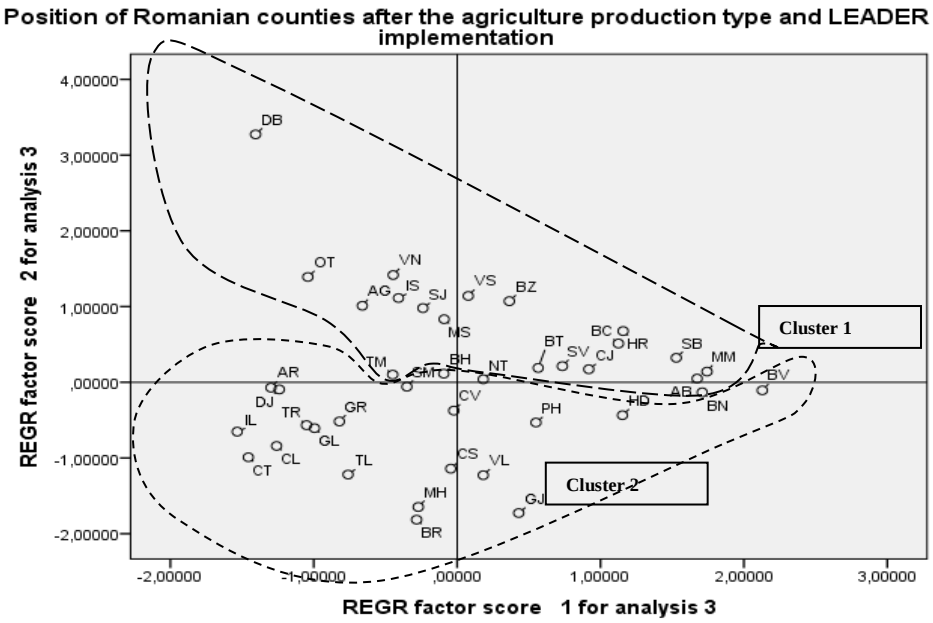


Fig. 8. *Combining the clustering with PCA, for the Romanian counties, in 2014*

The cluster method gives us two identical dendrograms using the Centriod Linkage and using Average Linkage (Between Groups); the dendrogram is presented in Fig. 9.

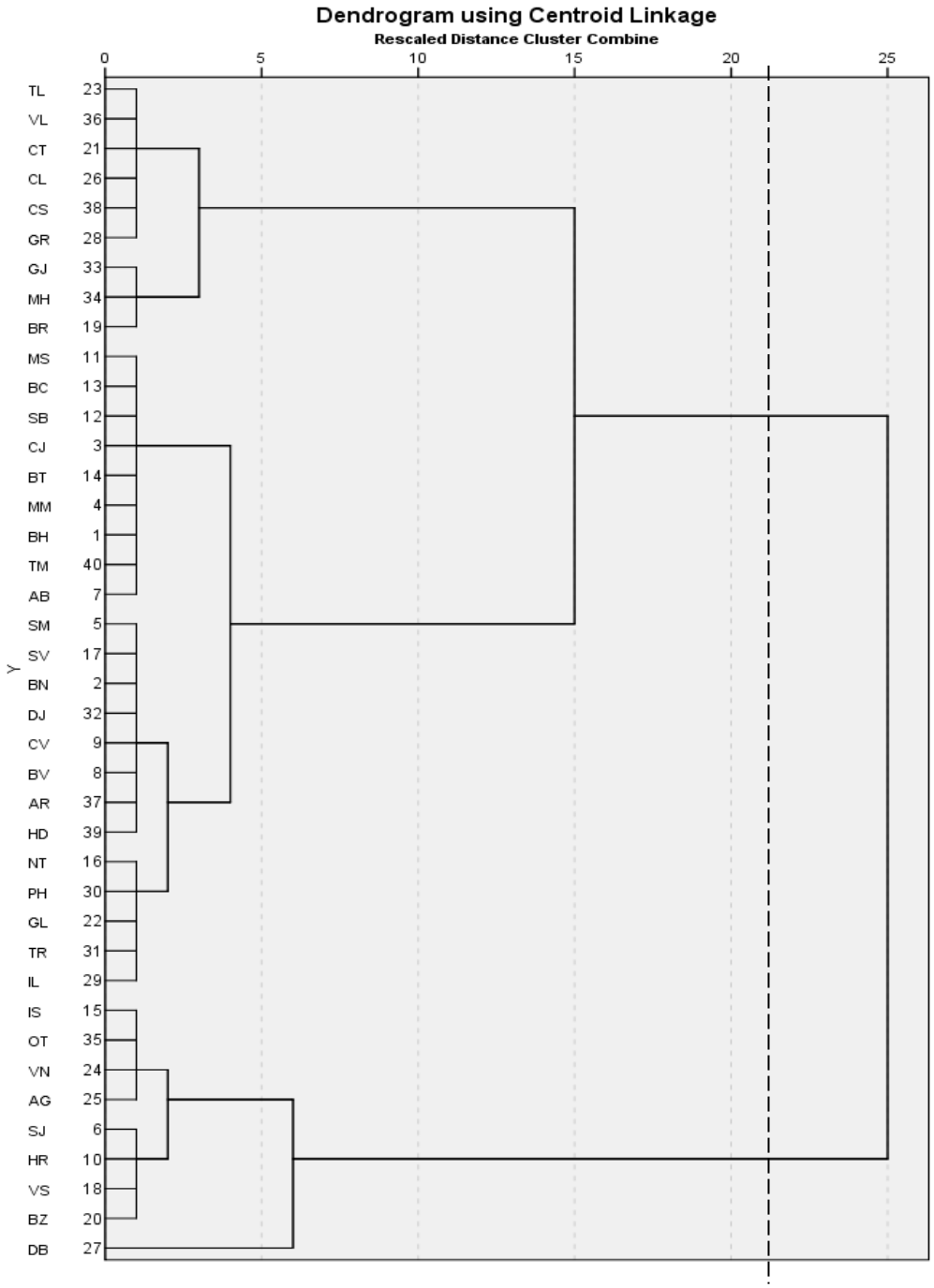


Fig. 9. *Romanian counties dendrogram, in 2014*

The two described clusters can be seen in Fig. 9, by cutting before combining them all. The agricultural profile of the vegetal-animal production proportions is mostly similar for all counties. The separation of counties in the two clusters is rather depending on their rural managerial performances through LEADER program.

4.2. Characterizing the rural development of Romanian administrative regions

The PCA for administrative regions had considered the variables also used at counties' level. It is interesting to see that the variables which can describe the rural development at regional level are almost the same as at counties' level. There can be identified the counties belonging to each administrative region.

4.2.1. Rural development of Romanian administrative regions, in 2012

Considering the same variables as the analysis at county level, we find that for the administrative regions the GDP/capita is not significant to describe the differences between them. This conclusion is based on the circle of correlations from Fig. 10.

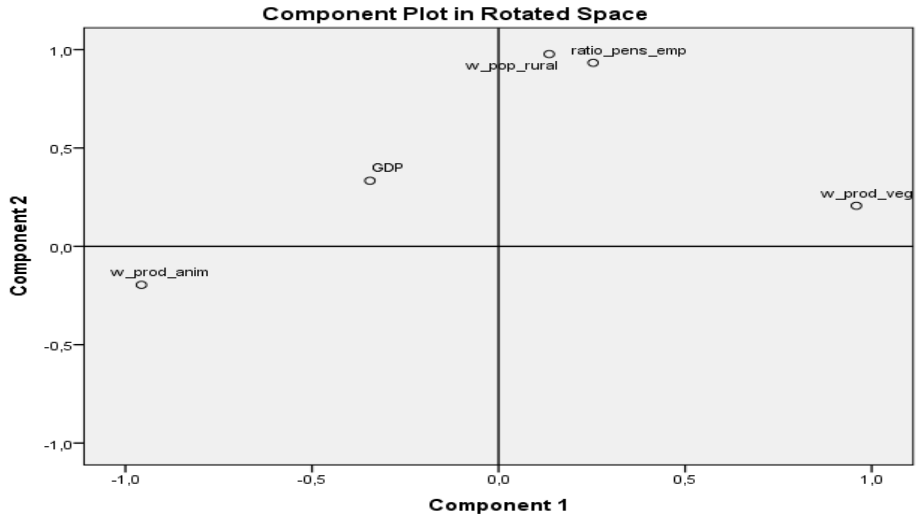


Fig. 10. *Circle of correlations for the PCA of administrative regions*

Eliminating the GDP/ capita of each region, we find a very good model which explains 99.5% from the variation of administrative regions. The new components are defined by the variables in Table 5 and the circle of correlations for a new PCA in Fig. 11.

Rotated Component Matrix[a]		
	Component	
	1	2
w_prod_veg	**,983**	,180
w_prod_anim	**-,986**	-,165
ratio_pens_emp	,218	**,971**
w_pop_rural	,129	**,987**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization

Table 5. *The correlation coefficients of variables for administrative regions PCA*

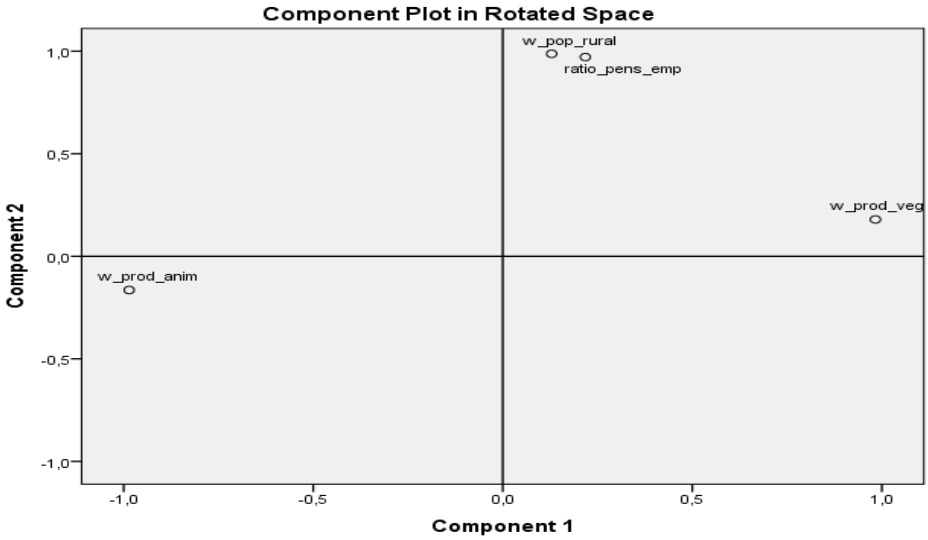


Fig. 11. *The components of administrative regions PCA*

The position of Romanian administrative regions, in 2012, depending on the two identified principal components: *the agricultural profile* on Ox axis and the *rural development* on Oy axis - is presented in Fig. 12.

In Romania there are four regions representative for the vegetal production proportions: South (S), South-East (SE), West (W) and South-West (SW), and three regions for the animal production proportions: Centre (C), North-East (NE) and North West (NV).

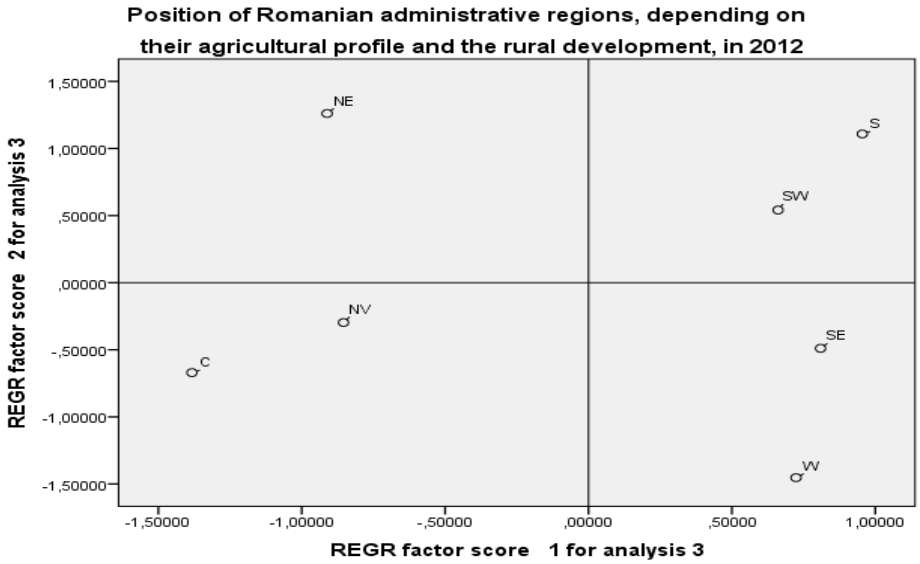


Fig. 12. *The position of Romanian administrative regions depending on their agricultural profile and rural development*

The regions North-East (NE) and South (S) are representative for the high rural population proportions. The West (W) region has less rural population, being more developed.

4.2.2. The managerial approach of rural development in Romanian administrative regions

We introduced the variables of managerial approach of rural development: the number of LAGs and the number of implemented projects in each region until 2014.

The new PCA offers a very good model, which explains 99.8% from the entire variation of administrative regions. As in the case of counties analysis, in Fig. 5, when we have introduced the managerial variables, the component of county agriculture profile has changed its sides, having the animal production proportion at the right side and the vegetal production proportion at the left.

Rotated Component Matrix[a]		
	Component	
	1	2
w_prod_veg	**-,984**	-,174
w_prod_anim	**,985**	,169
nr_lag	,026	**,999**
nr_proj	,505	**,862**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

Table 6. *The correlation coefficients of variables for administrative regions PCA*

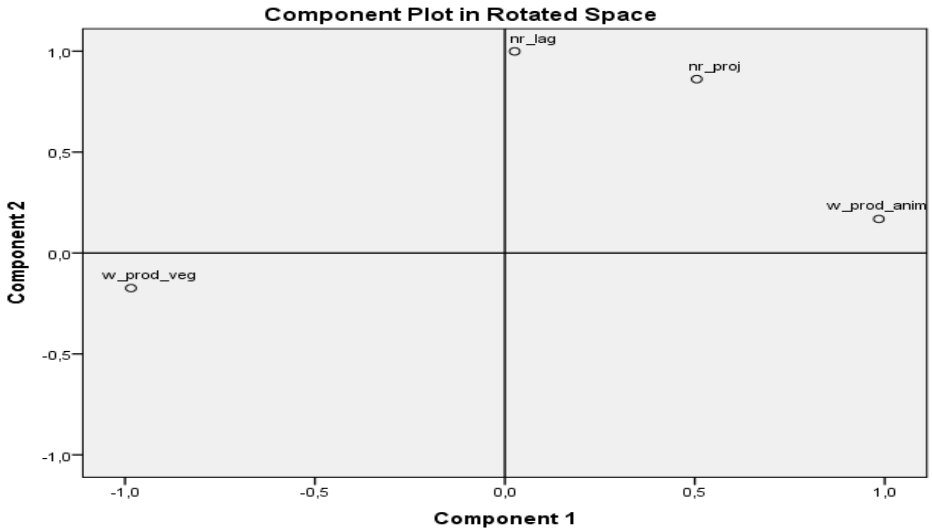


Fig. 13. *The rural managerial approach of administrative regions*

The conclusion is that the LEADER projects in rural areas have mainly addressed the livestock productions. The position of administrative regions described by the new PCA model is shown in Fig. 14.

South (S) region is apart from the group of five regions lying in the interval of average level plus and minus one standard deviation, being very representative for the vegetal production and also for a very good LEADER program implementation.

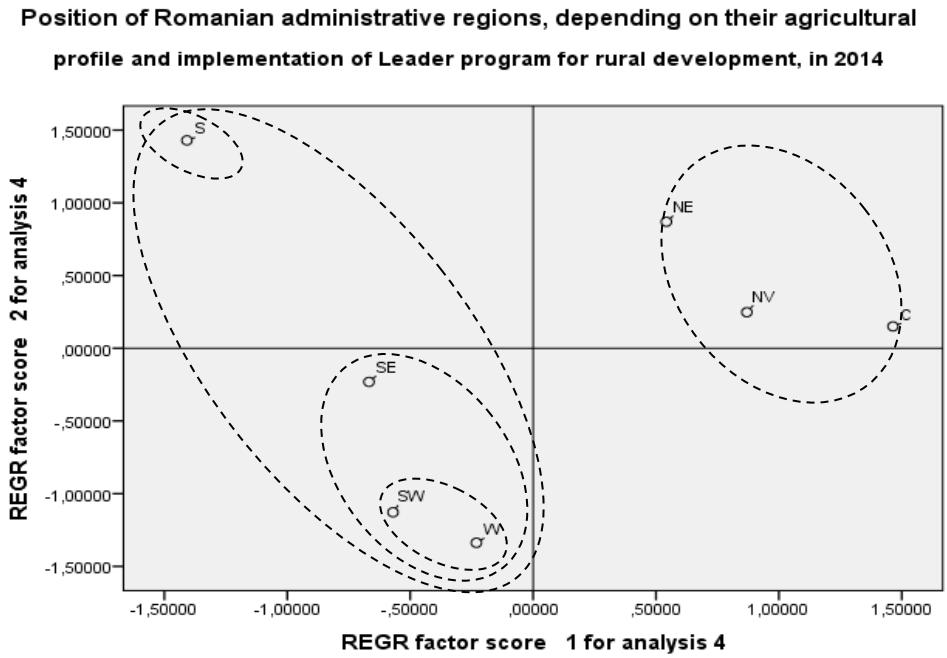


Fig. 14. *Romanian administrative regions depending on their agricultural profile and rural managerial approach*

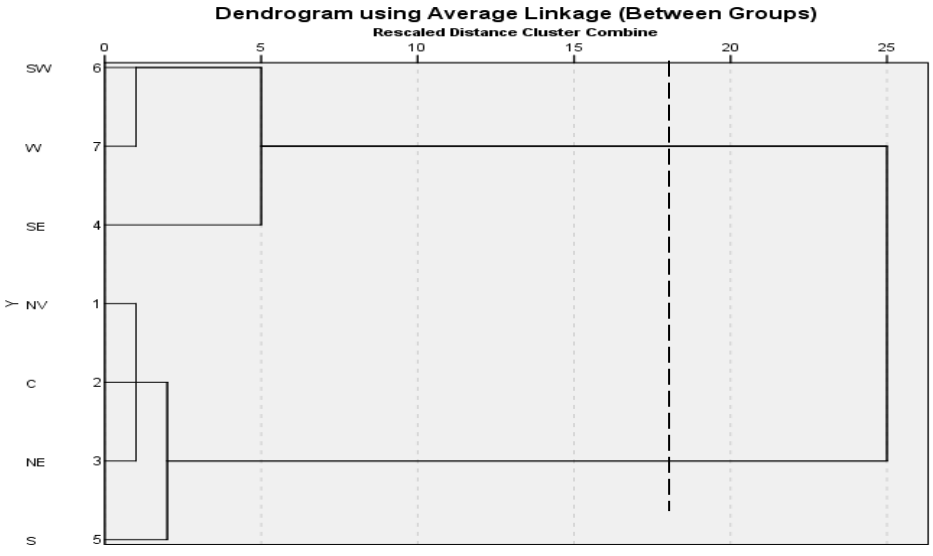


Fig. 15. *Romanian administrative regions dendrogram*

West (W) region was not very implied in the developing the LEADER infrastructure and its implementation. The explanation for West region is, as previously concluded, that it has a low proportion of rural population. South-West (SW) is close to the situation of West (W) region. Centre (C) region is the most representative for the animal production, as is also shown in Fig. 12.

Applying the cluster method for the administrative regions we obtain the dendrogram from Fig. 15, which describes the two groups formed already in the chart from Fig. 14.

5. Conclusions

The analysis of rural economic development has clearly showed the important role of agricultural profile of the counties. From all the considered variables, the emphasis fell on the two types of agriculture: crop production and growing domestic animals.

The counties' rural development profiles are quite different between them not only through the type of practiced agriculture, which depends on the geographical coordinates, but also through their economic development level. It was obvious in Fig. 3, that the rural population proportion is opposed to the GDP/capita, meaning that the counties with higher proportions of rural population are poorer than the others, as can be seen in Fig. 4.

The counties from the frames one and four of Fig. 4, have not only greater rural population, but also have higher ratios of number of insurances of pensioners/ employee; they have older population in rural area, more pensioners and less active labour force, no jobs for young people.

The National Programme of Rural Development for the period 2014-2020, approved in May 2015, established the modalities to use the measures of LEADER program for the development of rural communities, by identifying the local requirements and potential resources, through an integrated and innovative way. The local development strategies are elaborated by the local authorities and implemented by the LAGs.

Introducing the variables characterising the management approach, the rural aspects and the economic development level have become insignificant. The conclusion is that the component of LAGs' number and the number of LEADER implemented projects, in Fig. 5, took the place of the component of rural economic development, from the previous analysis, from Fig. 3, proving the very important role of the European funding for development of the counties. But meantime, this component of *rural development management* was seen as the second component, not as the first, like the one which was replaced. This means that the LEADER managerial approach did not find yet its return effects in the economic development level of counties. The rural development projects implemented by LAGs - the

infrastructure already built in each county through LEADER program, was not yet effective in 2014. In this context of comparing the counties' rural development, the most important component is that of agricultural profile. A good explanation is that LEADER measures were implemented for the agricultural activities with priority, than for other rural activities. The variation of the counties in Fig. 6, in the interval of the average level of both components plus and minus almost two standard deviations, show rather a homogeneous situation, except the outlier – county Dâmbovița (DB), whose outside position is rather strange than a good case.

Applying the same methodology, for the Romanian administrative regions, the conclusions can be oriented in the two directions: that of rural development characterization and that of managerial approach through LEADER program.

The rural development of the administrative regions was not influenced by the GDP per capita. This variable did not bring any significance difference between the administrative regions. But GDP per capita was important to differentiate the county's rural development. The conclusion is that there were no policies at level of administrative region in order to bring some contribution to the economic development of their territories, until 2014.

The administration at regional level didn't prove its efficiency in the rural development, because the GDP per capita was not significant in the context of this analysis. This conclusion should be considered when the regionalization process will be started. A new adding authority level will imply costs, which have no results in the economic development of regions, in general and for rural development, specially. Each administrative region has in the same measure richer and poorer counties. North-East (NE) region, followed by South (S) region have greater proportions of rural population and higher number of pensioners than employees. The administrative regions are rather homogenous concerning the rural development degree.

Considering the managerial approach at region level, the describing component of LEADER program implementation, emphasizes the results already obtained in previous analysis of Romanian counties. The South region is in the best position after LEADER implementation as opposite to West region, and the other regions are perceived as having a homogenous situation.

An important conclusion is that the rural development must be undertaken at county level, because the GDP per capita was significant for describing the differences of rural life at counties level. This conclusion is in the same pace with the purpose of LEADER program objectives.

Another conclusion is that LEADER program implementation until the end of 2014 in Romania was not still effective and there were no significant effects of European funding, found in increasing of the rural economic development. The LEADER measures envisage developing the life of rural communities starting from local initiatives. The authorities' role is to ensure an integrative way to achieve the objectives of the local development strategy.

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