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Landscape reading under “ethno” aspect: a bibliographic study

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RESUMO

A heterogeneidade de mosaicos paisagísticos associada aos fatores que levam a categorização de um dado ambiente, resume-se em um tema importante de pesquisa da Etnoecologia da Paisagem. Por consistir em uma temática recente, que vem ganhando notoriedade, objetivou-se apresentar um panorama sobre o tema em epígrafe, a partir da análise de sua evolução entre os anos de 2009 a 2019, a fim de verificar como ele vem sendo trabalhado e discutido pelos estudiosos, em todo o mundo. A pesquisa se delineou por meio de análise bibliométrica, cujos dados foram obtidos na base do Portal de Periódicos oferecido pela CAPES. Os assuntos centrais dos escritos avaliados relacionaram-se ao uso e classificação da paisagem, estudos conceituais, sobre a percepção do ambiente e categorização do solo. Dentre as pesquisas realizadas mundialmente, o continente americano foi o que deteve o maior número de estudos (64,7%). O ano com maior concentração de publicações foi o de 2016, tendo o Brasil como destaque, por agrupar uma quantidade superior de trabalhos em relação aos demais países. As pesquisas brasileiras foram desenvolvidas em áreas de Caatinga e Mata Atlântica, carecendo de estudos nos demais complexos vegetacionais do País. Os dados mostraram que os autores se concentraram em identificar ambientes mais abrangentes. Elementos de paisagem bióticos e abióticos deram fortes indícios na distinção dos mosaicos paisagísticos, principalmente, quando estes associavam-se aos componentes vegetação e topografia. Portanto, aprofundar o entendimento de como as pessoas estão interligadas ao ambiente, fornece caminhos importantes para a compreensão e gestão de um dado território.

Palavras-chave: Pesquisa de Literatura, Etnoecologia, Conhecimento Popular, Ambiente.

ABSTRACT

Heterogeneity of landscape mosaics associated with factors that lead to the categorization of a given environment is summarized in an important research theme of Landscape Ethnoecology. Consisting of a recent theme, which has been receiving notoriety, the goal was to present an overview about the referred subject, analyzing its Evolution between the years 2009 to 2019, in order to verify how it has been proposed and discussed by scholars around the world. This research was organized using bibliometric analysis, whose data were obtained on the basis of the Journals Portal by CAPES. Main subjects of the considered texts related to the use and classification of the landscape, conceptual studies, perception of the environment and soil categorization. Among researches performed worldwide, the American continent was the one with the largest number of studies (64.7%). 2016 was the year with the highest number of publications, highlighting Brazil for grouping a larger amount of works compared to other countries. Brazilian researches were developed in areas of Caatinga and Atlantic Forest, lacking studies in different vegetation groups in the country. Data showed that the authors focused on identifying broader environments. Biotic and abiotic landscape elements gave strong indications to differentiate landscape mosaics, especially when they were associated with vegetation and topography elements. Finally, deepening the understanding of how people are entwined to the environment provides important paths to understand and manage a particular territory.

Keywords: Literary Research, Ethnoecology, Popular Knowledge, Environment.

Introduction

Over the past years, several disciplines and areas of scientific knowledge have been interested in the term “Ethno”, trying to associate studies with popular knowledge (Pinheiro and Ferreira, 2015). This correlation helps to recover traditional/local forms of knowledge, differently from the way it occurs in the scientific model, because it includes elements resulting from their cultures, which end up being expressed in the daily lives of these communities (Trindade Junior and Ferreira, 2015).

In the mid-twentieth century, Ethnoscience emerged, with the objective of registering, understanding and valuing traditional/local knowledge, as well as the way groups deal with natural resources on which they depend, which can be understood as the interpretation of the relationship between culture and nature in a given territory, brought by beliefs and experiences (Strachulski, 2017).

Defined as the cross-cultural study about the way people perceive and manipulate their environments, it has been used to refer to the way in which communities with their own culture interact with flora, animals and with the very place or territory they inhabit, since the knowledge and perceptions emerge from the inter-relationship of landscape elements, from observation and use of resources, and are passed on through generations (Ribeiro, 2016; Poderoso et al., 2017).

The landscape can be understood as a part of the space from the point of view attributed by the one who observes it, but also as the dynamic and continuous interaction between natural, socioeconomic and cultural components, which through the interactions of these constituents and their impacts, end up determining the land units, that ceases to be just a physical space to be conceived as culture, expressed in the relationship between man and nature (Campos et al., 2012; Kiyotani, 2014; Carvalho, 2019).

Due to the complexity and integration of its environmental components, it can also be interpreted as an environmental unit broader than the sum of its parts. Thus, landscape's elements can be considered the basis of Ethnoecology when analyzing the cultural structure of traditional/local society, in different spatial patterns of landscape or ecosystem units, as result of the interaction with the environment (Sheil et al., 2002; Prasetyo et al., 2018).

Landscape Ethnoecology investigates people's relation with particular sectors of land (Silva et al., 2017). It emphasizes the way a living landscape is perceived and used by the local population, as well as different cultures understand and conceptualize landscape units (Johnson and Hunn, 2010; Molnár, 2012).

According to the definition by Johnson and Hunn (2010), the smallest culturally distinguished area in a landscape is a landscape unit or ecotope. The interaction of these parts with men occurs by using material and non-material resources in several historical processes, cultural aspects and ways of access to resources, resulting in diverse experiences and perceptions, which can be interpreted through myths, beliefs, stories and important emotional references to man (Amorozo and Viertler, 2010; Poderoso et al., 2017).

Each location has a specific body of knowledge linked to it, which provides paths for a holistic understanding of socio-ecological interactions, thus, toponyms help to deepen the understanding of how people in this unit inter-relate with the environment, at the interface between traditional/local/scientific knowledge, as it contains elements gathered from the physical, social and internal dimensions of the landscape (Elerie and Spek, 2010; Boillat et al., 2013).

Johnson (2000) and Silva et al. (2017) mention that the name of the landscapes is generally related to the use of resources that people use, that is, they classify landscapes for utilitarian reasons, which explains the knowledge they have about the environment, as well as the factors that interfere in the classifications. For this reason, human survival in a given environment depends on the recognition and classification of types of places, which are essential for the maintenance of subsistence (Johnson and Davidson Hunt, 2011).

Based on the integration of theoretical and methodological concepts derived from Landscape Ethnoecology and bearing in mind the relevance of the subject in question with regard to the way traditional/local populations perceive and interpret the landscape around them for purposes of subsistence and survival, this study tried to answer the following questions: 1. How are the researches on the theme distributed? 2. What do publications cover? 3. What are the predominant environmental components for the classification of landscapes in the analyzed texts?

In this sense, the objective of this research was to present an overview of the specific topic, based on its evolutionary analysis in the period between 2009 and 2019, in order to assess how it has been explored by scholars worldwide.

Development

Data collection

This research was designed using bibliometric analysis, whose data were obtained on the basis of the Portal of Journals offered by the Coordination for the Improvement of Higher Education Personnel (CAPES). Capes Journals Portal constitutes a virtual library that includes the very best of international scientific production, as well as national researches, currently holding a collection of more than 45 thousand titles with complete writings, 130 indexed bases, of which 12 are dedicated only for patents, despite books, encyclopedias, technical norms, statistics and audiovisual content (Portal de Periódicos Capes/Mec, 2019).

Only articles published in scientific journals that considered the interrelationship between the man/knowledge/landscape classification complex were taken into consideration in the 10-year period (2009-2019).

The research was performed using keywords such as: “Etnogeomorfologia”, “Etnoecologia das paisagens”, “Ethnogeomorphology” and “Landscape Ethnoecology”, using the “advanced search” feature, selecting the “subject” field and then specifying the interstice of interest for the study in the “publication date” filter, in order to store the largest number of works published in the period from January 2009 to June 2019.

For each keyword researched, texts related to the most different contents were gathered, which were rearranged into four categories, based on the main theme: use and classification of the landscape, conceptual studies, perception of environment and soil categorization. The number of works gathered by keyword can be seen in Figure 1.

Figure 1. Number of articles gathered by keyword in Capes Journals Portal on the theme of Landscape Ethnoecology in the interstice from 2009 to 2019. Source: RIBEIRO, K. V. (2019).

For the term “Etnogeomorfologia”, three articles were gathered, which were related to the scope of this study. For the second expression (“Etnoecologia da paisagem”), a total of 15 works was found, but only four were part of the theme. Regarding the word “Ethnogeomorphology”, 17

researches were recovered, however, only two fit. Now, regarding the last word (“Landscape ethnoecology”), 314 compositions were obtained, but only 15 were integrated, since all others were outside the main subject of this study. Discarded material addressed issues such as Physical

Geography applied in its strict sense (*e.g.* landscape analysis, use and coverage of soil, mapping and remote sensing), with purely technical discussions, not linking these contents with Ethnoscience, which is beyond the goal of this study. Therefore, out of 345 articles gathered, only 6.1% were part of the research scope. It is worth mentioning that three works appeared repeatedly in other keywords, which justifies the difference between the whole recovered and those really appreciated. Thus, 21 scientific articles were analyzed, which allowed the provision of information such as: main content of the text, number of papers by theme and its evolution in the decade from 2009 to 2019, in addition to the distribution of related research considering the world and Brazil, among other reports, as will be seen below.

It is worth mentioning that the method of approach of this study was characterized as mixed (Creswell, 2007), since qualitative and quantitative data were collected at the same time, in a single phase, and later, the analyzes expressed in the results were made through text reports and/or summaries, in addition to percentage calculations, for interpretative and comparative purposes.

Thematic configuration

Central subjects of the total of evaluated writings (21) are related to the great area of Landscape Ethnecology and are more specifically related to the use and classification of the landscape (14), conceptual studies (4), environment perception (2) and soil categorization (1) (Table 1).

Table 1. Content covered in publications published in Capes Journals Portal on Landscape Ethnecology, between the years 2009 to 2019.

Main theme	Authors/Year
Use and classification of the landscape	Boillat et al. (2013); Babai and Molnár (2013); Chen et al. (2014); Derungs and Purves (2014); Ribeiro (2015); Riu Bosoms et al. (2015); Machado (2016); Shrestha and Medley (2016); Poderoso, Peroni and Hanazaki (2017); Silva et al. (2017); Wartmann and Purves (2017); Prasetyo et al. (2018); Torre (2018); Wartmann and Purves (2018)
Concepts	Araújo et al. (2013); Wilcock, Brierley and Howitt (2013); Lopes and Ribeiro (2016); Ribeiro (2016)
Environmental perception	Campos et al. (2012); Almeida et al. (2016)
Soil categorization	Capra et al. (2015)

Source: RIBEIRO, K. V. (2019).

According to data in Table 1, it is possible to see that the category 'use and classification of the landscape' excelled when compared to the others, consisting of the most studied by researchers.

Alcorn et al. (2003) and Wehbe et al. (2006) argue that understanding local classification is important for three reasons: reflecting specific needs of a region; due to the fact people living in these places have a lot of qualitative contextual information based on well-defined diagnostic criteria; for having forms of knowledge better adjusted to the features of local socioecological systems than other global taxonomic systems based on natural sciences.

Furthermore, Silva et al. (2017) believe that understanding the criteria used for local classification is important to access information about the landscape transformation processes and

fill gaps in the theories of these processes, since people tend to know different landscapes because they depend on the resources provided by them. Besides that, local systems of landscape classification also allow local people to clearly identify spaces of social and spiritual importance (Ellen, 2010; Johnson and Hunn, 2010; Krohmer, 2010).

Considering this, it is possible to notice the purpose of use of land modifies landscape, shaping it, giving it meanings in which they are represented by their own nomenclatures and classifications, which causes interest on the part of researchers to investigate this theme, thus justifying high rates of studies in this category.

In order to detail subjects covered by each examined keyword, the following results were obtained (Figure 2).

Figure 2. Determination of the subjects covered by keyword searched in Capes Journals Portal on the theme of Landscape Ethnoecology in the period from 2009 to 2019. Source: RIBEIRO, K. V. (2019).

Articles gathered from the expression. “Landscape Ethnoecology” were included in all thematic categories, as can be seen in Figure 2. However, this is not true for other searched words (“Etnoecologia das paisagens”, “Etnogeomorfologia” e “Ethnogeomorphology”), summarizing, respectively, to: three, two and two main contents.

2016 was the year with the highest number of publications for the Keywords “Etnogeomorfologia” and “Etnoecologia das Paisagens”, with percentage rates of 9.5% each of the total articles gathered. For the expression

“Landscape Ethnoecology” the main years were 2013 and 2017, with 14.3% each, out of the estimated total. Finally, the term “Ethnogeomorphology” presented results only in the years 2013 and 2016 (4.7% each).

Considering the selected journals for researches publication, there were a total of 18 journals, with both national (27.8%) and international (72.2%) reach (Figure 3). “Landscape Research” and “Journal of Ethnobiology” were the ones that presented the most articles published on the referred topic, composing, respectively, 14.3% and 9.5% of the analyzed studies.

Figure 3. List of Journals according to Sucupira/Capes Platform where three articles were published in Capes Journals Portal between the years 2009 to 2019 on the theme of Landscape Ethnoecology and respective classifications. Conventions: NP: Do Not Score; SD: No Data. Source: RIBEIRO, K. V. (2019).

In conformity with Sucupira Platform - Qualis Journals, classification event referring to the “Quadriennium 2013-2016”, it was found that articles published ranged from strata A1 to B5, in the evaluation area for Environmental Sciences, emphasizing level B1, which combined two of these studies. It is noteworthy that five other studies were not scored in the area mentioned above, and for “Biodiversitas” and “Progress in Physical Geography” journals no data were found in this search.

Thematic evolution in the last decade

Landscape ethnoecology emerged from the Ethnoscience research field, being first introduced by Johnson and Hunn, in 2010, which justifies the lack of research in the 2009-2011 triennium (Figure 4). This study mentions the way local people perceive, understand and give names for “types of places” or “ecotopes”, as well as manage and relate to the goods offered by the environment.

Figure 4. Advance of thematic categories between the years 2009 to 2019 on the theme of Landscape Ethnoecology in Capes Journals Portal. Source: RIBEIRO, K. V. (2019).

According to Riu Bosoms et al. (2015), this area of knowledge has a double origin, whose genesis is rooted in the conception of landscape by Sauer (1925) and Ethnobiology, more specifically in the studies by Berlin et al. (1974) and Hunn (1977). The works of these authors were linked to the respective classification and use of plants and animals.

In 2012, Ribeiro helped creating a new branch of Landscape Ethnoecology, the Ethnogeomorphology of semi-arid land based on the combination of three aspects: Integrated View of its Components, Cultural Geography and Environmental Perception, based, respectively, on authors such as: Bertrand (1971, 2009), Tricart (1977), Bólos (1981, 1992); Sauer (2007) and Tuan (1980, 1983). It is at this moment that researches focused on this area of knowledge receives greater visibility on the world stage, as can be seen in Figure 3, with emphasis on the last two years,

which presented three publications directed to the same central theme (use and classification of the landscape). It is worth mentioning that several authors mention the need for further studies on the topic in question, given that it is considered new and recent (Campos et al., 2012; Derungs and Purves, 2014; Pinheiro and Ferreira, 2015; Riu Bosoms et al., 2015).

Still according to Figure 3, it can be seen that only the central theme “use and classification of the landscape” has had a clear evolution in the years within the interval of 2013 to 2018, as it has presented research throughout this time interval. “Concepts” category had little progress, appearing for the first time in 2013, returning only in 2016. “Soil categorization” content was the only one that did no progress, among all others evaluated, appearing exclusively in 2015.

The first academic study about soil use and management was conducted by Johnson in the state of Ceará, and his publication was registered in 1974. In his studies, he organized a classification system adopted by the local people, distinguishing them into eight types of land.

As part of Ethnoecology, Ethnopedology consists of a hybrid science structured from the combination of natural, social and soil sciences (including Geodemological research), in addition to Social Anthropology, Rural Geography, Agronomy and Agroecology, studying the knowledge traditional/local people have about the soil (Barrera Bassols, 1998; Toledo, 2000). It presents as goals to document and understand how local approaches perceive, classify, evaluate, use and manage the soil (Barrera Bassols, 2003).

According to Capra et al. (2015), researches on pedodiversity are related not only to physical-chemical behavior and taxonomic properties of the soil, but also to soil management, use and cultural practices. According to Wilding and Lin (2006), soil science has in its early years a performance specifically linked to food production, fibers and fuels, however, in recent decades, this area of knowledge directed actions to include social, environmental and ecological aspects in its study objects, realizing the need for this theme to be approached in a more integrated way.

Despite Landscape Ethnoecology being a new science, what is clear is that, regardless of the main object of study, all of them are strongly interconnected, overlapping each other and directly influencing the characterization of the landscape. This occurs, according to Strachulski and Floriani (2016), because it relies on the interdisciplinary approach and uses the plurality of concepts and methodologies of the social and natural sciences to understand the relationship of a group with its environment. Thus, for Neves and Salinas (2017), working with landscapes allows the visualization of it as an integrated thing.

Worldwide distribution of published works on the theme

For the purpose of quantifying the research conducted in the world, only the analysis of 17 texts, of the 21 initially appreciated, were taken into consideration, as four of them dealt with conceptual research (Araújo et al., 2013; Wilcock et al., 2013; Lopes and Ribeiro, 2016; Ribeiro, 2016), therefore, not being strictly linked to any geographic region.

Despite the gradual increase in publications developed in different countries on the content in question, there is much to be explored in the context of this overview, considering the finding of restricted studies to certain regions, as can be seen in the conformation below (Figure 5).

Figure 5. Overview of publications made worldwide about Landscape Ethnoecology in the period from 2009 to 2019 in Capes Journals Portal. Source: RIBEIRO, K. V. (2019).

Among researches conducted worldwide, the American continent was the one with the highest number (64.7% of the total examined),

followed by Asia and Europe, respectively with 17.6% and 17.7%.

Studies in America dealt with environmental perception (Campos et al., 2012; Almeida et al., 2016) and use and classification of the landscape (Boillat et al., 2013; Riu Bosoms et al., 2015; Ribeiro, 2015; Machado, 2016; Poderoso et al., 2017; Silva et al., 2017; Wartmann and Purves, 2017; Torre, 2018; Wartmann and Purves, 2018). Works developed in Asian countries only addressed the use and classification of the landscape (Shrestha and Medley, 2016; Prasetyo et al., 2018; Wartmann and Purves, 2018). European studies portrayed the use and classification of the landscape (Babai and Molnár, 2013; Derungs and Purves, 2014) and soil categorization (Capra et al., 2015). Finally, no studies were found on the African and Oceania continents.

According to Silva et al. (2016), it is necessary to expand this investigation in several parts of the world, since landscapes receive essential local classifications for understanding the interactions between society and nature, in addition to allow interferences on the past and the use of ecotopes, improving capturing changes of current landscapes.

Brazil was the country with the largest number of studies, with a total of 29.4%. Bolivia was the second country, with 23.5% of the total, followed by Mexico, with 11.76%. In Figure 6, it is possible to see the annual evolution of studies and origin countries.

Figure 6. Annual evolution of studies in countries surveyed in Capes Journals Portal on Landscape Ethnoecology in the period from 2009 to 2019. Source: RIBEIRO, K. V. (2019).

It is possible to note that Brazil presented a good evolution between the years 2015 to 2017. Bolivia followed with the same number of publications in the years 2013, 2015, 2017 and 2018, while Mexico presented specific results, with data released only in 2012 and 2018.

Brazilian researches (Figure 7) were focused in the Northeast regions, with three studies

conducted in Ceará and the South region, with two performed in Santa Catarina. Central subjects mentioned use and classification of the landscape (Ribeiro, 2015; Machado, 2016; Poderoso et al., 2017; Silva et al., 2017) and environmental perception (Almeida et al., 2016).

Figure 7. Distribution of researches in Brazil on Landscape Ethnogeography in the period from 2009 to 2019 in Capes Journals Portal. Source: IBGE (2018), modified by Karen Veloso Ribeiro in 2020.

According to Lopes and Ribeiro (2016), the oldest reference on the referred subject was written by Nunes Júnior and his collaborators in 2006, in which they presented concisely and without continuity in other publications about the applications of Ethnogeomorphology and its perspective. In this study, the authors highlighted that until that moment there were no specific studies and citations that proposed an alternative approach that would establish an interface between Environmental and Social Sciences. Also according to the authors, the most profound research in Brazilian literature is the thesis by Ribeiro (2012), in which the author developed a methodological approach within Ethnogeomorphology of semi-arid in the southern region of Ceará, in which she proposed a classification of the analyzed landscapes, that can justify the predominance of studies in that state.

From these thematic analyses investigated, it can be inferred that the reasons that substantially influenced the direction of ethnogeological studies

on landscape were based on aspects such as local historicity and how much it can contribute to the understanding of landscape dynamics, the different types of environments and resources provided by them, as well as the socio-cultural diversity and the strong local tradition, easily expressed by the close relationship established between man and the environment in which he lives.

Ethnogeological studies highlight that there are processes that form landscapes with their typical vegetation (Prasetyo et al., 2018). Furthermore, it is known that the vegetation complex of a given location directly influences the diversity of landscape mosaics, as well as the floristic similarity, influencing the organization of reliefs, reflecting utilitarian purposes based on a specific vegetation composition (Babai and Molnár, 2013; Silva et al., 2017). Based on this, the map of phytogeographies in Brazil was elaborated (Figure 8), in order to register in which of these the published texts are distributed.

Figure 8. Brazilian phytophysiognomies under which the articles published on “Landscape Ethnoecology”

are inserted in the period from 2009 to 2019 in Capes Journals Portal. Source: IBGE (2016), modified by Karoline Veloso Ribeiro in 2019.

Brazilian researches were developed in areas of Caatinga (Ribeiro, 2015; Almeida et al., 2016; Silva et al., 2017) and Atlantic Forest (Machado, 2016; Poderoso et al., 2017), lacking studies on the topic in the other vegetation complexes over the country. In Ceará, studies were developed in areas adjacent to Araripe National Forest (FLONA Araripe), Araripe Chapada and Palestine District of Cariri, while in Santa Catarina, they were conducted in Itajaí valley and Ibirama.

Wartmann and Purves (2018) confirmed in their studies that landscape units or ecotopes can be distinguished by species composition, vegetation color and height, forms of plant growth and species abundance. In addition to these characteristics, Babai and Molnár (2013) highlighted particularities as vegetation structure, successional stage and dominant plant species. Other authors have also reported ground cover (Campos et al., 2012; Shrestha and Medley, 2016), showing, in this way, the evident importance of knowing the main characteristics of phytophysionomies in the area to be studied, since they work as subsidies for analysis and interpretation of the landscape.

Besides vegetation, the presence of animals, soil, topography, hydrography, physical places, places of coexistence, climatic cycles and linguistics were also mentioned as distinctives in the identification of the ethnoenvironments. According to Riu Bosoms et al. (2015), and Wartmann and Purves (2018), the combination of such characteristics leads to a refined classification system, since the interaction between physical environment, means of subsistence and language shapes the diversification of landscape categories.

Conceptualizing localities is a tradition essential to cover two main functions: survival and orientation, that is, to recognize a certain space by a name directs man to pursue a particular resource, possibly considered as essential for the maintenance of oneself and relatives (Capra et al., 2015).

In this perspective, Chen et al. (2014) and Riu Bosoms et al. (2015) emphasize that the environment is the result of the combination of natural characteristics, human intervention and what changes over time, thus, ethnoenvironments end up transmitting regional culture and influences of nature, history, tradition and society. Therefore,

qualitative analyses of culture are seen as indispensable in the process of naming and renaming them.

What the studies report

In the research by Campos et al. (2012), the authors tried to understand how local farmers know and use the different landscape units, as well as the goods and services they provide. Landscape units were related to parts of land that these social actors perceive, describe and manage, which helped verifying that to discriminate types of landscapes they were based on criteria such as: relief, soil and land use and coverage. Interviewees were able to recognize the mount (high and low) and the mangrove, differentiating them according to vegetation. Regarding land use, cultivation systems were identified mainly by the dominant culture. Now, regarding functions that landscape has, the following categories could be identified: regulation, habitat, production and information. According to scholars, landscape typologies are the result of the diversity of management techniques.

Following the study by Babai and Molnár (2013), the authors tried to identify how the Csángó people divide their mountainous landscape and what characteristics they use to distinguish these habitats. Many words contained the word “place”. Thus, there was a need to group them into hierarchical categories, such as: macrohabitats (comprise a mosaic of habitats), mesohabitats (dominated by a vegetation type) and microhabitats (provide environmental niche). Despite vegetation, soil and use of land, habitats were also identified based on natural and man-made disturbance, hydrology, topography and geomorphology, the latter two being the most representative, since the area is mountainous. They also revealed that the scale consisted of a key part in the landscape partitioning of the studied area, in which the topographic aspect was shown to be more extensive in relation to the topological aspect, which pointed out to be more inclusive. This analysis allows authors to propose that abiotic characteristics often define categories of larger habitats, while biotic characteristics indicate the opposite.

Landscape stratification is a methodology used by some scholars in order to make it easier to analyze a set of environments identified by a local

population, whose territory evaluated is wide. Categorization of these parts in the form of geographical characteristics was initially explored by Battig and Montague (1969), named accordingly by basic Rosch levels. According to Turk et al. (2011), using different categories to this end becomes relevant as it allows people from different places and cultures to do it, since, according to Naveh and Lieberman (1984), the landscape is often seen as a whole thing made up of parts.

For Derungs and Purves (2014), the classification of characteristics in basic levels, superordinate or subordinate in parts or totalities is not an easy task, but quite the opposite, it is somewhat challenging. According to Ellen (2010), multidimensionality can prevent the development of a well-developed hierarchy, since, according to Hunn and Meilleur (2010), ethnoecological partitions of popular landscape are organized only superficially.

In the publication by Boillat et al. (2013), the authors tried to highlight names of places or toponyms that express the typical interactions of a social group with specific elements of the landscape. In this sense, it was possible to identify, predominantly, names of places that were directly related to traditional activities (land use), others included reference to water, built environment, wildlife and sacred locations, however, mentioned in a lesser proportion. These examples demonstrated that toponyms can refer not only to physical limits of a place, but also go beyond limits expressed geographically. Topography was the most perceptible component in the analysis of the landscape.

Naming a given place is an act that represents one of the oldest linguistic cultures in human history, being important cultural source and spatial record in past generations, since it represents answers to cultural landscape and physical environment (Chen et al., 2014). However, it is worth mentioning that Landscape Ethnoecology distinguishes between the study of “types of places” or “popular etotopes” that occur repeatedly in space and names of places (toponyms) that designate unique points in the landscape (Hunn and Meilleur, 2010). According to these authors, the first occurs repeatedly in space, while the other refers to unique points in the landscape. In addition to that, Penko (2008) affirms that generally toponyms last a long time, survive to language changes and only a few of them are

known outside the community in which they are used.

Therefore, geographical names are not only linguistic forms, but also socio-cultural artifacts offering insights on history and environmental impressions that are embedded in people’s lives (Jett, 1997; Cargonja et al., 2008; Nicolae, 2010). For this reason, those who think that for a given place to be recognized it is enough to assign only one designation are mistaken. For Tuann (1977), in addition to this attribute, a place begins to exist when people give it meaning. Thus, according to Boillat et al. (2013), the definition of a place precedes the observation of its ecological and other characteristics, however, it is not arbitrary; on the contrary: the definition of places comes from tradition and is evidenced by the most pressing characteristics of places or is spiritually revealed. For Wilcock et al. (2013), notions of belonging and identity are deeply rooted in this relationship. This mention was made explicit in the ethnogeomorphological research by Ribeiro et al. (2019), when local farmers affirmed they refused to leave their residences, due to the expansion of the agricultural border of soy (*Glycine max* (L.) Merr.) and eucalyptus (*Eucalyptus* sp) established in the city of Jardim do Mulato/PI, since they were born and raised in the locality.

In the text by Chen et al. (2014), the authors tried to discover the regularity of name distribution of places and the relationship of geographical names with landscape types using the Geographic Information System (SIG) and spatial analysis. Reported names were classified into five types based on linguistic meaning, namely: mountain, water, plain, settlement and construction. It was found that spatial arrangement of geographical names is associated with geographical accidents, mainly with the factors of elevation and inclination.

Derungs and Purves (2014) tried to explore how mountainous landscapes in the Swiss Alps were described and demonstrate how complementary approaches can help to understand landscape conceptualizations. From the description of the landscape, they found out that the characteristics of mountain, summit or peak and crest occurred in four studied points of the Alpine mountain range. However, the correlation between them was considered low, which means landscapes are described differently. Names collected were also related to topographic characters, reflecting a strong relationship between toponym and topography, as seen in the previous study.

Capra et al. (2015) investigated the meaning of the distribution of toponymy used in traditional and recent cartography of Sardinia region, based on an integrated ethnopedological approach which is rooted in linguistics, that is, the deciphering of names (etymologies/language pattern) known to them. Toponyms were grouped into seven categories: soil, soil/geology, soil/morphology, morphology/vegetation, morphology/fauna, vegetation and land cover/land use. They found that the toponyms reported referred to specific environmental characteristics, more precisely to the categories of soil/morphology and vegetation, clearly showing that the inhabitants named places according to the characteristics of their surroundings, which met the primary needs of the population. According the authors, specific environmental elements are in fact important in the orientation throughout space, especially in areas that present complex morphologies. For this reason, there is a tradition of naming places based on specific attributes related to a peculiar form of relief and/or the presence of a particular vegetation type.

Ethnobiological and ethnoecological approaches cover domains of meaning and knowledge as well as of the biophysical landscape, both of which can be integrated into Landscape Ethnoecology (Johnson and Hunt, 2011). For Posey (1987), Johnson and Hunn (2010) and Poderoso et al. (2017), knowledge and perceptions of different landscape units emerge from the interaction of people with the environment, through observation of plant composition, use of resources and means of subsistence, combined with the history of use of each ecotope and cultural criteria, that end up passing through generations revealing a peculiar way of building a knowledge base.

Ribeiro (2015) intended to justify how family farmers in semi-arid region understand geomorphological processes, and if so, how they use this knowledge to manage the living environment. According to the author, types of soil were perceived by interviewees, unlike relief forms, which did not have great differences. Social actors managed to recognize four types of soil (sand, shallow, massapé and clay) and two morphosculptures (highland and plain area). These first were easily discerned by the agricultural potential and ease of management, while these others could be distinguished by the slope of the land. Geomorphic processes most active and emphasized by the research volunteers were related to erosive processes and river sedimentation. Such

perceptions, constituted in the relations of coexistence of these within the heterogeneity of the environment, allow them to reach to the adversities caused to the environment, whether they are of natural or man-made genesis. In this study, production places were better classified in relation to pedological aspects than geomorphology.

In their study, Riu Bosoms et al. (2015) provided a description of how a group of hunter-horticulturists perceive their landscape. For this, they included descriptions provided by informants in two categories: popular ecotopes and ecotopic fragments. These first constitute classifications of elements that are repeatedly distributed throughout the territory (larger areas); the others, in turn, are characterized by dominance of a species of indicator plant (smaller areas). Thus, popular ecotopes can contain several ecotopic fragments of plants of the same species or different species. According to the authors, it was possible to recognize nine popular ecotopes: recent growth forest, old growth forest, river bank, lowland forest, mountainous forest, mainland forest, riverside forest, fallow and savanna landscape. A combination of biogeophysical characteristics were used to classify landscape units, namely: vegetation, geomorphology, hydrology and potential use of land, however, the first one stood out in relation to the others observed.

Shrestha and Medley (2016) examined how the exercise of local participatory mapping can contribute to the geospatial understanding of the diversity of existing landscapes. The authors emphasized physical places (e.g., trails, settlements, farms, resource extraction sites, forest fragments, agricultural areas, mountains, worship places, water sources and resting places), however, land cover classes were focused in the research, showing that topographic complexity of the area analyzed both hinders recognition between types of vegetation and interferes with the influence that man has on the patterns of diversity of land cover.

Landscape mapping studies using scientific tools like remote sensing and geographic information systems (SIGs) can effectively investigate landscape diversity. However, participatory mapping tools are essential to understand how and why perceptions and interactions of people with landscapes create or modify patterns of diversity, since their products provide a basis for representation and discussion of issues related to land, access to natural resources, local/traditional ecological knowledge, complex environmental histories and emerging ecologies,

promoting the empowerment of the community and local involvement in the assessment of landscape understanding (Tuxill and Nabhan, 2001; Cope and Elwood, 2009; Almeida et al., 2016).

Despite harsh criticisms on participatory researches, Landscape Ethnoecology does encourage a methodological structure to integrate local knowledge systems, through local participation and interpretation of landscape diversity and resource distribution patterns, since it helps to fill the gap between researcher (extra local cognition system) and researched (local perception system) based on the construction of the “sense of place” (Cooke and Kothari, 2001; Elwood, 2006; Almeida et al., 2016).

In this perspective, Almeida et al. (2016) evaluated the historical change of a monodominant landscape of *Attalea speciosa* Mart ex. Spreng, as perceived by human populations. Abundance of species was represented by a symbology (square) in four different periods (1980, 1990, 2000, 2013) and then possible causes of expansion/reduction were discussed. Factors mentioned that contributed to the expansion/reduction of forest were, respectively: an intense drought that occurred in the region, where cane fields gave way to the arrival of *A. speciosa*; the populational migration, causing the landscape configuration to undergo changes, from the opening of roads, construction of houses, among others. For social actors involved, subsistence agriculture and creation of small livestock herds had no influence on the increase/decline of the forest analyzed.

Machado (2016), in his research, discussed on the knowledge of an indigenous tribe about its territory in a past and present aspect. Names of places reported by this people were called part of it as scenic landmarks or places of reference, whose location, description and relationship with events and people of the past are passed on from one generation to the other. They talk about places they know and visit, but they can also refer to places they know, but do not visit. Trees and topographic markers assumed an important role in the naming of significant places in the territory, followed by places of coexistence and presence of animals. According to the author, landscape references do not represent anything new to our knowledge, since the act of naming places has always been a common practice, however, they call attention for being maintained over time, even if, in some cases, only in people's memory, after an intense cultural disruption and after specific forms of socio-political organization have been radically

transformed. These are names whose meanings are culturally shared, either by passing on oral information or direct experience, and refer to a collective memory of a past that continues to be recovered in the present, acting as simultaneous markers of time-space.

Silva et al. (2017) sought to assess whether socio-economic variables and forms of knowledge about useful plants can explain the degree of knowledge people have over the environment, based on the assumption people classify landscapes for utilitarian reasons. Identified landscapes were organized in the following categories: people's names, symbolic factor, biotic factor, abiotic factor, land management, geographic factor, topographic factor and phytophysiognomic factor. Classifications of environment corresponded to resource collection processes, providing evidence that the studied landscape was transformed due to local demands for these resources. Also, according to the authors, people map areas of interest as an optimization strategy, as they use and/or depend on landscape products to survive, thus being stored in the informant's memory.

In the research by Wartmann and Purves (2017), the authors compared characteristics outlined by participants during the community mapping with landscape categories used in everyday language. In cartographic elaboration, the most frequent characteristics were: house, drainage and roads. On the other hand, in the vocabulary-based characteristics the following were highlighted: agriculture, water, topography and substrate. Elements of landscape, such as infrastructure, stood out in the first method used, and vegetation was predominant in this other.

Poderoso et al. (2017) tried to identify where interactions between people and environment occur. Catalogued ecotopes were related to places of resource collection, water availability and agricultural activities, being easily recognized by observing the composition of plant species present and the history of use of each landscape unit. According to the authors, understanding the dynamics between society/nature helps to explain the historical processes within a landscape, as well as the way culture and the environment are interconnected.

Between Geography, Anthropology and Linguistics, the field of Ethnophysiography emerged, exploring how people from different cultures categorize landscape features, such as relief forms, water resources and vegetation set, as well as cultural meanings and beliefs associated

with these particularities (Mark and Turk, 2003). Unlike Landscape Ethnoecology, which focuses on the scientific ecological elements for its classification, Ethnophysiography includes the study of people's knowledge systems, beliefs and customs to define it (Johnson and Hunn, 2010; Mark et al., 2011). It applies ethnographic methods to explore landscape, thus requiring more intensive fieldwork with local informants (Derungs and Purves, 2014).

Torre (2018) conducted a more theoretical-conceptual approach focused on landscape interdisciplinarity and dialogue in relation to other forms of knowledge, especially within linguistics, to verify how a specific language uses more general or more restrictive terms to conceptualize and internalize the different parts of a landscape. For this, he appropriated the contributions of Ethnophysiography for the categorization of the landscape. The author concentrated in elements of cosmovision and knowledge systems of beliefs and customs of people to distinguish forms of relief and landscapes in general. Based on a critical discussion, the author tried to emphasize the relationship between popular and scientific knowledge, arguing that neither of them is fully valid, as both are incomplete. In addition, he points out that that dialogue between them could reduce existing contradictions and inequalities, leaving reflection on the importance of other sciences and other linguistic origins about the way of seeing the world.

Wartmann and Purves (2018), in turn, investigated ethnoecological categories based on both ecological foundations and cultural meanings. The greatest variety of categories referred to the characteristics of the landscape represented by vegetation soil or hydrology. Indicator plants with specific use in local culture was the distinguishing element among the identified units, especially in relation to the vegetational ones. This result showed that landscape provides much more than direct ecological access (e.g., shelter, food etc.), as culture and local identity are deeply rooted in landscape.

Prasetyo et al. (2018), analyzed traditional knowledge in the management and use of landscape or ecosystem units, generated from agricultural activities, as well as the beneficial value of each one based on gender perception. The result between the study community and the analyzed environment was manifested in four types of landscape units: backyard, rice field, garden and field. These function as resources for subsistence

support, with backyard being the most important for the interviewees' way of life. Research has shown that there are ecological processes that contribute to the formation of landscapes with their typical vegetation.

Conceptual researches were debated on the basis of concepts and definitions by classic and current authors on the subject in evidence, in which they tried to clearly and objectively outline the main active ideas from a well-delineated, enlightening, dynamic and integrated context.

Wilcock et al. (2013) used geomorphology and physical processes to explore a conceptual framework through which geography could contribute, since it considers itself as a discipline evaluating interactions between nature-society or people-environment. Collaborators of this study tried to establish a coherent way to visualize and examine landscapes that present an integration platform for geographic research and associated applications of landscape scale management, based on a robust theoretical framework and its foundations. They defended an ethical framework for engagement between multiple worldviews, emphasizing the scientific (geomorphic) concerns of links and connections between parts that compose landscape, along with the disquietude of people-people and people-landscape interactions.

In the publication by Araújo et al. (2013), authors highlighted the importance of Ethnopedology and the contributions to improve the relationship between formal (scientific) and local (popular) knowledge based on an integrative and complementary approach.

Lopes and Ribeiro (2016) proposed a theoretical studied based on the analysis of the relationship of two main concepts: Ethnogeomorphology and Landscape. They highlighted that the ethnogeomorphological knowledge local communities have is interconnected with the other elements of the landscape, revealing that the forms of popular knowledge are broad and integrated.

Finally, the investigative research by Ribeiro (2016) tried to understand how rural producers understand geomorphological processes, as well as how they use their knowledge to manage the environment in which they live and how they use this knowledge to classify geographically the ethno-environments, from a theoretical-methodological perspective on Ethnogeomorphology.

Researched environments in the analyzed texts

According to Johnson and Hunn (2010), there are several terminologies used in Ethnobiology to refer to landscape units (e.g. ecotope, habitat, type of place, biotope, among others). In this sense and analyzing texts, it was

possible to observe that the studied environments were diverse (Figure 9). Data informed that the authors concentrated on trying to predominantly classify more embracing landscapes, while others chose to study smaller and more specific units.

Figure 9. Environments studied by the authors in texts searched in Capes Journals Portal from 2009 to 2019 with their respective striking landscape elements. Source: RIBEIRO, K. V. (2019).

Within each perceived landscape unit there are biotic and abiotic landscape components that favor its recognition. Wider environments (the entire observable landscape) include more of these components, when compared to the smaller ones. Vegetation element was the most evident, being mentioned in 13 of the total studies assisted, followed by elements topography (7) and land use (4). These criteria are consistent with what Martín (1995) suggests, when confirming that the main domains of popular ecological knowledge are: relief forms, soils, climate, vegetation and land use. Boillat et al. (2013) complement that, although vegetation and soil play important roles along with a series of several criteria, such as the built environment and history, topography also plays a preponderant role in defining a location, because, according to the authors, the diversity of criteria used, the knowledge related to places, as well as the inclusion of men, provide interesting paths for a holistic understanding of the dynamic relationships between people, biota and the environment.

It is not possible to explain what a landscape is without first clarifying what it does,

therefore, understanding the importance of the place and the multiple connections of existing landscapes is essential to find right ways to engage with countless senses of the landscape (Wilcock et al., 2013). That is why it is necessary to accurately understand dynamics behind each interaction, biophysical or sociocultural.

Conclusion

Given the above mentioned, it appears that Landscape Ethnoecology involves classification of different environments perceived by a traditional/local population, which are identified based on a series of biophysical and/or cultural factors.

Although there was a record on the subject some time ago (see Nunes Junior et al., 2006), it was noted, according to the publications, that initial studies were tenuous, evolving gradually over the years, however, an intensification is observed during the decade from 2009 to 2019.

Articles recovered in this study were published in various journals and, mostly, in

English, with emphasis on Brazil, which gathers most of the research worldwide.

“Use and classification of landscape” was the category most explored by scholars, showing the importance of studying characteristics of the recognized place, considering that this, in most cases, reflects its particularities.

Biotic and abiotic landscape elements gave strong indications for distinguishing landscape mosaics, especially when they were associated with the vegetation and topography components.

Cultural identity was also intertwined with ethnoenvironments, influencing designation of place names and giving meaning to the lives of the people residing there.

Therefore, deepening the understanding of how people are connected to the environment provides important paths for understanding and managing landscape mosaics of a given territory.

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References

- Alcorn, J.B., 1995. Ethnobotanical knowledge systems: a resource for meeting rural development goals. In: The cultural dimension of development, Intermediate Technology Publications, London, pp. 1-12.
- Almeida, G.M.A., Ramos, M.A., Araújo, E.L., Baldauf, C., Albuquerque, U. P., 2016. Human perceptions of landscape change: the case of a monodominant forest of *Attalea speciosa* Mart ex. Spreng (Northeast Brazil). *A Journal of the Human Environment* 45, 458-467. DOI: 10.1007/s13280-015-0761-6.
- Amorozo, M.C.M., Viertler, R.B., 2010. A abordagem qualitativa na coleta e análise de dados em etnobiologia e etnoecologia. In: Albuquerque, U.P., Lucena, R. F. P., Cunha, L. V. F. C. (Org.), Métodos e técnicas na pesquisa etnobiológica e etnoecológica. NUPPEA, Recife, pp. 65-82.
- Antrop, M., 2000. Background concepts for integrated landscape analysis. *Agriculture Ecosystems Environment* 77, 17-28. DOI: 10.1016/S0167-8809(99)00089-4
- Araújo, A.L., Alves, A.G.C., Romero, R.E., Ferreira, T.O., 2013. Etnopedologia: uma abordagem das etnociências sobre as relações entre as sociedades e os solos. *Ciência Rural* 43, 5, 854-860. DOI:10.1590/S0103-84782013000500016
- Babai, D., Molnár, Z., 2013. Multidimensionality and scale in a landscape ethnoecological partitioning of a mountainous landscape (Gyimes, Eastern Carpathians, Romania). *Journal of Ethnobiology and Ethnomedicine* 9, 11, 1-21. DOI:10.1186/1746-4269-9-11
- Barrera Bassols, N., Zinck, J.A., 1998. The other pedology: empirical wisdom of local people. *Proceeding 16th International Congress of Soil Science Montpellier, ISSS/AFES, The Netherlands*, 1-8.
- Barrera Bassols, N., Zinck, J.A., 2003. Ethnopedology: a worldwide view on the soil knowledge of local people. *Geoderma* 111, 171-195. DOI: 10.1016/S0016-7061(02)00263-X.
- Battig, W.F., Montague, W.E., 1969. Category norms for verbal items in 56 categories: a replication and extension of the Connecticut Norms. *Journal of Experimental Psychology* 80, 2, 1-46.
- Berlin, B., Breedlove, D.E., Raven, P.H., 1974. Principles of Tzeltal plant classification: an introduction to the botanical ethnography of a Mayan speaking community in Highland Chiapas. Academic Press, New York.
- Bertrand, G., 1971. Paisagem e geografia física global – esboço metodológico. *Cadernos de Ciência da Terra* 13, 1-27. DOI:10.5380/raega.v8i0.3389
- Bertrand, G., Bertrand, C., 2009. Uma geografia transversal e de travessias – o meio ambiente através dos territórios e das temporalidades. Massoni, Maringá.
- Boillat, S., Serrano, E., Rist, S., Berkes, F., 2013. The importance of place names in the search for ecosystem-like concepts in indigenous societies: an example from the

- Bolivian Andes. Environmental Management 51, 663-678. DOI: 10.1080/13658816.2013.772184
- Bólos, M., 1981. Problemática actual de los estudios de paisaje integrado. Revista de Geografia 15, 2, 45-68.
- Bólos, M., 1992. Manual de ciência del paisaje – teoria, métodos y aplicaciones. Masson, Barcelona.
- Campos, M., Velázquez, A., Verdinelli, G.B., Priego Santander, A.G., McCall, M.K., Boada, M. 2012. Rural people's knowledge and perception of landscape: a case study from the Mexican Pacific Coast. Society and Natural Resources 25, 759-774. DOI:10.1080/08941920.2011.606458
- Capra, G.F., Ganga, A., Buondonno, A., Grilli, E., Gaviano, C., Vacca, S., 2015. Ethnopedology in the study of toponyms connected to the Indigenous knowledge on soil resource. Plos One 10, 3, 1-20.
- Cargonja, H., Đaković, B., Alegro, A., 2008. Plants and geographical names in Croatia. Collegium Antropologicum 32, 927-943.
- Carvalho, A. B. P., 2019. Uma exótica na paisagem: traços de cultura, memória e um desafio à conservação do patrimônio natural. Tese de Doutorado. Canoas-RS: Universidade La Salle.
- Chen, X., Hu, T., Ren, F., Chen, D., Li, L., Gao, N., 2014. Landscape analysis of geographical names in Hubei Province, China. Entropy 16, 6313-6337. DOI: 10.3390/e16126313
- Conklin, H. C., 1954. The relation of the Hanunóo culture to the plant world. Tese (Doutorado). New Haven: Yale University.
- Cooke, B., Uma, K., 2001. Participation: the New Tyranny? Zed Books, London.
- Cope, M., Sara, E., 2009. Qualitative GIS: a mixed methods approach. Sage Publications Ltd, London.
- Creswell, J. W., 2007. Projeto de pesquisa: métodos qualitativo, quantitativo e misto. Artmed, Porto Alegre.
- Derungs, C., Purves, R.S., 2014. From text to landscape: locating, identifying and mapping the use of landscape features in a Swiss Alpine corpus. International Journal of Geographical Information Science 28, 6, 1272-1293.
- Diegues, A.C.S., 1996. O mito moderno da natureza intocada. HUCITEC, São Paulo.
- Elerie, H., SPEK, T., 2010. The cultural biography of landscape as a tool for action research in the Drentsche a National Landscape (Northern Netherlands). In: Bloemers, J.H.F., Kars, H., Van Der Valk, A., Wijnen, M. (Eds). The cultural landscape heritage paradox: protection and development of the Dutch archaeological-historical landscape and its European dimension, Amsterdam University Press, Amsterdam, pp. 83-113.
- Ellen R., 2010. Why aren't the Nuauulu like the Matsigenka? Knowledge and categorization of forest diversity on Seram, Eastern Indonesia. In: Landscape ethnoecology: concepts of biotic and physical space. New York and Oxford, Berghahn Books; pp. 116-140.
- Elwood, S. 2006. Critical issues in participatory GIS: deconstructions, reconstructions, and new research directions. Transactions in GIS 10, 693-708. DOI: 10.1111/j.1467-9671.2006.01023.x
- Hunn, E.S., 1977. Tzeltal folk zoology: the classification of discontinuities in nature. Academic Press, New York.
- Hunn, E.S., Meilleur, B.A., 2010. Toward a theory of landscape ethnoecological classification. In: Landscape ethnoecology. concepts of biotic and physical space. New York and Oxford, Berghahn Books, p. 15-26.
- Jett, S.C., 1997. Place-naming, environment, and perception among the Canyon de Chelly Navajo of Arizona. The Professional Geographer 49, 481-493. DOI: 10.1111/0033-0124.00094
- Johnson, A., 1974. Ethnoecology and planting practices in a swidden agricultural system. American Ethnologist 1, 1, 87-101.
- Johnson, L.M., 2000. A place that's good. gitksan landscape perception and ethnoecology. Human Ecology 28, 2, 301-325.
- Johnson, L.M., Davidson Hunt, I., 2011. Ethnoecology and Landscapes. In: Ethnobiology, Wiley-Blackwell, Hoboken, pp. 267-284.

- Johnson, L.M., Hunn, E.S., 2010. Landscape ethnoecology: concepts of biotic and physical space. Berghahn Books, New York and Oxford.
- Kiyotani, I., 2014. O conceito de paisagem no tempo. *Geosul* 57, 27- 42.
- Krohmer, J., 2010. Landscape perception, classification, and use among Sahelian Fulani in Burkina Faso. In: Johnson, L.M., Hunn, E.S. (Eds). Landscape ethnoecology: concepts of biotic and physical space, New York and Oxford, Berghahn Books, pp. 49-81.
- Lopes, V.M., Ribeiro, S.C., 2016. Etnogeomorfologia e paisagem. *Revista de Geociências do Nordeste* 2, Número Especial, 212-220.
- Machado, J.S., 2016. Caminhos e paradas: perspectivas sobre o território Laklãñõ (Xokleng). *Revista do Museu Arqueologia e Etnologia* 27, 179-196.
- Mark, D., Turk, A., 2003. Ethnophysiography. Draft paper for presentation at the Workshop on Spatial and Geographic Ontologies, Switzerland.
- Mark, D.M., Turk, A.G., Burenthult, N., Stea, Benjamins, J., 2011. Landscape in Language. Berghahn Books, New York.
- Martin, G.J., 1995. Ethnobotany: a conservation manual. Chapman & Hall, London.
- Mólnar, Z., 2012. Classification of pasture habitats by Hungarian Herders in a steppe landscape (Hungary). *Journal of Ethnobiology and Ethnomedicine* 8, 28, 8-28. DOI: 10.1186/1746-4269-8-28
- Montaner, J., 2008. Reciclaje de paisajes: condición posmoderna y sistemas morfológicos. In: Nogué, J. (Eds). El paisaje en la cultura contemporánea, Biblioteca Nueva, pp. 233-248.
- Naveh, Z., Lieberman, A.S., 1984. Landscape ecology theory and applications. Springer, New York.
- Neves, C. E., Salinas, E., 2017. Paisagem na Geografia Física integrada: impressões iniciais sobre sua pesquisa no Brasil entre 2006 e 2016. *Revista do Departamento de Geografia Volume Especial*, 124-137. DOI: 10.11606/rdg.v0ispe.132757
- Nicolae, I., 2010. Camino de Santiago: place names and street names as border posts in the collective memory. *Hum. Geogr. J. Stud. Res. Hum. Geogr.* 4, 17-31.
- Nunes Júnior, E., Barros Goes, M.H., Aguilar, R.A.S., Guerreiro, M. 2006. Etnogeomorfologia: aplicação e perspectivas. *Anais do VI Simpósio Nacional de Geomorfologia e Regional Conference on Geomorphology*, Goiânia, 1-1.
- Penko, N.P., 2008. Significance of toponyms, with emphasis on field names, for studying cultural landscape. *Acta geographica Slovenica* 48, 33-56.
- Pinheiro, D.A., Ferreira, B., 2015. A Etnogeomorfologia como possibilidade didática no contexto da Educação Ambiental. *Revista do CERES* 1, 2, 77-81.
- Poderoso, R.A., Peroni, N., Hanazaki, N., 2017. Gender influences in the perception and use of the landscape in a rural community of German Immigrant descendants in Brazil. *Journal of Ethnobiology* 37, 4, 779-797. DOI: 10.2993/0278-0771-37.4.779
- Portal de Periódicos Capes/MEC, 2019. Disponível em: <https://www.periodicos.capes.gov.br/>. Acessado em: julho de 2019.
- Posey, D.A., 1987. Manejo da Floresta Secundária, capoeiras, campos e cerrados (Kayapó). In: *Suma Etnobiológica Brasileira*, Vozes, Petrópolis, pp. 199-213.
- Prasetyo, B., Chikmawati, T., Walujo, E.B., Amzu, E., 2018. Ethnoecology: the traditional landscape of Osing Tribe in Banyuwangi, Indonesia. *Biodiversitas* 19, 6, 2003-2009.
- Ribeiro, K.V., Ribeiro, K.V., Albuquerque, E.L.S., Barros, R.F.M., 2019. Do ver ao saber: etnogeomorfologia por moradores de uma comunidade rural no estado do Piauí. *Gaia Scientia* 13, 1, 1-10.
- Ribeiro, S.C., 2012. Etnogeomorfologia sertaneja: proposta metodológica para a classificação das paisagens da sub-bacia do rio Salgado/CE. 278p. Tese (Doutorado). Rio de Janeiro, UFRJ.
- Ribeiro, S.C., 2015. Etnogeomorfologia sertaneja – estudo dos conhecimentos dos produtores rurais do sítio Canabrinha, Distrito de Palestina do Cariri – Mauriti/CE acerca dos

- processos morfodinâmicos. *Geosaberes* 6, Número Especial 2, 103-112.
- Ribeiro, S.C., 2016. Etnogeomorfologia na perspectiva da gestão ambiental e aprendizagem na educação básica. *Espaço Aberto* 6, 1, 175-190.
- Riu Bosoms, C., Vidal, T., Duane, A., Onrubia, A.F.L., Gueze, M., Luz, A.C., Gálvez, J.P., Macia, M.J., Reyes-Garcia, V., 2015. Exploring indigenous landscape classification across different dimensions: a case study from the Bolivian Amazon. *Landscape Research* 40, 3, 318-337. DOI: 10.1080/01426397.2013.829810
- Sauer, C.O., 1925. The morphology of landscape. University of California Publications in Geology 2, 19-54.
- Sauer, C.O., 2007. Geografia cultural. In: Correa, R.L., Rosendahl, Z. (Orgs.). *Introdução à geografia cultural*, Bertrand Brasil, Rio de Janeiro, pp. 19-26.
- Sheil, D., Puri, R.K., Basuki, I., Van Heist, M., Wan, M., Liswanti, N.R., Sardjono, M.A., Samsoedin, I., Sidiyasa, K., 2002. Exploring biological diversity, environment and local people's perspectives in forest landscapes: methods for a multidisciplinary assessment. Center for International Forestry Research, Bogor.
- Shrestha, S., Medley, K.E., 2016. Landscape mapping: gaining "Sense of Place" for conservation in the Manaslu Conservation Area, Nepal. *Journal of Ethnobiology* 36, 2, 326-347. DOI: 10.2993/0278-0771-36.2.326
- Silva, T.C., Medeiros, M.F.T., Peronic, N., Albuquerque, U.P., 2017. Folk classification as evidence of transformed landscapes and adaptive strategies: a case study in the semiarid region of northeastern Brazil. *Landscape Research* 42, 5, 521-532. DOI: 10.1080/01426397.2016.1258047
- Strachulski, J., Floriani, Nicolas., 2016. Saber ecológico tradicional da comunidade rural Linha Criciumal, Cândido de Abreu – PR: práticas e representações da fertilidade das terras. *Revista da Associação Nacional de Pós-graduação e Pesquisa em Geografia* 17, 219-256. DOI: 10.5418/RA2016.1217.0010.
- Strachulski, J. 2017: "Etnociências e teoria da complexidade: aproximando referenciais para compreender os conhecimentos tradicionais". *Revista Contribuciones a las Ciencias Sociales*, 1-10.
- Toledo, V. M., 2000. Indigenous knowledge on soils: an ethnoecological conceptualization. In: Barrera-Bassols, N., Zinck, J.A. (Eds). *Ethnopedology in a worldwide perspective: an annotated bibliography*. ITC Publication, Enschede, pp. 1-9.
- Toledo, V.M., 1992. What is ethnoecology? Origins, scope and implications of a rising discipline. *Ethnoecologica* 1, 1, p. 5-21.
- Torre, G.B., 2018. Las "otras" geografías en América Latina: alternativas desde los paisajes del pueblo Chatino. *Revista de Ciencias Sociales* 61, 33-50.
- Tricart, J., 1977. *Ecodinâmica*. Fibge, Rio de Janeiro, 91 p.
- Trindade Junior, E.E., Ferreira, B., 2015. A Etnogeomorfologia como proposta de análise dos desertos salinos do litoral setentrional do estado do Rio Grande do Norte, Nordeste do Brasil. *Revista do CERES* 1, 2, 82-8. DOI: <https://doi.org/10.17141/iconos.61.2.018.2915>
- Tuan, Y.F., 1977. *Space and place: the perspective of experience*. University of Minnesota Press, Minneapolis.
- Tuan, Y-F., 1980. *Topofilia – um estudo da percepção, atitudes e valores do meio ambiente*. Difel, São Paulo.
- Tuan, Y-F., 1983. *Espaço e lugar: a perspectiva da experiência*. Difel, São Paulo.
- Turk, A.G., Mark, D.M., Stea, D., 2011. *Ethnophysiography*. In: Mark, D.M., Turk, A.G. Burenthult, N., Stea, D. (Eds). *Landscape in language*. Philadelphia, John Benjamins, pp. 25-45.
- Tuxill, J., Nabhan, G.P., 2001. *People, Plants and Protected Areas*. Earthscan Publications, London.
- Wartmann, F.M., Purves, R.S., 2017. What's (Not) on the map: landscape features from participatory sketch mapping differ from local categories used in language. *Land* 6, 79, 1-16.

- Wartmann, F.M., Purves, R.S., 2018. 'This is not the jungle, this is my *barbecho*': semantics of ethnoecological landscape categories in the Bolivian Amazon. *Landscape Research* 43, 1, 77-94. DOI: 10.1080/01426397.2016.1269882
- Wehbe, M., Eakin, H., Seiler, R., Vinocur, M., Ávila, C., Marutto, C., 2006. Local perspectives on adaptation to climate change: lessons from Mexico and Argentina. AIACC Working Paper, Florida.
- Wilcock, D., Brierley, G., Howitt, R., 2013. Ethnogeomorphology. *Progress in Physical Geography* 37, 5, 573-600.
- Wilding, L.P., Lin, H., 2006. Advancing the frontiers of soil Science towards a geosciences. *Geoderma* 131, 257-274.