

**AN ANALYSIS OF THE BRAZILIAN SEMINAR THROUGH
CARTOGRAPHY THEMATIC FOR GEOGRAPHY CLASSES IN THE
FINAL YEARS OF ELEMENTARY SCHOOL II**

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RESUMO

O Semiárido brasileiro é uma importante região delimitada pela Superintendência do Desenvolvimento do Nordeste (SUDENE), através do clima e precipitação pluviométrica, essa região que se destaca em níveis globais, muitas vezes passa despercebida no âmbito escolar em disciplinas importantes para o aprendizado sobre a diversidade que o Brasil se constitui, como a de Geografia Geral. Portanto, o presente trabalho tem como objetivo principal o relato da análise de alguns fatores básicos sobre o Semiárido brasileiro, que na presente concepção, não deveriam faltar nos planos e currículos de aulas e estudos sobre o tema, como a riqueza em vegetação, paisagens, hidrografia entre outros fatores importantes para o conhecimento dessa região, assim como da Geografia como disciplina em ensinos como a do Fundamental II. Para que os estudos obtenham um melhor entendimento do assunto, foi utilizado como uma das ferramentas e metodologia a Cartografia Temática através de Geoprocessamento utilizando o Software Qgis. Por fim, podemos concluir que o Semiárido brasileiro é uma fonte rica de conhecimentos que não pode faltar nos estudos dentro de nossa sociedade.

Palavras-Chave: Aspectos físicos do Semiárido; Geotecnologia, Ensino de Geografia.

ABSTRACT

The Brazilian Semi-arid is an important region designated by the Northeast Development Superintendency (SUDENE), through the climate and the rainfall. That region, which highlights in global levels, most of the time, is unnoticed in the schooling environment, in important school components, that might contribute for the learning of the diversity of Brazil configuration, such as, General Geography. Therefore, the presented paper has as its main purpose the report of some basic factors analysis on the Brazilian Semi-arid, which, in the current conception, must not lack in the class planners or school curriculum, as well as, there must be studies on the theme, as the richness in vegetation, the landscapes, hydrography and other important aspects that might enhance the knowledge of that region, as well as of Geography, as a school component, for the teaching for Elementary School Levels II. In order to obtain better results and understanding in the studies, the Thematic Cartography was used as methodology and tools through the Geoprocessing, by the use of the Qgis Software. Concluding, we may say that the Brazilian Semi-arid is a rich source of knowledge that might not lack in our Society studies.

Keywords: Physical Aspects of Semi-arid; Geotechnology, Geography Teaching.

INTRODUCTION

Considering that Brazil is a country of continental extension, it is composed by a lot of diversity in culture, history, economy, flora, fauna, climate, within other aspects, hence, being always updated with those knowledge and aspects is not a very easy task. Thus, the school environment is considered the crucial requirement for the primary knowledge within the various knowledge necessary on this country.

The school component Geography is one of the basic requirements in critical education for the knowledge and the learning on the diversity of aspects that constitute Brazil and the world, hence, in order to make this knowledge available on a basic way in classrooms, and properly compatible with the realities of designated places and regions, it is necessary to be done scientific studies and analysis regarding the syllabus that might not lack within the school environment.

Currently, composed by 1.262 counties, according to the Northeast Development Superintendency (SUDENE), the Brazilian Semi-arid is a rich climatic region in culture, flora and fauna, that, most of the times, might be unnoticedly learnt by internal or external population of the country. According to Schistek (2013), the Brazilian Semi-arid is a misunderstood region, due to the misuse of campaigns about that region. Santos (2019), highlights that the Semi-arid presented in Brazil is classified as the biggest area existent in just one country, as well as the most inhabited Semi-arid area in the world, when compared to the Semi-arid regions in other countries.

This paper has as its main general purpose the analysis of basic elements, however considered, in this case, important for a better understanding of the Brazilian Semi-arid, that should be used in classrooms with the intent of showing learners another view of the Semi-arid, in important classes, as Geography, also using the Thematic Cartography, as one of the tools to enhance the understanding of Semi-arid.

As the hypothesis, Geotechnology in a Thematic Cartography could be a very important tool within the school component General Geography for Elementary School II, providing the use of maps and other requirements, as the simple information junctions and the appropriate use of images of that important Brazilian region, that will be presented along this paper, making classes more dynamic and playful.

METHODOLOGY

As a roadmap methodological, a bibliographic study on the proposed theme was done, besides a data survey in non-governmental and governmental institutes and sectors, as well as in the electronic addresses of the Brazilian Geography and Statistics Institute (IBGE), Brazilian Semi-Arid Articulation (ASA), and the Northeast Development Superintendency (SUDENE). As part of the use of the obtained data, maps using the Software Qgis, version 3.16.7 LTR, using the Reference System (DATUM) with the Geocentric Reference System for the Americas (SIRGAS-2000) were also consulted and used.

There were also the use of the basic understanding and knowledge of the proposed thematic in this paper, acquired in events and through the classroom experiences with teachers and students.

BASIC ASPECTS OF THE BRAZILIAN SEMI-ARID

According to IBGE (2021, S.d), “The Brazilian Semi-arid is a designated area by the Northeast Development Superintendency - SUDENE – considering semi-arid dominant climatic conditions, especially, the rainfall”. According to a ASA (S.d), currently, the Brazilian Semi- arid region occupies an area of 1,03 million km², corresponding to 12% of all the national territory. The majority of the Semi-arid is located in the Brazilian Northeast, formed by 1.262 counties, distributed in the 9 states of the area (Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe and Bahia). It is interesting that the Semi-arid is not only presented in the Northeast of Brazil, but also spreaded until the Southeast, in the North of Minas Gerais, something that most of the times might not be considered in the educational environment. This reality can be seen in the map below (Image 1), Thus, it is possible to introduce the public view in a classroom, with the use of maps, and demonstrate the awesomeness of that region, that occupies the majority of the Northeast area and reaches part of the Southeast.

Currently, the number of the inhabitants in that region is about 27 millions. It is also important to highlight that 81% of all Brazilian quilombola communities is located in the Semi- arid (ASA, S.d). This figure demonstrates a rich source of knowledge to be valued, clarifying that the rooth culture and history of the Brazilian people is an important part of that region.



Figura 1: Map of Delimitation of Brazilian Semi-arid

Source: Collection of Authors, 2021.

Physical Aspects

The physical aspects are important to get the understanding of a region; the weather in the Brazilian Semi-arid is the semiarid tropical, hot and dry, which is considered one of the main factors that contribute for the image and the natural formation of this region. This configuration ended by adjusting its vegetation and the relief constitution in dry or rainy periods, attributing peculiar characteristics to the region.

The high temperatures occur due to the fact that the Semi-arid is located in low latitude – near the equator line - triggering temperatures with minimum above de 15 °C and maximum reaching 40 °C. However, there are areas with high reliefs, that make it possible the presence of more humid winds, with low temperatures (ARAÚJO, 2011).

Vegetation

The climate as one of the conditioners of the current semi-arid landscape allowed the vegetation adjust itself, according to Araújo (2011, p. 91), the diversities of plants “[...] adjusted themselves along thousands of years to those variation and environmental conditions, remaining alive, although looking like “dead”, in a latency period, waiting for the time to bloom and show up leafy during the rainy time” It is possible to see a bit of the beauty of the light white cloak giving way to a greeny cloak of vegetation around Piranhas town, in Alagoas State.



Figure 2: Piranhas, State of Alagoas, semi-arid region
Source Collection of the Authors, 2018.

Thereby, in spite of the sandy and dry landscape, the vegetation remains alive, surviving to the climate, with similarities of plants existing in snowing low temperature countries, when during spring they bloom, despite the snow which kept them covered. This view shows us that there is beauty in these landscapes. And, for this characteristic of reborn, despite seeming dead, they are considered symbol of resistance, comparing the fact to the people who are inhabitants of this region.

The main biomes in the Semi-arid location are, in the majority, are predominantly Caatinga and Cerrado. Nevertheless, through the maps, it is possible to identify that their extension also reaches the Atlantic Forest, according to Marinho (2015) “Part of the Atlantic Forest Biomes, Cerrado and Caatinga is included in the Brazilian Semi-arid” (Image 3). This fact provides the cited region with a variety and diversity of flora e fauna and reiterates the need of being studied and preserved. Therefore, we can demonstrate how the use of Thematic Cartography is highly important for learning in related classes.

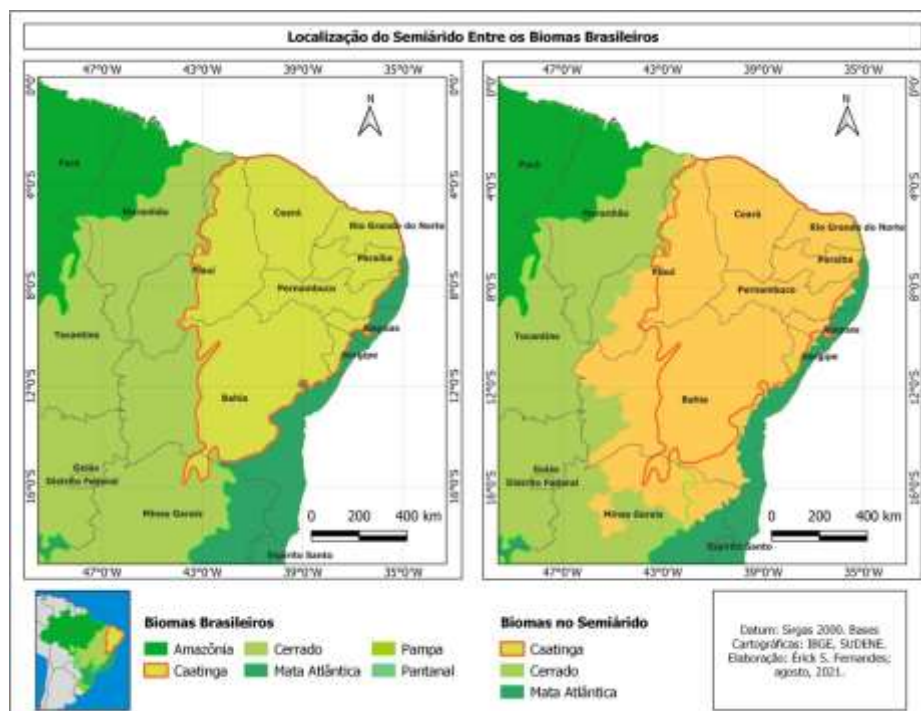


Figure 3: Map of Semi-arid between Brazilian Biomes
Source: Collection of Authors, 2021.

Within the two main cited biomes, the biggest one in Brazil is the Cerrado, which is also considered the Brazilian Savannah, according to IBGE (2019, p. 26), “The typical Savannah of the Biome Cerrado, on the other hand, is very well characterized on the Landings of Mearim River Headwaters, carved in sandy sediments and basalt igneous rocks from the Alpercatas Basin fill (Rifte)”, existent in the Semi-arid, Cerrado region, as the other cited biomes, is composed by a great diversity, according to o Environment Ministry (MMA, S.d), For its great richness in fauna e flora Cerrado s also considered a world hotspot of biodiversity, possessing extreme abundance of endemic species, in a total of cataloged 11.627 species of native plants, about 199 species of mammals, 837 species of birds, 1200 species of fish, besides hundreds animals species. Bordering with cerrado, in the area that comprehends the Semi-arid, there is the biome Caatinga, in

almost all area, which is also rich in hundreds of vegetation and animal's species.

Caatinga occupies an area of about 844.453 square kilometres, the equivalent to 11% of the national territory. It comprehends the states of Alagoas, Bahia, Ceará, Maranhão, Pernambuco, Paraíba, Rio Grande do Norte, Piauí, Sergipe and the North of Minas Gerais. Rich in biodiversity, the biome is a shelter for 178 species of mammals, 591 of birds, 177 of reptiles, 79 species of amphibians, 241 of fishes and 221 of bees (MMA, S.d).

This variety of vegetations and animals is also present in the divisions between those biomes, the vegetation Carrasco, little mentioned, is an interesting vegetation that survives on a sandy soil of high altitudes, as slaps, such as Ibiapaba Highland, Araripe Slap, among other high-altitude reliefs. Vegetation that is present in ancient debates and that is still part of those nominated biomes.

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Amongst the vegetational sorts of the semi-arid area, caatinga vegetation is the dominant feature, presenting variations in the floristics physiognomy and composition (Luetzelburg 1922/23, Egler 1951, Andrade-Lima 1966, 1981, Fernandes & Bezerra 1990). Andrade-Lima (1978) referred to another kind of vegetational xerophilous, so-called carrasco or catanduva, occurring on sandy soils on contiguous slaps to the caatingas vegetation in the Paraíba River Basin (Piauí). According to the author, the carrasco, for its deciduous, would be a sort of caatinga, but, due to the bigger density of specimen, the apparent unistratification and almost absence of cactus and bromeliads, it could be recognized as an own entity. Fernandes (1990) e Fernandes & Bezerra (1990) stated that carrasco comes from the partial destruction or devastation of cerrado, turning into the aspect of a dense poultry, occurring in the high and tabular levels of the plateau reverse of Ibiapaba and Araripe Slap, also seeming to occur in some areas of Diamantina Slap, in Bahia State. Yet, Figueiredo (1986, 1991) refers to that vegetation as a xerophyll community, dense shrub, with specimen of thin stems, and, most of the times cespitose and some arboreal, formed by its own species, but also by cerrado, caatinga and woods. (ARAÚJO, et al, 1997, p. 02).

Therefore, we can witness a rich Semi-arid, not only in its diversity, but also in content, for research purposes and educational material, that may make it possible the understanding of the factors grandiosity which constitute the country. Nevertheless, one of the contributing factors for the landscapes and images referred to the Semi-arid is the lack of water, considering that the level of rainfall in this region of Brazil varies between 268 and 800 mm. The intense periods of drought provoke the high temperatures, so that, the evapotranspiration acts with more intensity, considering the little rainfalls, turning the landscape into the dry appearance.

[...] the water limitation occurs annually, due to the lengthy dry period which triggers the despozenization of endogenous rivers and streams. The reduced capacity of rain water absorption in the soil is difficulted, because of the altered relief and the shallow and stony soils. (SILVA, 2006, p. 17).

In this context, Santos (2019, p. 86), says that “[...] the higher levels of solar radiation that focus on this region increase the potential of evapotranspiration [...]” thus, they do not allow the soil to absorb the water effectively, causing the rapid water absorption, this happens also because of the soils configuration, with their crystalline and shallow terrains, little deep, which hampers the infiltration in the underground aquifers.

Yet, the Semi-arid is not only composed by drought

The lack of water is a present reality for the population who lives in the Brazilian Semi-arid. The hydric shortfall in the region is one of the worry adversities that the population faces, principally, for those who survive from agriculture and animal husbandry. Related to the climate of the semi-arid region, the rivers present there are mainly intermittent, that is, rivers with full riverbeds duration only during rainy periods, during the drought, they dry, causing the death of the animals which survive from them.

Combined with these climate features, the Semi-arid rivers mostly intermittent and conditioning to the rainy period, when they become superficial rivers, exposed to the predominant hot and dry air mass, the *tepid kalaarian* (TK), that evaporates the riverwater, the soils, and wherever there is water. So, during the dry period, rivers seem to extinguish, turning submerged in the alluvium of the valleys, supplying the groundwater. (SANTOS, 2019, p. 86-87).

According to Araújo (2011), the geologic formation contributes to the absence of many perennial rivers in most of the locations: the rivers are based on crystalline terrains, with very shallow soils, which ends in an impediment of the water runoff and percolation in the groundwater. One of these difficulties which makes this activity deficient is the existence of soils with characteristics of textural and clayey horizon B, which waterproofs the soil, preventing the groundwaters from obtaining water.

Though, the Semi-arid is not only composed by Drought, based upon ASA, while other semi-arid regions in the world have annual rainfall between 80 and 250mm, in Brazil the semi-arid region is considered the one which gets more rain in the Planet, with the average of annual rains between 200 and 800mm. Moreover, even representing a great lack of water and rainfall, the Semi-arid region is located in an area of five hydrographic regions – Western Northeast Atlantic, Eastern Northeast Atlantic, Parnaíba, North Atlantic, and, mostly, inside Hydrographic region of São Francisco River Basin, something that provides, besides beautiful landscapes, a refuge to minimize the droughts of other localities, as it can be seen in the map below, allowing us to use it for an analysis of the areas more contemplated with rivers.



Figure 4: Map of the Brazilian Semi-arid Delimitation inside the Hydrographic Regions
Source: Collection of the Authors, 2021.

It is important to mention that, though inside a Hydrographic Region, this is not a grant that all semi-arid region has been benefited by the rivers of this hydrographic region. However, an example of richness and abundance in the São Francisco hydrography, inside the Semi- arid, despite the environmental impact, a series of National Hydroelectric Plants can be found in the area, as Sobradinho Hydroelectric Plant, localized in the State of Bahia, Itaparica or Luiz Gonzaga Hydroelectric Plant, the Hydroelectric Plan inside Paulo Afonso Complex - Moxotó, composed by three complexes with the same damming, with Paulo Afonso IV with its flow rate coming from Moxotó reservoir (AMORIM, 2009); the most popular hydroelectric plant which is also part of the sequence of plants fed by São Francisco River is Xingó Hydroelectric Plant (Image 5). That, as Paulo Afonso complex, is a tourist spot, on the border between Alagoas and Sergipe.



Figure 5: Xingó Hydroelectric Plant, semi-arid region between Alagoas and Sergipe States
Source: Collection of the Authors, 2018.

Nevertheless, the lack of water and its bad distribution still provoke intense droughts, causing serious problems to the population. Due to this difficulty found in the region, some campaigns and programmes have been emerged along the years, such as the so-called project 1 million of cisterns Programme (P1MC), coordinated by ASA, with the purpose of ensuring the access of quality water to the needy population.

Cisterns are places where the rainwater can be stored, they are built with cement slabs by the inhabitants themselves, beside their residences, after a brief training and instructions referring to the appropriate building and necessary care.

There is also the São Francisco River Integration Project, that, according to Regional Development Ministry (MDR), has the aim of building a canal to conduct water for 12 millions of inhabitants in the states of Pernambuco, Paraíba, Ceará and Rio Grande do Norte.

FINAL REMARKS

The Brazilian Semi-arid proves to be an important Region, that hosts an extensive diversity, which, during this present paper, it made it possible to notice, through a basic analysis of the climate, vegetation – within the three biomes; fauna, flora, hydrography - embracing five hydrographic regions, besides other factors, which show us that this region is an abundant source of knowledge, and so, it must be approached with more distinctness in the school environment, as well as in studies on the thematic here presented. Thus, some factors using Thematic Cartography are shown and they might be used as an approach in classrooms, in order to provide people with a more efficient and profitable understanding of what our Brazilian Semi-arid is.

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