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A methodology for definition of rural spaces: an implementation in Brazil

Uma metodologia para definição de espaços rurais: uma implementação no Brasil

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ABSTRACT

Rural spaces definitions are differentiated in several countries. The Organization for Economic Co-operation and Development (OECD) has standardized a rural definition by regional typology. The OECD regional typology set areas as Predominantly Urban, Intermediate, or Predominantly Rural. This paper analyses the application of OECD regional typology in Brazilian territory. The research used the OECD methodology, with support of GIS software, to define the rural areas in Brazil. The mostly segmented data from Brazilian Census of 2010 are used in contrast to others studies. The paper concludes that Brazil is more urban than official estimates and OECD reports. According to paper results, 87.48% of Brazilian population is urban and only one Territorial Level 3 region was classified as predominantly rural.

Key words: *Urban/Rural spaces, OECD regional typology, Rural Brazilian areas.*

RESUMO

As definições de espaços rurais são diferenciadas em vários países. A Organization for Economic Co-operation and Development (OECD) tem padronizado uma definição de rural através da sua tipologia regional. A tipologia regional da OECD define áreas como Predominantemente Urbanas, Intermediárias ou Predominantemente Rurais. O presente artigo analisa a aplicação da tipologia da OECD no território brasileiro. A pesquisa usou a metodologia proposta pela OECD, com o suporte de software GIS, para definir as áreas rurais presentes no Brasil. Utilizando os dados mais desagregados disponíveis dos Censos Brasileiros de 2010, este artigo se diferencia de outros estudos desse âmbito. As conclusões apontam para um Brasil mais urbano do que as estimativas oficiais e os relatórios da OECD. De acordo com os resultados, 87,48% da população brasileira seria urbana e apenas uma mesorregião seria classificada como Predominantemente Rural.

Palavras-chave: *espaços rurais/urbanos, tipologia regional OECD, áreas rurais brasileiras.*

INTRODUCTION

Traditionally, the rural spaces refer to places where natural landscapes and low population density predominate (ÖĞDÜL, 2010). The rural definitions, in academic institutions and others, have generated in the last decades a wide discussion without a consensus definition. The UNITED NATIONS (2009) alerted that 2007 was the first time in human history when the majority of the world's people were living in urban area. WIMBERLEY et al. (2007) also calculated May 23, 2007 as the day when this finally happened. These assertions are questionable because there is not a worldwide rural definition and these estimations use the official definitions of the countries that belong to these institutions (MINNESOTA POPULATION CENTER, 2013).

The lack of consensus on rural meaning leads to other dilemmas. The underestimates or overestimates of poverty in rural communities are a consequence of the indefiniteness. Suppose that country X (Malaysia) considers urban spaces as 1,000 or more persons and country Y (Senegal) deliberates

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this number against 10,000 inhabitants (MINNESOTA POPULATION CENTER, 2013). Even if the distribution of the population among different sized places within X and Y is supposedly identical, a considerable higher proportion of the inhabitants, and of the people under the poverty line of, for example, one U.S. dollar per day, would be counted as rural in Y but not in X (INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT, 2001).

Most international organizations have been concerned with rural definitions. The OECD (2009) has created a typology to define rural spaces. This method of delimiting the rural spaces has been a tool for many public policies. Considering this scenario, this study aimed to apply the OECD typology in Brazil. The country was chosen by its territorial-economic dimensions and by the lack of a unified rural definition. Other attempts to apply this methodology in Brazil, such as VEIGA (2004) and the OECD report (2013a), had limitations in the databases used. Both research projects utilized only data aggregated by municipality that can produce inaccuracies in the results.

The present study is structured in three sections. The first one is concerned with an introduction and the literature review recounts several approaches for determining the rural definition since the 1970s and the OECD rural-urban definition. Subsequently, the methodology and the results are displayed and finally the conclusions are presented. The study aims to set an operational definition of the rural spaces and to use an operational methodology to implement it in Brazil. In addition, this paper purposes to compare the results with others literature attempts, namely VEIGA (2004) and the OECD report (2013a).

Until the present, it was not possible to have a consensus on the definition of the rural spaces. BENGS & SCHMIDT-THOMÉ (2006) synthetized the approaches for understanding the rural and urban spaces. The authors have created four groups for rural definitions: implicit definitions; statistically derived policy-relevant differentiation of rural areas; statistically derived index of rurality; and neutrally defined rural delimitation.

Part of the published researches defines the rural space using intuitive ideas, theories or empirical evidences. The rural point of view does not consider the use of statistical tests to consolidate the results. OECD definition might be included in this approach. The OECD three-fold classifications, which are discussed in the next section, consider only population density and the size of urban centers for defining the delimitation of rural spaces.

The second approach according to BENGS & SCHMIDT-THOMÉ (2006) is a "statistically derived policy-relevant differentiation" of rural areas. This approach commonly classifies rural by means of an exploratory study utilizing statistics tools. The variable selection is predefined by theoretical criteria. Authors such as MALINEN (1995) are including in this research line.

Also following BENGS & SCHMIDT-THOMÉ (2006) in statistical approaches for rural definition, one must consider the rurality index method. This point of view has as its central mentor CLOKE (1977; 1992), who started this type of study in 1977, and used several ways for calculating the rurality indexes. ÖĞDÜL (2010) identified a trend in this type of research using the definition of rurality as a mode of life. This approach has a limited connection inter-authors, like as demonstrate by BRAGA et al. (2014). They used the social network methodology and concluded that this research line has low modularity and low density among authors quote.

The last line of research pointed out by BENGS & SCHMIDT-THOMÉ (2006) is called "neutrally defined rural" delimitation. This approach is mostly used as a preliminary stage in a most complex analysis. The first step of the OECD rural-urban typology (1994) is in this approach. Determination the rural areas will be explored more in the next.

The OECD regional typology was published the first time in 1994 (OECD, 1994). This typology was reaffirmed in later OECD reports (2009, 2013a, 2013b, 2013c). It follows three separate steps. In the first step, it recognizes rural communities according to population density. The community is considered urban if its population density is over 150 inhabitants per square kilometer. The exceptions are Japan and Korea, which consider urban population density as over 500 inhabitants per square kilometer. These exceptions are used when the national population density exceeds 300 inhabitants per square kilometer in the last demographic census (OECD, 2013c).

Step two consists in aggregating this data in Territorial Level 3 (TL3) and categorizing it as "Predominantly Urban", "Intermediate" and "Predominantly Rural". The percentage of the population living in rural areas is used for determine the TL3 regions as: Predominantly Urban (PU), if less than 15% of the population is living in rural areas; Intermediate (IN), if the percentage of the population living in rural areas is between 15% and 50%; Predominantly Rural (PR), if more than 50% of the population is living in rural areas (OECD, 2013c).

Finally, the urban centers inside the TL3 regions can change the previously classification. If a region is classified as Predominantly Rural and contains an urban center with more than 200,000 inhabitants (500,000 for Japan and Korea) and this represents at least 25% of population, its region becomes Intermediate. If a region is set as Intermediate and contains an urban center with more than 500,000 inhabitants (1,000,000 for Japan and Korea) and this represents at least 25% of the population, its region becomes Predominantly Urban (OECD, 2013c).

MATERIALS AND METHODS

This study used the data from the 2010 Brazilian demographic census, utilizing the most disaggregate data available from the *Instituto Brasileiro de Geografia e Estatística* (IBGE), census sectors. Besides IBGE data, the study also used digital maps for all 314,018 census sectors to measure the areas and display results with the help of the Terrawiew software version 4.2.2 (IBGE, 2013a, 2013b).

This research used a different method from the OECD report (2013a) and VEIGA (2004) because it utilized census sector data. The most disaggregate data was justified once the OECD typology determined, in its first step, the use of data from "local units" or communities (OECD, 2010, 2013a, 2013b, 2013c). In addition, the use of census sector data contributed to better homogeneity of the sample, once this data is aggregated by the quantitative dwellings.

For Brazil, OECD determines the TL3 regions as the *mesorregiões* (subdivisions) of IBGE. Thus, Brazil was divided in one hundred thirty-seven TL3 regions (OECD, 2013a). In this way, each TL3 regions in Brazil receives the classification of "predominantly urban", "intermediate" or "predominantly rural", following the three steps proposed in the OECD typology.

In the present study, population density was first calculated in each census sector, which was classified as a rural or urban area. Census sector was a rural area if it had less than 150 inhabitants per square kilometer. The results were combined in TL3 regions and the percentage of rural population was obtained. If the percentage was more than 50%, the TL3 region was Predominantly Rural; if the percentage was between 15% and 50%, the TL3 region was Intermediate; and if the percentage was less than 15%, the TL3 regions was Predominantly Urban.

Finally, if a TL3 region was categorized as Predominantly Rural and had a municipality with more than 200,000 inhabitants and this municipality represented at least 25% of the population, the TL3 region became Intermediate. If a TL3 region was fixed as Intermediate and contained a municipality with more than 500,000 inhabitants and this municipality represented at least 25% of the population, the TL3 region became Predominantly Urban (OECD, 2013a).

RESULTS AND DISCUSSION

The results revealed Brazil as more urban than the OCDE report (2013a) and VEIGA (2004) estimations. Indeed, in this study, only one TL3 region, Marajó in the State of Pará, was classified as Predominantly Rural (Figure 1). Brazil in 2010 had 87.48% of its population living in urban areas, if considering the census sector as a local unit. That percentage is higher than official statistics that present 84% of the Brazilian population living in urban areas (IBGE, 2013b).

These results pointed to a high sensibility of OECD typology from changes of aggregate level data. There are several differences between the OECD report and results using census sectors data. Indeed, only ten of one hundred thirty-seven areas maintained their classifications. OECD report (2013a), as VEIGA (2004), uses data aggregated by municipalities causing these differences.

Two regions were reclassified in the last proceedings, Centro-Norte Piauiense (Central North Piauí) and Norte Maranhense (North Maranhão), due to containing municipalities with over half a million inhabitants, representing more than 25% of the TL3 region population, Teresina and São Luiz respectively. This last proceeding was apparently ignored by the OECD report. That report classified the Norte Maranhense (North Maranhão) as Predominantly Rural. Others results of the OECD report can be questioned; for example, the Metropolitana of Belo Horizonte (Metropolitan Belo Horizonte) is set as an Intermediate region. However, this region contains the third largest Brazilian state capital, the Belo Horizonte municipality, with more than two million inhabitants.

Brazil is mostly composed by Intermediate TL3 regions, considering the results of this research. The country has 86 Intermediate regions, 50 Predominantly Urban regions and just one Predominantly Rural region. In the figure 1 it is possible to view the TL3 regions where the states capitals are localized as Predominantly Urban, except in the States of Acre, Rondônia and Tocantins, all in North Brazil.

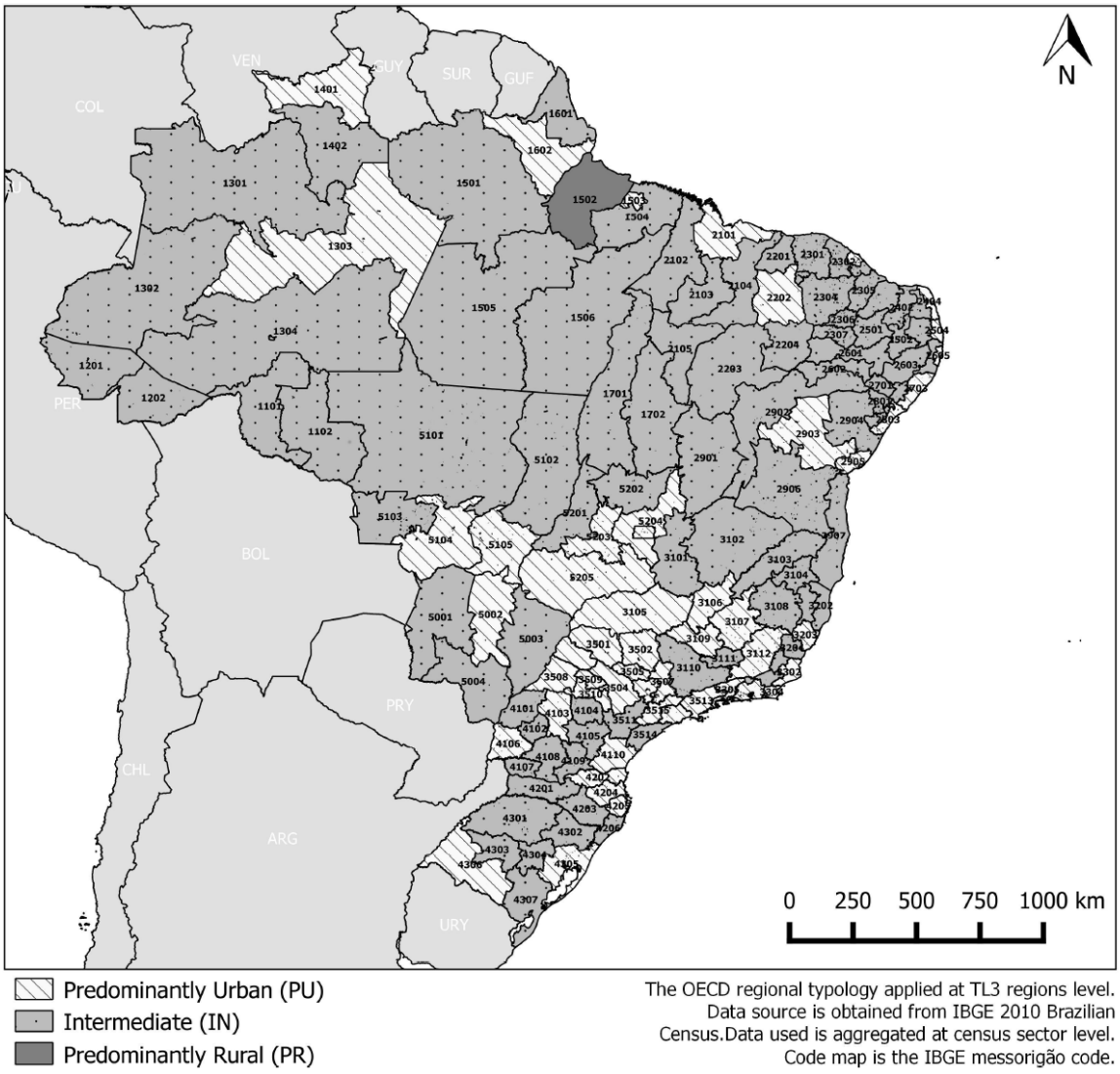

Figure 1 - Organisation for Economic Co-operation and Development (OECD) typology applied in Brazil considering Census Sector Data.
Source: Authors' own elaboration, based on IBGE data (2013a, 2013b).

The Brazilian TL3 regions are large as compared with TL3 regions of the USA and Europe. Taking into account the OECD typology, they were recalculated putting the municipalities in place of TL3 regions (mesorregiões). Brazil had 5,565 municipalities in 2010, which have ample heterogeneity of areas and population. The Brazilian municipalities are the smallest level of political division. The OECD typology on the level of municipality might be useful for public policies. Figure 2 presents the OECD typology applied to Brazilian municipalities.

The last proceeding of this classification was not used in this analysis, because the municipality is the smallest level of Brazilian official segmentation. Figure 2 presents a Brazil that is more rural than TL3 region classifications. Four municipalities (Tupirama, São João do Itaperiú, Cariri do Tocantins and São Félix do Tocantins) present their populations as totally living in rural areas. Other municipalities exhibit at least one census sector with more than 150 inhabitants per square kilometer.

These results demonstrate a large gap with the VEIGA study (VEIGA, 2004, p.11) that

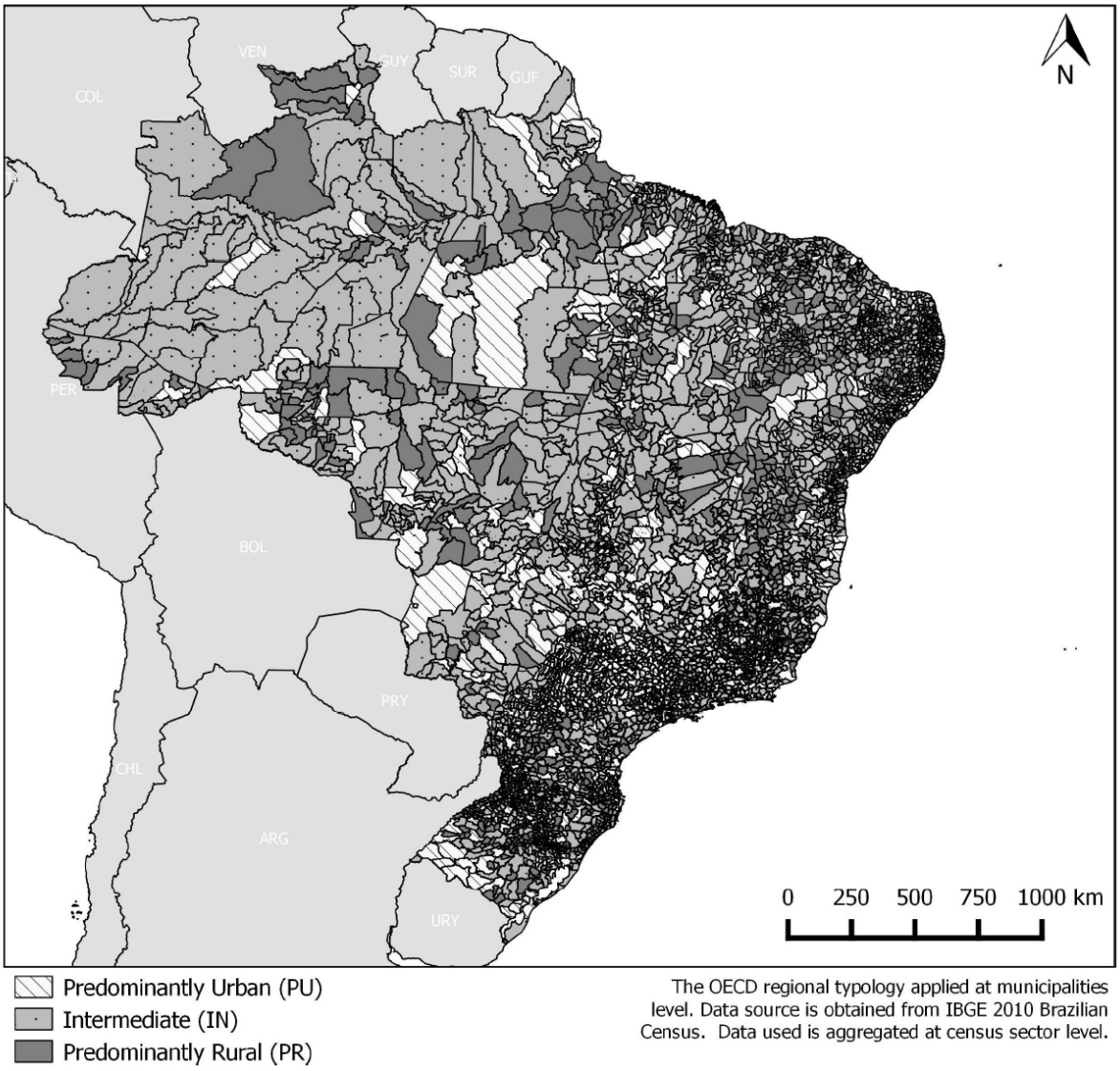

Figure 2 - Organisation for Economic Co-operation and Development (OECD) typology for Brazilian municipalities. Source: Authors' own elaboration, based in IBGE data (2013a, 2013b).

stated 80% of Brazilian municipalities are rural. In addition, VEIGA (2004) did not indicate which are these municipalities. Instead, applying the OECD typology in Brazilian municipalities with census sector data, 1,114 municipalities (20.6%) are Predominantly Rural; 1,326 municipalities (23.8%) are Predominantly Urban; and 3,095 municipalities (55.6%) are Intermediate. Figure 2 demonstrates that a large municipality, for example Altamira PA, can be Predominantly Urban once its population is concentered.

CONCLUSION

Brazil does not have a national parameter to define the rural areas. The rural areas are defined administratively by Brazilian municipalities. However, official calculations of rural population, despite their inaccuracies, have results close to the OECD typology applied with census sectors data. Using the study methodology, Brazil is not so much rural as pointed out by VEIGA (2004), official Brazilian data (IBGE, 2014a), and OECD report (2013a).

Results presented that the OECD regional typology is highly sensitive to changes in the level of aggregate data. Like other approaches that consider rural as synonymous with low population density, this bias is a limitation for similar studies. That sensibility must be taken into account in transnational studies. Perhaps the best way for making this type of study is creating comparable data areas, like collecting the data in one square kilometer grid cells.

It is important to consider that any rural approach has its own limitations. Understanding that there are other ways of measuring the rural areas is essential. Futures studies can, for example, use the rurality index approach. This approach can improve other rural views and the results. This can be a promising way for attempting rural determinations.

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