Defining Tourism Potential Through Territorial Mapping Using Geographic Information Systems (GIS). Case Study: Municipality of Garagoa, Colombia

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ABSTRACT
The municipality of Garagoa, in the province of Neira, department of Boyacá, Colombia, possesses natural, cultural, and gastronomic resources that have not yet been transformed into a coherent and consolidated tourism offer. This research sought to define the municipality's tourism potential based on an inventory of tourist attractions and territorial mapping through Geographic Information Systems (GIS). The study adopted a documentary approach based on secondary institutional sources, complemented by cartographic analysis and multi-criteria weighting across five territorial environments: attractions, accessibility, infrastructure, perception, and disaster risk management. The results indicate that Garagoa, Chinavita, and Macanal hold the greatest tourism potential in the province, with attractions of regional, national, and international appeal, although considerable gaps were identified in infrastructure and territorial information. The territory has real foundations to move towards sustainable and diversified tourism products, but this progress depends on stronger local planning and greater community involvement in the process.

KEYWORDS: Tourism potential; Geographic Information Systems; multi-criteria analysis; sustainable tourism planning; Garagoa; Tenza Valley.

INTRODUCTION

Rural and cultural tourism is currently one of the strongest strategies for economic diversification in territories with natural and intangible heritage in Latin America. In Colombia, the 2022-2026 Sectoral Tourism Plan (MinCIT, 2022) recognizes that the competitiveness of destinations depends not only on the existence of attractions, but also on the institutional capacity to identify them, organize them spatially, and integrate them into tourism products that are consistent with the real conditions of each territory. This national policy orientation underscores a persistent gap in smaller municipalities, where environmental and cultural wealth coexists with fragmented or non-existent tourism

planning, a condition that restricts both the visitor experience and the economic benefits for the local population.

Garagoa, the capital of the Neira province in the department of Boyacá, illustrates this tension with particular clarity. The municipality boasts a remarkable diversity of natural, heritage, gastronomic, and cultural resources, including the Mamapacha Páramo, the El Secreto Nature Reserve, the Parish of Our Lady of Candelaria, and festivities such as the celebrations in honor of the Virgin of Candelaria. However, SITUR Boyacá and the Municipal Development Plan 2024-2027 (Mayor's Office of Garagoa, 2024) confirm that these resources have not been integrated into a consolidated tourism offer, that the tourism service infrastructure is insufficient, and that the municipality lacks sustained tourism planning processes. This condition is not exclusive to Garagoa: recent research in Colombian municipalities with a similar tourist vocation has shown that the absence of comprehensive territorial diagnoses produces a systematic underutilization of available attractions and weakens the competitive position of the destination in its regional context (Naranjo and Martínez, 2022).

In this context, the use of Geographic Information Systems (GIS) as a territorial analysis tool has gained relevance in specialized literature for its ability to spatially represent the distribution of attractions, identify accessibility patterns, evaluate the availability of tourism infrastructure and model scenarios of sustainable tourism development. Ramano (2022) and Chaudhary et al. (2022) document that integrating GIS with multi-criteria analysis allows for a shift from a statistical description of the territory to an analytical assessment that guides investment and planning decisions with greater precision. In the Colombian case, this type of analysis remains scarce at the municipal level, creating a methodological gap that this study seeks to help reduce.

Given the lack of a territorial assessment that integrates the resources of Garagoa and its surrounding area in the province of Neira, this research aims to define the municipality's tourism potential by compiling an inventory of attractions and mapping the territory using GIS. To this end, a multi-criteria analysis system was developed based on five territorial environments: tourist attractions, accessibility and centrality, service infrastructure, perception of the territory, and disaster risk management. In addition, the study also aims to integrate the territory’s identity elements as a basis for the future consolidation of a diversified, sustainable cultural and natural tourism product aligned with the guidelines of the Sectoral Tourism Plan 2022-2026 and Law 2068 of 2020, which promotes the sustainability and responsible use of tourist destinations and attractions in Colombia.

Garagoa Municipal Government. (2024). Garagoa Municipal Development Plan 2024-2027. Garagoa Municipal Government.

THEORETICAL FRAMEWORK

Tourism and tourism potential

According to Naranjo Llupart and Martínez Rodríguez (2022), tourism has shown continuous growth in the global economy, with significant annual expansion rates during the second half of the 20th century and continuing into the present. Furthermore, it is projected that, in the post-Covid-19 recovery process, it will be the fastest-growing sector worldwide in the 21st century. Richard Butler (1980), drawing on product life cycle theory, conducted a study on the life cycle of tourist destinations, proposing that as their quality declined, tourist traffic shifted to other destinations. This once again highlights the importance of local authorities' involvement in destination management. Hence, the intervention of the State in studies defining tourism potential is mainly aimed at guiding

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planning and development processes and at developing policies and making investment decisions in tourism. (Alvarado, Flores, & Miranda, 2011).

This global landscape of tourism growth underscores the need for detailed analysis at the local level to define tourism potential. Defining this phenomenon is fundamental to understanding local capacities and the comparative advantages of different regions.

Developing a deep understanding that improves the long-term outcomes of tourism activity, with a particular focus on its tourism potential, will provide key insights for decision-makers to improve the diversification of the tourism offering which translates into greater profitability of destinations, their sustainability and competitiveness (Londoño, 2020).

Furthermore, the tourism potential allows for the identification of competitive advantages for destinations, leading to an expansion of the tourism offerings and leveraging local resources that might not have been previously considered. It also enables the design of new tourism experiences that, in the long term, can contribute to the destination's sustainable growth. In an increasingly competitive environment, this analysis is key to positioning the municipality as an attractive destination and generating appropriate planning that maximizes the social and economic benefits of tourism.

Based on the tourism planning process issued by UN Tourism (2015), which outlines a series of stages to define a roadmap for a tourism development model, tourism potential has been considered a key aspect in the territorial assessment. This potential is consolidated when a territory with a tourism focus has identified its development objectives, as well as when local management commits to recognizing tourism as a driver of economic and social development.

Geography, Tourism and Geographic Information Systems (GIS)

As part of the cartographic analysis, it is necessary to mention terms such as geography, which consists of the description and explanation of the specific location and distribution of natural and cultural phenomena, and for this reason it can be considered the science of location and distribution; it is the art of describing the spatial or geographical patterns of phenomena in specific places (Baker, 2003). Prioritizing the identification of patterns in terms of location and distribution. In the context of tourism, it is necessary to highlight the relationship between geography and tourism, which is based on space, where tourist activity is generated and where territorial impacts can be identified. It is through tourism that geography advances from a descriptive perspective to a comprehensive one, recognizing actors, displacement, interrelationships, economic flows, and landscape transformation (Ojeda & Kieffer, 2020).

Thus, geography, through the years and supported by technological advances, has relied on Geographic Information Systems (GIS), considered a computer tool that allows the capture, storage, manipulation, analysis, and visualization geographically referenced spatial data, integrating information on natural, social, cultural and economic aspects of a territory (ESRI Colombia, 2024). Territorial integration through GIS involves the efficient coordination and connection of different actors, resources and activities in a geographic space to promote harmonious development, optimizing decision-making based on accurate and up-to-date information (Esri Colombia, 2024).

GIS is essential for visualizing geographic phenomena related to the territory and solving planning and management problems, providing benefits for territorial integration such as: It supports municipal and regional management through accurate information, facilitates citizen participation and transparency in public management (Esri Colombia, 2024), optimizes the use of territorial resources, connecting productive, social and cultural actors

and activities, facilitates planning for sustainable development, avoiding territorial conflicts and promoting environmental and social balance.

These geographical aspects are intertwined with Christaller's (1963) central place theory, which recognizes tourism as an economic activity and presents it in his research studies in terms of the location of tourist activities, where these activities cluster in tourist areas to minimize costs and maximize accessibility. Similarly, Fuster (1985) emphasizes the economic importance of tourism and considers it an activity with multiplier effects on the economies of the countries that host it.

In this sense, the work of the German geographer Walter Christaller in the 1960s demonstrates the quantitative influence on geography. His central place theory made it possible to model trade relations between central cities and smaller peripheral cities located within an area of influence. From an economic perspective, space is conceived primarily as a support for human relations related to trade, and aspects such as the location of the origin of goods and markets, as well as connectivity, become relevant for analyzing flows, distances, and transit times.

In this regard, Christaller himself was the pioneer of tourism analysis within economic activity, with the particularity that tourist consumption centers correspond to the peripheries. The influence of the spatial economic approach of the theory on central places is palpable in characteristic tourism studies after 1950, in which terms such as product life cycle, tourist conglomerates, and tourist development poles are frequent (Hiernaux, 2008). Geographical tourism studies from this perspective became increasingly numerous during this period as a result of capitalist expansion, where tourism consolidated itself both as an activity for the elite and as a mass phenomenon. Thus, tourism was conceived as an industrial production process, in line with the economic development models promoted by countries in the so-called First World.

METHODOLOGY

The research adopted a qualitative, documentary approach, based on the systematic review and analysis of secondary institutional sources. This approach is relevant to the object of study because it allows for an understanding of the cultural, natural, and territorial dimensions of the municipality of Garagoa without requiring the application of primary field instruments, given that the information available in official sources provides sufficient depth to construct a diagnosis of the local tourism potential. Hernández-Sampieri and Mendoza (2018) recognize that the qualitative documentary approach enables a deep understanding of complex phenomena from existing records, provided that the sources are relevant, up-to-date, and of verifiable institutional origin, a condition that is met in this study.

The methodological process was structured in three interconnected phases. The first phase involved compiling an inventory of tourist attractions in the municipality of Garagoa and the municipalities in its area of influence in the province of Neira, following the methodology established by the Ministry of Commerce, Industry and Tourism (MinCIT) for the categorization of natural and scenic, heritage, cultural and gastronomic attractions. The sources consulted include the Boyacá Tourist Information System (SITUR), the Garagoa Municipal Development Plan 2024-2027, the Garagoa River Basin Management and Planning Plan issued by the Regional Autonomous Corporation of Boyacá, and previous territorial characterization studies available in academic and institutional repositories.

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The second phase involved territorial mapping using Geographic Information Systems (GIS), which have become a valuable tool contributing to land-use planning and management processes. Their evolution has enabled the processing of spatial data and the mapping of territories for analysis and understanding (Álvarez & Gamba, 2022). This phase made it possible to capture, organize, and spatially represent the attractions identified in the previous phase. Geographical knowledge refers to the set of descriptions, interpretations, and explanations not only of natural processes but also of their social implications, including the relationships between them and the resulting situations (Bozzano, 2016). The cartographic analysis was structured around five territorial environments, each assessed using an ordinal scale from one to five according to criteria defined for each dimension. The first environment evaluated the tourism potential of the attractions, ranging from resources with no available information to attractions of international renown. The second analyzed accessibility and centrality with respect to the municipal capital of Garagoa as the central location of the province, based on Christaller's central place theory (1966). The third assessed the facilities and tourist services available in each municipality. The fourth environment examined the perception of the territory based on qualitative information derived from secondary institutional sources. The fifth environment integrated disaster risk management variables based on the Garagoa River POMCA (Watershed Management Plan), considering the territory's exposure to flooding, landslides, and flash floods.

The third phase consisted of a multi-criterion weighting of the five environments to produce an integrated tourism potential index. Each environment was assigned a relative weight according to its impact on the tourism system, giving the greatest weight to tourist attractions at 30 percent, followed by facilities at 20 percent, risk management at 10 percent, accessibility at 20 percent, and perception at 20 percent, for a total of 100 points. This distribution made it possible to generate a final cartographic representation that identifies the areas of the territory with the greatest suitability for the development of sustainable and diversified tourism products.

RESULTS

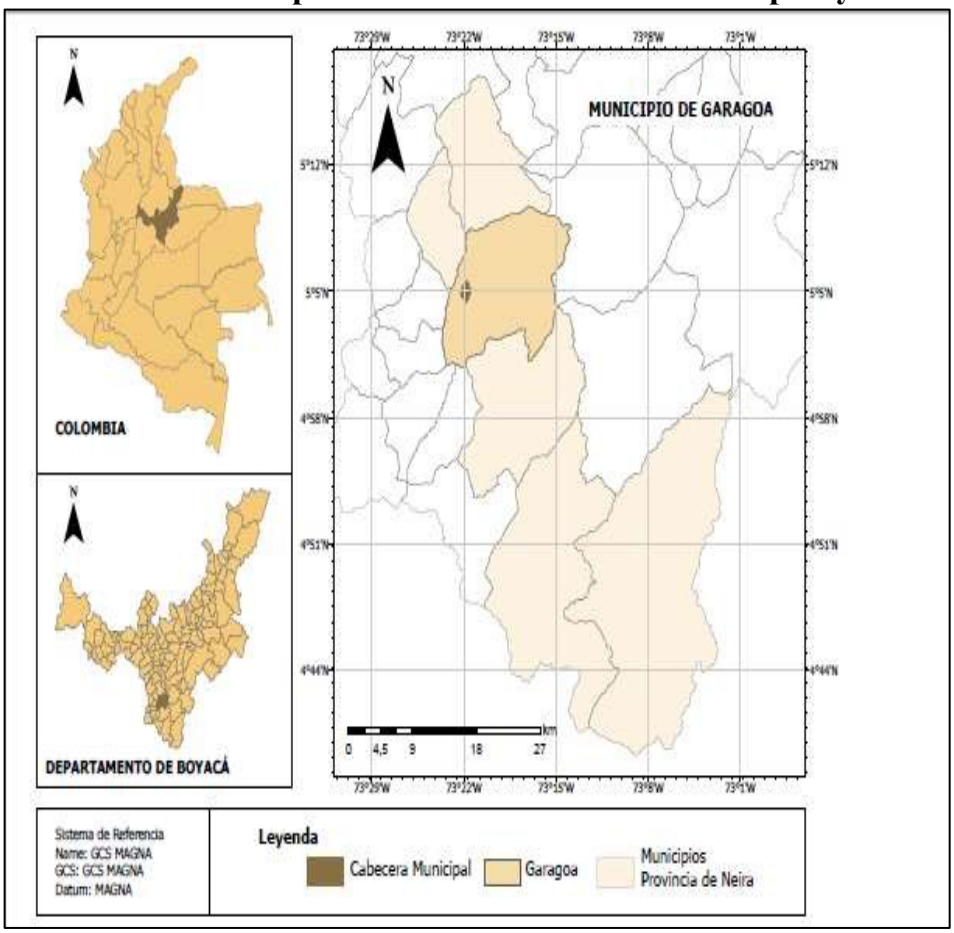
Geographic context

The province of Neira, located in the southeastern part of the department of Boyacá, covers 1,388 km², representing 6% of the department's territory, and comprises six municipalities: Garagoa, Chinavita, Pachavita, Macanal, Santa María, and San Luis de Gaceno. Its capital, Garagoa, known as the Sultana of the Tenza Valley, is the ninth most populated municipality in Boyacá with approximately 16,195 inhabitants, an area of 191.75 km², and an altitude of 1,705 meters above sea level. The average temperature of 19°C and the presence of the Garagoa River as the main waterway create a biophysical environment that determines both the diverse landscapes of the territory and its suitability for the development of sustainable tourism activities (Garagoa Mayor's Office, 2015). The strategic location of the province as an alternative route between Bogotá and the Eastern Plains, combined with the richness of its natural and intangible heritage, positions Garagoa as an articulating node of a regional scale tourism offer with supra-departmental projection (Arévalo et al., 2018).

For this specific case study, the municipality of Garagoa, the ninth most populated municipality in the department of Boyacá, is known as the Sultana of the Tenza Valley. The municipality covers an area of 191.75 km², has an altitude of 1705 meters above sea level, is located on a slope, and has an approximate population of 16,195 inhabitants, 12,084 in

the urban area and 4,111 in the rural area. The average temperature is 19 °C. The main river in this municipality is the Garagoa River, along with some streams such as the Quigua and the Colorada. (Garagoa Mayor's Office, 2015). Garagoa presents a territory with a geographical, cultural, and socioeconomic configuration highly conducive to sustainable tourism development. Its strategic location in the Tenza Valley, its diverse Andean landscapes, and the enduring presence of its tangible and intangible heritage position the municipality as a territory with the capacity for tourism diversification and territorial consolidation within the context of eastern Boyacá. Figure 1 below shows the geographical location of the municipality of Garagoa.

Figure 1 National and departmental context of the municipality of Garagoa



Source: Prepared by the authors

Geographic Information

Through mapping carried out in the municipality of Garagoa and its surrounding area in the province of Neira, different types of resources were identified by categorizing attractions: natural and scenic, heritage, cultural, and gastronomic. Among the latter are the market squares, which constitute the main focus of this project. Applying a rating scale from 1 to 5 (based on the variables defined for each analyzed environment) allowed for a more accurate picture of the territory's current state and its potential for designing a tourism product (Gutiérrez & Urrego, 2012). This is particularly evident in aspects such as:

Map Value Environment 1: Tourist Attractions

This was done by searching for natural attractions, taking into account the protected areas of the territory, as shown in Table 1, where the variables in range 1-5 correspond to:

1. Unconsolidated or Uninformed Attractiveness

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2. Attraction that motivates local tourist flows
3. Attraction that generates regional tourist flows
4. National-level attraction
5. Exceptional International Attraction

Table 1 *Table of categorization of surrounding attractions 1*

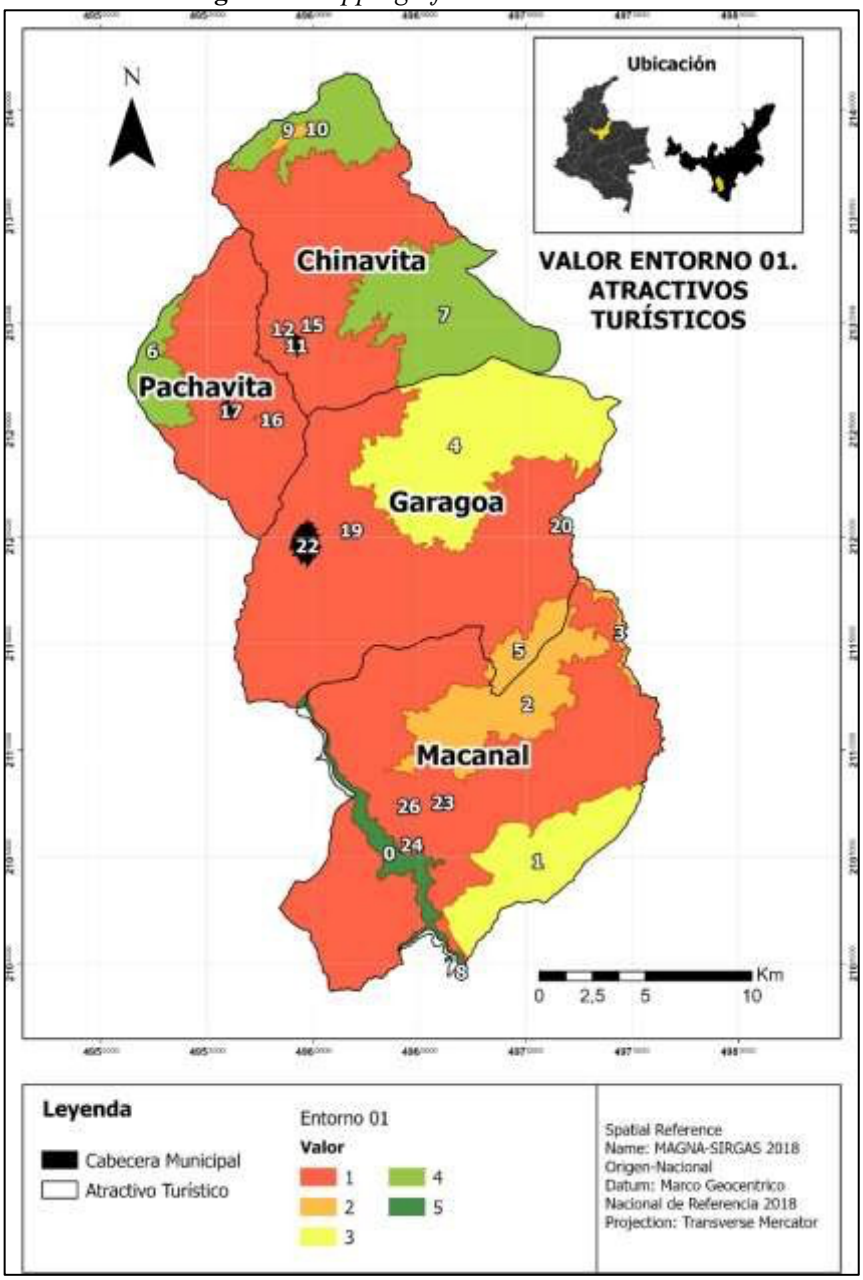
ID	Town	Name of attractive	Value	Category
0	Macanal	Embalse de Chivor	5	**Natural and scenic attraction**
1	Macanal	Cuchillas Negra y Guanaque	3	**Natural and scenic attraction**
2	Macanal	Cuchilla El Varal	2	**Natural and scenic attraction**
3	Macanal	Cuchilla Buenavista	2	**Natural and scenic attraction**
4	Garagoa	Páramo Mamapacha y Bijagual	3	**Natural and scenic attraction**
5	Garagoa	Cuchilla El Varal	2	**Natural and scenic attraction**
6	Pachavita	Páramo de Cristales, Castillejo o Guachaneque	4	**Natural and scenic attraction**
7	Chinavita	Páramo Mamapacha y Bijagual	4	**Natural and scenic attraction**
8	Santa María	Cuchillas Negra y Guanaque	3	**Natural and scenic attraction**
9	Chinavita	San Antonio	2	**Natural and scenic attraction**
10	Chinavita	Páramo Mamapacha y Bijagual	4	**Natural and scenic attraction**
11	Chinavita	Iglesia de San Antonio de Padua	3	**Heritage appeal**
12	Chinavita	Plaza de Toros La Verónica	4	**Cultural attraction**
13	Chinavita	Fiestas Patronales de San Antonio de Padua	4	**Cultural attraction**
14	Chinavita	Martirio Restaurante Bar	3	**Cultural attraction**
15	Chinavita	Alto de la Cruz	2	**Natural and scenic attraction**
16	Pachavita	Alto del Carvajal. Festival Internacional del Parapente	5	**Natural and scenic attraction**
17	Pachavita	Iglesia Parroquial San José de Pachavita	2	**Heritage appeal**
18	Pachavita	Fiestas Patrimoniales	3	**Cultural attraction**
19	Garagoa	Bioparque Palluala	4	**Natural and scenic attraction**
20	Garagoa	Reserva Natural El Secreto	3	**Natural and scenic attraction**
21	Garagoa	Plaza de Mercado	3	**Gastronomic attraction**
22	Garagoa	Fiestas en Honor a la Virgen de la Candelaria	3	**Cultural attraction**

23	Macanal	El Fogón Chivareño	3	**Gastronomic attraction**
24	Macanal	La Mano del Minero	4	**Gastronomic attraction**
25	Macanal	Fiestas Patronales y Ferias Campesinas	3	**Cultural attraction**
26	Macanal	Minicakes	3	**Gastronomic attraction**
27	Garagoa	Parroquia de Nuestra Señora de la Candelaria	4	**Heritage appeal**

Note: Prepared by the authors (2024)

Once the attractions have been identified and assessed, the mapping is presented in Figure 2:

Figure 2 *Mapping of Tourist Attractions*



Note. Prepared by the authors (2024).

Through data collection, mapping, and analysis, the following is evident: the map identifies areas with the highest concentration or potential for tourism, especially municipal capitals, and the number of attractions registered within them. Based on this information, it can be

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stated that sufficient data is not available for most of the province, which is why the map appears predominantly in red, corresponding to the lowest ratings.

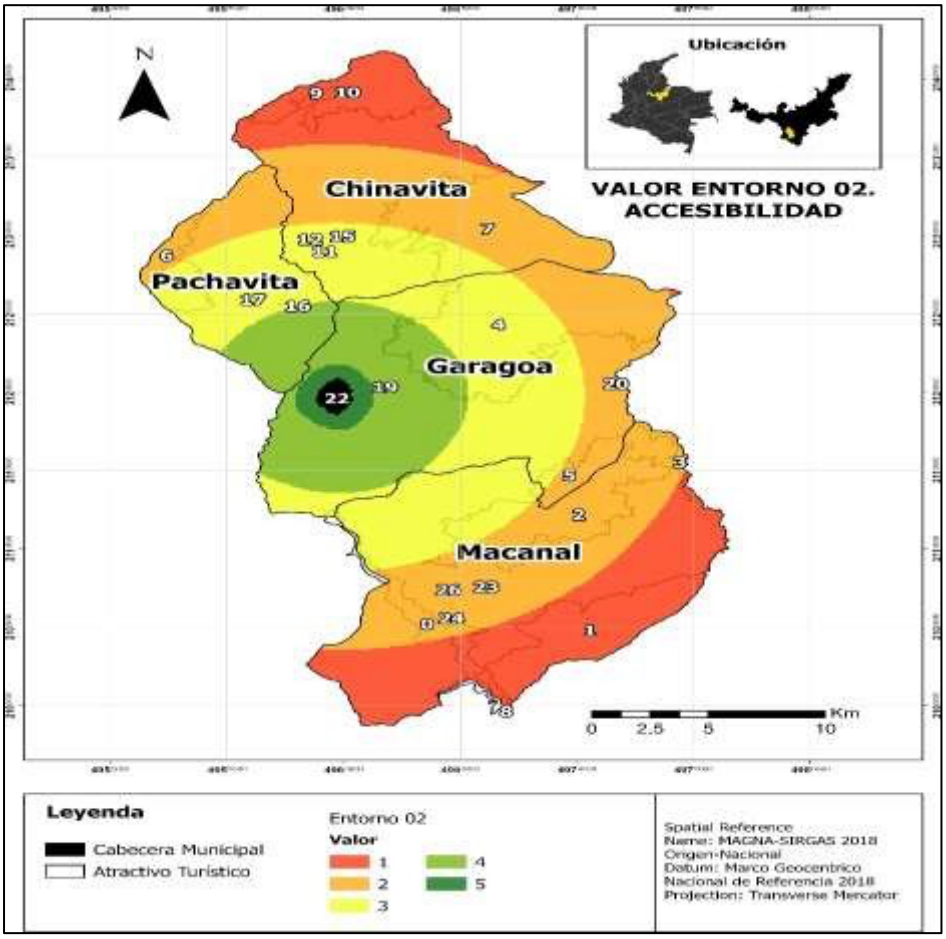
In contrast, the dark green color (category 5) stands out, representing an Exceptional Attraction of International Level, assigned to the Chivor Reservoir. Regarding the table of attractions, the map allows visualization of the concentrations of tourist resources, demonstrating that the province of Neira has a significant number of them: one of international level, eight of national level, and twelve of regional level. This demonstrates a wide range of tourism potential for the design and implementation of diverse and high-impact tourism products.

Environment Value Map 2: Accessibility/Centrality

The mapping was carried out using central place theory, establishing Garagoa as the municipal capital, as shown in Figure 3, where the variables of range 1-5 correspond to:

1. More than 15km from the municipal center of Garagoa
2. Between 10 and 15 km
3. Between 5 and 10 km from Garagoa
4. Between 5 and 1k from Garagoa
5. Within the municipal center, less than 1km from Garagoa

Figure 3 *Accessibility Environment Mapping*



Note: Prepared by the authors (2024)

From the data obtained, the areas furthest from the municipal capital are defined as having a value of 1. This indicates that, due to their accessibility, the areas marked in red have fewer tourist attractions. Furthermore, areas closer to the central capital are considered

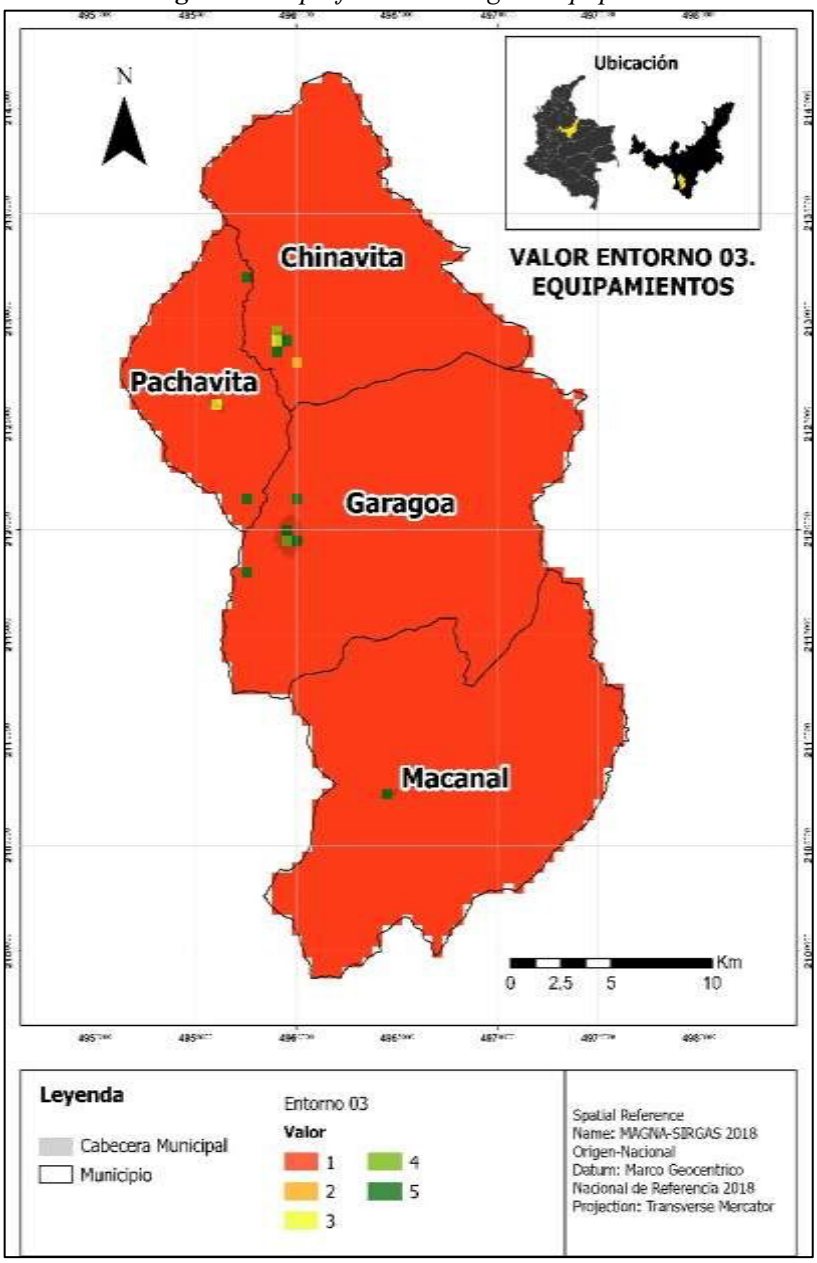
more important due to their accessibility and easy access to the main cities and these attractions, where a greater number of them are found.

Map Value Environment 3: Tourism Facilities and Infrastructure

Conducted in Garagoa as the municipal capital, as shown in figure 4, where the variables of range 1-5 correspond to:

1. No information
2. Recreational and Sports Equipment
3. Health and Safety Team
4. Commercial Equipment
5. Tourism Service Infrastructure

Figure 4 *Map of surroundings 3 Equipment*



Note: Prepared by the authors (2024)

Due to limited access to information, the map mostly presents ratings in category 1, as it was not possible to obtain sufficient data for a more precise evaluation. However, it is possible to identify that the registered facilities (mainly tourist-related, such as

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accommodation) are concentrated in the municipal capitals.

Value Map Environment 4: Perception/ Experience

Made using data taken qualitatively in Garagoa as the municipal capital where the variables of range 1-5 correspond to:

1. Very negative
2. Negative
3. Neutral
4. Positive
5. Very positive

Similarly, the attractions were tabulated and evaluated with respect to the aforementioned variables, resulting in Table 2:

Table 2 *Table of categorization of surrounding attractions 4*

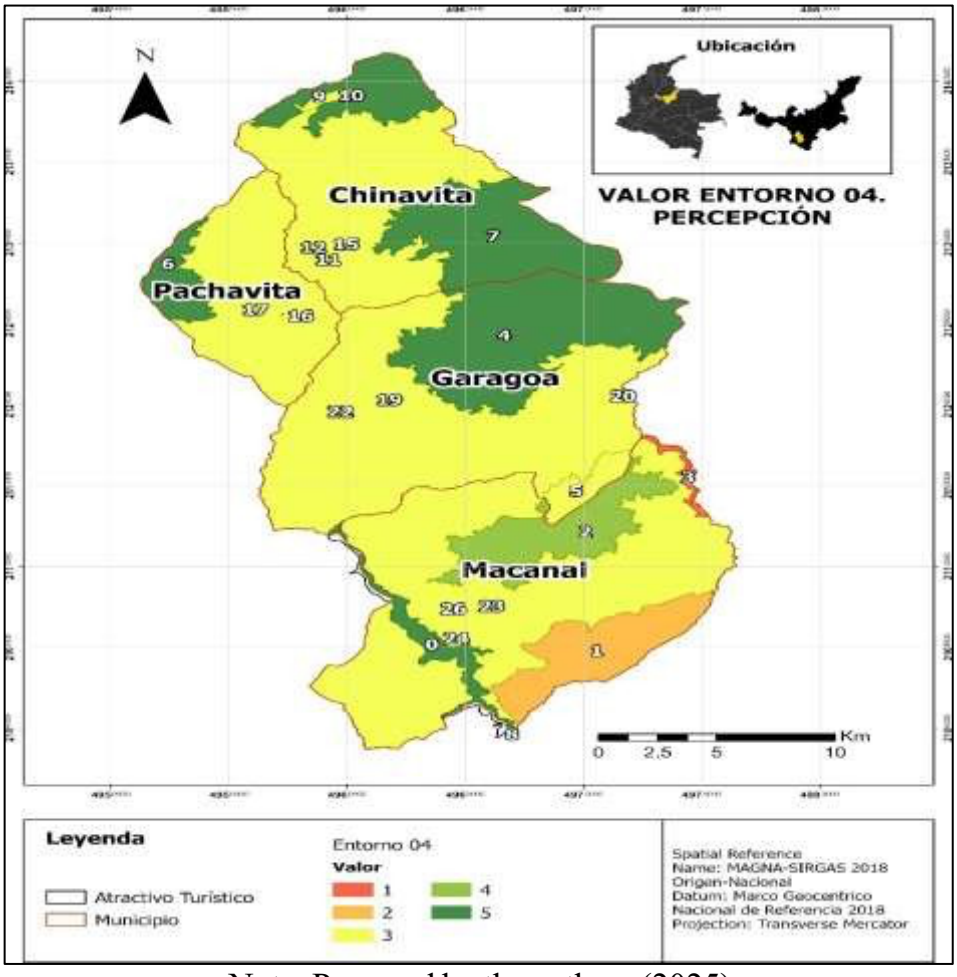
ID	Town	Name of attraction	Value	Category
0	Macanal	Embalse de Chivor	5	Natural and scenic attraction
1	Macanal	Cuchillas Negra y Guanaque	3	Natural and scenic attraction
2	Macanal	Cuchilla El Varal	2	Natural and scenic attraction
3	Macanal	Cuchilla Buenavista	2	Natural and scenic attraction
4	Garagoa	Páramo Mamapacha y Bijagual	3	Natural and scenic attraction
5	Garagoa	Cuchilla El Varal	2	Natural and scenic attraction
6	Pachavita	Páramo de Cristales, Castillejo o Guachaneque	4	Natural and scenic attraction
7	Chinavita	Páramo Mamapacha y Bijagual	4	Natural and scenic attraction
8	Santa María	Cuchillas Negra y Guanaque	3	Natural and scenic attraction
9	Chinavita	San Antonio	2	Natural and scenic attraction
10	Chinavita	Páramo Mamapacha y Bijagual	4	Natural and scenic attraction
11	Chinavita	Iglesia de San Antonio de Padua	3	Heritage appeal
12	Chinavita	Plaza de Toros La Verónica	4	Cultural attraction
13	Chinavita	Fiestas Patronales de San Antonio de Padua	4	Cultural attraction
14	Chinavita	Martirio Restaurante Bar	3	Cultural attraction
15	Chinavita	Alto de la Cruz	2	Natural and scenic attraction
16	Pachavita	Alto del Carvajal – Festival Internacional del Parapente	5	Natural and scenic attraction
17	Pachavita	Iglesia Parroquial San José de Pachavita	2	Heritage appeal

18	Pachavita	Fiestas Patronales	3	Cultural attraction
19	Garagoa	Bioparque Palluala	4	Natural and scenic attraction
20	Garagoa	Reserva Natural El Secreto	3	Natural and scenic attraction
21	Garagoa	Plaza de Mercado	3	Gastronomic attraction
22	Garagoa	Fiestas en Honor a la Virgen de la Candelaria	3	Cultural attraction
23	Macanal	El Fogón Chivareño	3	Gastronomic attraction
24	Macanal	La Mano del Minero	4	Gastronomic attraction
25	Macanal	Fiestas Patronales y Ferias Campesinas	3	Cultural attraction
26	Macanal	Minicakes	3	Gastronomic attraction
27	Garagoa	Parroquia de Nuestra Señora de la Candelaria	4	Heritage appeal

Note. Prepared by the authors (2024)

Once the attractions have been categorized, Figure 5 is presented:

Figure 5 *Environment map 4. perception*



Note: Prepared by the authors (2025)

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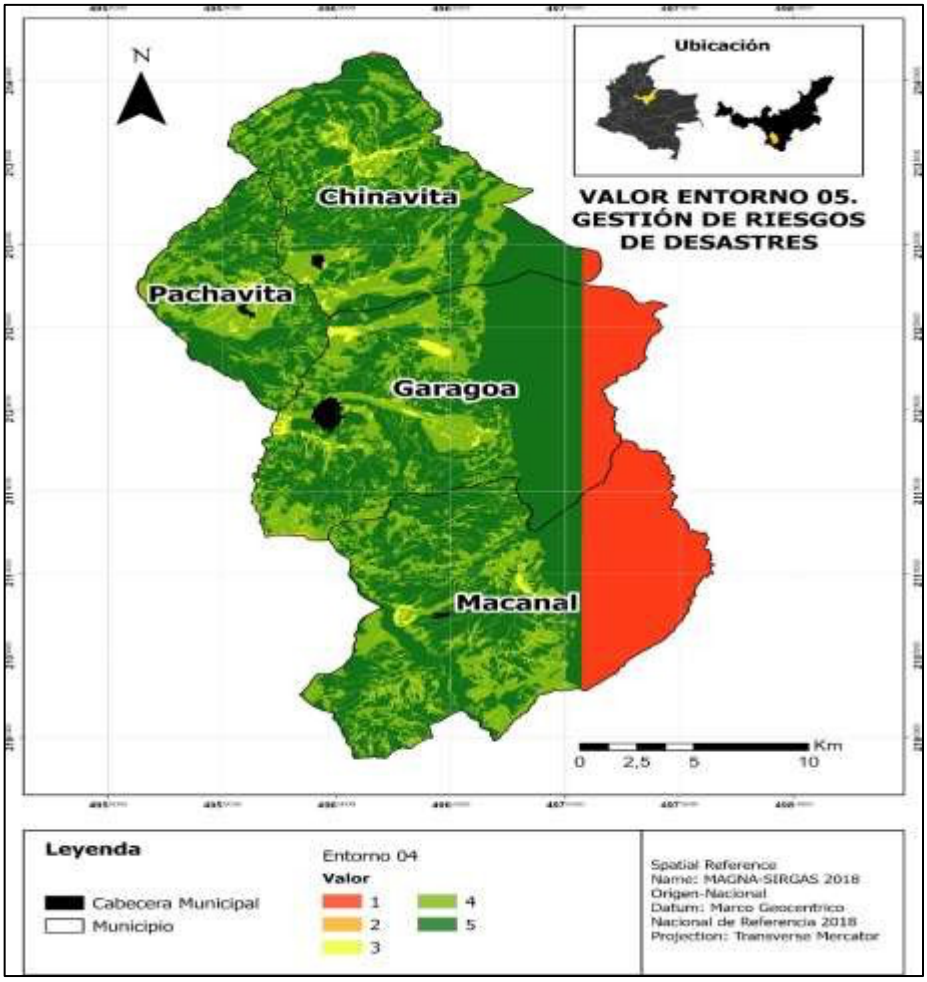
Determining the evolution and perception of the community's and the general public's experiences with tourist attractions was challenging. Therefore, the analysis was primarily qualitative, assigning a rating of 3 (neutral) in most cases. This is because the objective is not to underestimate or overestimate a destination or attraction, but rather to gain a general and balanced understanding of how they are perceived in the region.

Environment Value Map 5: Disaster Risk Management

According to the POMCA of the Garagoa River, issued by the Regional Autonomous Corporation of Boyacá (2018), it is necessary to incorporate risk management into planning processes, which aims to protect ecosystems from the effects of climate change, guaranteeing the sustainability of landscapes. The disaster risk study identifies that Garagoa is predisposed, due to its climate and other terrestrial factors, to face floods, mass movements, and flash floods. Taking this information into account, as shown in Figure 6, the variables in range 1-5 correspond to:

1. No Information
2. Medium-high threat across three phenomena
3. Medium-high threat across two phenomena
4. Medium-high threat across one phenomena
5. No medium-high threat.

Figure 6 *Map Environment 5: Risk and disaster management*



Note. Prepared by the authors (2024)

It has been determined that the presence of these phenomena in the area may be related to its proximity to the Chivor Dam, since the reservoir's natural conditions directly influence its surroundings. Having this information, along with that related to the other phenomena mentioned above, is essential for defining the area's tourism activity calendar. This allows us to determine the best times to visit or explore the dam, the moorland areas, and other spaces, always ensuring the safety of visitors and promoting sustainable tourism. As shown on the map, there is an area of the territory with no available information, which is why it was assigned a value of 1. Most of the map shows values between 4 and 5, indicating that it is a generally stable territory with respect to the analyzed phenomena, registering one or none of them. However, it is important to highlight areas such as the Chivor dam, which receives a rating of 3 due to the higher level of risk associated with these phenomena.

Mapping of Tourism Potential in the Municipality of Garagoa – Multi-criteria Analysis

Taking into account the information gathered during the mapping process and the analysis performed, it is possible to determine the tourism potential of the territory through a weighting system. To this end, and considering the type of project and the product to be developed, greater priority was given to aspects such as tourist appeal, accessibility, and infrastructure. The resulting weighting is presented in Table 3 below.

Table 3 *Weighting of Tourism Potential*

Environment	Weighting/Importance	Value No data
01 Tourist Attractions	30	**1**
02 accessibility	2	**1**
03 Tourism Infrastructure/Services	20	**1**
04 perception	1	**3**
05 GRD	10	
Total	100	

Note: Original work

Based on this information, the mapping process was carried out (see Figure 7), which identifies the municipal capitals and main natural attractions. The green boxes represent the location of registered tourist facilities, including lodging and hot springs, which are of great importance for the region's tourism development.

Areas closer to municipal capitals, natural attractions, areas further from risk or disaster zones, attractions of international interest, and those with a positive or very positive perception were given greater value. Therefore, areas meeting these criteria were assigned a value of 5. Based on this information, variables ranging from 1 to 5 were established, corresponding to:

The higher the number, the greater the tourism potential.

1. No information available.
2. These correspond to areas with high DRG or low perception.
3. Present a neutral stance towards risks.
4. They have good perception and are located at a considerable distance from the areas with DRGs.

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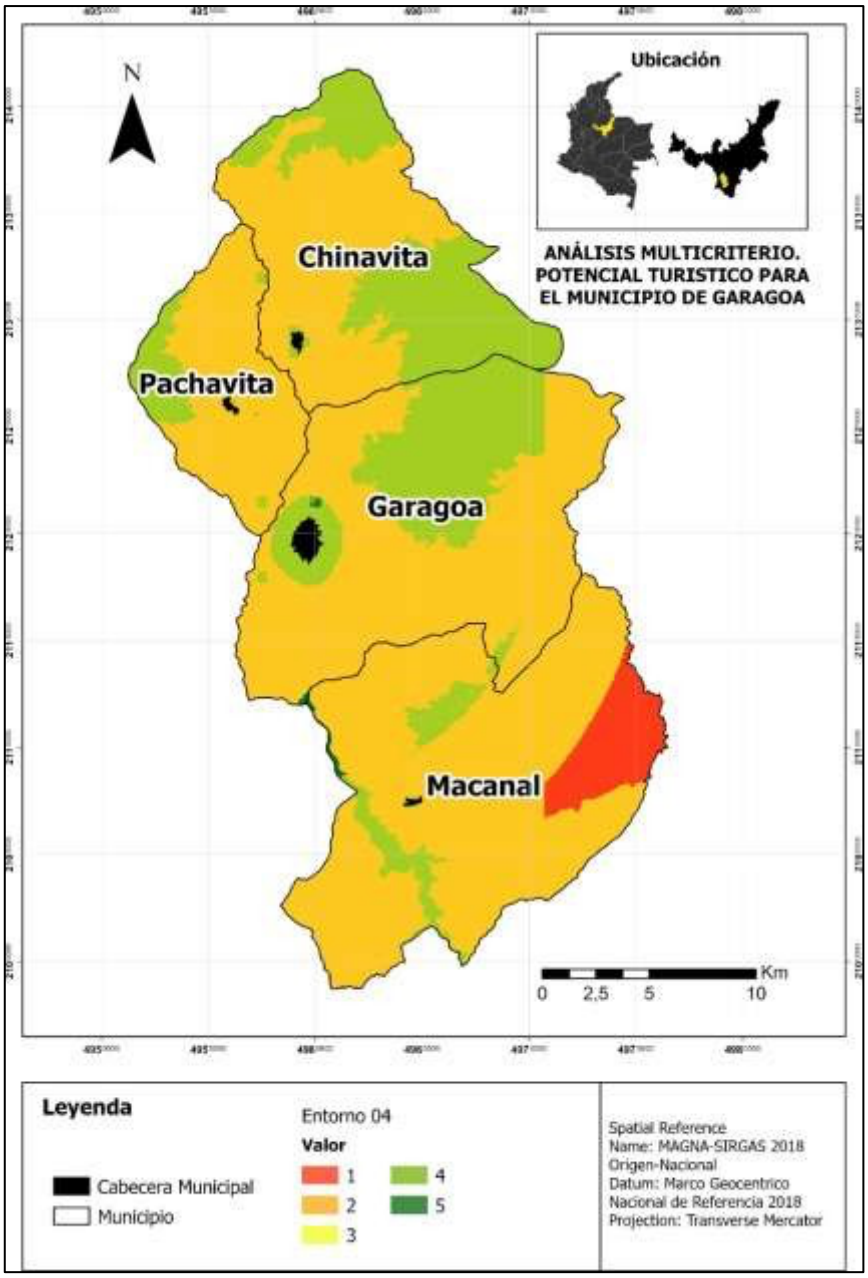
5. They represent areas with greater tourism potential.

Figure 7 *Map of the Final Environment with Tourist Potential 16*



Note: Prepared by the authors

DISCUSSION

The results obtained in the territorial analysis of the province of Neira reveal a tension characteristic of medium-sized tourist municipalities in Colombia: the coexistence of a natural and cultural heritage of proven value with a support infrastructure and a tourist information system that fail to transform that heritage into a coherent and competitive offer. This condition is not exclusive to Garagoa; Naranjo and Martínez (2022) point out that the fragmentation of the tourism offer in Colombian rural destinations frequently responds to the absence of comprehensive territorial diagnoses that allow the identification of the interdependencies between attractions, services and accessibility as a system.

The application of GIS in this study proved its relevance in overcoming this fragmentation. Unlike traditional descriptive inventories, multi-criteria cartographic analysis allowed for

the simultaneous representation of the spatial distribution of attractions, accessibility conditions from the central hub, and the restrictions imposed by disaster risk management. Ramano (2022) and Chaudhary et al. (2022) document similar results in rural contexts in developing countries, where the use of GIS transforms tourism planning from a descriptive exercise to an analytical and strategic one, aimed at prioritizing intervention areas based on verifiable territorial criteria. In the case of Garagoa, this approach made it possible to identify that the three municipalities with the greatest potential—Garagoa, Chinavita, and Macanal—share not only geographical proximity but also a cultural and environmental connection that makes them complementary as nodes of the same tourism product.

One finding that deserves particular attention is the centrality of the market square as a gastronomic and cultural attraction. García Canclini (1990) argues that popular spaces of exchange constitute scenarios of cultural hybridization where intangible heritage is reproduced and transformed in contact with contemporary dynamics. From this perspective, the Garagoa market square does not simply function as a specific tourist attraction but as a setting that articulates the local gastronomic heritage, rural production traditions and territorial identity, a condition that positions it as a structuring axis of a differentiated cultural tourism product. This reading converges with the guidelines of the Sectoral Tourism Plan 2022-2026 (MinCIT, 2022), which recognizes in the spaces of popular economy an opportunity for community tourism and the generation of local added value.

Disaster risk management as an analytical framework represents a methodological contribution of this study that local tourism literature does not typically incorporate systematically. The results indicate that most of the territory presents favorable conditions, but the presence of the Chivor reservoir as a hydrological risk factor establishes a temporal constraint that must be integrated into the design of the tourism product. This integration of tourism planning and environmental management aligns with the provisions of Law 2068 of 2020, which promotes the sustainability and conservation of tourist destinations and attractions in Colombia as a condition for their responsible use. The gap identified in tourism infrastructure represents the most urgent challenge to the viability of the tourism product in the province. The concentration of services in municipal capitals and the scarcity of information on rural infrastructure limit the spatial distribution of tourism benefits and perpetuate an asymmetry between municipalities with tourist attractions and those with the capacity to provide services. Overcoming this gap requires public investment decisions guided by the territorial diagnosis developed in this study, which demonstrates the practical value of multi-criteria analysis as an input for local tourism planning.

CONCLUSION

The territorial analysis carried out using GIS and multi-criteria weighting allows us to affirm that the province of Neira, with Garagoa as its central hub, meets the necessary conditions for the development of a diversified cultural and natural tourism product. The municipalities of Garagoa, Chinavita, and Macanal boast the highest concentration of attractions of regional, national, and international value. They share a cultural and environmental identity based on the Muisca tradition, the paramo landscape, and local gastronomy, and possess sufficient relative accessibility to form viable tourist circuits from the central hub. They also feature nature tourism and a strong presence of local traditions reflected in their market squares. As these spaces serve as community gathering places for the community, they are strategic for the design of a tourism product that takes advantage of the benefits of the territory and consolidates these points of interaction as integrating elements.

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However, the need to strengthen the tourism infrastructure and facilities of these municipalities is also identified in order to guarantee a more solid and competitive offer.

The design of the tourism product seeks to integrate ancestral elements, mysticism, and local mythology with Garagoa's rich gastronomy, cultural attractions, and unique cultural landscape. This combination will create an authentic and distinctive experience for visitors.

Overall, the analysis of the territory shows that the union of these three municipalities is not based solely on their proximity to one another, but on their shared cultural and environmental mix, which can become the basis of the tourism product. Reviewing the maps reveals clear opportunities to create routes, stories, and experiences that connect market squares, moorland landscapes, and traditional practices, thereby strengthening the region's identity.

However, to fully realize this potential, planning actions are needed to improve infrastructure, strengthen tourism services, and encourage community participation.
Thus, the territory can move towards a sustainable cultural tourism model, capable of generating social, economic, and environmental benefits, and position Garagoa as the central point of a unique tourist experience in the Tenza Valley.

The use of GIS as a methodological tool proved appropriate for producing a territorial diagnosis that goes beyond a mere inventory of attractions and generates an analytical representation of the territory geared towards planning decisions. The integration of five analytical environments, including disaster risk management—a variable typically absents from studies of this type—provides an operational sustainability dimension that strengthens the relevance of the diagnosis for institutional decision-making.
However, the study also identifies structural limitations that hinder the realization of the identified potential. The lack of available territorial information for large areas of the province resulted in default low ratings for attractions and facilities, implying that the territory's actual potential may be greater than recorded. This limitation underscores the need to strengthen municipal and provincial tourism information systems as a prerequisite for any long-term planning process.
The consolidation of Garagoa's tourism potential as a sustainable destination in eastern Boyacá depends on three conditions that this study establishes but does not resolve on its own: the strengthening of tourism infrastructure in rural areas, the construction of tourism governance processes that link institutional, private and community actors, and the incorporation of risk management as a permanent criterion in the design of the calendar and tourist circuits. These conditions, addressed from the guidelines of the Sectoral Tourism Plan 2022-2026 and Law 2068 of 2020, constitute the roadmap on which the territory can move towards a model of cultural and natural tourism that generates distributed benefits, protects heritage and consolidates Garagoa as a tourist reference in the Tenza Valley.

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