

Agriculture as a Key Issue for Rural Development in the European Union

Vidal, C.

Eurostat, Bâtiment Joseph Bech, 5 Rue Alphonse Weicker, L-2721 Luxembourg
e-mail: claud.vidal@cec.eu.int

Eiden, G., Hay, K.

CESD Communautaire, 3, Rue Wenceslas 1er, L- 2724 Luxembourg
e-mail: gerd.eiden@cesd.lu

Abstract: with a specific focus on agriculture, and using available data at Eurostat the main aim of this work has been to characterise the spatial components of rural areas within Europe. This data has been used to develop different typologies of 'rural', contributing to a fuller understanding of some of the similarities, differences and diversity between rural areas in regions and countries of the EU. It is anticipated that it will enable a comparative evaluation of territorial strengths, weaknesses, opportunities and threats. In this way, policy-makers and practitioners may use such information to formulate and target policies in a meaningful and regionally focused manner:

Keywords: agriculture, rural areas, rural development, indicators

1. Background – a change in direction for rural areas

Since the beginning of the 1980s structural policy in favour of rural areas has evolved substantially with numerous policy initiatives and changes being proposed and brought about by the European Commission. In particular, Community policy on rural development experienced an important change with the 1988 reform of the Structural Funds. Gradually policies have been taking on a greater territorial perspective with different measures such as environmental, agricultural and regional development increasingly horizontally integrated. The CAP reform after 1992, and the Treaty of Union confirmed that the development of rural areas must be included as part of Community policies for economic and social cohesion.

This shift in policy direction is due in part to the major restructuring occurring in rural areas (Barthelemy et al. 1999, Vidal 2000 a, b, c). These changes have helped contribute to the creation of a new image and role for areas, for example, in the conservation of the environment and protection of the natural heritage (European Commission, 1998). Agenda 2000 (European Commission, 1997) and the more recent Rural Development Regulation (European Commission, 1999) have continued to focus on the idea of horizontal integration of measures from a territorial perspective. Rural development became the second pillar of the CAP and takes into account environmental, marketing, tourism, rural services and village improvement. There was also an important shift to further 'green' what had formerly been regarded as agricultural structures' measures

and agri-environment became a compulsory element in territorial rural development plans.

An in-depth analysis of the regional situation and specific conditions within rural areas is necessary as it is increasingly recognised that rural areas are diverse and undergoing significant changes. These need to be monitored, particularly for the purposes of future policy approaches.

It is impossible to use the term 'rural' generally as it holds very different meanings depending upon the geographical region. This diversity is reflected in a typology, which has been developed in the course of this study and based upon an extensive set of variables. It is anticipated that these typologies will be useful to policy makers and practitioners both when formulating new policies related to the development of rural areas and also as an indicator of how successful present policies might be within various regions.

2. Methodological approach

2.1 Rural areas: problems of delimitation

There have been several definitions of rural areas produced by different bodies over the years. One of the classification schemes from the late 1980s, and one that is also similar to more up-to-date classifications, was developed by the Council of Europe and incorporated aspects such as pressure of modern life, rural decline, very marginal areas and the level of integration within the national economy.

However, for administrative purposes rural areas are commonly categorised using single variable analysis. In 1994, the OECD (OECD, 1994) developed a simple territorial scheme that identifies three types of regions based on population density: predominantly rural, significantly rural and predominantly urbanised. Rural areas are defined as having population densities of below 150/km². The EUROSTAT (EC 1997) approach also distinguishes three different types of regions based on the degree of urbanisation: densely populated zones, intermediate zones and sparsely populated zones. Recent efforts in the framework of the 'Study Programme on European Spatial Planning' (SPESP, 2000) revealed that the inter-relationships and interdependence between urban centres and the rural hinterland are increasing, making any clear distinction even harder to formulate. The existence of so many different definitions highlights the difficulty when attempting to distinguish between rural and urban.

For the purposes of the report, however, it was decided to use population density alone as the distinguishing factor of 'rural' with a threshold of 200 inhabitants per km². Had the OECD definition of 150 inhabitants been used for example, over fifty percent of the NUTS 3 regions would have been excluded from the analysis. In some respects, therefore, 200 inhabitants per km² represented a compromise between the various definitions of 'rural' and the data available. From 455 NUTS regions at NUTS 2 or 3 level composing the entire territory of the EU 355 were included in this analysis.

2.2 Data sources and the geographic breakdown

In principal all variables available at Eurostat refer to the Nomenclature of Territorial Units for Statistics (NUTS [1995 and 1999]). In order to ensure that regions of

comparable size are analysed, the statistical data refers to NUTS 3 level, except for Germany, Belgium and The Netherlands where data is related to NUTS 2 regions.

The report also had to take into account the fact that in January 1999 the Statistical Office of the EU introduced the latest modification to NUTS – NUTS 1999 which covers EU-15. It replaces the former NUTS 95, which only covered EU-12. The modifications to the territorial breakdown can have an impact on the consistency of the databases. Problems related to the modification can be summarised as follows:

- New coding: introduction of a new coding of the regions at different levels
- Disaggregation: splitting of NUTS regions into smaller units, not existing before
- New territorial delimitation: due to a reorganisation of local governments etc. new NUTS regions are created.

Certain databases were updated, taking into account these modifications, others not. For the purposes of the report it was, therefore, necessary to find a certain territorial correspondence between the old and new regions. A table of convergence had to be created, linking the different databases and different territorial units.

2.3 Choice of variables for characterising rural areas

Based on the information available from Eurostat, and taking into consideration some of the problems with the data, a list of seven fields and associated variables were developed. These were chosen to reflect the development of rural areas but with a specific focus on the agricultural sector.

Demographic variables can be considered as some of the most important indicators when it comes to measuring strengths and weaknesses of a territory. Perhaps of greater interest, however, are the trends in population over time, and their causes and consequences. Changes in total population can be used as a measurement of development where population decline is an indicator of the economic fragility of an area or, on the other hand, where population increase is an indication of economic strength. This indicator can be reinforced further by taking into account age structure. The use of Gross Domestic Product (GDP) per capita (expressed in PPS [Purchasing Power Standards]) and evolution of GDP per capita was chosen as a measure of the regional value-added and welfare changes arising from economic activities in the region. It is seen as the best available estimate of average income levels in different regions and over time. It can also be used as an indicator of relative economic performance. Levels and changes in agricultural employment are important as they indicate the relative importance of agriculture in the local or regional employment structure, and how this is changing over time. As recent surveys prove, the level of agricultural employment is continually shrinking relative to output (due to both technological changes as well as structural changes). Therefore, through measuring the level of agricultural employment in the local economy, this will reveal how much employment needs to come from other sectors if the rural economy and population are to be sustained. The importance of agricultural employment is further developed through the inclusion of numerous variables associated with the farm labour force. Variables chosen within this field reflect the number of people employed (including regular family labour) per holding and per 100 ha, which can also be used as an indication of farm size, for example, whether or not a farm requires intensive labour such as those with permanent crops. It is also important to differentiate between labour types – whether or not farms have a high proportion of family labour force, part-time

work, and seasonal work. Through the inclusion of both the age structures of those working within agriculture and the importance of off-farm work to their income, an insight is provided into the vitality and sustainability of the agricultural sector in an area.

Table 1: *Thematic fields and the list of corresponding variables*

Thematic fields	Variables
1. Demography	Population density
	Share of population less than 20 years
	Share of population older than 60 years
	Evolution of population
2. Economic Strength	GDP per capita and evolution of GDP per capita
	Unemployment rate and its evolution
3. Agricultural Employment	Share of agricultural employment and its evolution
4. Farm Labour Force	Average Number of Annual Working Units (AWU) by holding
	Average Number of AWU by 100ha
	Proportion of Family Labour Force (AWU) of total labour force
	Proportion of Young Holders (AWU) in the agricultural sector
	Proportion of Old Holders (AWU) in the agricultural sector
	Proportion of holders with other gainful activities
	Proportion of holders without spouses
	Proportion of old holders with other gainful activities
5. Agricultural Land Use	Proportion of Utilised Agricultural Area (UAA) of total land
	Proportion of Arable Land (from UAA)
	Proportion of Permanent Grassland and Pasture Land
	Proportion of Olive Trees
	Proportion of Vineyards
	Proportion of Permanent Cultures (except olive, vine)
	Proportion of Area Under Grass
	Proportion of Fallow Land
6. Farm Structure	Average Utilised Agricultural Area
	Average Economic Size of Holding
	Average Standard Gross Margin (SGM) per AWU
	Average Wooded Area of Holding
7. Livestock	Average Number of Bovines (LSU) per holding
	Average Number of Sheep (LSU) per holding
	Average Number of Pigs (LSU) per holding
	Average Number of Table Fowls and Laying Hens
	Average Number of Livestock Units per UAA
	Average Number of Herbivore per hectare Forage Crops, Permanent Meadows and Pastures
	Average Number of Carnivore (LSU) per hectare arable land and grassland

An analysis of the varying land uses in and between regions can be a valuable source of information for a number of reasons. It can be used as an indication of the different intensities of land use, how productive the land is as well as the diversity of land use. The fact that different crops are subject to different CAP commodity regimes under market policy, some knowledge of these can allow an assessment of changes in different regimes. Variables relating to livestock provide much the same information as those relating to land use. Both livestock indicators and agricultural land use, particularly those relating to intensity of production, are also useful in determining the environmental impacts of agriculture.

3. Statistical Analysis

In order to highlight the differences between rural regions of the European territory a statistical analysis of the variables had to be carried out. Figure 1 gives an overview of the different statistical procedures applied.

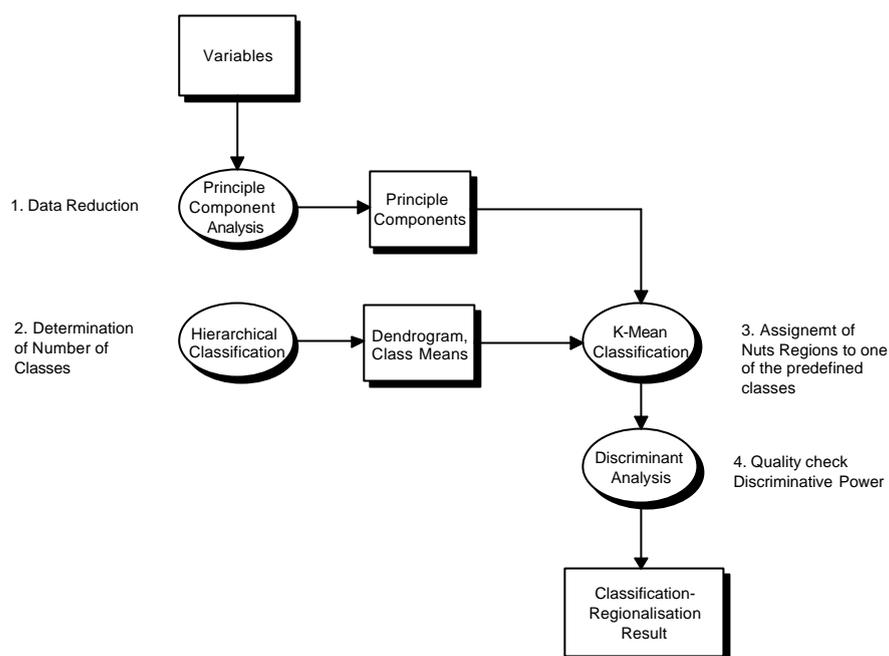


Figure 1: *Data processing chain*

(1) In the first stage a Principal Component Analysis (PCA) was carried out for each thematic field and the corresponding variables (see table 1). The aim of PCA is to define the underlying structure in a data matrix for the purpose of summarisation or data reduction. The principal components have been calculated for each of the thematic fields and the corresponding variables. In total 13 principal components were used, each of them clearly related to the original variables and thus enabling a meaningful interpretation of the components itself and their weight within the classification.

(2) The classification process started with a hierarchical cluster analysis aiming at a reasonable determination of the number of classes. By means of the dendrogram, a standard output of the agglomeration process, details about the similarity of the NUTS regions regarding the used PCA's are revealed, which eases the decision on how to group the different NUTS regions and facilitates a clear interpretation of the final classification result. A total of thirteen clusters - or types of rural areas - have been chosen. It is a compromise between the territorial detail required and to maintain characteristic differences between the clusters, which eases a clear and meaningful interpretation of the regional specificities.

(3) Based on the determination of the number of classes and the corresponding class means the final assignment of the NUTS regions to one of the predefined classes was done through a k-means cluster analysis.

(4) Finally, in order to evaluate the result of the classification procedure a discriminant analysis was performed. This procedure was used to validate the stability or reliability of the classification process. The quality check was aimed at detecting questionable assignments of certain NUTS regions to a cluster as well as the evaluation of the specific weight of variables within the final classification result.

4. Results and Interpretation: Typology of rural areas in the EU

As can be seen from the dendrogram, the cartographic presentation of final classification (map 1) result highlighted some remarkable features:

Particularly noticeable is the fact that the borders of many classes concur with those of the EU Member States. This is most obviously the case for the Nordic countries, Ireland and Portugal. The territorial pattern of the 13 groups shows a certain spatial consistency. When combined, the NUTS regions in nearly each of the 13 clusters are forming regional clusters (with the exception of class 5, 3 and 6). The 13 clusters can be combined without losing their consistency. However, whilst it was possible to aggregate the final thirteen classes into four general groups, there remains nonetheless, not only variation between the final four groups but also between regions within a group (perhaps with the exception of the Nordic Countries).

The following tables highlight the specificities and regional characteristics of the different types of rural areas in the EU. The Nordic regions were the only group which are made clearly of only one class. Southern Middle-Europe regions were made up of four classes which are quite similar in many respects, but at the same time there are important differences. All these regions have a below average labour force with the exception of Central Italy, below average economic size of farm, above average GDP (except S-France and N-Spain), a higher share of younger farmers (except Central Italy).

However, despite the similarities, it has to be noted that there are significant differences. Central Italy, for example has an ageing population with over a quarter of the population over 60 years of age. Unemployment rates also differ between these groups with Central France, Southern France and Northern Spain having much higher rates than the other classes within this group. As with the Southern Middle-Europe group, this group also had below average labour force but was characterised in particular by above average AWU per holding, high economic size of holdings (except Ireland) and low unemployment rates except in the East German Lander. Perhaps some of the more interesting data in this group relates to the East German Lander. This class is unique in

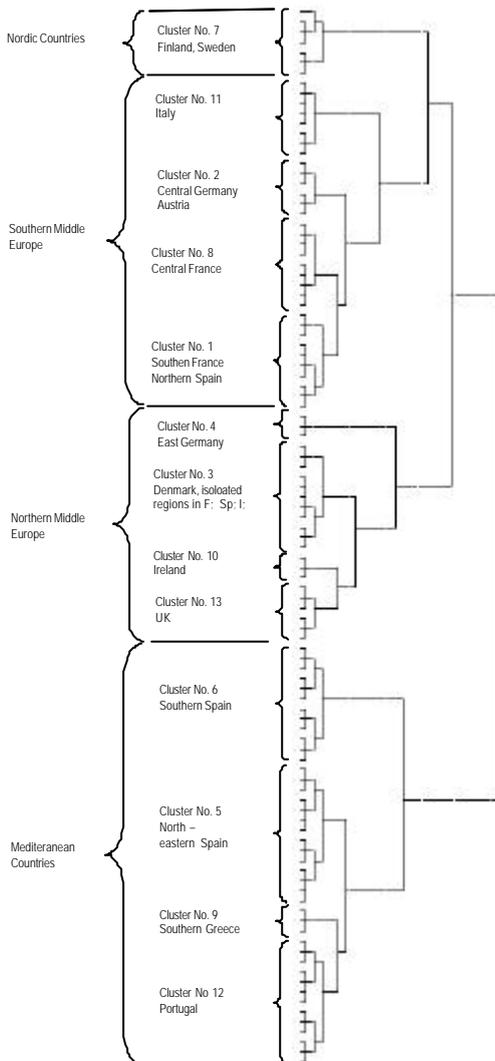
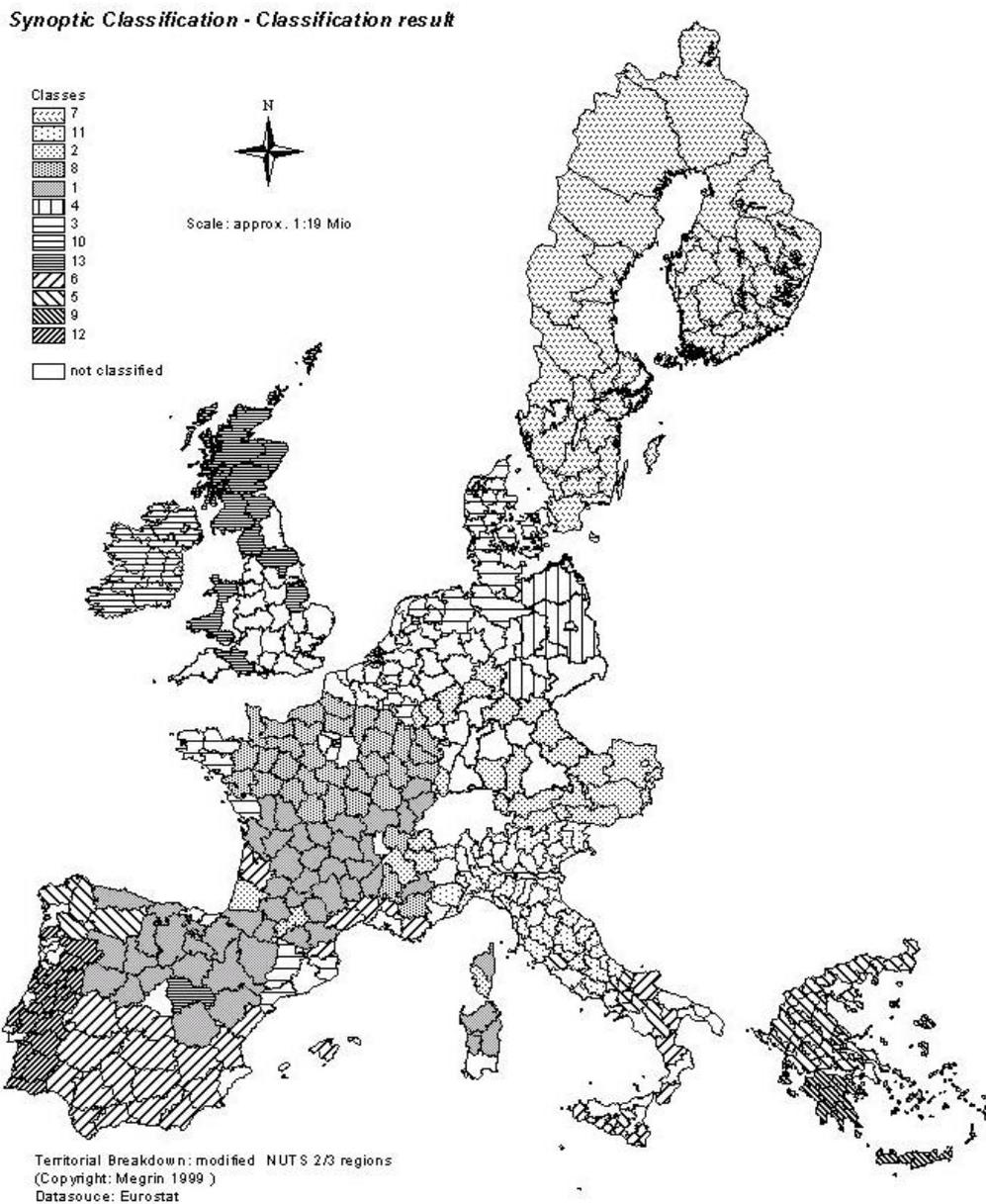


Figure 2: Dendrogram of synoptic classification process (selection of regions)

many respects, not only in this group but also from the three other groups in the final classification.



Map 1: Cartographic presentation of the final classification result

This class had the highest unemployment rate, highest evolution of GDP, highest economic size of holdings, lowest rate of agricultural employment and the highest number of young holders compared to all other 12 classes, reflecting its position as a state in transition. The Mediterranean regions were possibly the easiest to associate together into one group and only had one or two minor differences as is shown in the table. These regions were characterised by small farm size, high levels of unemployment, an ageing population, low income levels and with agricultural

employment dominating, particularly in Portugal where it reaches 20% of total employment.

Table 2: Description of types of rural areas in EU

Nordic region	Description		
Nordic Countries – Finland, Sweden (cluster No 7)	Below average farm labour force (1.4AWU/100ha)	High % of farmers with other gainful activities (52%)	
	Low seasonal labour force (3.6%)	Low population density	
	Above average % of young farmers (13.3%)	Population under 20 above average (25.3%)	
	Above average economic size (18.8%)	Above average unemployment rate (13.3%)	
	Above average farm size (28.2%)		
Southern Middle-Europe	Description		
Central Italy (cluster No 11)	Above average farm labour force (8.1AWU/100ha)	High % of young farmers with other gainful activities	
	Lowest AWU per holding (0.8)	Highest population density (118.9)	
	Below average % of young farmers (5.6)	Population over 60 above average (25.7%)	
	Above average % of old farmers (60.6>55)	Below average unemployment rate (7.4 %)	
	Below average economic size (9.5 ESU)	Below average farm size	
Central France (cluster No 8)	Below average unemployment (7.4%)	Highest level of GDP/capita	
	Below average farm labour force (3.4AWU/100ha)	Below average % of farmers with other gainful activities	
	Above average AWU per holding (1.4)	Above average population density (81.2inh./skm)	
	Above average % of young farmers (16.6<35)	Population under 20 above average (26.5%)	
	Above average economic size (31.8 ESU)	Above average farm size	
Austria, Lux, Germany, France, Italy (cluster No 2)	Above average unemployment rate (11.6%)	Above average GDP	
	Below average farm labour force (4.5 AWU/100ha)	Above average % of farmers with other gainful activities (43.8%)	
	Average AWU per holding (1.0)	Above average population density (117)	
	Below average economic size (13.9 ESU)	Below average farm size	
	Above average % of young farmers (16.6<35)		
Southern France, Northern Spain (cluster No 1)	Below average unemployment rate (6.7%)	Above average GDP per capita	
	Below average farm labour force (3.5AWU/100ha)	Below average % of farmers with other gainful activities (25.7%)	
	Average AWU per holding (1.1)	Below average population density (47.1)	
	Below average economic size (13.3ESU)	Above average farm size	
	Above average % of young farmers (15.1<35)	High % of permanent grassland/pastures	
Northern Middle-Europe	Above average unemployment rate (12.6%)	Below average GDP per capita	
	Description		
	Scotland and selected regions in UK (cluster No 13)	Below average farm labour force (2.2 AWU/100ha)	Above average % of old farmers with other gainful activities (20.6%)
		Above average AWU per holding (1.9)	Above average population density (94.7 inh./skm)
		Above average economic size (37.7 ESU)	Above average farm size
Below average % of young farmers (8.4%<35)		High % of sheep (46.3), bovines (62.8) permanent grassland/pastures (56.2)	
Above average GDP/capita		Below average unemployment rate (7.4%) with decreasing tendency (-4.1%)	
Ireland (cluster No 10)	Below average farm labour force (5.0 AWU/100ha)	Below average % of farmers with other gainful activities (25.1%)	
	Above average AWU per holding (1.4)	Below average population density (48.9 inh./skm)	
	Below average economic size (12.9 ESU)	Above average farm size	
	Above average % of young farmers (13.3%)	Highest % of permanent grassland/pastures (80.1)	
	Below average GDP per capita	High % of LSU per AWU (1.5%)	
Denmark, Northern parts of Germany (cluster No 3)	Low unemployment rate (9.9%) with decreasing tendency (-6.8)		
	Below average farm labour force (4.4 AWU/100ha)	Below average % of farmers with other gainful activities (25.5%)	
	Above average AWU per holding (1.3)	Above average population density (105.9)	
	Above average economic size (34.8 ESU)	Above average farm size	
	High % of LSU per UAA (1.9)	High % of arable farming (65%)	
East German Lander (cluster No 4)	Low % of agricultural employment	Low unemployment rate (7.3%) with decreasing tendency	
	Lowest farm labour force (2.0 AWU/100ha)	Above average % of young holders with other gainful activities (46.4%)	
	Highest AWU per holding (4.3)	Above average population density	
	Highest average economic size (112.3 ESU)	Lowest rate of agricultural employment	

	Above average number of young holders (21.7%)	High % of bovines and sheep
	Below average GDP/capita	Highest unemployment rate (19.2%)
	Highest evolution of GDP/capita (14%)	
Mediterranean Countries	Description	
Mediterranean Regions (cluster No 6,5,9,12)	High AWU/100ha	High share of part-time labour
	Below average AWU per holding	Small % of young farmers
	High proportion of older farmers	Low GDP per capita
	High unemployment rate	High proportion of agric. employment
	Domination of permanent crops	
Southern Spain, South coast France (cluster No 6 only)	Low AWU/100ha	High unemployment rate (22%)
	High agricultural employment	High proportion of seasonal labour force (26%)
NW Spain, Greece, Italy (cluster No 5 only)	Highest unemployment rate (12%)	
Portugal (cluster No 12only)	Highest share of agricultural employment 20%	High evolution of unemployment rate 6.2%
	Small average farm size (11ha)	

5. Conclusions

The classification obtained illustrates the great diversity of rural areas in the EU and showed some remarkable spatial differences between regions. Although a great deal of variation exists between areas, there is nonetheless a distinct regional and spatial coherence, which can be explained in a number of ways. The coherence indicates that rural areas follow geographic and national specific characteristics. This is proved when aggregating the thirteen clusters to four overall groups, resulting in a clear north-south gradient. This would seem to follow from the fact that the variables chosen are a result of both historical and social development (farm structure, economic strength etc) and physical geographical conditions (e.g. agricultural land use). A second element of the explanation may be related to the quality of the data used. Whilst every effort was made to harmonise the data, definitions for certain variables vary considerably between member states of the EU and these national specific definitions could have had some influence upon the final classification result. With regard to the thematic interpretation of the classification result, it is important to be aware of the fact that certain variables played more of a role in the final regionalisation results. These were farm labour force, farm structure, and the economic strength of a region. Despite the fact that only a limited number of the 39 original variables were included in the final analysis (i.e. the principal components), it was, nonetheless, clear that those relating to the agricultural sector (farm structure, agricultural employment and farm labour force) contributed substantially to the diversity of rural regions. However, with regard to the choice of variables, some improvements are necessary, particular considering other relevant and important characteristics of rural areas such as remoteness, accessibility or social integrity etc.

These findings are of particular relevance to the continuing debate and policy development concerning rural areas. They highlight the fact that, although rural areas within a region may contain certain similarities, there are significant differences between regions themselves. As a result, policy must continue to be territorially specific rather than sector specific. For example, the importance of agriculture to the economy varies enormously between regions. In terms of employment, it is far more important to the Mediterranean regions than those in the North. Such diversity between regions, therefore, cannot be ignored. If the issues concerning rural areas are to be addressed in an appropriate and coherent manner then typologies such as the one conducted for the

purposes of this report are extremely important. This territorial classification makes an important contribution to the identification of the strengths, weaknesses and opportunities in rural areas across the European territory and it is hoped that it will be used by the Commission as complementary or background information.

References

- Barthelemy, P.A.; Vidal, C. (1999) *Rural realities in the European Union*, in European Commission (1999) *Agriculture, Environment, Rural Development - Facts and Figures: A Challenge for Agriculture*, Brussels
- Council Regulation (EC) No 1257/1999 of 17 May 1999 on Support for Rural Development. EC.
- European Commission (1997) *Rural Developments, CAP 2000 Working Document*
- European Commission (1998) *The Agricultural Situation in the European Union, 1998 Report*, Brussels
- European Commission (1999) *Methods and Nomenclatures - NUTS*, Luxembourg: Office for Official Publications of the European Communities
- European Commission (2000) *Agenda 2000: Development of the Common Agricultural Policy (CAP)*, Brussels.
- European Commission (2000): *Study Programme on European Spatial Planning*. Final Report at www.nordregio.se
- OECD (1994) *Creating Rural Indicators for Shaping Territorial Policy*, OECD, Paris
- Vidal, C. (2000a) *Thirty Years of Agriculture in Europe: Farm Numbers Declining as Farms Grow in Size*, Eurostat-Statistics in Focus, Agriculture and Fisheries, Theme 5 – 3/2000
- Vidal, C. (2000b) *Ever Larger Holdings but different Economic Situations*. Eurostat-Statistics in Focus, Agriculture and Fisheries, Theme 5 – 9/2000
- Vidal, C. (2000c) *Arable Land, increased Size of Holdings and Changes in Crop Rotation*. Eurostat-Statistics in Focus, Agriculture and Fisheries, Theme 5 – 12/2000