

Geographical Perspectives of an Ecclesiastical Circumscription

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ABSTRACT: It is an interdisciplinary study that seeks to describe the characterization of an ecclesiastical circumscription having geographic information as its guiding axis. The circumscription corresponds to the territory of the Diocese of Teófilo Otoni, in Minas Gerais state, Brazil. When characterizing its social and spatial aspects, the goal was to support the role played by this diocese. The choice of data took into account the information concerning the social activity of the Church, based on its pastoral action centers. In addition to Geography, the solution of the problem involved the theoretical-methodological body of the disciplines of Mathematics and Cartography. The cartographic method allowed for the representation of space and the synthesis of its information. Geographic Information Systems-GIS were used as technological support. The understanding of the spatial behavior of the processed geographic data, concerning the area of the circumscription, allowed for a more detailed knowledge of the territory of the Diocese. The material produced by this research is in line with the social work of the Roman Catholic Church and its dialogue with society. The geographical approach to religion contributes to the efforts aiming at articulating the Church with organizations of the society which share the same goals of values in defense of human dignity and rights.

KEY WORDS: Interdisciplinarity. Geographic Information. GIS. Society. Religion. Teófilo Otoni.

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I. INTRODUCTION

The characterization according to geographic perspectives of the Diocese of Teófilo Otoni, in the state of Minas Gerais, Brazil is described in this text. The territory of the Diocese covers an area of twenty-four thousand five hundred and eighty-three square kilometers (24,583 km²) defined by the National Conference of Brazilian Bishops (CNBB), a body of the Roman Catholic Church. The Episcopal Council of the CNBB, through its Commission for the Service of Justice, Charity and Peace, establishes the Social Pastoral Action Centers (Figure 1), in which dialogue takes place with other sectors of Society, including the University.

The contextualization of the social and spatial aspects of the region are important points to support the role which the diocese plays in this area. The geographical approach provides support for the actions of the Church in the diocese, which require the knowledge of space and the needs of its inhabitants. The concern to know better the ecclesiastical circumscriptions, can be exemplified by the works developed by one of the research sectors of the Pontifical Catholic University of Minas Gerais - PUC Minas. This sector is the Advanced Training System (ANIMA), created in 2011. This is part of the Center for Geoprocessing of Information and Pastoral and Religious Research (CEGIPAR), which provides geoprocessing and research services aimed at meeting the needs of the Church in the field of Religious Studies.

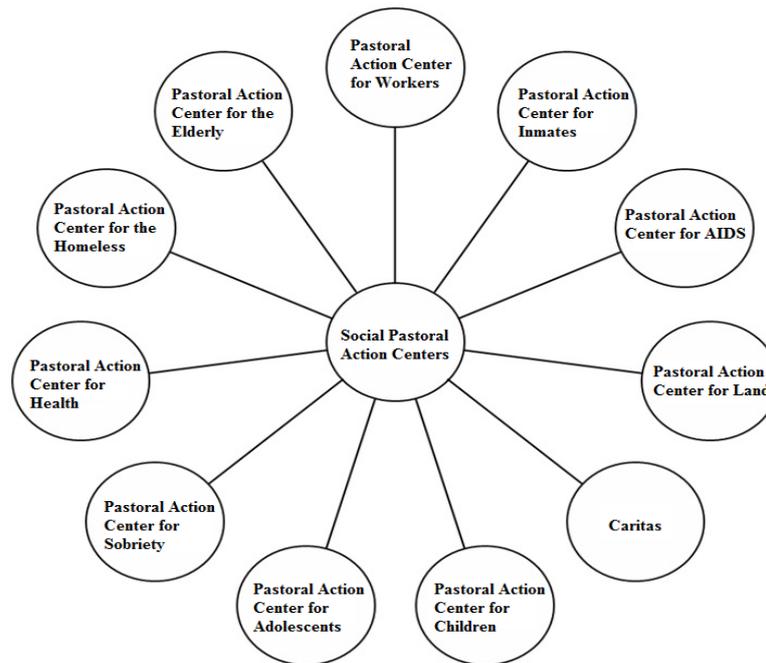


Figure 1: Commission for the Service of Justice, Charity and Peace

The work at this sector is mainly focused on supporting and advising the Archdiocese of Belo Horizonte, Minas Gerais state, Brazil in its evangelizing, political, administrative and pastoral activities by means of the geoprocessing of information in order to enable it to identify the human, social, political, economic, historical, cultural and structural profile of its communities, parishes and episcopal regions.

It may be verified that efforts are being made in other countries to organize data, with the aim of guiding the actions of the dioceses. Groundwork GIS [1] is an organization based in the United Kingdom which develops projects and conducts consultancy in Geographical Information Systems. One of the projects of this organization was executed for the Diocese of London, consisting of the development of a tool which gathers data from local, regional and national bodies, thus representing on a map the changes that occurred due to the development of the diocese. In Ireland, there is also an example of a computerized map for the definition of parishes in the Diocese of Ferns [2]. This diocese was founded in the year 598 AD and is located in southeastern Ireland.

The Diocese of Rochester [3], located in the state of Minnesota, in the United States of America, has a pastoral planning office for the organization of all parishes and faith communities, and uses the WebGIS service of the GIS laboratory of the University of California for its mappings.

The path to the analysis employed in this paper deals with the processing of the information focused on the spatial distribution of the physical structure of establishments of the Church. In fact, it is an organization of geographical data within an ecclesiastical circumscription which, in this study, is considered a specific region, formed by the municipalities that comprise it.

In the region of the Diocese there are forty-two parishes, scattered in the thirty-four municipalities. The total population in the territory of the Diocese is four hundred seventy-seven thousand, five hundred and forty inhabitants (477,540), according to the demographic census conducted by the Brazilian Institute of Geography and Statistics (IBGE). By means of an exploratory analysis of a set of geographic data, the goal was to understand the spatial behavior of this region (Figures 2 and 3).

Thus, the identification of the demographic, social and spatial aspects by means of using geographic data on the Diocese of Teófilo Otoni, in Minas Gerais, Brazil, is a commitment to offer analyzes aimed at supporting the pastoral planning of this ecclesiastical circumscription.

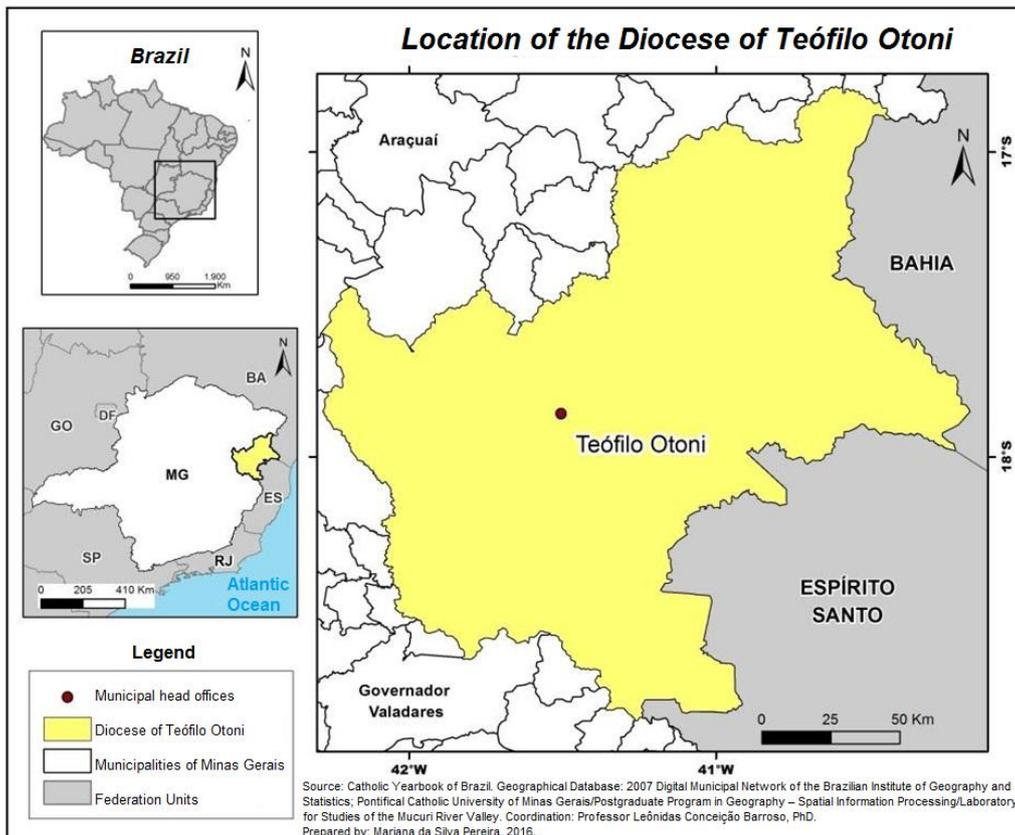


Figure 2: Location map of the Diocese de Teófilo Otoni

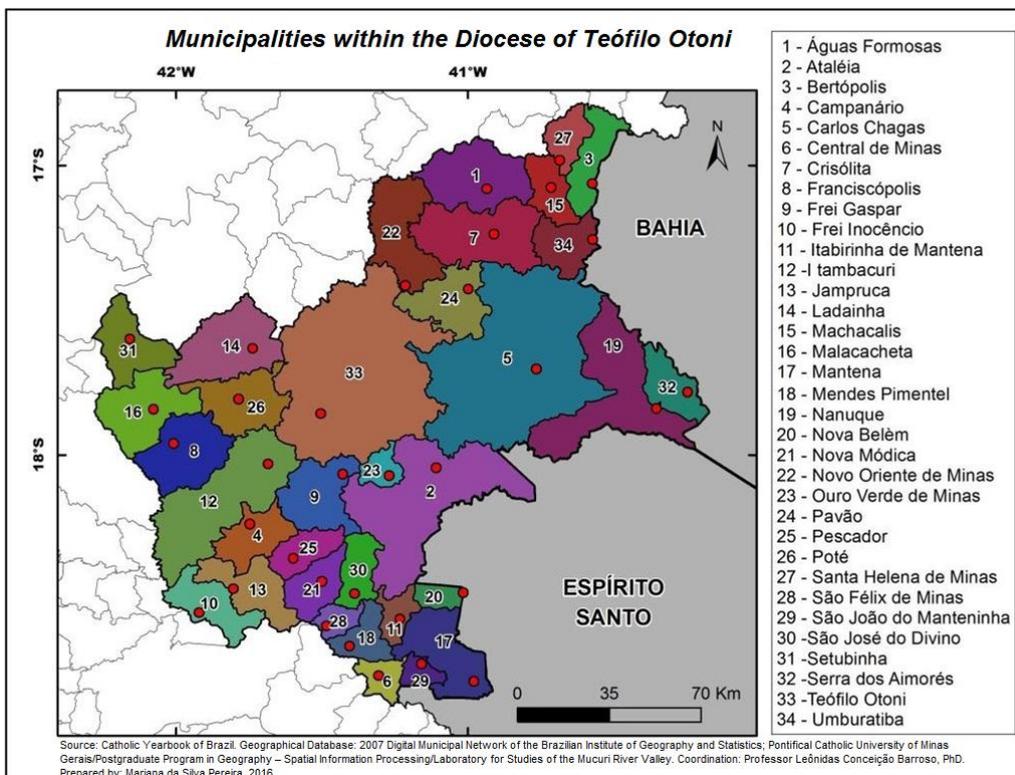


Figure 3: Municipalities within the Diocese of Teófilo Otoni

1.1 Geography and Religion

The relationship between Geography and Religion must be thought from the standpoint that Geography, as a human science, will explain the phenomena of this nature and, one of these phenomena, is the religion [4]. Therefore, the relations between Geography and Religion are part of the explanation of this phenomenon, as well as in other areas of knowledge such as Sociology, Anthropology and History. For a better understanding of the relationship between Geography and Religion it is necessary to consider the categories of analysis Geography uses to explain reality. Through its category or broader concept, which is Space, the Spatial Categories can be delineated: Region, Territory, Place, and Landscape. There is no exact definition for the term “region,” when it is used without an adjective, but it is generally used to qualify a portion of the Earth's surface which is somehow distinct from the areas of its surroundings. This distinction may be based on one or more criteria. Geography, in the effort to explain the religious phenomenon, is based on these categories of analysis, when considering Religion as a spatially placed event.

In addressing the relationship between Geography and Religion, it should be stressed out that, even though they are apparently different themes, they mean, in the first instance, social practices, thus becoming integral parts of human life. [5]. In this sense, these themes meet each other through the spatial dimension, one because it analyzes the space (Geography), the other (Religion) because as it is a cultural phenomenon, it occurs in space.

The religious experience of individuals or social groups is the subject of several sciences dedicated to studying the human being. Rosendahl [5] noted among these examples that the theme Religion appears in Psychology of Religion, Sociology and Anthropology. The crucial question for the research relating Geography and Religion is in its definition and differentiation in relation to other fields of study and methods of scientific investigation. In order to contextualize the research work, sets of themes are presented that indicate ways to understand the religious phenomenon from the standpoint of Geography, as shown in Figure 4.

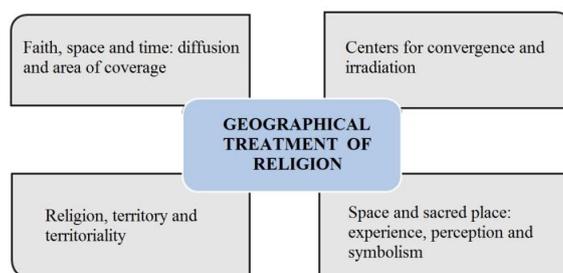


Figure 4: Sets of themes which indicate possibilities of a geographical treatment of Religion.

It can be seen from the description of these four themes and Rosendahl's observation that these “are not mutually exclusive, but interpenetrate each other” ([5], p.46). In this way, the themes are understood as topics which do not exhaust the probable appearance of others, as well as their interrelationships. In this paper, the intersection occurs through Religion, territory and territoriality.

1.2 Quantitative Geography

The various views of Geography depart from their etymological meaning and respect the heterogeneity of their composition. The term “Geography,” which among the Greeks alludes to the description of the Earth, “[...] was not a simple description, but a description that should have a philosophical, scientific and technical basis,” according to Amorim Filho. [6] In this sense, according to this author, those professionals who practice some geographic activity search beyond the location of humans, landscapes and events on the Earth's surface, “[...] their description, representation (especially cartographic), explanation, monitoring and, under certain conditions, prepare projections and forecasts.” Among the several aspects that paved the way for a renewal in Geography are the formulation of the General Systems Theory, Structuralism, Cybernetics and Set Theory. [7]

At the beginning of the twentieth century, in parallel with Classical Geography, a question was raised, regarding the small application of the regional studies, based on theories and methodologies which, in general, did not meet the immediate needs of society and government.

In the 1950s, a change in the classical paradigm began in the United States. In this context, Geography appropriates quantification, allowing a more rigorous scientific treatment of geographic research data. Thus using “mathematical formulations and statistics, which would gain great prestige and develop statistical methods which would allow for a greater abstraction and theorization of the geographical knowledge” [8]. It is the approach of Geography known as “Theoretical- Quantitative Geography,” the theoretical-methodological basis of this work. Some pillars of its construction can be seen in Figure 5.

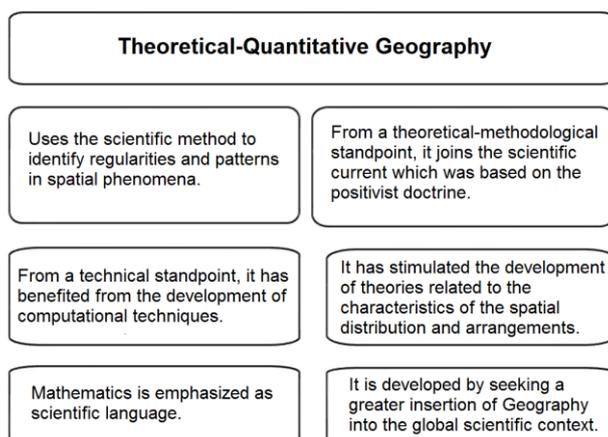


Figure 5: Table of the Theoretical Basis of Quantitative Geography

II. MATERIAL AND METHODS

The logical-mathematical method is widely used in Theoretical-Quantitative Geography. In the execution of this work, Set Theory, Matrices and Logic were essential. Set Theory is used as an integrating interface of interdisciplinarity, Matrices for data storage and transformation, and Logic for queries on the GIS.

The excessive fragmentation of knowledge sometimes distances what is researched from its reality, by not allowing a broad and comprehensive view of the object being observed. In this sense, Santomè says that the construction and diffusion of knowledge oscillates between two poles: on one side a tendency to specialization, on the other a greater unification of knowledge [9]. Among the dynamics mentioned by him, the interdisciplinarity of knowledge lies in having a discipline which shares objects of study, parts of the same theme or research methodologies. Thus, due to the complexity of the problems of mainly social research, it is important to be able to count on more points of view. “The breakdown of boundaries between disciplines [...] is leading to the consideration of much more powerful models of analysis than those which characterize only a disciplinary specialization. The complexity of the world and current culture leads to unraveling problems with multiple lenses, as many as the existing areas of knowledge; otherwise, the results would be affected by the deformations imposed by the selectivity of the perspectives of analysis adopted” (Santomè, 1998, p.44, [9]).

On the other hand events occur in time and space. Besides geographers, spatial analysis has been used by different branches of science. This great use is what Abreu calls the “boom of spatial knowledge.” [10] One can notice the use of spatial analysis in publications that are not necessarily among geographical briefs or journals. Maps are increasingly becoming essential resources for research, making geographic knowledge and the location of these events increasingly valued, not only in Geography. Spatial Analysis emerged with greater force within the Theoretical-Quantitative Geography. Hagerstrand, quoted by Ferreira, formalizes Spatial Analysis and its relation to Quantitative Geography by stating in 1968 that Quantitative Analysis [11]:

[...]recently incorporated into Geography, represents the in-depth study of the patterns of points, lines, areas and surfaces, arranged on maps, defined by spatial coordinates in two or three dimensions (Hagerstrand apud Ferreira [11]).

The term “Spatial Analysis” has also been used as a synonym for “Mapmatics.” This use is due to the aggregation of Numerical Map Analysis techniques, Thematic Cartography and Geographic Information Systems. Mapmatics, while creating images of analytical quantities of geographic space, also produces numerical values from the visual variables of the thematic map, through spatial analysis operations [11]. New maps are produced by changing the visual structure of other maps, which, thus generates new numerical values, organized into tables to be statistically analyzed (Ferreira, p. 103,[11]).

In this work, the data were stored in a matrix structure, whose rows contain location data and, in its columns, a given attribute or measurable variable. The intersection formed by rows and columns are the cells which represent geographic information, that is, the location of a geographic fact for a given attribute. This composition allowed for building the inventory of the Region. Some comparisons could be made by using several attributes related to the geographical location. For example, the matrix rows could be compared to each other, which allowed for differentiating the areas.

The time dimension associated with the spatial data matrix is also important. To insert this dimension, one needs simply to build multiple matrices of location, each matrix representing a different time. This provides the observation of the temporal dynamics of the geographic space being studied.

Descriptive Spatial Statistics techniques were used to compute the geographic distribution of the studied variables, while the ArcGIS software was used for mapping. [12] Descriptive Spatial Statistics explores the analogies between the frequency diagrams of Statistics and the frequency maps of Geography. It is a Bivariate Statistics, where the parameters are the Mean Center (similar to the Mean) and the Standard Distance (similar to the Standard Deviation). Thus, with the Mean Center and the Standard Distance, the distributions of geo-referenced data sets are compared, thus allowing for observing the direction of the displacement of the center of equilibrium. Besides that, for setting the objectives, face-to-face meetings were held with the Most Reverend Diocesan Bishop and his pastoral staff. In addition, field work was conducted as an investigative element, a union between theory and method and a dynamizer of the elaboration of knowledge about the object of study.

III. RESULTS AND DISCUSSIONS

The results on the territory of the diocese of Teófilo Otoni were transformed into maps with explanatory texts. Besides those that will be presented next, other maps can be found in [12].

For Geography, the statistical work with a certain set of maps gains another dimension, when spatially represented. By considering what is of prime interest to Geography, the *locus* of human activities or natural events, space becomes a fundamental reference. [13]

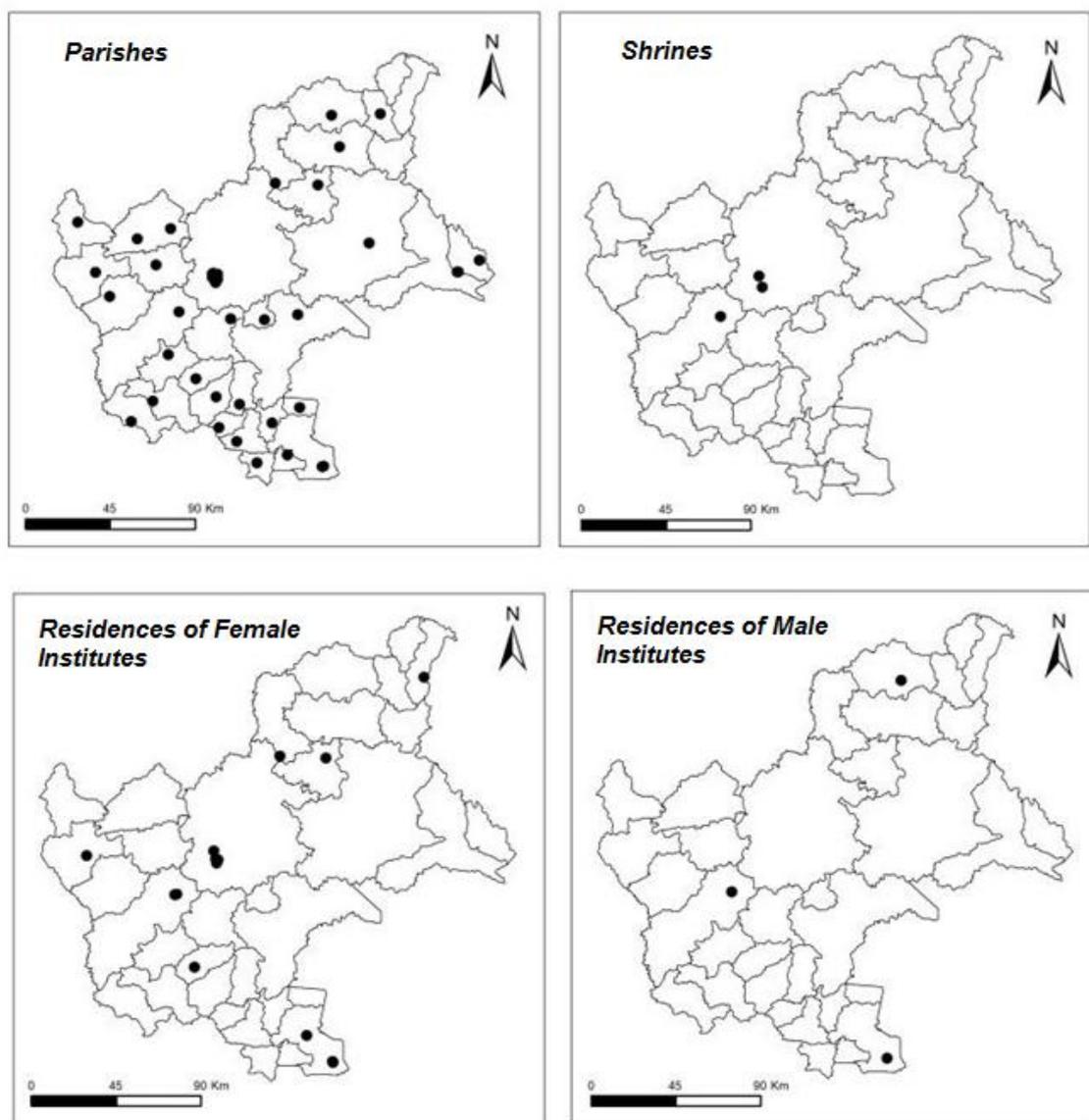
In this paper, some thematic maps of the study in question are presented. The location of the Diocese of Teófilo Otoni in the set of municipalities of the state of Minas Gerais, Brazil, is presented in Figure 3. The establishments of the Church are distributed according to the maps of Figure 6. According to the 2015 data, presented by the Catholic Yearbook, the main municipality Teófilo Otoni had 9 parishes of those 42 existing within the diocesan territory. The municipalities of Ladainha, Mantena and Nanuque have 2 parishes each. The other municipalities had only 1, except Bertópolis and Santa Helena de Minas, which shared their religious services. There are 3 sanctuaries, 2 in the main municipality and 1 in Itambacuri.

Within the ecclesiastical circumscription, the variable number of health establishments is more concentrated in relation to the standard distance. The weighted mean center moves Northwest. More than 50% (fifty percent) of the health facilities are concentrated in the Diocese's headquarters, in the city of Teófilo Otoni (Figure 7).

The mission of the Pastoral Center for Children is to “promote the development of children[...] from the womb to the age of six, through basic health, nutrition, education and citizenship guidelines, within the Christian mystery that unites Faith and Life, supporting their families and communities to realize their own transformation.” The map shown in Figure 8 deals with the distribution of children. The mean center, weighted by the variable “children” moves Northwest, with respect to the mean center.

In Brazil, the law which regulates the national policy for the elderly, created in 1994, considers as elders people those over 60 years of age [14]. The elderly population also has its representation in the Pastoral Action Center for the Elderly, [15] which was created in 2004, aimed at ensuring that this portion of the population lives with dignity. According to the data distribution, the mean center weighted by the variable “elderly” (Figure 9) moves Southeast as to the mean center. Although the distribution is close to the standard distance, the municipality of Franciscópolis, which is at 1(one) standard distance, is outside, when weighted by the elderly. Thus, we have 2 towns at a standard distance (Jampruca and Mendes Pimentel) and 17 towns at less than a standard distance.

Diocese of Teófilo Otoni – Parishes, Shrines and Presence of Religious People



- Establishment
- Municipalities within the Diocese

Source: 2015 Catholic Yearbook of Brazil. Geographical Database: 2007 Digital Municipal Network of the Brazilian Institute of Geography and Statistics; Pontifical Catholic University of Minas Gerais/Postgraduate Program in Geography – Spatial Information Processing/Laboratory for Studies of the Mucuri River Valley. Coordination: Professor Leônidas Conceição Barroso, PhD. Prepared by: Mariana da Silva Pereira, 2016.

Figure 6: Diocese of Teófilo Otoni -parishes, shrines and residences.

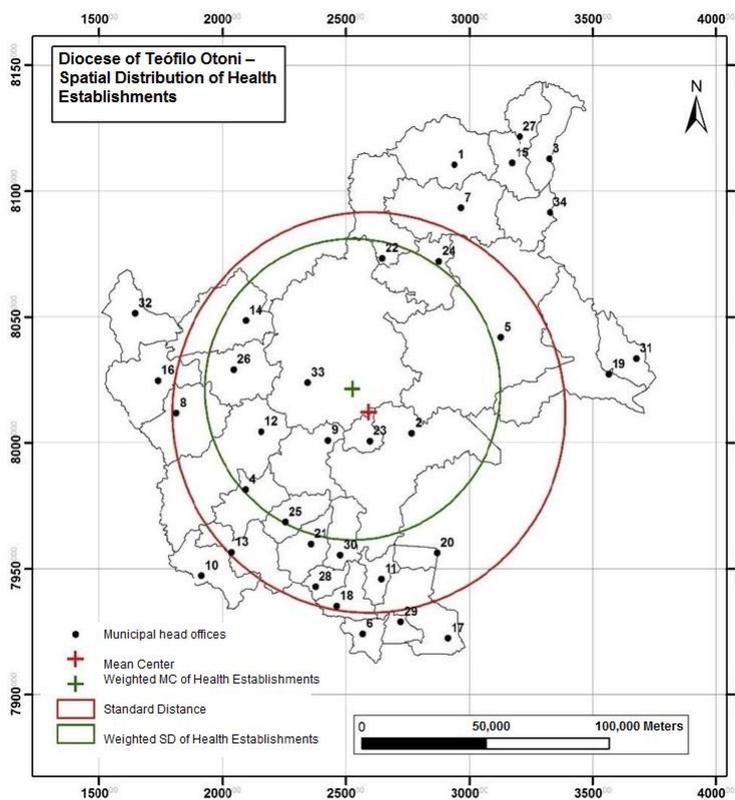


Figure 7: Diocese of Teófilo Otoni – Spatial Distribution of Health Establishments.

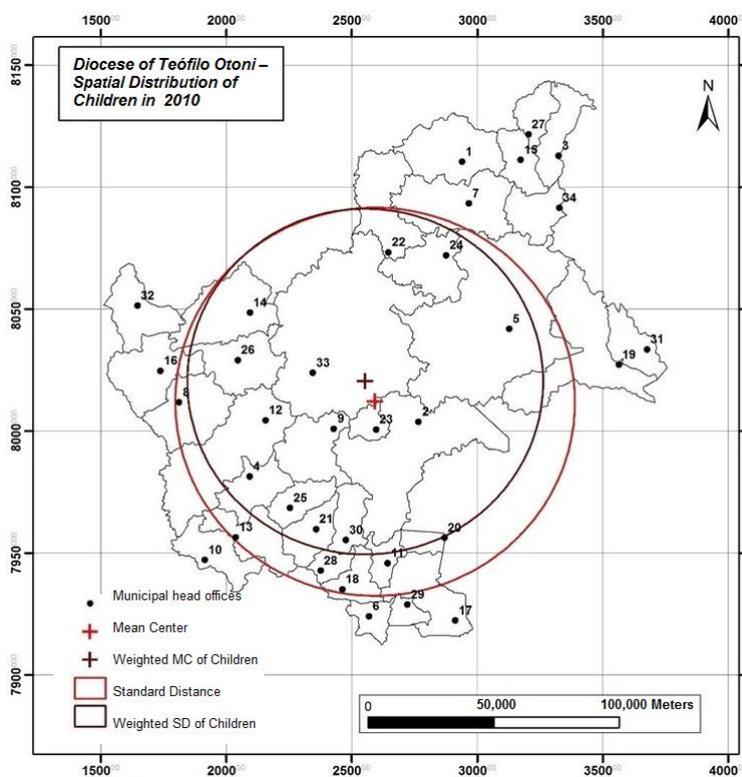


Figure 8: Diocese of Teófilo Otoni – Spatial Distribution of Children in 2010.

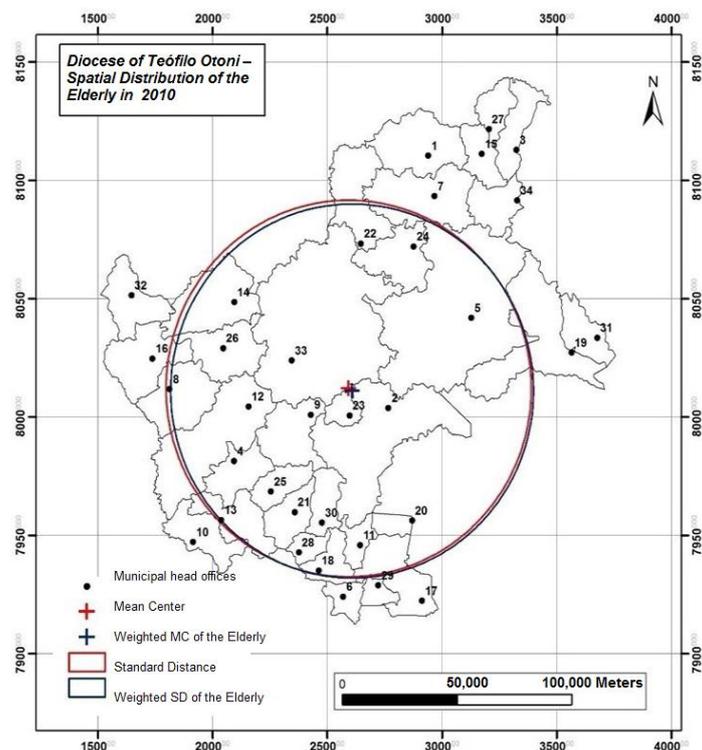


Figure 9: Diocese of Teófilo Otoni – Spatial Distribution of the Elderly in 2010

IV. CONCLUSIONS

The proposed objectives were attained through methodological procedures which integrated geographic, mathematical and cartographic knowledge within a Geographic Information Systems environment to generate new mappings. In addition to Geography as the guiding axis to solve the problem, the methods of Spatial Analysis were used, with the technological support of Geographic Information Systems. The cartographic method allowed for the representation of space, the synthesis of its information and its visualization and gave support to the production of maps which communicate the data gathered. Not by simply gathering, inventing and spatializing, by generating a series of maps, but rather by making assumptions to guide the logic of thought in order to organize the data that responded to the purpose of the study. In this way, the technique is chosen according to the problem, which on its turn gives the rationale of the research. The analysis of demographic variables of its population was also included. It is considered that the analysis from a geographical perspective presents an investigation which includes the human events, split into several dimensions, thus reinforcing the relevance of interdisciplinarity.

Finding ways to work on both Religion and Geography, by accomplishing a data spatialization is in line with the management of actions that are employed within a protocol followed by the Roman Catholic Church. The understanding of the spatial behavior of the geographic data worked for the area of the ecclesiastical circumscription allowed for the detailed knowledge of the territory and to deliver, in this geographic scale, analyzes in line with the pastoral planning.

The results were made available to the Diocesan Bishop and his pastoral staff. The material produced by the research is in line with the social work of the Church and its dialogue with society. The geographical approach of Religion from the standpoint of the Spatial Analysis contributes to the promotion of the articulation of the Church with organizations of society that share the same goals of values, in defense of human dignity and rights. In this sense, the University fulfills its true function: the teaching, research and extension.

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