

Article

Delimiting Rural Areas: Evidence from the Application of Different Methods Elaborated by Italian Scholars

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Abstract: The present text illustrates the methods developed by Italian scholars to delimit rural areas in the period 2005–2020 and compares the relative territorial representations graphically and quantitatively. In that period, Italian scholars experimented with several methods to delimit territories because they are pressed by the desire to find the one that best described the territories, i.e., was both locally relevant and internationally comparable. This pressure originates from the need to map intermediate territories and redesign urban–rural extremes. In addition, it depends on the need to efficiently allocate national and European funds and circumscribe the corresponding program areas. Finally, it is also strongly related to the desire to internationally compare the economic, social, and environmental performance of homogeneous and permanently delimited territories. The text describes the key features of the methods they developed, such as adopted statistical technique and the spatial unit, the processed variables, and the territorial typologies. The results reveal that municipalities and provinces are preferred as spatial units, while economic and demographic indicators are the most used and elaborated through both relatively simple and articulated statistical techniques. The resulting territorial representations show different degrees of ruralization. While some methods design a mostly weakly urban and rural Italy, others completely ignore rural territories. Where they delimit them, the percentage of the population living in each territorial typology varies a lot. No scholars have either applied the methods at an international level or replicated them in other studies.



Citation: Cattivelli, V. Delimiting Rural Areas: Evidence from the Application of Different Methods Elaborated by Italian Scholars. *Land* **2022**, *11*, 1674. <https://doi.org/10.3390/land11101674>

Academic Editor: Hossein Azadi

Received: 24 July 2022

Accepted: 22 September 2022

Published: 28 September 2022

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Keywords: rural area; rural areas delimitation; Italy; urban–rural linkages; territorial typologies; mapping methods

1. Introduction

Over the last few decades, both researchers and political institutions have pressed to formulate methods for accurately differentiating and classifying urban and rural areas (e.g., [1–6]). Although this formulation can be considered an academic exercise, its implications are substantial in policy making and research. Accurate territorial delimitation is a prerequisite to efficiently allocate European and national funds across heterogeneous spaces, thus grouping jurisdictions along common lines and defining the policy priorities to be addressed [7,8]. Equally, it is important to have a map to serve as a basis for comparing economic, social, and territorial performance through statistical data [9,10]. As evidenced by Copus (2014) [11] with reference to rural areas, the diversity in the territorial classification of socioeconomic data has the potential to affect policy-making and economic development.

Categorizing rural and urban areas appears to be the simplest exercise; however, it is not. Although the rural–urban dichotomy has been particularly scrutinized, attempts to delimit one or more intermediate areas between these territories do not provide a comprehensive characterization due to their complexity (e.g., [12]).

Within the vast terrain of scholarly and policy-making, there are two opposing strands of thought when managing territorial delimitation.

The first one questions the effectiveness of articulated methods for international comparisons and suggests adopting methods based on a few variables processed through

basic statistical techniques. This strand is supported by EUROSTAT and the European Commission, which propose harmonised urban-rural typologies for international official statistics and standards at the European level and regulate them legislatively (TERCET Initiative, Regulation (EU) 2017/2391). These typologies are essentially based on the calculation of demographic indicators at the grid level and the setting of thresholds to delimit only three territories: urban, rural, and intermediate [13]. Due to their simplicity, these typologies are easy to replicate across all European regions and are used to compare territorial performance over several time periods. However, their delimitation prevents them from accurately assessing territorial diversity at the local level because it does not detail additional typologies beyond the urban, rural, and intermediate ones.

The second strand extols the need to thoroughly represent local diversity as a prerequisite for territorial-based policies and adequate planning decisions (among the first, Bibby and Shephard; among the last, Saastamoinen et al., 2022) [14,15]. By supporting this point of view, national statistical offices and regional governments elaborate on their own territorial methods to measure progress toward local policies. These methods integrate an appreciable number of dimensions of analysis and indicators to delineate several territories as intermediate, in addition to urban and rural ones (e.g., [16,17]). Their consistent number prevents possible comparisons among homogeneous territorial categories [18]. For the boundaries to be effective, the data should be collected and updated frequently. In certain cases, data are not free or they need articulated statistical methods for their processing.

To settle the dispute between these two strands, some Italian scholars have proposed simplified but accurate methods with a multi-scalar approach and a focus on the patterns of territory diversity, thus challenging the framework based on the urban/rural dichotomy [9,10].

Currently, there is no comprehensive and comparative study of these methods with specific reference to Italian rural areas. These territories have undergone a change induced by the transformation of urban areas. Their extension around urban areas has decreased, while those most remote will be less populated in the future. However, both areas represent space for resilience and new revitalization policies. Their complexity suggests concentrating in their delimitation, with it being a prerequisite for the policies and any other reaction to excessive over and peri-urbanization or depopulation (e.g., among the most relevant, [19–27]).

To fill this knowledge gap, the present investigation pours considerable effort into the description of the methods to delimit rural areas and of their characteristics (used variables, the chosen spatial unit, the adopted statistical techniques, and territorial classes). It also reserves particular attention for their relevance at a local level and their comparability at an international one. As a sign of relevancy at a local level, the investigation explores the details of the multiple facets of intermediate areas, while as a revealing factor of their comparability, it analyses the possibility of using them in other studies at an international level.

The remaining section of the research demonstrates how the application of different methods leads to dissimilar territorial representations of rural areas. The comparison is performed considering the graphical and demographic representations resulting from the application of the considered methods.

As such, the research questions are:

- i. Are the methods developed by Italian scholars to identify urban, rural and intermediate territories locally relevant and internationally comparable?
- ii. How do the representations of rural areas vary when applying the various methods? More specifically, how many people live in the rural—thus delimited—areas?

For these reasons, the article is structured as follows. The first paragraphs include a brief overview of the motivations that justify the proliferation of different territorial delimitations and the changes in rural areas in Italy. Section 4 explains the method adopted to collect and cluster information. Section 2 presents the characteristics and the consistency of the considered methods. Finally, the last ones bring the discussion to a close and draw conclusions.

2. Background

In recent decades, rural areas have changed profoundly and lost their clear and defined connotations due to demographic dynamics, changes in settlement intensity, and economic specialization ([28–34], for example).

The relocation of people and economic activities beyond the urban fringes leads to an explosion of cities into the countryside, with the consequent conversion of agricultural land for productive and residential purposes in nearby rural areas (among the last, [35,36]). In turn, this generates a sort of territorial *continuum*, the peri-urban territory, which combines urban and rural features and includes different types of landscapes, such as agricultural spaces and consolidated and dispersed built-up urban areas (among the most relevant, [37–39]). Its spatial patterns reflect the urban change in land use as well as the intensity of urban–rural flows (commuting, migration, relocation of companies, regeneration of vacant spaces among urbanized and dispersed settlements) and land tenure-related conflicts [40–42]. Depending on these flows, their demarcation is critical to developing appropriate policies to manage and preserve them [43].

Because it extends beyond urban administrative boundaries and encompasses several nearby municipalities [44], this territory proves challenging to govern [45]. Its governance takes place in the context of specific spatial planning systems, governance scales, and multi-actor dynamics, which are affected by recent transformations in terms of the prerogatives of public intervention and private stakeholders in the field of planning [46]. For the time being, the governance of peri-urban areas is rarely included in regulations and plans. Some prescriptions are included in municipal plans. However, since they are based on the urban–rural dichotomy, these plans only regulate urban and rural areas, ignoring the continuum within them and the specificities of some of their parts. Furthermore, they refer exclusively to the governed territories, failing to promote integrated institutions for the joint regulation of neighboring areas.

Beyond suburbanization, changes in rural areas are partly dictated by variations in production specialization. The favorable geography and progressive suburbanization of rural areas closer to urban centers increase the attractiveness of these territories for newcomers, and positively impact on demographic dynamics (see, e.g., [47,48]). The local production system resulted in a mixture of traditional local firms and innovative firms performing traditional activities [49], as well as delocalized firms from urban areas [50]. Agriculture persists as the most practiced economic activity but shifts to a broader set of additional services (agritourism, social agriculture, etc.) and extends beyond rural boundaries to intermediate and urban areas (urban and peri-urban agriculture [51,52]). Multifunctional agriculture and tourism and energy-related initiatives contribute to diversifying local economies [53].

In contrast, remote rural areas continued to suffer from depopulation, aging, land abandonment, and a lack of job opportunities [54]. Factors that hinder their development include the inadequacy of services to the population and businesses, the low levels of investments in transportation and technological infrastructure, and the lack of access to markets and credit [55–57]. They also include land fragmentation and the impoverishment of historical and cultural landscape resources, as well as the negative impacts of climate change [58,59]. Local development is also negatively affected by conflicts among the economic sectors. Agriculture, forestry and mining compete locally with niche manufacturers, tourism, and recreational activities as dominant economic drivers and for the exploitation of natural resources [60]. Such conflicts reduce job opportunities and service availability for local communities and are therefore responsible for their socio-cultural marginality, ageing and depopulation. They also negatively affect size and profit opportunities, as well as investment in off-farm activities and technological adaptation [61–63].

Considering these transformations, traditional territorial methods to delimit territories based on the urban–rural dichotomy are no longer appropriate [64]. The concept of ‘rural’ has changed, it is no longer synonymous with ‘agricultural’ and has been gradually replaced by the notion of ‘rurality’, which in turn, assumes a different meaning depending on the specific context and its typical trends [65–67].

This innovative assumption reveals that rural areas have different specializations. Beyond agriculture, rural areas play an essential role in biodiversity and soil protection and in the prevention of natural hazards. However, the excessive exploitation of their resources for recreational activities or excessive urbanization processes reduce rural richness, and homologates behaviors, which result nearer those typically urban.

As Van et al. note, the notion of rural varies geographically a lot. As a well-identified territorial category, rural is assumed to exist only at the extreme end of a territorial continuum (see, e.g., [68,69]), or is delimited at the national level as part of “national rurality [70]” or even as regional and European typologies (among the most productive scholars, Copus [71,72]). The delimitation of more detailed typologies with different degrees of rurality is less frequent. Where done, the typologies reflect the territorial peculiarities at the local level and detail social, economic, and environmental local characteristics (see, e.g., [73–76]). The underlying statistical process is articulated and involves several variables to be performed. As such, sometimes it requires the identification of representative regions for their application and the collection of substitute variables for missing economic data for many regions.

Some examples of methods which identify several rural typologies are those provided by Cloke and its rurality index (and four categories, such as extreme rural, intermediate rural, intermediate non-rural and extreme non-rural) [77], or Bogdanov et al. [78] and Ascuito et al. [79] with their numerous rural clusters. Banski and Mazur [80] encounter three types of methods in the literature, such as locational (e.g., Psaltopoulos et al., 2006 [81]), structural (e.g., Brezzi et al., 2011 [82]), and combined (e.g., Eupen van et al., 2012 [8]). The first type details the urban–rural continuum and distinguishes urban centers and their areas of influence (including peri-urban and suburban areas, rural areas, and peripheral areas). The adopted criteria are those related to the accessibility of urban centers and population density, which proxied economic relations among territories. The structural type groups rural areas based on their economic and social characteristics. The assignment of each area is based on the sectors of economic activity that predominate in the socio-economic structure of the considered territory. The quoted example articulates the previous OECD method (1994) [83] in more detail. Another one elaborated by Marsden (1998) distinguishes between: (1) the preserved countryside, characterized by stagnation and conservative attitudes among the local decision-makers; (2) the contested countryside, situated in the zone of influence of the cities but outside of the main suburban catchments and featuring strong influence by the landowners–farmers on the directions of development; (3) the paternalistic countryside, where the leading role is played by the owners of large estates; and (4) the clientelist countryside, where the development processes are strongly dominated by the farming sector. This typology differs distinctly from previously considered examples because it has a qualitative character, incorporating expert knowledge without the explicit use of concrete diagnostic features. Thus, it cannot constitute an instrument for quantitative formal identification of rural types in space.

Beyond the evidence of the relevance at the local level, the proliferation of these methods aspires to reduce information costs as well as increase the knowledge of the factors driving rural typification and performance locally. However, the insightful detail of the territorial typologies prevents them from being used in comparative studies and scaled to larger areas. With such an approach, identifying the characteristics that differentiate rural areas and demonstrate similarities within certain sets of spatial units becomes problematic.

Opposed to this relevance at the local level, there is a desire to adopt an international-scale regionalization approach to compare the territorial representations with those resulting from different research. The latter implies the adoption of a harmonised method to define rural areas, which minimizes territorial typologies. One of the most interested institutions in identifying rural typologies among regions is the European Union (EU). With EUROSTAT, the EU has introduced a degree of urbanization classification (DEGURBA [84], 2012) to distinguish three different classes: cities, towns and suburbs, and rural areas (or densely, intermediate, and thinly populated areas). This classification is based on information for population grids, provides greater comparability, and is still applied. The 2017

revision [31] strengthens the magnitude of the eventual urban core present in the region. At the European level, there is also the TERCET initiative, which harmonizes the range of statistics regarding territorial typologies and integrates them into the NUTS Regulation. One of these is the urban–rural typology method, which distinguishes predominantly urban regions and predominantly rural regions at the extremes of the intermediate regions based on a three-step approach. The first step is to calculate the population density of clusters of 1 km². With a density of at least 300 inhabitants per km² and a minimum population of 5000, these clusters are classified as urban. Those without these characteristics are oppositely rural grid cells. The second step declines the NUTS3 regions, which are classified into one of the three abovementioned typologies based on the share of the rural population. Once the grid cells have been classified as rural grid cells or urban clusters, they must be re-allocated to the NUTS3 regions. This happens by calculating the total population for each NUTS3 region and the population living in urban clusters for each NUTS3. The calculation then defines the share of the population living in urban clusters for each NUTS3 region and applies certain thresholds. In the third step, the eventual distortions are resolved (Figure 1).

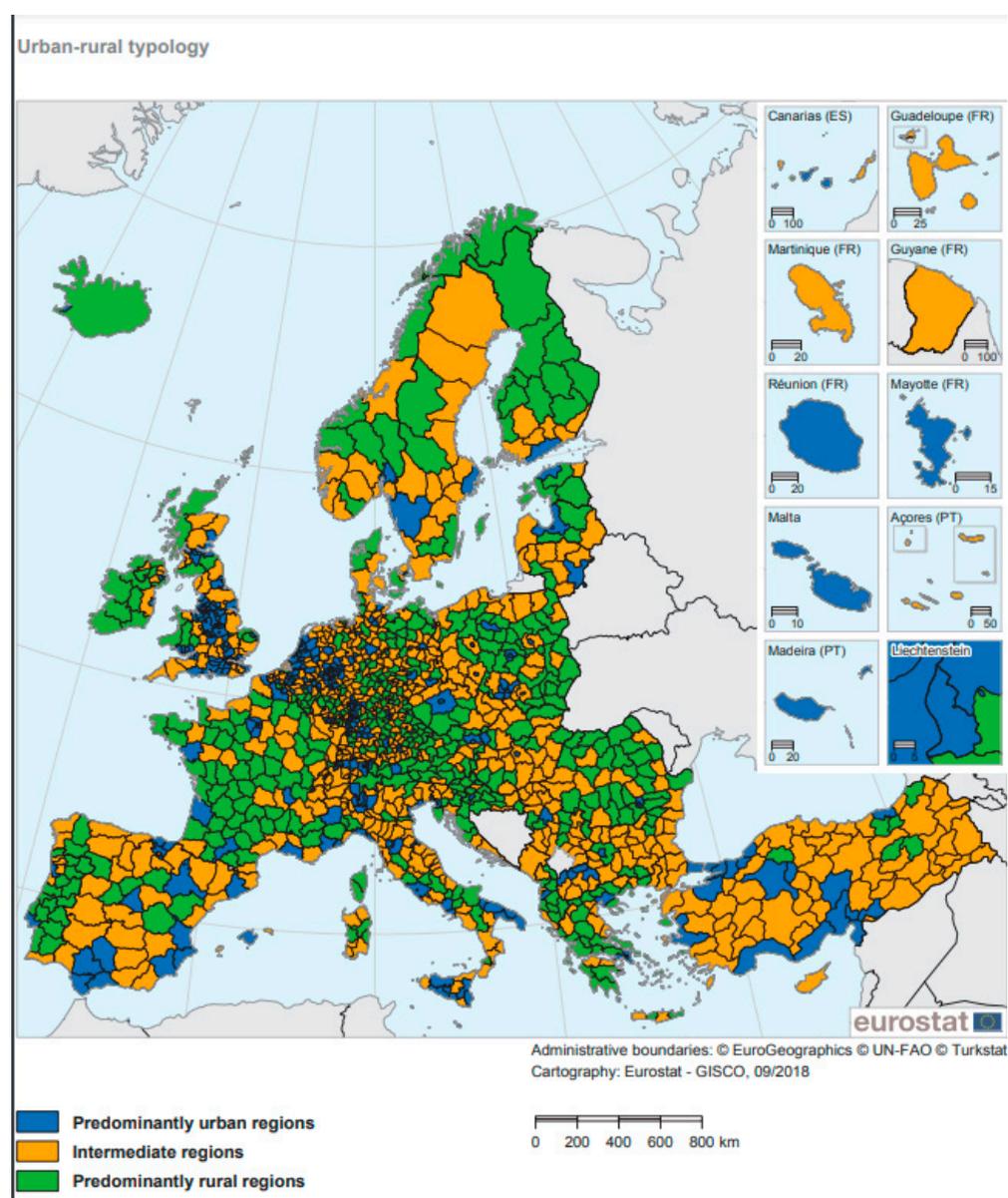


Figure 1. The representation of Europe and Italy after applying the Tercet classification, Urban–rural typologies.

Some years earlier, the OECD [83] identified three territories in Italy (“predominantly urban areas” “predominantly rural areas”, and “intermediate”) based on the demographic density calculated at the regional level.

As the potential variables are limited to those demographic and applied to territories delimited by administrative or statistical boundaries, all these methods can be applied with similar territorial outcomes. However, they do not differentiate among rural areas. Being threshold-based approaches, they continue to adopt a dichotomous view of rural versus urban areas, which is still criticized by several scholars, particularly Lerner and Eakin, 2011 [85] and Schaeffer et al., 2013 [86].

3. Characteristics of Rural Areas in Italy

The current extent of rural areas is the result of a long process of urbanisation that began after World War II [87].

Since the 1950s, people have moved towards industrialized centers in the north, leaving rural areas. As a consequence, these centers have exploded in the near-rural areas, beyond their urban fringes, while many mountains/remote areas and small urban centers in the South experienced demographic desertification and outmigration flows. Ref. [88] (above all in the period 1961–1971).

“In the period of maximum polarized growth (1958–64), while the natural balances were positive almost everywhere, due to widespread emigration from the countryside to the cities, positive demographic balances were recorded on only 23% of the national territory, i.e., mainly in the large urban agglomerations and along certain axial, Po Valley, and coastal routes” ([89], p.14).

After the 1960s, the rural population declined much more slowly than in the rest of Europe, and the divide became more noticeable from the second half of the 1980s, accompanied by a concomitant understandable “ageing” of the rural population.

In the next decades, the Italian cities experimented with their transformation into a ‘diffuse city’ and counter-urbanization. Their boundaries between urban and rural areas became increasingly blurred, while medium-sized urban centers emancipated themselves from their condition of peripherality. Firms locally reorganized their structures and decided to relocate abroad or along urban nodes and networks to save urban economies. In particular, in the period 1991–2001, the largest metropolitan areas began to degrow demographically, while medium-sized urban centers increased considerably. As a result, between 1971 and 2019, the population in 1000 municipalities (out of 8000 in Italy) increased by more than 163%. Among these municipalities, those with the highest growth rate were small and/or located in the countryside. Their increasing urbanization influenced the expansion of peri-urban areas around major urban centers [90,91]. On the contrary, the growth of the population has been contained in the most important neighboring urban centers and, for some of them, the relative growth rate was negative.

Later, starting in 2010, the metropolitan areas stabilized demographically, whereas medium-sized ones continued to grow.

This process of urbanisation has generated two types of rural areas, those closer to urban areas and those more remote. The former benefit from the economies of urbanisation, but are the most exposed to the conversion into urban areas. The latter exhibits same frailties. The inadequate services provided to the population and enterprises, the low levels of investment in the transportation and technology infrastructure, and the lack of access to markets and financing are all factors that hinder their development. Along with the detrimental effects of climate change, they also include land fragmentation and the improvement of historical-cultural landscape resources. Conflicts between different economic sectors appear to also have a negative impact on local development. Locally, tourism and recreational activities are increasingly competing with agriculture, forestry, and mining to exploit natural resources.

As a result, these lagging factors reduce job opportunities and service availability for local communities and are therefore responsible for their sociocultural marginality, ageing,

and depopulation. They also negatively affect size and profit opportunities, as well as investment in off-farm activities and technological adaptation. Among rural areas, the most peripheral and mountainous areas are those that struggle more with these factors (e.g., [92–95]).

To counteract these negative effects, turn-around territorial-based strategies that promote a balanced and sustainable revitalization of these territories are required and have, in recent times, been experimented in such regions. These strategies include measures to foster the competitiveness of agriculture and forestry and promote the sustainable use of natural resources. Within the first types of measures, there is the promotion of knowledge transfer, economic sectoral diversification, and resource efficiency (see, e.g., [96]). Adopting agroecological approaches, harnessing the relevance of technologies and innovation, and reducing food waste and unproductivity of degraded agricultural lands are other possible actions to scale up (see, e.g., [97]). Beyond these, the measures to adopt can include the preservation of ecosystems, the restoration of sustainable urban–rural flows, as well as the shift toward climate-resilient primary sector activities (see, e.g., [98,99]).

EU policies sustain these measures by specifically promoting the green and digital transition of rural territories with specific projects and funds (e.g., [100–102] based on CAP policies 2021–2027). They also induced a change in the traditional urban–rural dichotomy, and the definitive abandonment of the productivistic paradigm in favor of a more territorial-based approach to rural development policies. Furthermore, their implementation has stimulated the adoption of the endogenous rural development paradigm, based on the mobilization of communities and the valorization of local resources.

These measures find fertile ground, especially in rural areas with a socially cohesive community. On the one hand, cohesion promotes the sharing and the dissemination of common values. On the other hand, it encourages greater social responsibility and a larger perception of the importance of common goods and local cultural matrices to steer local development (see, e.g., [103,104]).

Agriculture continues to play an important role in the local economy. The last agricultural census revealed that the agricultural areas were reduced by 2.3%, while the number of farms was 32.3%. Despite this, the total agricultural area (SAT) in Italy is 17,081,089 hectares (57% of the Italian territory) and the agricultural area (UAA) amounts to 12,856,047 hectares (43% of the Italian territory) [105]. This means that a large part of the national territory is interested in the primary sector. Other related reflections refer to the broad range of roles of agriculture (that is, as a guardian of biodiversity, environmental and aesthetic qualities of the landscape, as well as a practice generating and preserving collective goods, etc.) and local food systems that, with their attention to sustainable production practices and consumers' needs, can hold some of the keys to future development of rural areas.

Concerning the delimitation of rural areas, several methods have been formulated in recent decades by policy makers. The Ministry of Agriculture's food and forestry policies defined these territories as 'a complex natural and cultural system composed of both material resources (for example, landscape, environmental systems, biodiversity, agricultural and forestry resources) and intangible resources, such as traditions, cultures, religions, languages, dialects, which can be traced back to the local material culture (artistic manifestations, crafts products, traditional foodstuffs, traditional architecture, archaeological sites and finds, etc.). Based on this, the Ministry in a first version in 2007, and then in its revision in 2010 has identified rural areas with specialized intensive agriculture, rural areas with intensive specialized agriculture, intermediate rural areas and rural areas with overall development problems.

4. Materials and Methods

The present investigation starts from an identification of the territorial methods to be considered. In her recent work, Cattivelli (2021b) has found 80 different methods which are applied variously to identify rural areas across European regions. These methods were developed by international organizations, national statistical and government offices, and

international scholars and were mainly tested in the period 2005–2020. Among these methods, the investigation considers only those elaborated by Italian scholars in the same period. Although other methods elaborated by Italian statistical and governmental institutions have already been analyzed (Cattivelli, 2021b), those formulated by scholars at the national level are still less considered. As such, the present investigation focuses on these, listed in Table 1.

Table 1. The method considered in the present investigation, based on Cattivelli (2021b).

Authors	Bibliographical Reference
Anania & Tenuta	Anania, G., & Tenuta, A. (2006). Ruralita, urbanita, and ricchezza nell'Italia contemporanea. <i>Agriregionieuropa</i> , 2(7).
Barbieri & Cruciani (1)	Barbieri, G., & Cruciani, S. (2007). Caratteristiche of localized urban systems. In Esposito, G. <i>Contabilità nazionale, finanza pubblica, and attività di controllo. Scritti per il Cinquantenario ISCONA</i> (pp. 259–280). Roma: ISCONA.
Barbieri & Cruciani (2)	
Boscacci	Boscacci, F. (2010). Urban-rural relations. A methodology to classify rural areas. RUFUS/TRUST workshop “Diversities of rural areas in Europe and beyond”. Hannover.

The investigation analyzes the purpose and some key features of the methods, such as the statistical technique, the spatial unit, the variables, and the territorial typologies.

The purpose is to support policy decisions or scientific details or international comparisons.

The statistical technique is the technique by which variables are elaborated. It can be a basic statistical procedure such as the use of simple indicators or more articulated such as the application of statistical or econometric methods. Its choice affects the typology delimitation in several ways, including how the boundaries are created, the information provided, and the kind of data that can be used. It also includes the decisions related to the thresholds to delimit the boundaries within typologies. This choice is particularly crucial and can be affected by some constraints. Its determination can be based on a preconceived notion of rural or subjective considerations. In addition, it can be influenced and varied by geographical contexts, as the characteristics of places can vary greatly at the local level.

The spatial unit is the unit to which the variables refer. It can be administrative if it coincides with an administratively defined area (i.e., NUTS 3, LAU 2), either statistical (grid), or political (e.g., macroregion or business district). For all, the unit at the lowest level offers the most detailed picture of local diversity. However, in the lowest unit, statistical methods lose their viability, and other qualitative and geographical techniques should be preferred.

Variables can be economic, social, demographic, or include indicators of land use and distance. If a single criterion is used, then it is most often an indicator of population density. When multicriteria approaches are proposed, they are based on characteristics of the socioeconomic structures, especially job specialization and the degree of specialization in agriculture. Their choice depends on their availability and cost.

Territorial typologies divide territories in a certain number of categories based on a similarity relationship, i.e., according to a multilevel (dividing the set into lower and higher-level classes solely based on differences in a single criterion) or multidimensional classification (dividing objects that differ according to different aspects at the same time). Their optimal number depends on the importance attributed to the social, economic, and environmental diversity of rural areas and to its evidence. When scholars adopt a large number of typologies, they demonstrate their increasingly interest for local characteristics, and specifically for the identification of the intermediate areas and their differentiation. Oppositely, when they adopt only two typologies, they support the traditional urban/rural dichotomy.

The comparison of resulting representations with specific attention to rural areas is articulated in two phases. The first one is graphical, because it highlights the differences that emerge when displaying the maps illustrating the considered methods. The second is quantitative because it compares the percentage of the population included in each rural typology.

5. The Reference Methods

5.1. *Their Purpose and Characteristics*

The first method considered is that formulated by Anania and Tenuta (2006). These scholars assume that the degree or ‘rurality’ of a municipality depends on demographic, urban, and economic factors. As such, when formulating their rurality/urbanity indicator (RUI) within a specific research project, they use data related to demographic density, population dispersion, population employed in agriculture and public services, degree of urbanization, and the availability of living spaces. These data are processed by applying a principal component analysis technique. Based on the values assumed by the RUI, the authors define each municipality as extremely rural, rural, weakly rural, weakly urban, urban, and extremely urban, accordingly. Its application gives rise to the representation of a more heterogeneous rural Italy in the north, with Lombardy as less rural, and the other northern regions as more urban. In the south, it identifies larger urban areas than other classifications (especially in Puglia, Basilicata, and Sicily). Figure 2 shows the application of these methods to Italian municipalities. We have decided to replicate the Anania and Tenuta method to the letter. However, this method dates back to 2006, and in the intervening years, many municipalities have either changed their names, ISTAT codes, have merged, or have been suppressed. Most municipalities in white have precisely recorded these variations.

The second considered method is that elaborated by Barbieri and Cruciani, who base their own method on a different territorial unit rather than the previous quoted method: the Sistemi Locali del Lavoro (SLL)—Local Labor System (LLS). LLSs represent territorial grids whose boundaries are defined using daily home/work travel flows (commuting).

The two scholars apply a multivariate analysis technique to the 686 LLSs existing in Italy to identify those with typically urban functions. Firstly, they identify urbanized LLSs among those that have most localities with more than 2000 inhabitants living in settlements near each other and within less than 200 m. These LLSs are then classified according to population density, intensity of land use, and economic specialization.

Based on this technique, the scholars identify four different types of urban areas (highly specialized urban areas, low-skilled urban areas, unspecialized urban areas, urban areas, and shipyards) but ignore the delimitation of any rural areas. Their mapping exercise suggests that the vast majority of LLSs are not urban. Urban LLSs are scattered throughout the territory and differ in terms of their economic specialization (Figure 3).

The two scholars later applied the same method to municipalities rather than to LLSs, and introduced an additional indicator, the degree of urbanization. They calculate this indicator considering the proportion of the morphological surface of the urban agglomeration on the total municipal area, as well as the share of urban agglomeration population with the municipal population. After performing the method using this indicator, the authors identify urbanized municipalities only in terms of population density, urbanized municipalities in terms of surface, non-urbanized municipalities, and highly urbanized municipalities. As shown in Figure 3, the urban areas appear to be more extensive. While in the north, municipalities are mostly urbanized by surface area intensity, in the south they are mostly urbanized by population intensity (Figure 4).

The last considered method is that formulated by Boscacci (2010). This author adopts a different territorial unit of reference, replacing municipalities with provinces. Unlike other methods, he excludes any demographic variables when mapping these territories, as he assumes that the territories differ only in terms of economic vocation. As such, he only considers strictly economic indicators such as the productivity of the agricultural sector, the relevance of the agricultural sector to the provincial economy proxied by the comparison

of used agricultural areas and the total provincial area, economic diversification measured by the number of employees in small firms, and the total agricultural labor force, as well as urban sprawl. By combining these indicators and applying them to the provinces, Boscacci identifies five territorial areas: strong province, province under pressure, province under pressure/weak, and weak province. The areas defined as urban through the application of almost all other methods considered (for example, the Po Valley around Milan and Via Emilia) are also defined as urban here. The large size of the provinces as a statistical unit precludes the possibility of analyzing the great territorial diversity within them. This is illustrated in Figure 5.

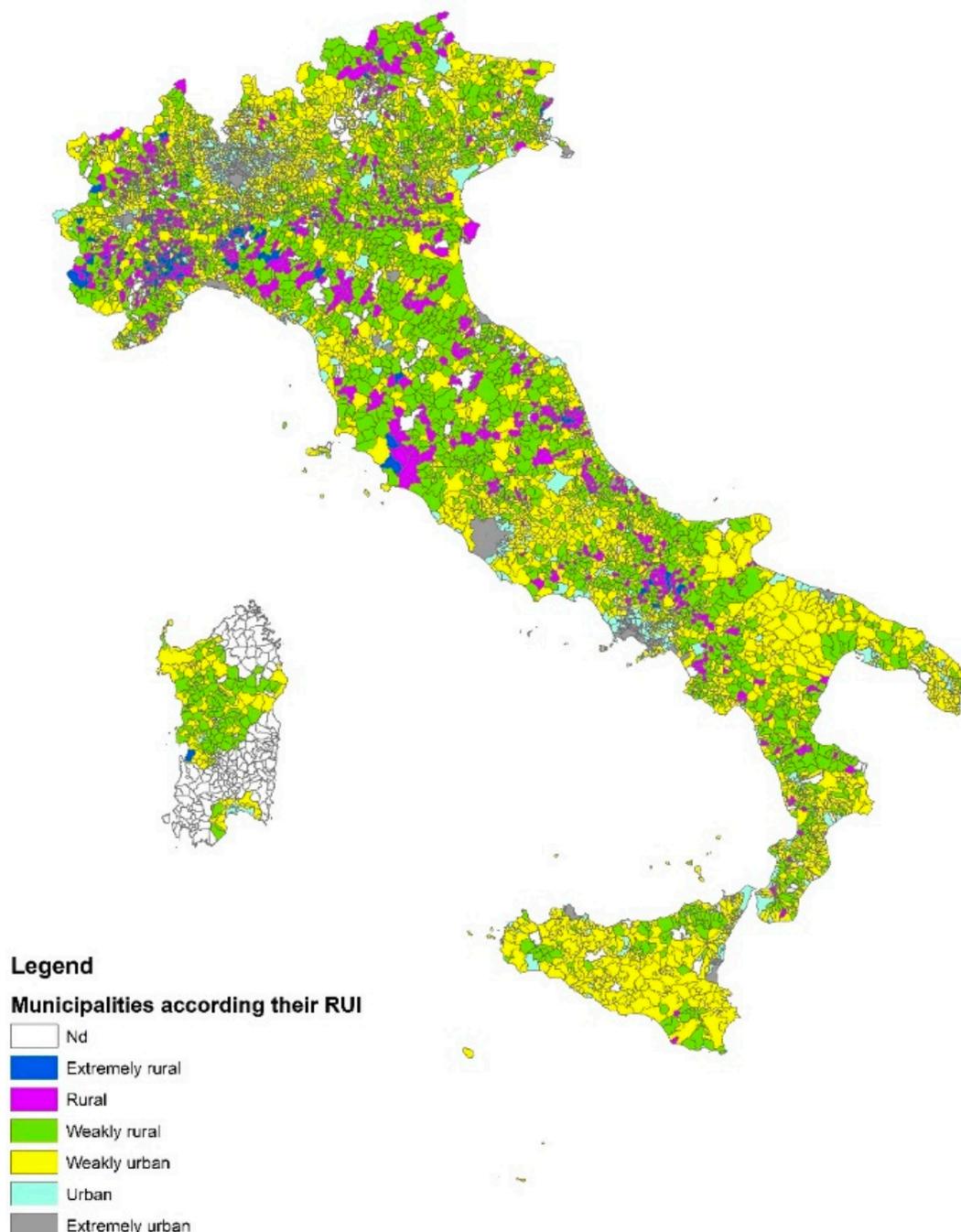


Figure 2. The representation of Italy after applying the Anania and Tenuta method. Territorial classification of each Italian municipality. Source: Anania, Tenuta, 2006.



Figure 3. The representation of Italy after applying the Barbieri and Cruciani method. Territorial classification for each LLS existing in Italy. Source: Barbieri and Cruciani, 2007.

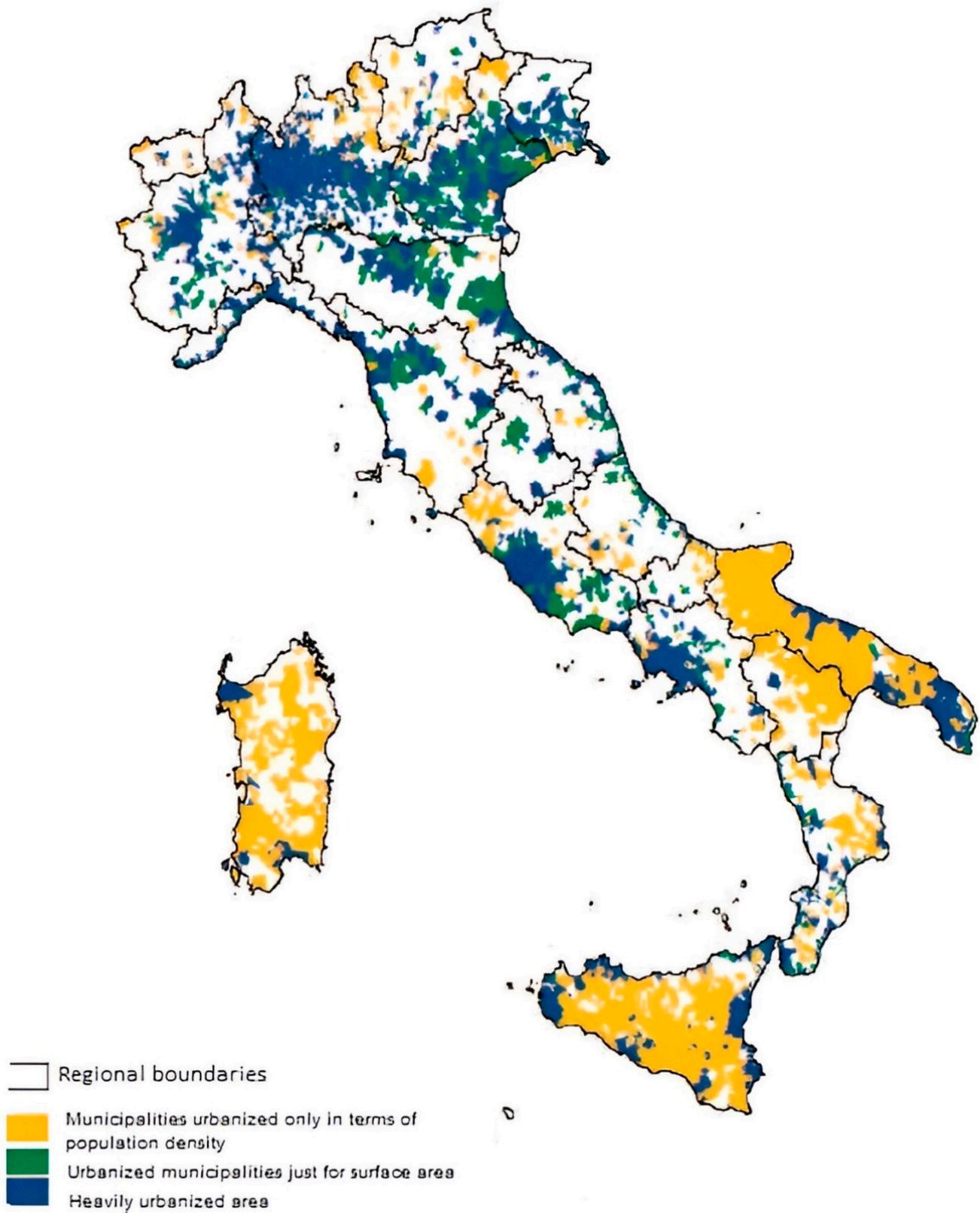


Figure 4. The representation of Italy after applying the Barbieri and Cruciani method (2). Territorial classification for each municipality in Italy. Source: Barbieri and Cruciani, 2007.

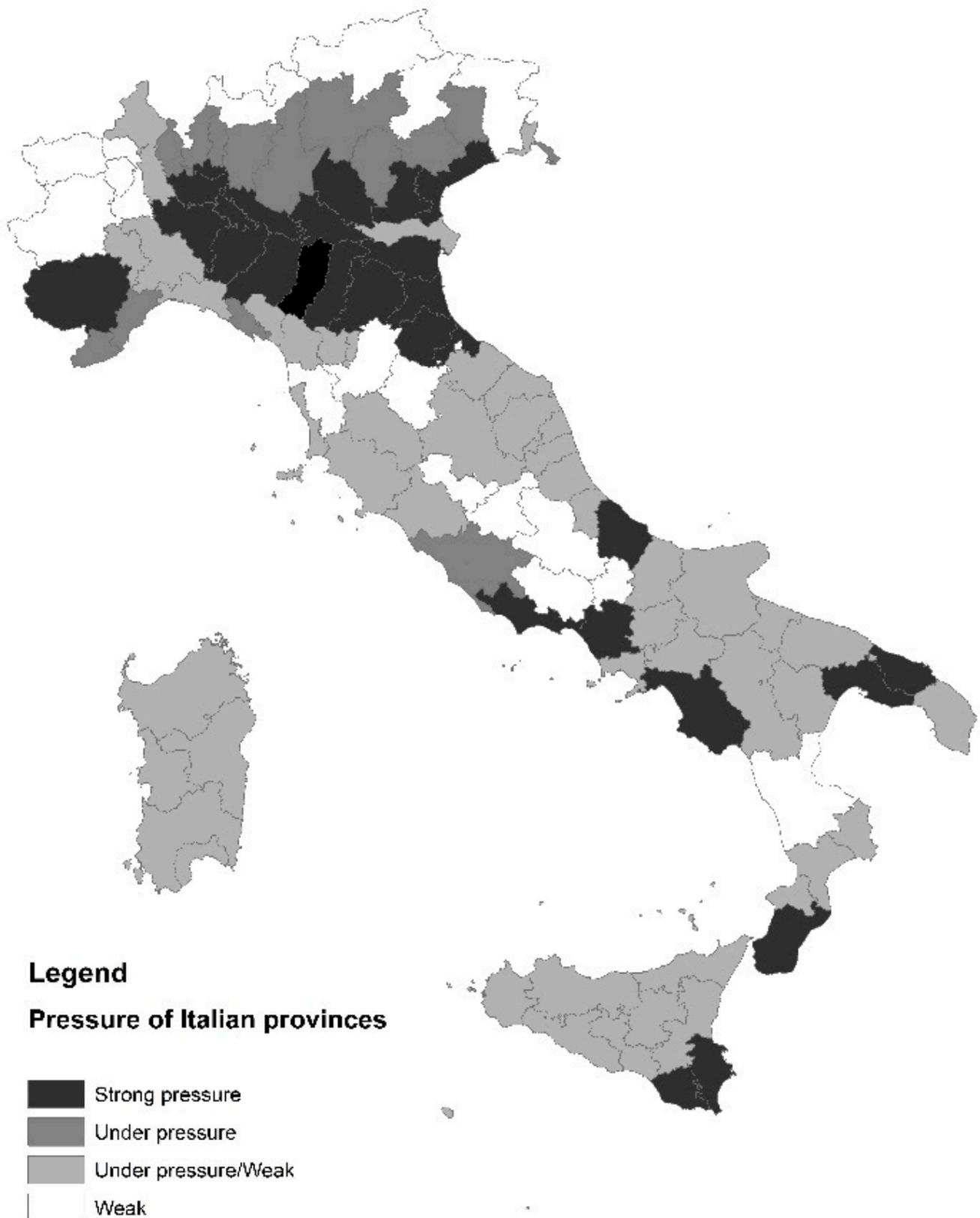


Figure 5. The representation of Italy by applying the Boscacci method (2). Territorial classification of each province that exists in Italy. Source: Boscacci, 2010.

Table 2 illustrates the characteristics of the considered methods.

Table 2. Summary of the methods considered. Source: own elaboration based on literature review.

Method	Spatial Unit	Variables	Statistical Method	Territorial Typologies
Anania & Tenuta	Municipalities	Demographic density, population dispersion, population employed in agriculture and public services, urbanization, availability of living spaces	Simple indicator, calculated after applying the principal component analysis	<ul style="list-style-type: none"> • Rural • Weakly rural • Weakly urban • Urban • Extremely urban
Barbieri & Cruciani	LLS (Local labor system)	Economic specialization	Multivariate analysis techniques, on the basis of prevailing production specializations	<ul style="list-style-type: none"> • Highly specialized urban areas • Low-skilled urban areas • Unspecialized urban areas • * Urban areas and shipyards
Barbieri & Cruciani	Municipalities	Economic specialization and degree of urbanization	Multivariate analysis techniques on the basis of prevailing production specializations	<ul style="list-style-type: none"> • Urbanized municipalities only in terms of population density • Urbanized municipalities in terms of surface • Municipalities that are not urbanized • Highly urbanized municipalities.
Boscacci	Provinces	Productivity of agriculture, weight of agricultural area, economic diversification, urban sprawl	Simple indicators	<p>The combination of all these indicators may be summarized as follows:</p> <ul style="list-style-type: none"> • High productivity and High weight agriculture: <i>Strong province</i> • High productivity, Low weight agriculture and low urban sprawl: <i>Strong province</i> • High productivity, Low weight agriculture, high urban sprawl: <i>Province under pressure</i> • Low productivity, high-weight agriculture, low diversification: <i>Province under pressure/weak</i> • Low productivity, High weight agriculture, high diversification and high urban sprawl: <i>Province under pressure/weak</i> • Low productivity, high weight agriculture, high diversification and low urban sprawl: <i>Weak province</i> • Low productivity, low-weight agriculture: <i>Weak province</i>

5.2. *The Relevance and Comparison of the Methods at a Local and International Level*

The Anania–Tenuta method is extremely relevant at the local level. Beyond urban and rural municipalities, it distinguishes intermediate areas with precision. These areas are characterized by several degrees of ruralization (extremely rural and weakly rural) and urbanization (extremely urban and weakly urban). This clarification underlines the desire of both authors to detail the differences existing among territories with accuracy. This detail is relevant and different for this method from the others, which are characterized by less precision in the definition of territorial typologies.

The former Barbieri and Cruciani method is not relevant at a local level because it does not define intermediate areas with precision. In contrast, it only details urban areas with great levels of detail while ignoring totally intermediate and rural areas.

The latter method, developed by the same scholars, is not relevant at a local level. Detailed only in urban areas, it completely ignores rural and the intermediate areas. Within urban areas, in addition to heavily urbanized areas, Barbieri and Cruciani delimit municipalities which are considered urban just because they have one of the few considered criteria. In one case (the municipalities are colored yellow), the municipalities are considered urban only in terms of population density because they show high levels of this indicator.

Finally, the Boscacci method is not relevant at the local level because it does not detail any intermediate and rural areas.

Regarding the replicability of these methods, that is, the possibility of using them in other studies at the international level, the results of the analysis are not satisfactory. In fact, none of these methods is used or replicated in other studies, particularly at the international level, or updated some years after their formulation.

5.3. *The Comparison at a Graphical and Quantitative Level*

The Anania and Tenuta method designs a very articulated rural Italy. Extremely rural municipalities are limited to a few municipalities, which are located particularly in the south of Piedmont and Lombardy and in the north of the Campania region. In the Alps or across the Apennine, these municipalities are very scarce. Oppositely, rural municipalities are more numerous and are very close to extremely rural and weakly rural municipalities. They are especially common in mountain areas and along the Apennine in Emilia-Romagna. They are also numerous in the central part of Italy, whereas in the south they are almost totally absent. Weakly rural and urban areas are the most numerous municipalities in all Italian regions. This means that, according to the authors, rural areas are extremely diversified and merge characteristics that are typically urban and rural at the same time. Based on the first method elaborated by Barbieri and Cruciani, most of the Italian territory is not classifiable. Using the general expression “not urban LLS”, both scholars hypothesize to avoid determining “possible” rural areas. Among urban areas, those with low-skilled workforces and shipyards are the most numerous. Boscacci does not define rural areas. Among the territories defined by him, those under or with pressure are the most extended.

Quantitatively, the percentage of the population living in each territorial typology changes a lot. Table 3 summarizes the relative values.

The percentages related to the distribution of the population among territorial typologies identified by Anania and Tenuta confirm the relevance of intermediate areas. The weakly urban and the weakly rural municipalities are the most consistent territories. Urban and extremely urban municipalities are also relevant as they include more or less 43% of the Italian population. Rural areas are less populated. Only 2% of the population lives there.

The first Barbieri and Cruciani method does not specifically define rural. However, the residual territories, i.e., territories which are not included in any urban typologies, include 57.26% of the population. Applying their second method, about 18% of the Italian population lives in non-urbanized areas. In Boscacci, if territories under weak pressure are proxied to rural ones, they include 52.89% of the population.

Table 3. The % of population living in each territorial typology.

Authors	Typologies and % of Population Living in Each of Them
Anania & Tenuta	Extremely rural municipalities: 0.20% Rural municipalities: 2.20% Weakly rural municipalities: 16.95% Weakly urban municipalities: 37.58% Urban municipalities: 17.09% Extremely urban municipalities: 25.97% Data 2006
Barbieri & Cruciani (1)	Highly specialized urban areas: 12.1% Low-skilled urban areas: 8% Unspecialized urban areas: 6.84% Urban areas and shipyards: 15.80% Data 2001
Barbieri & Cruciani (2)	Urbanized municipalities only in terms of population density: 9.82% Urbanized municipalities in terms of surface: 9.48% Municipalities that are not urbanized: 17.55% Highly urbanized municipalities: 63.19% Data 2001
Boscacci	Strong pressure: 27.31% Under pressure: 7.80% Under pressure/weak: 12% Weak: 52.89% Data 2010

Source: own calculations, 2022.

6. Discussion of Findings

The present paper describes the methods formulated by Italian scholars in the period 2005–2020. Research was fruitful in the earlier years of that period, whereas work in later years was limited to adapting or revising the methods tested in previous years. The legal obligation to adopt TERCET methods to produce official statistics has certainly discouraged the development of new methods. Although the number of the methods considered appears limited, their analysis represents an occasion to better understand the methodological efforts to identify territorial peculiarities. These methods, in fact, provide a framework for national and regional policy makers to target economic and social policies at the territorial level and question the effectiveness of articulated methods for international comparisons.

Generally speaking, only one method splits territories into urban and rural areas and evidences a different way of sub-dividing rural areas. Therefore, not all methods offer breakdowns of rural areas. In doing so, the only method that separates rural areas appears relevant at the local level because it details several territories. At the same time, none of the considered methods are internationally comparable, as they are not replicated outside of Italy and/or in other international projects beyond those within which they are formulated.

Several difficulties arise from the variety of scales and dimensions of the statistical units of reference. The considered methods use different statistical units of reference. Beyond the municipality, the other units are the Local Labor System (LLSs, Barbieri and Cruciani) and the provinces (Boscacci). The choice of a municipality or province as units is not simple and often depends on the availability of data. However, the preference for the first suggests an idea of rurality which is very close to the real characteristics of the places. Using a more detailed definition puts every place in the right light and helps local policy decision-makers to assume efficient development policies, which result cohesively with the local characteristics. Contrarily, the choice of the province is based on the conviction that the rural extends beyond administrative municipal boundaries and covers larger territories. The choice of LLSs is motivated by the hypothesis that territorial dynamics are based on

social and economic relations, which extend over larger territories than the municipality. Similarly, using harmonized classifications such as TERCET ignores local differences. Large typologies can obscure the existence of more variation within areas than there is between them.

The choice also depends on the availability of data. Most data are only collected at a municipal level (and that can therefore be regrouped at the local labor system level), and refer to economic, social and demographic dimension. Less data are collected at the provincial level. Few methods add to the analysis data related to land use in the sense of proportion of built-up areas to total LAU/NUTS area or degree of urbanization. This is surprising, but probably depends on limited data availability. Reliable small-scale and European-wide data on land use have only been available for a relatively short period of time, so that in the past, population was used as an available proxy as it was widely available, even as a time series. Data are then processed through both sophisticated statistical analysis (multivariate analysis, Barbieri and Cruciani) and simpler techniques with single or more indicators (the remaining methods).

These choices reveal that the concept of 'rural' is not intuitive but difficult to define. Rural is not characterized only by low demographic dynamics but by several dimensions, including social and environmental. All methods use 'stock' values and apply certain thresholds to them to generate typologies. This means that a unit with a low stock value does not benefit from high values in the neighboring unit, because potential interrelations between the units are not considered. Spillover effects among territories are not considered. One suggestion comes from a project, ESPON PROFECY (<https://www.espon.eu/inner-peripheries>, accessed on 23 September 2022), which is not considered here. Using the 'population potential within 50 km' as one of the indicators, this project is based on the consideration that disadvantaged areas are not only disadvantaged due to low stock values, but due to non-existing interrelations with better performing surrounding regions.

Another aspect is strictly connected but missing; in most studies, the identified thresholds are applied to the entire statistical unit of reference without differentiation. For instance, if a threshold is fixed at one determinate level, no difference is made whether the unit is large or small, populated or scarcely populated. For example, while towns with 50,000 inhabitants are numerous and strictly connected to each other in Lombardy, such a unit qualifies for a larger agglomeration in less populated and urbanized regions of Italy. The problem here is that, inherently, by using the same thresholds everywhere, one assumes that towns/cities of the same size have the same functions/meanings in all regions, which is obviously not the case. A counterexample was applied in ESPON PROFECY, where the standardization/evaluation was not against a single European-wide threshold but on the average of the surrounding regions in each case.

Thresholds are few in all methods. This implies that the typologies of territories are few and that the differentiation of territories is rather limited. None methods specifically frame peri-urban territories. Few detail rural areas meticulously, and this precludes their replication in rural planning.

7. Conclusions

This article offers an overview of the methods formulated and implemented by Italian scholars over the period 2005–2020 to delimit rural areas.

Some years ago, these actors began questioning the urban/rural dichotomy, proposing a multi-scalar approach and challenging the framework based on traditional administrative boundaries. Because TERCET methods were the most widely used for official statistics, Italian scholars were discouraged and stopped developing new original methods.

To relaunch the debate considering the incessant peri-urbanization of the Italian territory, research like the present is useful to switch the light on the opportunity to formulate accurate territorial methods. Choices related to the chosen statistical unit and method, as well as defined territorial categories and variables, are not simple and directly influence the territorial representation.

The choice of a municipality as a statistical unit highlights a preference for simple but accurate representations or the availability of data. Opting for others such as LLSs reflects the aspiration to map territories, but also the economic relations that insist on them. This option can also be reinforced by the decision to adopt economic variables. This is a solution that has been adopted several times, in addition to demographic ones. Its adoption suggests that rural characterization depends on the economic structure or demographic trend, rather than on distance or land use measures. Defining territorial categories is also relevant because the choice is a signal of attention or inattention to territorial diversity. While a high number is appreciated by those who think that it is essential to describe territorial diversity, a lower number has the opposite meaning and tends towards the appreciation of a dichotomic approach. The choice of simple or complex statistical methods depends on the availability of variables and the degree of understanding of those who apply them.

Differences among methods depend on the combination of choices related to these elements. The result is a different distribution of the population among territorial typologies, which statistically prevents the relative data. The percentage of the local population living in rural areas is not comparable and varies greatly.

It is not possible to establish a priori which method is the best or most representative of rural areas. Generally, the appropriateness of a method depends on the general aims of the investigation (more complex methods in the case of developing territorial targeted policies, simpler when producing statistics or performing comparisons among territories).

Future studies should be of interest to those who wish to explore further the different representations offered by methods developed by Italian scholars and compare them with those resulting from the application of the methods developed by Italian and/or European statistical and governmental institutions. They may also be of interest to those who wish to develop a greater understanding of rural–urban differences in general or those involved in local policy development and public fund allocation. Seeing clearer differences between different types of rural areas may present an opportunity to design, implement, and monitor efficient policy and statistical analysis. It also enables us to dig deeper than impressions and stereotypes.

Funding: This research received no external funding.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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