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# THE USE OF GEOGRAPHIC INFORMATION SYSTEMS IN SELECTING THE MOST SUITABLE SITES FOR TOURISM PROJECTS IN EL DRIOUCH (NORTHEASTERN MOROCCO)

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**Abstract:** This study explores the potential of using Geographic Information Systems (GIS) in spatial analysis to identify the most suitable locations for establishing tourism projects in the Driouch Province. The study aims to diagnose the reality of tourism in the Driouch province, identify tourism potential, and develop sustainable tourism planning for the long term. The research adopts the Analytic Hierarchy Process (AHP) as a multi-criteria decision-making methodology. Optimal tourism planning contributes to the development of the tourism sector in a sustainable, organized, and effective manner. It leads to economic and social growth while preserving natural and cultural resources an endeavor that requires the collective will of state institutions, the private sector, associations, and the local population. The study employed various analytical and methodological tools, starting with theoretical approaches and fieldwork, and incorporated modern geographical techniques particularly GIS, satellite imagery, and the Global Positioning System (GPS). The findings reveal that Driouch Province possesses diverse tourism assets (natural, cultural, and historical), which could serve as pillars for strengthening the tourism economy. However, these resources remain underutilized, and the tourism sector has yet to contribute meaningfully to regional development. Moreover, tourism in the area is characterized by randomness and a lack of proper planning. To address this, the study proposes areas potentially suitable for tourism projects, selected based on several criteria, including proximity to road networks, the coastline, and urban centers, and distance from watercourses, hazard zones, agricultural land, and residential areas. The results offer significant potential for optimized tourism planning and will support decision-makers in making informed administrative choices not only for establishing tourism projects but also for prioritizing economic development initiatives in the Driouch Province based on its tourism assets.

**Keywords:** tourism, tourism planning, GIS, tourism development, AHP, Driouch Province, cultural heritage, spatial analysis

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## INTRODUCTION

Tourism is one of the main economic sectors that is of great importance in many countries of the world, as it represents an important source of financial revenues. This activity contributes to creating jobs for the community, which in turn leads to increased income and automatically improves the welfare of the population (Grilli et al., 2021).

It brings in hard currency (Apergis & Payne, 2012) and contributes to a country's gross domestic product (Khasawneh et al., 2023), meaning that tourism has become a driving force for global economic and social development (Danish & Wang, 2018). It also plays a key role in achieving the Sustainable Development Goals (World Tourism Organization,2022). Moreover, tourism promotes people-to-people communication and cultural exchange, which contributes to strengthening international relations and easing tensions between countries and regions.

The tourism sector has become one of the main sectors that is witnessing continuous development (Suma, 2018). This development is the result of the curiosity and desire of individuals to discover new things, places and people (Khairun et al., 2015). With the development of tourism and the improvement of living standards, tourists have become increasingly interested in the tourism experience, with a focus on the environment of the tourist destination (Pei et al., 2022).

Tourists prefer to spend less time in the tourist destination, but in return they visit multiple places and at the same time need diverse services at lower costs (Shaghaghipour & Larijani, 2017). Considering that tourism is an activity closely linked to recreational activities mainly (Acharya et al., 2023). It depends on travel and movement, which requires diverse psychological, cultural, social and financial needs (Sani et al., 2011). In order to achieve this, it requires precise tourism planning and careful management (Daghestani, 2012). However, it remains a very complex matter due to the overlap of a group of factors with each other (Husain et al., 2024). Several factors intervene in the development of sustainable tourism, such as central and local institutions and administrations, actors in the commercial sector, investors and society, in addition to the availability of infrastructure, a transportation network and a suitable environment (Kuklina et al., 2022; Trigo et al., 2022). As one of the most important factors contributing to tourism attractiveness

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(Kulakov et al., 2024) in this regard, researchers have identified six basic elements of tourism planning, namely: food, shopping, transportation, accommodation, entertainment, and tourist attractions (Sánchez et al., 2022).

Today, tourism is witnessing continuous expansion and has become one of the largest and fastest growing sectors in the world (Wibisono et al., 2024). with the number of tourists reaching approximately 1.3 billion international tourists in 2017 and expected to reach 1.8 billion by 2030 (Thomas & Asrat, 2018). At the national level, Morocco achieved a new historic step in 2023, as the Kingdom received approximately 14.5 million tourists, recording a significant increase of 34 percent compared to 2022, and 12 percent compared to 2019 (Moroccan Ministry of Tourism, 2020). This sector thus enjoys an important strategic role in the Moroccan economy, thanks to its multiplier effects and strong connections with many other sectors in the national economy (Arib, 2005). It played a vital role in creating more than 550,000 jobs in 2019 (Ksissou et al, 2024). This prompted the authorities responsible for the tourism sector in Morocco and businessmen to promote and develop tourism and to bring to mind its cultural and environmental dimensions due to its important roles (Héctor et al., 2003).

The study of tourism as an academic field is a recent phenomenon. Over the past few decades, this field has witnessed rapid transformations and has become a subject of interest and focus for academic research (Xiao & Smith, 2006). Therefore, in this study, we wanted to shed light on an important topic related to the importance of employing geographic information systems in tourism planning, and thus enhance the ability of officials to direct investments towards tourist destinations while taking into account sustainable development and the protection of natural resources. This research seeks to achieve a set of key objectives, the most important of which is to highlight the pivotal role played by Geographic Information Systems (GIS) in supporting decision-making and effectively guiding tourism development paths. It focuses on the study of the Driouch province, a region rich in diverse natural and cultural assets. The study monitored and analyzed the factors influencing tourism attractiveness, such as infrastructure, environmental resources, heritage sites, and accessibility. The study also relied on GIS tools and techniques to draw analytical maps that highlight spatial disparities in tourism potential. The results aim to suggest ideal locations for future tourism projects that take in to account the geographical distribution of resources and development determinants. The outcomes of this research constitute a reference for developing sustainable tourism development strategies in the Driouch province, by directing investments and providing an appropriate environment to enhance tourism attractiveness locally and regionally.

Among the most important studies that addressed the issue of spatial suitability of tourism projects, we find the study (Sagatbayev et al., 2025). This study focuses on assessing the natural and recreational potential of the Teniz-Korgalzhyn Depression using remote sensing and GIS technologies. It aims to analyze key environmental components such as relief, vegetation, and water resources to support ecotourism development. The balance method was applied to identify priority areas for recreational use and their accessibility. NDVI and MNDWI analyses revealed spatial variations in vegetation and water presence, aiding in environmental planning and identifying degraded areas. The findings highlight the importance of sustainable resource management to maintain ecological balance. The Korgalzhyn Nature Reserve stands out as the region's most valuable natural asset. Then we find the study (Waiyasusri et al., 2025).

The aim of this study was to identify the spatial distribution of Buddhist cultural tourism sites in Nakhon Si Thammarat Province, Thailand, and to map the tourism route using geographic information technology. The methodology included field surveys using Global Positioning System (GPS) to record coordinates, and the application of Geographic Information System (GIS) tools with kernel density analysis to assess spatial patterns.

The results showed a high density of tourist attractions in the eastern coastal plain, divided into three regions: northern, central, and urban, with density increasing toward urban areas. A total of 16 Buddhist cultural sites were identified, including temples, archaeological sites, and natural features. A four-day tourism plan, distributed across three regions, was proposed to ensure efficient travel and site visits. In addition, a study (Naimi et al., 2024) aimed to identify optimal areas for geomorphosite sites across large areas by analyzing the influencing factors, with a focus on the Upper Ziz Basin (ZUW) in southeastern Morocco. A field inventory of 120 geomorphosite sites was conducted, and detailed topographic data were collected. A "bagging" machine learning algorithm was applied to develop a predictive model that achieved high performance (AUC = 0.935). The model identified highly favorable areas covering approximately 12% of the area, particularly in the mountainous western regions with steep slopes and high elevations.

These results support the development of geotourism and guide decision-makers in site selection.

## MATERIALS AND METHODS

### Study area

The area being studied is naturally bounded between the Nekour Valley to the west and the Kert Valley to the east. It opens to the Mediterranean coast to the north and connects to the Guercif Basin to the south. Geographically, as is well known by geographers, it belongs to the Eastern Rif region and is part of the Rif Mountain e. Administratively, it is considered a newly established region, having been separated from the Nador Province by Royal Decree No. 2.03.319 issued on June 11, 2009. It belongs to the Eastern region and is bordered by Nador Province to the east, Al-Hoceima Province to the west, guersif Province to the south, and Taza Province to the southwest (Figure 1). Thus, it is considered a transitional area between Nador and Al-Hoceima. The total area of the study region is approximately 2,867 km², which represents 3.2% of the total area of the region and 0.40% of the national territory. It consists of two districts: the Driouch District and the Rif District, with eight administrative subdivisions, three urban centers, and 23 local communities, including three urban municipalities.

According to the most recent official census in 2024, the total population is about 188,191 people (8.20% of the total population of the Eastern region). The population is distributed as follows: 46,054 urban residents, representing 24.47% of the total population of the region, and 142,137 rural residents, making up 75.53% of the total population of the region.

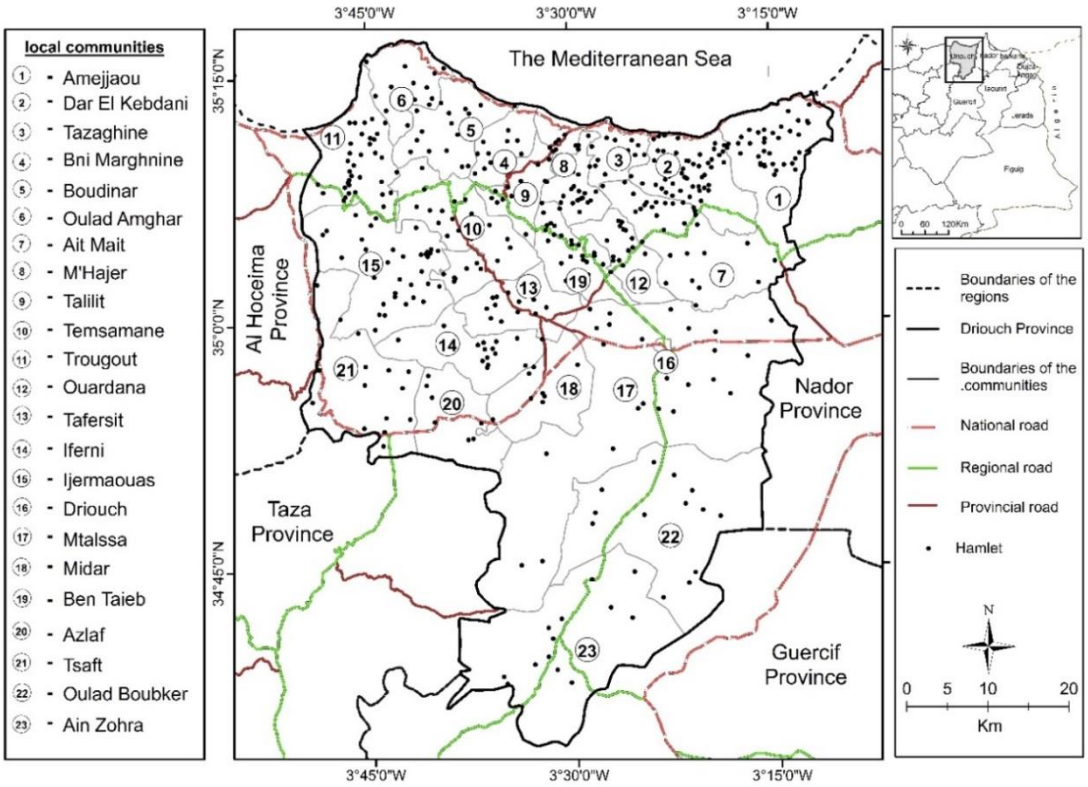


Figure 1. Geographic location and administrative division of the study area
(Source: Map of the administrative division of Morocco 2015, personal work)

**Database collection and construction sources**

We relied on various sources to collect data for the topic. In addition to field work, we used open source data provided by a group of global sites. After collecting the necessary data about the phenomenon to be modeled on maps, we were required to follow the following steps:

- Step One: In the first stage, we prepared each criterion in the form of an independent layer (Shapefile), which allowed us to control each of the adopted variables.
- Step Two: Processing each criterion using the (Euclidean Distance) tool and reclassifying it using the (Reclassify) tool in order to unify the criteria and give all sites a value representing the degree of suitability on a continuous scale ranging from 1 to 10.
- Step Three: We applied the process of cumulative matching of weighted criteria (Map Algebra)
- Step Four: Extracting the final result in the form of a composite map showing the degree of suitability according to its preference.

Table 1. Approved criteria, their weights and data collection sources (Source: Own work 2025)

| Approved standards | Weights (%) | Data source |
|---|---|---|
| Proximity to tourist sites | 20 | GPS |
| Proximity to coastline | 20 | Google Earth pro 2022 |
| Proximity to the road network | 20 | Shape File |
| Slopes | 15 | DEM (USGS) |
| Distance from water network | 5 | DEM (USGS) |
| Proximity to vegetation | 5 | Satellite Images |
| Distance from cultivated (agricultural) lands | 5 | Satellite Images |
| Proximity to urban and sub-urban centres | 5 | Shape File |
| Distance from built-up area (housing) | 5 | Satellite Images |

The data obtained enabled us to create an important database on the field of study, and we focused primarily on the data that would be of interest to us in our research, and on the basis of that, a set of criteria were selected to determine the best paths for implementing tourism projects and giving weight to each criterion according to the degree of impact. It is worth noting that there are other criteria that can be added to determine the appropriate areas, such as distance from airports, ports, neighboring urban centers, etc., but they remain of little importance, so we limited ourselves to only the aforementioned criteria (Table 1).

**METHODOLOGY**

The Analytical Hierarchy Method (AHP) has gained wide importance and use due to its reliance on quantitative and qualitative analytical methodology. By integrating multiple criteria that are converted into quantitative expressions, which enhances the credibility of the evaluation results (Lee, 2016) where the ranking of all criteria is determined by a

comparison system that is applied to the elements of the hierarchy. This process involves converting these verbal criteria into numerical values on a scale ranging from 1 to 9 (Gompf et al., 2021). The Analytical Hierarchy Method (AHP) is an effective way to deal with complex decision-making, and can help in identifying and evaluating criteria, analyzing collected data, and accelerating the decision-making process (Saaty, 1980).

The AHP method also provides a useful mechanism for verifying the consistency of assessments, which helps reduce bias in decision-making (Alessio & Markus, 2002), especially since it is based on comparison and giving weight to each proposed criterion (Jamshidi & Solmi, 2012). Therefore, it is considered a methodology and a method used specifically in collective decision-making, and it has been applied globally in various fields such as industry, health, education, business, and site selection (Saaty & Vargas, 2013) because it guides decision-makers towards the best options based on their goals and enhances accurate judgments (Mahmood, 2023) and relies on effective mathematical equations (Triantaphyllou & Mann, 1995). The strength of the methodology lies in its ability to integrate a set of tangible and intangible factors and criteria, in addition to qualitative and quantitative measures in the decision-making process (Akıncı et al., 2013) and to reach a range of preferences derived from a set of alternatives (Abedini et al., 2017), especially since this method has proven its success and high efficiency in solving complex problems (Elkasseb, 2021). AHP works in geographic information systems to calculate the relative importance value of each criterion with the aim of extracting a final result (a composite map) that shows the degrees of spatial suitability (Figure 2).

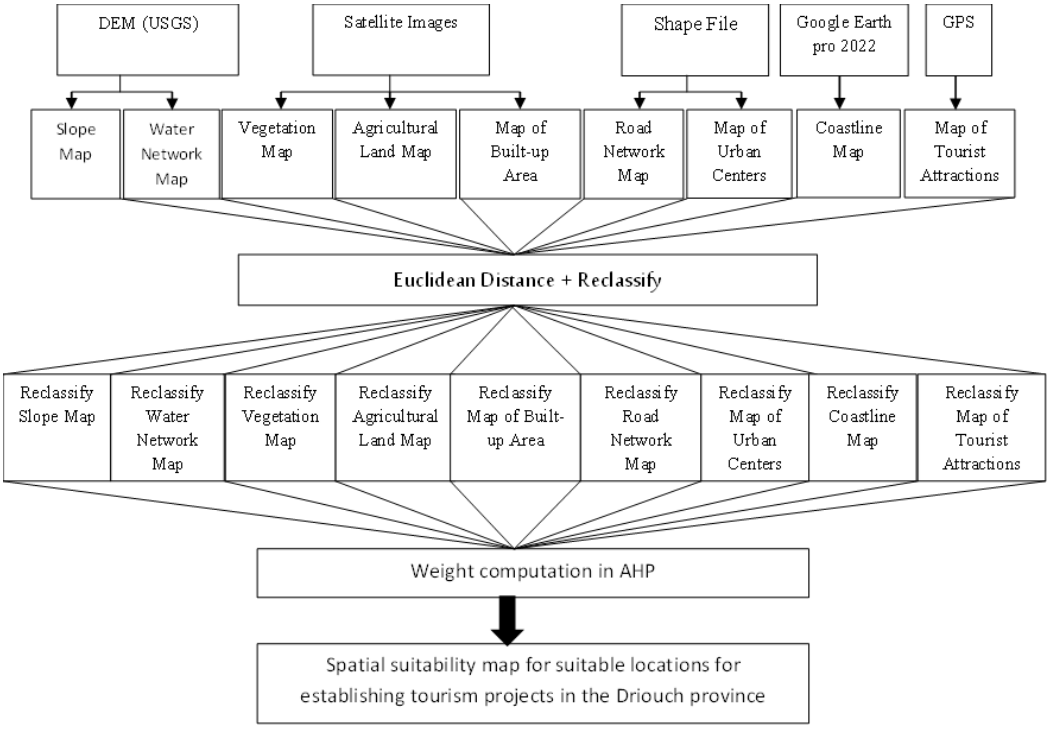


Figure 2. Summary of the methodology used (Source: Own work 2025)

**(a)** **(b)**

Figure 3. Some tourist attractions in the Driouch province (a) Kilati historical landmark, (b) Sidi Bou Said beach) (Source: Images taken by researchers 2024)

## RESULTS AND DISCUSSION

### 1. Diversity of tourism qualifications in the Driouch province

The Driouch province is located within an area that has distinct natural, cultural and environmental components and

qualifications, in addition to having a hinterland with important qualifications that constitute the basic pillar of tourism development. In addition to the beach qualifications, it also has important aspects of cultural tourism with local production.

- Attractive beaches: The Driouch province has various sandy and rocky beaches that offer important opportunities for developing the tourism sector, as they allow for the practice of various activities related to the sea (swimming, fishing, surfing.). Among the most important of these beaches are Sidi Idriss, Tzaghine, Chemlala, Ghanso, and others (Figure 3).

- Mountainous and picturesque landscapes: Due to its location and belonging to the Rif Mountains, the Driouch province is distinguished by its diverse terrain that provides great opportunities for mountain activities such as sports, climbing and camping. Especially since the region has forests, valleys and biological diversity.

- Cultural and historical heritage: In addition to its natural assets, the Driouch province also has an important cultural and historical heritage, where tourists can discover traditional villages and engage in local cultural activities, such as seasonal festivals that reflect popular customs and traditions. In addition, the region includes many historical.

- Agricultural heritage and fishing: The Driouch province is famous for producing high-quality local fruits and vegetables. Tourists can visit local farms to learn about traditional farming methods and discover aspects of rural life in the region. Fishing is also part of the daily lives of many fishermen in the Driouch province. In general, the Driouch region is a tourist destination characterized by a great diversity in its natural, cultural and historical landscapes. From its picturesque beaches to its mountains, from its cultural heritage to its biological diversity, the region offers a rich tourist experience for visitors seeking to explore the local culture and interact with nature. It is therefore considered a strategic choice for domestic and foreign tourism.

## 2. Analysis and discussion of the approved standards

In studying, analyzing and selecting suitable places for implementing tourism projects in the Driouch region, we relied on nine criteria whose importance varies from one criterion to another according to the degree of influence of each one. In order to obtain greater accuracy, each criterion was divided into ten equally spaced categories whose degree of preference ranges between number (1), which corresponds to areas unsuitable for implementing the project, and value (10), which expresses the best place to establish the project. These values are graded so that the higher the value and the closer it is to 10, the more suitable areas it expresses, and vice versa. In determining and classifying these values, we employed the (Euclidean Distance) tool and the (Reclassify) tool, which are provided by the Spatial Analyst Tools toolbox. The following are the results of each criterion:

### 2.1. Spatial suitability according to the criterion of proximity to tourist sites

Tourist sites play a fundamental role in tourism promotion, as they can attract many tourists and visitors to discover these landmarks and qualifications. Therefore, it is natural to build tourism projects near these sites in order to facilitate tourist access and provide suitable conditions for tourists (hotels, restaurants, tourist routes, services). Given the importance of these sites in tourism planning, we have given them an influence weight of 20%. Accordingly, the classification of the degree of spatial suitability according to the criterion of proximity to tourist sites came as follows: The areas close to tourist sites took the highest value (7, 8, 9 and 10) and thus they are excellent areas for building the tourist project, while the very distant areas took values (1, 2, 3) and thus they are not suitable according to this classification, while the areas between them took values (4, 5 and 6) and they are classified within areas of medium to very weak suitability (Figure 4).

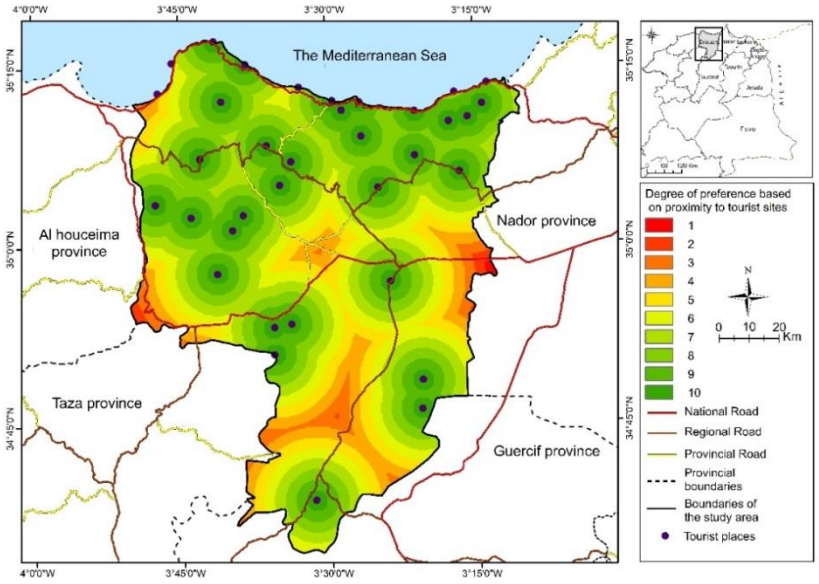


Figure 4. Spatial suitability for the implementation of tourism projects according to the criterion of proximity to tourist sites (Source: Personal work based on geographic information systems, 2025)

### 2.2. Spatial suitability according to the criterion of proximity to the coastal area

Coastal areas or those adjacent to them are considered among the most important tourist sites worldwide, as they witness significant tourist dynamics, especially during the summer. Given their importance, we have taken the coastline as

a criterion for determining the most appropriate site for implementing tourism projects, and we have given it an influence percentage estimated at 20%. This adopted standard gave us a result that all areas adjacent to the coast (values 8, 9, 10) are suitable to a good to excellent degree for establishing tourism projects, and this is what is expected from adopting this standard, while the further we are from the coast, the weaker the degree of suitability, and thus it ranges between average (values 7 and 6) and unsuitable, as expressed by the values (1, 2, 3, 4, and 5) fixed on the map (Figure 5).

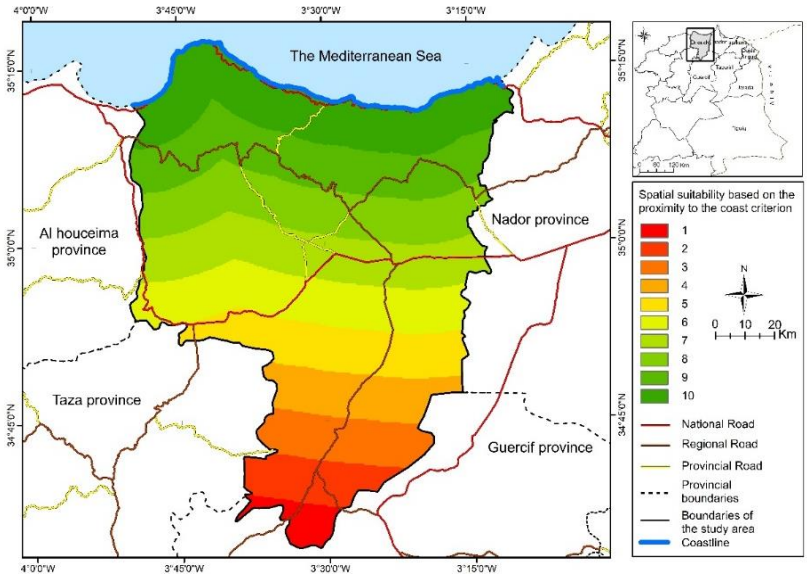


Figure 5. Spatial suitability for the implementation of tourism projects according to the criterion of proximity to the coastline (Source: Researcher's achievement using Geographic Information Systems 2025)

**2.3. Spatial suitability according to the criterion of proximity to the road network**

The road network and its efficiency are considered the arteries through which various currents flow, whether it is related to population movements or commercial movement and the movement of goods and capital, or to facilitating access to basic social, economic and recreational services. Here, the issue of access to tourism services is of utmost importance, considering that the road network plays a prominent role in introducing the region and attracting tourists and thus attracting various tourism investments, and without it, the area loses its attractiveness. On this basis, we classified all areas adjacent to the road network among the most suitable areas and took a value of (10), while the distant areas took a value of (1) as unsuitable according to this criterion. As for the weight of the criterion and given the importance of the road network, we took an impact rate of 20%. By analyzing the criterion of proximity to the road network, it became clear to us that the area we are studying is crossed by a diverse road network (national, regional, provincial). Therefore, the issue of localizing and establishing tourism projects does not pose any obstacle. As shown by the map, it appears that the most suitable areas are distributed almost throughout the territory of the Driouch region; meaning that most of the excellent areas (values 7, 8, 9 and 10) are located less than 5 kilometers from the nearest main road, while others that are considered unsuitable because they are far from the main roads are concentrated in very limited areas of the Ijermaous and Ouled Boubker communities (values 1, 2 and 3) (Figure 6).

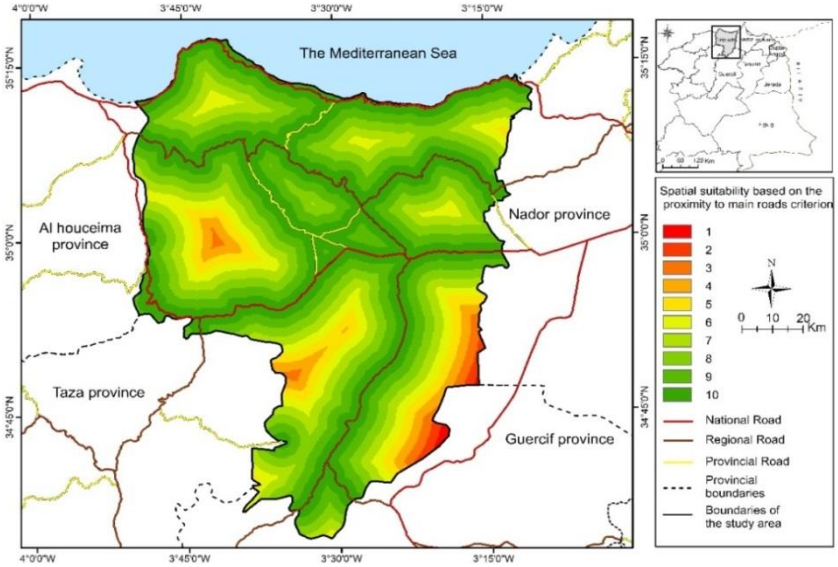


Figure 6. Spatial suitability for the implementation of tourism projects according to the road network criterion (main axes) (Source: Personal work based on GIS 2025)

**2.4. Spatial suitability of tourism projects according to the slope criterion**

Areas with steep slopes are considered unsuitable for the establishment of urban or tourist facilities, as they are areas threatened by danger (erosion, floods, landslides) and also because the cost of completing projects in flat areas with less slopes remains low compared to rugged areas with steep slopes, which in turn require the construction of roads, the provision of water and electricity, and the construction of tunnels and bridges. Therefore, it was necessary to adopt this criterion, which we classified into ten categories ranging from value (1), which corresponds to unsuitable places because they are located on steep slopes exceeding 60 degrees, to value (10), which is considered the most suitable areas, and between them there is a group of values whose degree of preference varies from medium to very weak (Figure 7).

We conclude from the map of the slope criterion, whose impact is estimated at 15%, that all areas with a slope of less than 15 degrees are suitable for completing the project, while areas with a slope ranging between 15 and 24 degrees are medium to weak, while those with a slope of more than 24 degrees remain unsuitable for establishing tourism projects

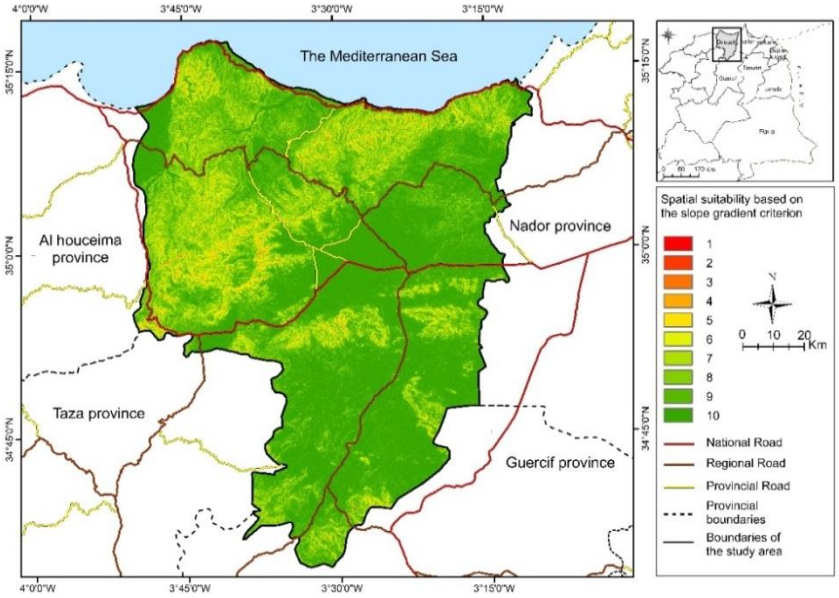


Figure 7. Spatial suitability for tourism projects according to slope degree (Source: Personal work based on GIS, 2025)

**2.5. Spatial suitability according to the criterion of distance from the water network (main sewers)**

Waterways are considered places classified as areas threatened by natural hazards, where construction, housing and project completion are prohibited. Therefore, we took this criterion into consideration during the analysis and classification of the criteria and gave it an impact weight of 5%. The result was as shown in the following map (Figure 8).

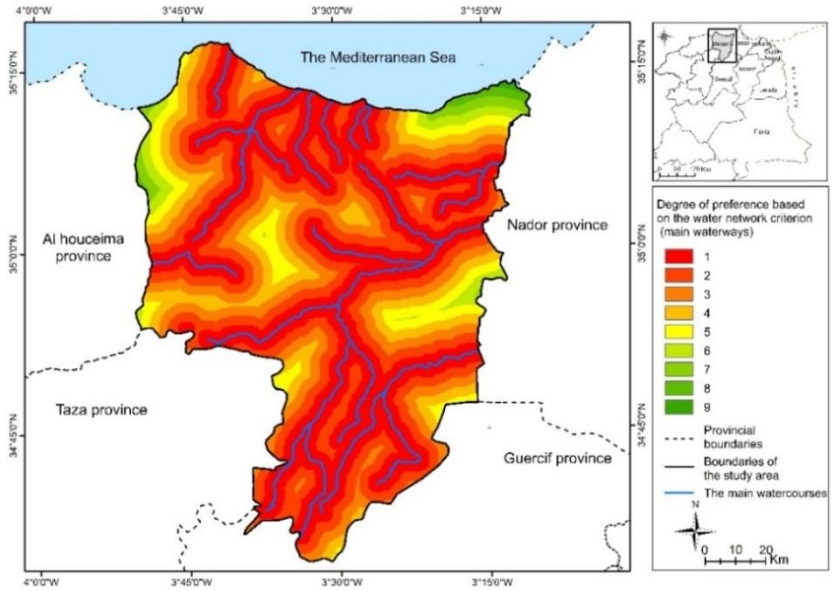


Figure 8. Spatial suitability for the implementation of tourism projects according to the criterion of distance from the water network (main sewers) (Source: Personal work based on Geographic Information Systems 2025)

To analyze this criterion, we relied on the main watercourse layer (Shapefile) extracted from the digital elevation model (DEM) and reclassified it into ten equidistant classes using the (Euclidean Distance) tool and the (Reclassify) tool.

The results of adopting this standard were that all sites adjacent to waterways fall within the scope of areas unsuitable for establishing tourism projects, as shown on the map through values (1, 2, 3). The further we move away from waterways, the more suitable places there are for completing the project. Accordingly, it can be said that adopting the water network standard remains of great importance in tourism planning in order to avoid programming any project in areas close to waterways.

**2.6. Spatial suitability by distance from forest**

Forest areas constitute distinguished tourist places on the global level due to the space they provide for recreation and entertainment and as a tourist product, and thus they have the ability to develop the eco-tourism sector. We adopted this criterion not only to measure the degree of tourism suitability, but also to raise awareness of the importance of preserving the forest heritage and preventing the programming of projects of any nature at the expense of the forest. In other words, there must be a balance between the implementation of tourism projects and ensuring the sustainability of the vegetation cover, as we observed in many parts of the study area urban expansion without taking into account the forest environment (Figure 9). The result of the spatial analysis of this criterion showed that all forest areas and those adjacent to them that carry values (1, 2, and 3) are not suitable for establishing a tourism project in order to preserve the forest heritage, while areas with values (4, 5, and 6) are considered medium to weakly suitable, while values (7, 8, 9, and 10) are considered excellent and very suitable for establishing tourism projects. It is worth noting that this criterion took an impact rate estimated at 5%, which seems weak but is expressive and important considering that the area includes other tourism qualifications of great importance and thus took a high impact rate.

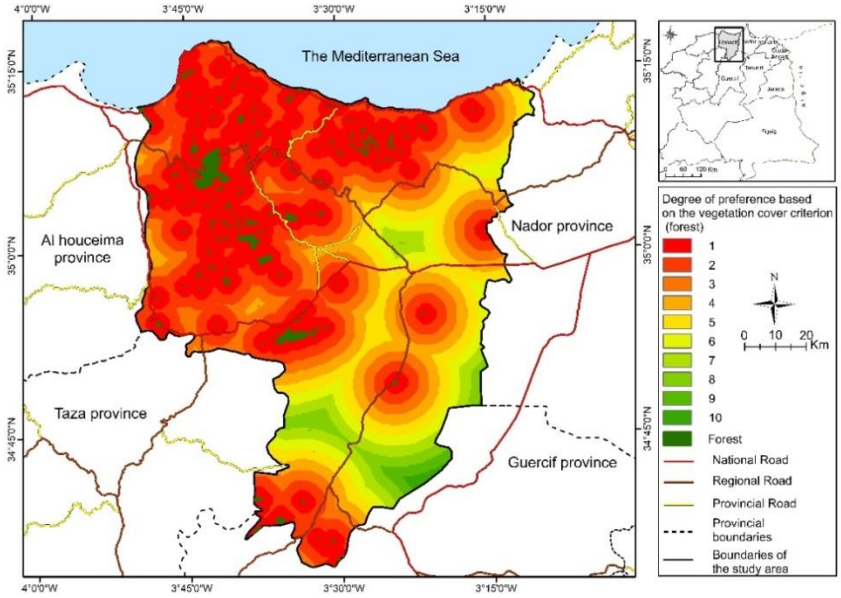


Figure 9. Spatial suitability for the implementation of tourism projects according to the criterion of distance from the forest area (Source: Personal work based on geographic information systems 2025)\

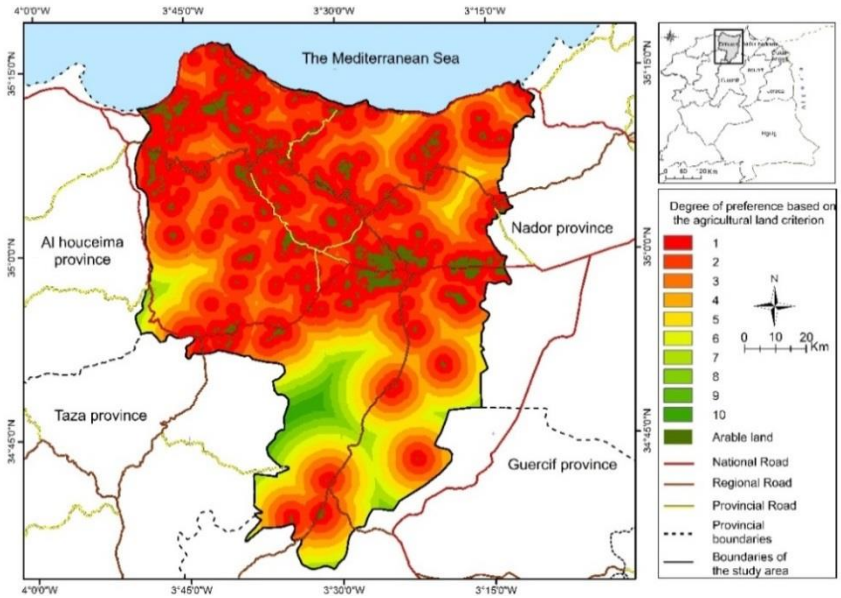


Figure 10. Spatial suitability for the implementation of tourism projects according to the criterion of distance from agricultural lands (Source: Personal work based on geographic information systems 2025)

**2.7. Spatial suitability according to the criterion of distance from agricultural lands**

Agricultural areas and lands used for agriculture and planting are areas where it is recommended not to build on or program projects because they are considered a means of agricultural production and ensuring the continuity of the countryside. Therefore, this criterion remains important because it reconciles the requirement to complete tourism projects on the one hand and protect cultivated lands on the other hand (Figure 10).

As a first step, we completed a land use map, which included a layer for agricultural lands (planted and cultivated), and then we entered the data into the SIG program in order to rearrange this criterion into a set of equidistant values arranged in ascending order from value (1) to value (10). As for the weight of the impact of this criterion, we gave it a percentage of 5%. The results of this criterion showed that all agricultural and cultivable areas remain unsuitable for establishing tourism projects at their expense. Thus, values (1, 2, 3, 4) were taken. In contrast, areas with values (5, 6) are considered to be of medium suitability, while areas with good and excellent suitability are concentrated in limited areas (values 7, 8, 9, 10).

**2.8. Spatial suitability according to the criterion of proximity to urban and semi-urban centers**

Proximity to urban and semi-urban centers is considered one of the factors that help in tourism planning, considering that tourism does not only need qualifications and attractive locations, but also the services provided by urban centers (shopping, restaurants, cafes, other services) which are of particular importance. Therefore, we took this criterion to determine the most appropriate paths for completing tourism projects, and we relied on a point layer (Shapfile) for distributing urban and semi-urban centers and reclassifying them into equidistant criteria with values arranged in ascending order according to their suitability. The criterion of proximity to urban and semi-urban centers took an impact rate estimated at 5%, and thus the results were as follows (Figure 11):

- All areas close to urban and semi-urban centers are more suitable for establishing tourism projects; that is, those that are less than 5 km away from these centers, and thus the values (8, 9, 10) were taken;
- Relatively distant areas (between 5 and 10 km) are considered areas of medium to weak suitability, which correspond to the values (5, 6, 7);
- Areas far from these centers (more than 10 km) are classified as areas that are not suitable for establishing tourism projects.

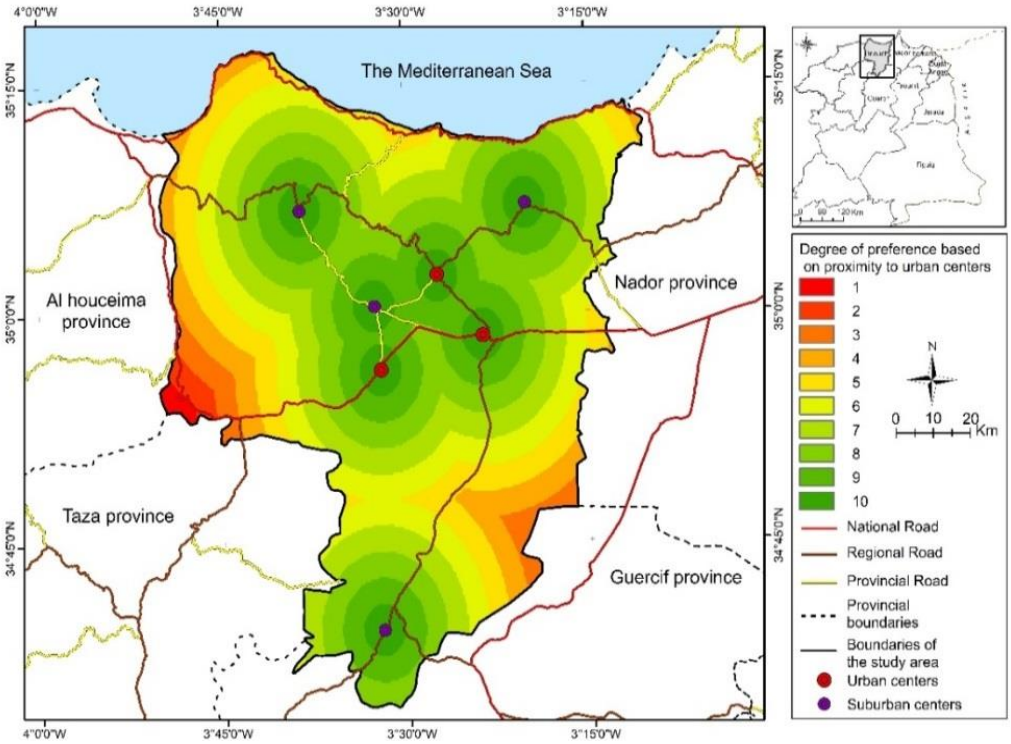


Figure 11. The form of spatial suitability for the implementation of tourism projects according to the criterion of proximity to urban centers and emerging centers (Source: Personal work based on Geographic Information Systems, 2025)

**2.9. Spatial suitability according to housing criterion**

In analyzing this criterion, we relied on a satellite image (Landsat 8-9) provided by the famous American website USGS (United States Geological Survey), where we extracted the built-up areas using geographic information systems tools. After that, we employed the (Euclidean Distance) tool and the (Reclassify) tool to reclassify the criterion into ten equidistant categories in order to show the suitable, medium, and less suitable areas.

The adoption of this criterion is due to the fact that built-up areas cannot accommodate tourism projects, as they are areas that are already consumed in construction. Therefore, we gave a value of (1) to all built-up areas, and thus they are considered areas unsuitable for completing tourism projects, while empty areas took a value of (10), and therefore they can be considered the best areas for completing projects, while values between (2) and (9) are of weak to medium suitability (Figure 12).

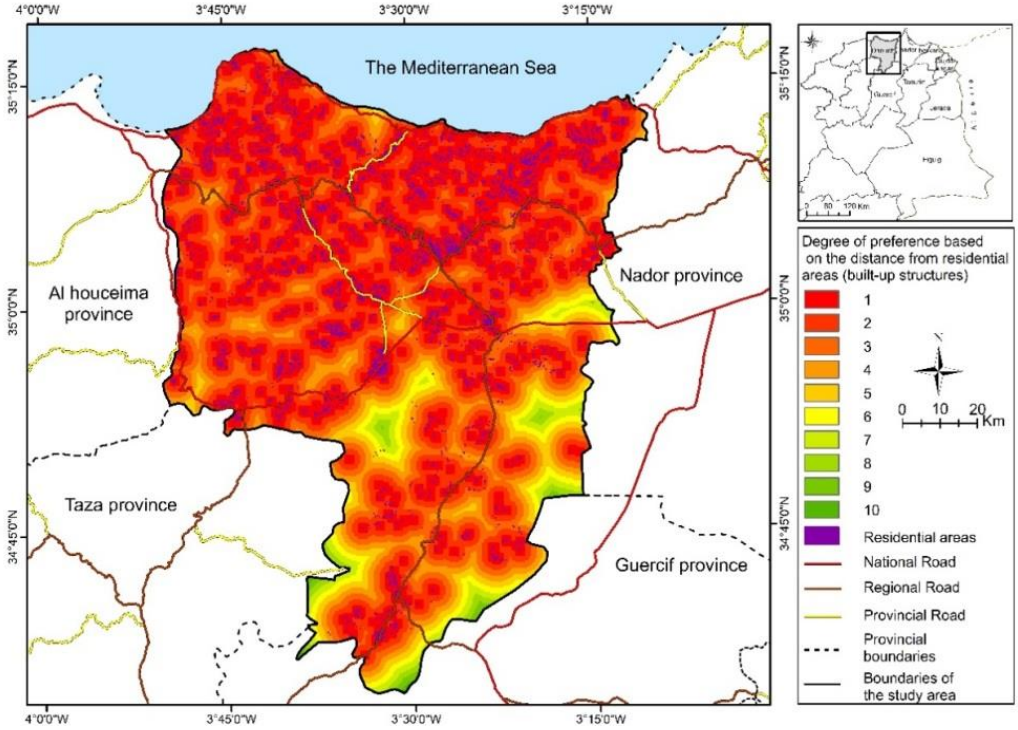


Figure 12. The form of spatial suitability for the implementation of tourism projects according to the housing criterion (built area) (Source: Personal work based on Geographic Information Systems, 2025)

**3. Synthetic summary of the results of spatial suitability for the implementation of sustainable development tourism projects in the Driouch province**

In extracting the final result to determine the most suitable locations for establishing tourism projects, we relied on the cumulative matching process (balance) provided by the Raster calculator available in ArcToolbox, where each criterion was given a specific weight in percentage (%) according to the importance and degree of impact, and this was calculated based on the following equation: (Work at SIG by researchers) $\sum C_i * P_i$ Ci: standard employed, Pi: weight of standard

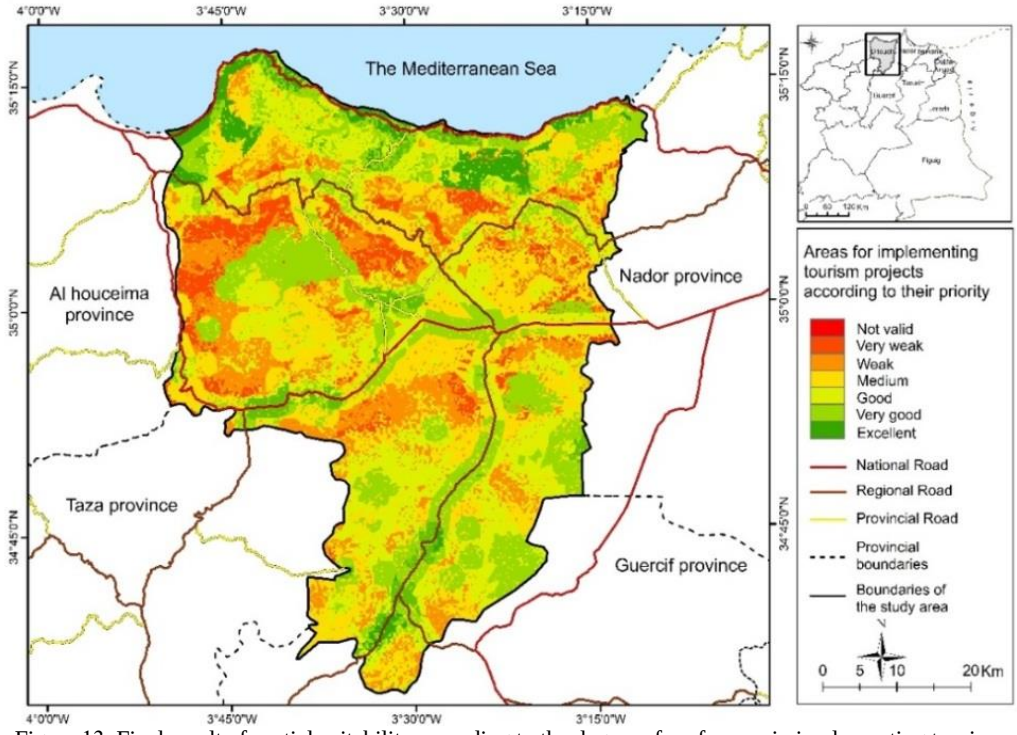


Figure 13. Final result of spatial suitability according to the degree of preference in implementing tourism projects in the Driouch Province (Source: Personal work based on Geographic Information Systems, 2025)

After collecting the approved criteria and carrying out the balancing process, we reached a set of results as is clear from the synthetic map. The paths that are not suitable for the implementation of tourism projects represent about 12.78 km2, while the

paths with a suitability ranging from very weak to medium represent about 911.66 km2, while the paths with a degree of suitability ranging from good to excellent extend over an area estimated at 1914.2 km2 (Figure 13).

Suitable areas were concentrated along main roads and near tourist sites, in addition to areas adjacent to the coast and those located on a slope of less than 15 degrees, while areas adjacent to waterways, agricultural and forest lands, and lands used for housing were considered unsuitable areas for establishing projects. This classification largely responded to the expected results that we were hoping for from applying the multi-criteria spatial analysis methodology (AHP).

## CONCLUSION

The Analytic Hierarchy Process (AHP) is a highly effective tool for analyzing and determining the spatial suitability of sites for tourism projects. It provides a systematic and mathematical framework for making informed decisions based on multiple, often overlapping criteria. This methodology helps transform both quantitative and qualitative data into decisions that reflect the relative importance of each criterion. Moreover, it allows for the adjustment of criterion weights based on the specific nature of a tourism, industrial, commercial, or other project, making it a flexible and valuable tool adaptable to various geographical, economic, and social contexts. In this study, we applied nine criteria to assess spatial suitability: proximity to the coast, urban centers, tourist sites, and road networks, as well as distance from waterways, housing, vegetation, agricultural land, and steep slopes. These criteria enabled the creation of a composite map highlighting areas classified as highly suitable, moderately suitable, or unsuitable for tourism development. While the methodology itself is robust, its success heavily depends on the accuracy and relevance of the data and criteria used. Therefore, effective implementation requires collaboration among various stakeholders, including decision-makers, experts, and academics, to ensure outcomes that support sustainable and practical tourism planning.

In conclusion, the use of AHP in determining the spatial suitability of tourism projects in the Driouch Province goes beyond decision-making it serves as a key contributor to sustainable tourism development. It supports the local economy and benefits the population while ensuring the preservation of natural resources, cultural heritage, and regional characteristics. As such, AHP represents a strategic approach for all those involved in tourism planning and development.

### Future prospects for research

With regard to the future prospects for research on the subject of using geographic information systems to determine the spatial suitability of tourism projects in the Driouch province, and in order to obtain more comprehensive data and more accurate results, the scope of research can be expanded to include other geographical units and new criteria for evaluation and study. Therefore, our study can be considered an introduction to new, more accurate future research.

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