

Preservation of Urban Heritage and Promotion of Tourism within the Framework of Algerian Law Using GIS. Case Study: Urban Heritage of the Beni Yellman Casbah, M'sila

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ABSTRACT

Problem Statement. This study addresses the integration of Geographic Information Systems (GIS) with the Algerian legal framework for heritage protection, with a particular focus on Law 03/03 Related to the protection of archaeological sites and areas of tourism development, which includes several and legal and regulatory texts provisions dedicated to safeguarding heritage sites from neglect or encroachment. The case of the Casbah of Beni Yellman in M'sila province – an urban settlement dating back to the 9th century – was selected to demonstrate how spatial technologies can contribute to the documentation and preservation of heritage as well as an attempt to convert legal texts and materials into spatial layers and geographic maps.

The purpose. Algeria boasts a rich urban heritage resulting from the succession of multiple civilizations (Byzantine, Roman, and Islamic) The province of M'sila represents a vivid example of this wealth, particularly through its urban and architectural landmarks such as the Casbah of Beni Yellman, which dates back to the ninth century AD.

This research aims to highlight the importance of using Geographic Information Systems (GIS) in protecting and documenting architectural heritage, while promoting tourism by aligning it with Algerian laws related to the protection of urban archaeological sites, particularly Law 03/03.

Research methodology. To map and delineate the boundaries of the Casbah of Beni Yellman, along with its access routes and pathways, the study relied on field surveys that combined Global Positioning System (GPS) Using the Garmin 62 GPS device data with ArcGIS 10.8 for the georeferencing of the site, the definition of its boundaries, access paths, and surrounding buffer zones The analysis revealed the areas most vulnerable to encroachment and provided an evidence-based tool to support local authorities in implementing the provisions of Law 03/03 Especially concerning protected and restricted areas.

The results. The study demonstrated that Geographic Information Systems are an effective tool for safeguarding and documenting architectural and urban heritage. They contribute to the implementation of heritage protection laws under Algerian Law 03/03, particularly in defining the buffer zones specified by the law. GIS also supports decision-making and enhances tourism by linking spatial precision with legal compliance Furthermore, the study confirmed the potential of applying this technology to multiple sites rich in urban, architectural, and natural heritage Where this study can be applied to the other archaeological sites in the Algerian state.

Keyword: *Urban Heritage, Tourism, Preservation, Geographic Information Systems (GIS), Law 03/03, buffer zones, Beni Yellman Casbah, M'sila province.*

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Introduction

Heritage comes in many shapes – in tangible forms such as sites, buildings, landscapes, or as intangibles, like memories, emotions, values and customs – as does the use of heritage, ranging from the purpose of building nations to marketing places. Heritage usually represents a phenomenon within a traditional historical discourse but have lately, more and more, come to take in peripheral appearances; often emanating from groups at the fringes of that traditional discourse as well. The use of heritage occurs in different arenas and takes on significance as a vehicle for political, cultural and entrepreneurial purposes, as well as educational and emancipator, to name just a few How to interpret heritage in order

to understand its meaning to different groups is therefore a very important task [1].

GIS technology offers great opportunities for the development of applications using maps and visualisation methods in the field of spatial management. This technology integrates common database operations with the unique visualisation and geographic analysis. For that is necessary to use non spatial and spatial data. GIS is used for bringing the georeferenced data (spatial and non spatial) of any geographic location into digital maps [2].

Despite serving as a medium for the interpretation, dissemination, iterative accumulation, and active inheritance of historical memory, cultural heritage is also susceptible to degradation and destruction [3].

has recently elevated the role of GIS in cultural heritage management [4].

Like other countries in the world, Algeria is rich in numerous diverse archaeological sites that are classified as part of the world's cultural heritage. In order to preserve them, Algeria began at the start of the 21st century to establish the foundations of a new national policy for the protection and development of its cultural heritage in general, and real estate cultural heritage in particular. This policy is based on a comprehensive and forward-looking vision for sustainable development. Real estate heritage is considered one of the most important pillars of comprehensive developmental movement, and its protection and preservation presents a significant challenge to researchers and various stakeholders in the institutions overseeing historically and culturally significant sites.

The objective of the research

- The attempt to integrate GIS with the Real Estate Conservation Law and Tourism Promotion Law of Algeria, No. 03/03, in order to create a database that outlines the boundaries of the Kasbah of Bani Yilman, as well as to develop a map showing its geographical location in the M'sila Province of Algeria.

- Promoting cultural tourism: Utilizing geographical data to enhance the management of tourist sites and attract visitors.

- Compliance with Law 03/03: Ensuring that the efforts made align with the legal provisions.

Here's the English translation of your text:

Materials and Methods

- Legal framework: Algerian Law 03/03 on heritage protection.

- Cartographic and geospatial data: topographic maps, photographs, and recent satellite images.

- Defining the scope of the study using a GPS-MAP 62 device.

- GIS software: ArcGIS, for buffer zone creation and classification.

- Georeferencing The georeferencing of maps was performed with a Root Mean Square Error (RMSE) of less than 3 meters, ensuring acceptable accuracy.

- Buffer Zone Delineation: A buffer zone of approximately 500 meters was created around the centroid of the Kasbah, in accordance with the requirements of Law 03/03.

Literature review

- The study titled Emerging trends in GIS application on cultural heritage conservation: a review Published in the journal Heritage Science (2024) Several practical applications of GIS in the restoration and preservation of cultural sites were discussed Examples were provided on how GIS is used to monitor changes in historical sites, study environmental impacts and human activities on them,

and also to develop sustainable protection strategies The study concluded that the use of GIS in cultural heritage conservation opens new horizons in the field of sustainable preservation, and that there are significant opportunities to improve these tools and use them more effectively in the future [5].

- The second study The study titled Sustainable Tourism Development Based on Spatial Analysis Published in the journal of Cases on Information Technology (2023) The study highlighted how to effectively utilize and manage tourism resources to achieve sustainable and coordinated development of the environment, economy, and society Taking a tourist city in southwestern China as a backdrop, this study conducts an empirical investigation on assessing the suitability of tourism development Through spatial quantitative analysis, the study concluded that government support is a crucial factor in regional tourism development A resource integration development model, an optimization and coordination model, and a guided development model were proposed. The implementation of these models requires joint efforts and cooperation between the government, tourism development investors, and other relevant parties [6].

- The third study, entitled Application of GIS in archaeological site detection and cultural heritage preservation, was published in International Journal of Research in Engineering journal in the year (2024). Researcher Alaa Abdulhadi Abbas attempted to use the latest applied geospatial technologies at the site for purposes of preservation and management related to the archaeological heritage of Ur in Iraq. In this study, we created a Geographic Information System (GIS) database that includes satellite imagery, aerial photographs, Ground Penetrating Radar (GPR) data, and precise field surveys.

This study helped identify and map archaeological features, providing a comprehensive picture of the site's geospatial nature. This integration enabled a thorough comparative study between historical maps and current remote sensing data to detect any changes in the landscape Most importantly, this interdisciplinary approach emphasizes the significance of digital technologies in safeguarding cultural assets, enabling collaboration among various stakeholders.

Through his research, Abbas also sought to establish a GIS database to assist authorities in heritage preservation, providing data for continuous monitoring. The study further highlights the importance of geospatial technologies in ensuring the survival of historical assets for future generations [7].

There is also another study entitled Leveraging GIS for sustainable tourism development, was published in Applied and Computational Engineering in the year (2025). The study highlighted the applica-

tion of GIS as a pivotal tool in spatial analysis and sustainable tourism development. Through mapping tourism resources, planning accessibility and infrastructure, it also sought to emphasize the role of GIS in designing personalized travel routes, risk management, environmental impact assessments, resource management, environmental conservation, stakeholder engagement, and community planning.

Furthermore, this research sheds light on the crucial role of GIS in shaping future tourism practices, stressing the importance of spatial analysis in promoting a balanced tourism approach that benefits local [8].

Definition of heritage. Cultural Heritage refers to the contemporary society's use of the past. "Our cultural heritage" contributes to the shaping of national stereotypes and regional identity and it's a modern or postmodern reflection of the past. In Europe it is often associated with older city centers. In North America, it is strongly linked to national parks, museums and galleries in urban areas. In Australia and New Zealand, it is also associated with the indigenous culture, identity and landscape [9].

The concept of real estate heritage according to international charters Heritage is a cultural wealth for all nations, reflecting their history and authenticity. Therefore, both peoples and governmental and non-governmental organizations have started to research the concept of heritage and how to preserve and enhance it [10]. Several international conferences and charters have been held on this matter, the most important of which are:

- The Athens Charter for the Restoration of Historical Monuments (1931).

- The Venice Charter for the Restoration and Preservation of Monuments and Sites (1964).

- The Burra Charter, which emerged from the International Council on Monuments and Sites (ICOMOS). Conference in 1979, focusing on the preservation of places of archaeological and cultural significance [11].

- The Dubai Charter, published during the First International Conference titled "Preserving Architectural Heritage Between Theory and Practice" in 2004, which aims to find ways to preserve and restore archaeological sites.

- Urban heritage sites "These include buildings associated with a distinctive natural environment, either in their natural state or man-made."

- This definition includes elements that are closely related to the concept of real estate heritage, due to the integration they form. Heritage buildings provide us with the history and culture of the people who inhabited them, while the heritage areas reflect the events of the era in which they were constructed. As for urban sites, they represent the characteristics

of the community, where we find urban values alongside customs and traditions.

Heritage is perceived as a comprehensive concept that engages a relationship with the community it represents. From this perspective, the significance of heritage is attributed not only to objects and places, but also to the meanings and uses that society attaches to them, as well as the values it bestows upon them, all within a continuous interplay of interactions and transactions between people and places. This could be described as an "act of re-integrating memories into frameworks of life that are open to the present and the future", which shifts the heritage issue from a concern solely for traditional preservation to a second logic that can be viewed as projective [12].

Some possibilities of GIS application in tourism planning and sustainable tourism development. A very useful platform is the GIS (Geographical Information System), which allows data to be managed and analysed with extreme precision. A GIS consists of geographical data stored in a database, software and the computer hardware that supports it the database contains all the data, stored in digital form. This platform has applications in land and building registration, for processing environmental [13].

The use of GIS technology enhances the interpretation of complex data sets, transforming raw data into actionable insights [14].

Remote sensing technology and GIS have been widely developed and applied globally to research, monitor, and track LULC changes. Remote sensing satellites are the most-used data source to detect, quantify, and map both current land use and LULC changes because of their ability to collect multitemporal spatial data in the form of precisely geolocated [15].

The phenomenon of tourism is interdisciplinary, and representatives of many different scientific disciplines are investigating it – the fact, which testifies to its complexity and multidimensionality [16].

Enhancement Strategies [17], notes that certain cities renowned for their architectural heritage and the events they host have transformed into attractive tourist destinations. Whether well-known or less famous, these cities offer visitors innovative experiences They also organize themselves to attract diverse clientele, enrich their offerings, and extend the length of tourist stays [18].

Tourism is an activity which depends on natural resources, but is also a phenomenon which can have a destructive effect on the natural geographic environment in case of an inadequate access to its planning and development Negative impacts of tourism on the environment are manifested primarily through its degradation by the mass tourist visits and

the construction of tourism infrastructure in inadequate areas. In addition, during the daily management and operations of tourist facilities, a large number of tourists are a big consumer of energy and water and at the same time produce a significant amount of solid waste, hazardous gases and waste water.

These negative impacts can be prevented or reduced by the application of certain GIS technology in order to achieve sustainable tourism development. Main applications of GIS in planning and management of sustainable development of tourism include the following activities:

- inventory of natural and cultural resources of a destination;
- determining the shortest path between two or more places;
- planning and determining the appropriate location for the development of tourism;
- promotion of a tourist destination;
- determining paths and attractions suitable for sustainable tourism [19].

Protection of architectural heritage according to law no. 03-03 related to expansion areas and tourist sites and its role in protecting antiquities

- This law was issued to define the principles, rules, and guidelines for the development, promotion, and management of expansion areas and tourist sites, as well as the preservation of cultural heritage and tourism resources. It focuses on using and exploiting cultural, artistic, and religious heritage for tourism purposes. The Algerian legislator has made it mandatory for the development and management of expansion areas and tourist sites to comply with the laws related to environmental protection, coastal management, and the protection of cultural heritage, particularly if these areas contain classified cultural and architectural heritage. This is achieved by incorporating them into the national land-use plan.

- The legislator has also allocated special protection to classified tourist sites and expansion areas designated as protected zones, through several measures aimed.

- Obligation to respect urban planning and development rules during the use and exploitation of land within protected areas

- Ensuring the protection and preservation of these areas and sites from all forms of pollution and environmental degradation, whether natural or cultural.

- Subjecting the granting of building permits in these areas to special procedures, including obtaining a prior opinion from the ministry responsible for tourism, in coordination with the administration responsible for culture [20].

It is worth noting that this law does not only provide legal protection for heritage in certain aspects but also extends to offering criminal protection

Article 41 of the law allows legally established associations to take action in protecting the environment, urban development, and cultural, historical, and tourist landmarks. These associations can act as a civil party in cases of violations related to this law.

Therefore, it can be said that Law No. 03-03, related to expansion areas and tourist sites, and its role in protecting antiquities, has significantly contributed to the protection and preservation of architectural heritage, both directly and indirectly, as evidenced by the numerous provisions it contains.

Study area. The M'sila Province emerged from the administrative division of 1947, which increased the number of provinces in Algeria from 15 to 31. Prior to this date, the M'sila region was part of the Setif Province. M'sila is located in the heart of northern Algeria, serving as a connecting link between the eastern and western regions of the country, as well as between the northern and southern parts of the nation. It belongs to the region of the High Plateaus and covers an area of 18,175 square kilometers. The population of M'sila is approximately 669,200 people, with a population density exceeding 66 people per square kilometer. It is bordered by the following provinces: To the north: Bordj Bou Arréridj Province, Setif Province, and Bouira Province. To the south: Biskra Province and Djelfa Province. To the east: Batna Province. To the west: Médéa Province [21].

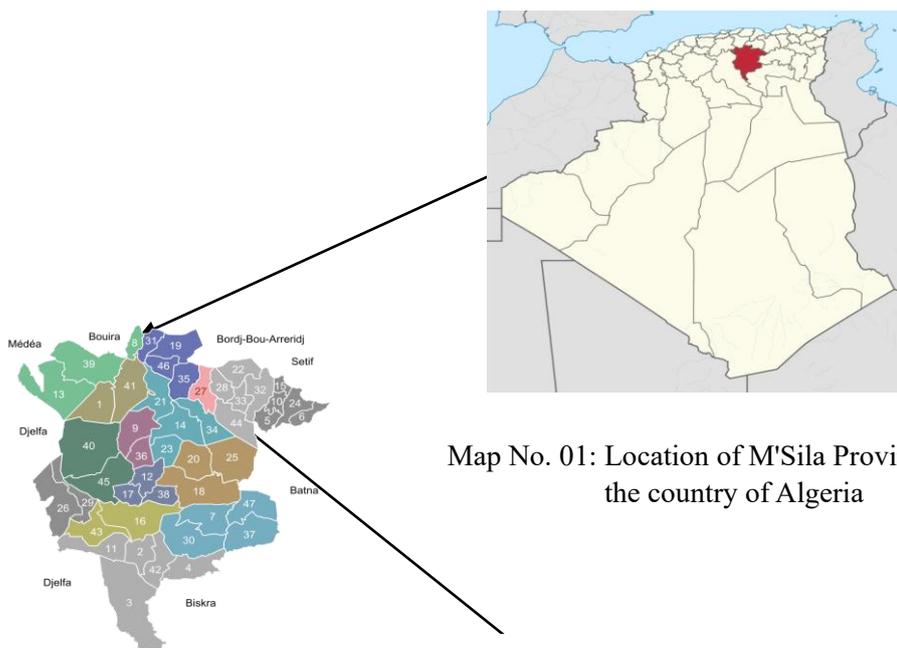
This study focuses on Beni Ilman, located north of the Wilaya of M'Sila, 65 kilometers away, while the old Kasbah is situated at the foot of Mount Kharat, approximately 5 kilometers from the town center. Its foundation dates back to the 4th century Hijri, established by Sheikh Yalman bin Muhammad Al-Idrissi Al-Hasani.

The Kasbah includes a prayer mosque called *The Great Mosque* and a school for teaching the Quran known as "*Al-Zawiya Al-Siddiqiyya*".

Satellite image data acquisition. Satellite images (Landsat 8) were used to map land use and delineate the boundaries of the Beni Yelmen archaeological area. After traveling to the site, we used a Global Positioning System (GPS) device (Garmin GPSMAP 62) to identify seven points as geographic coordinates, utilizing Global Mapper v18.0 after downloading the image from an online data source.

The satellite images listed in Table 1 were geometrically corrected to the Universal Transverse Mercator (UTM) coordinate system, Zone 31 North Sahara, based on the WGS84 datum.

As a final product, we delineated the boundaries of the Beni Yelmen archaeological area on the aerial image and assigned geographic coordinates as a digital identifier for the archaeological site using digital software such as ArcGIS, Global Mapper, and others.



Map No. 01: Location of M'Sila Province within the country of Algeria

Map No. 02: Location of the commune of Beni Ilmane within M'Sila Province



Map No. 03: Administrative boundaries of the commune of Beni Ilmane

Source: Prepared by the researchers based on reference maps from the Algerian Ministry of Tourism

Here is an fig No.02 depicting the historical Kasbah of Bani Yelmen in the m'sila province of Algeria, showing signs of population and activity It reflects the traditional architecture and the lively.

Field images are considered an important part of scientific work in the fields of urban planning and engineering. They take us to the Kasbah of Bani Yelman for fieldwork, collecting information to document the current status of the Kasbah. The following images illustrate the physical part of the Kasbah as an architectural and touristic heritage.

Integrating ARCGIS software from the Tourism Promotion and Heritage Conservation Law. First and foremost, the following aspects are considered for the preservation of cultural landscapes: legislative recognition, the establishment and operation of an appropriate state management system, inclusion in strategic, programmatic, and spatial planning documents, development of regulatory and methodological support, and advancement of scientific research in the areas of identification,

classification, mapping visualization, and promotion [22].

After communicating with the Directorate of Tourism of M'sila Province, information was collected about sites classified as part of the architectural and urban heritage of the province A map containing a database identifying the locations of this heritage was prepared with the aim of preserving it and promoting tourism using the ARCGIS 10.8 program.

This was implemented within the framework of Law 03/03 concerning the protection and preservation of architectural and urban heritage in Algeria. All historical sites indicated on the map are subject to the provisions of this law.

In this study, the integration of Law 03-03 with Geographic Information Systems refers to the process of translating the provisions of the law related to the protection of heritage sites into spatial parameters that can be represented and analyzed within the ArcGIS environment.

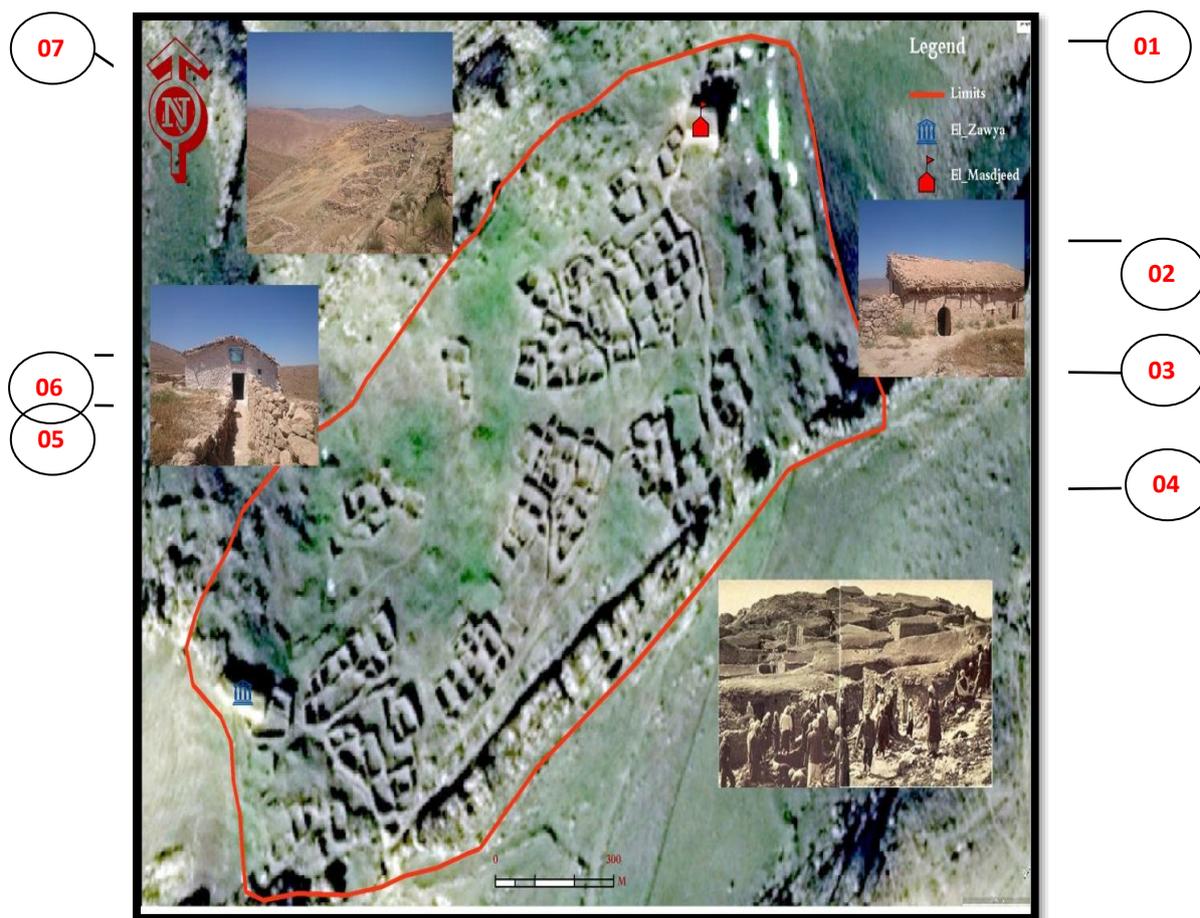


Fig. 1. Aerial view of the Kasbah of Beni Ilmane (Source: Aerial image + researchers' processing)

Table 1

THE coordinates of Kasbah Beni Ilman based on the World Geodetic System (WGS)
UTM North Sahara Projection 1959 Zone 31

	Unit	X (m)	Y (m)	Source	Purpose	Tools Used
Coordinates	01	598920.165	3982154.491	Coordinates from an image Geotif Using a program Global Mapper v18.0 Open source	Extensive spectral bands, thermal infrared imaging	Google Earth Pro
	02	598948.014	3981950.708			
	03	598934.437	3982016.557			
	04	598913.102	3981897.330			
	05	598884.864	3981906.743	Landsat 8		ArcGIS
	06	598847.123	3981912.704			
	07	598819.289	3982021.891			

Source: the researchers



Fig. 2. Shows the Kasbah in 1956 inhabited by residents (Source: Directorate of Tourism, M'Sila Province)



Fig. 3. Center of Kasbah Beni Illma



Fig. 4. Interior of a dwelling showcasing local construction materials in walls and ceilings



Fig. 5. The sign of the Great Mosque of the Kasbah, "Jami' al-Jumu'ah"



Fig. 6. Pathways in the Kasbah of Beni Illman



Fig. 7. Wooden doors used in the dwellings of Kasbah Beni Illman

Source: the researchers

Among the provisions of the Algerian Law 03/03 on the protection of archaeological areas is the definition of the direct protection zone, which is set at 500 meters from the center of the Kasbah, where construction or any other works are strictly prohibited.

This approach allows for the registration of all historical and cultural heritage objects, followed by the establishment and adjustment of historical boundaries. This approach has both positive aspects and drawbacks, as the protective zone from the centroid may not always cover the entire territory of the object, especially if it has an irregular shape (Figure 9).

The protective zone of a historical and cultural heritage object is set at 300 m from the polygon centroid in undeveloped areas and may be reduced depending on the surrounding development through contractual agreements.

The boundaries of the Beni Yellman Kasbah were determined based on a ministerial decree from the Ministry of Culture, which precisely defines the limits of the archaeological area.

The georeferencing process was performed using 12 ground control points, with a Root Mean Square Error below 3 meters, which is acceptable for urban heritage mapping.

Result and Discussion

- The study emphasized the necessity of preserving and documenting heritage through the crea-

tion of Geographic Information System (GIS) maps for the Beni Yellman Kasbah. These maps document landmarks, roads, and pathways.

- The study adopted digital archiving to develop a digital archive for storing and managing data related to urban and architectural heritage.

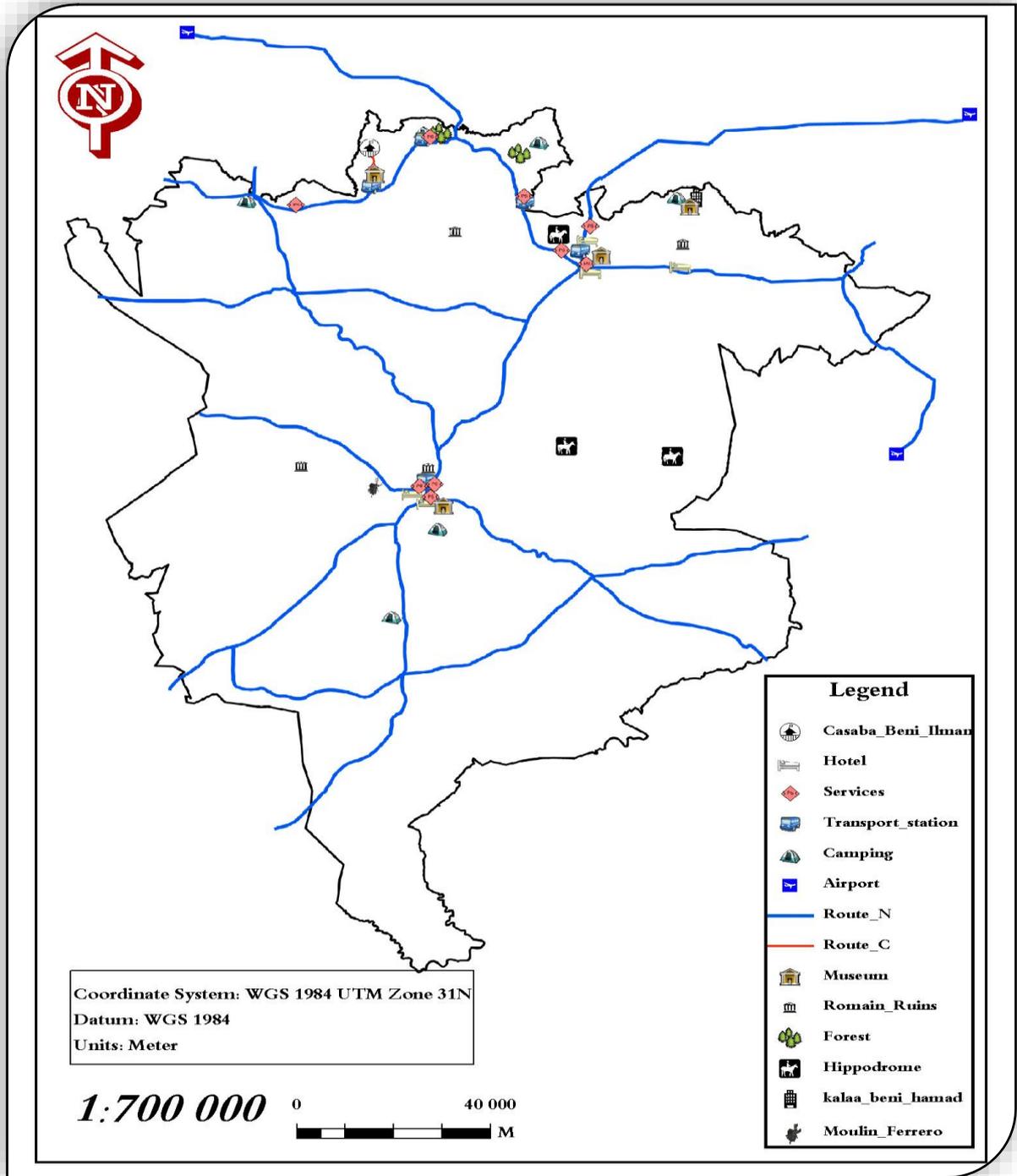
- Tourist routes leading to the Beni Yellman Kasbah in M'Sila Province were planned as part of the study.

- The study concluded that GIS supports the enforcement of Algerian laws, particularly Law 03/03, which focuses on the preservation of architectural and urban heritage and promotes tourism.

- Continuous monitoring is ensured by complying with legal procedures, such as tracking changes in land use or unauthorized modifications within the protected areas of the Beni Yellman Kasbah.

The Algerian Law No. 03/03 constitutes the legal framework for the protection of urban and real estate heritage. This law encompasses several articles aimed at safeguarding heritage sites from neglect or encroachment, granting local authorities and relevant entities a key role in their preservation. GIS systems can facilitate the spatial inventory process of heritage sites listed under Law 03/03, helping to accurately delineate their boundaries.

GIS systems assist in implementing urban regulations to preserve the distinctive architectural heritage of the Kasbah of Beni Haman, in line with the



Map No. 04 contains a database showing the locations of architectural and urban heritage to preserve them and promote tourism (*Source: the researchers*)



Fig. 8. Buffer zones constructed around the centroid of the object and around the centroid of irregularly shaped polygons

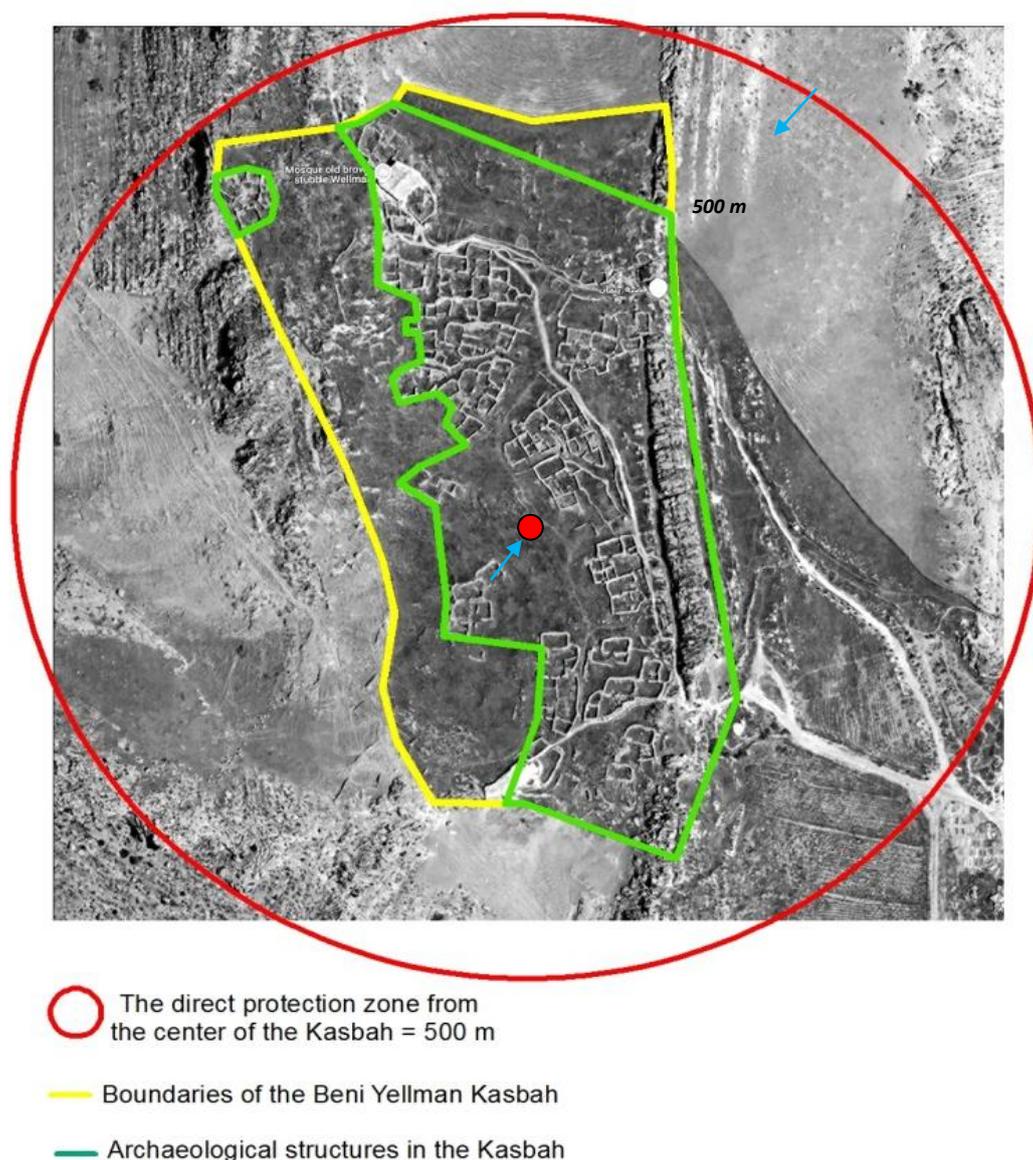


Fig. 9. Buffer zones were created around the center of gravity of the Kasbah of Beni Yelman using the ArcGIS program and defined according to Law 03/03 at 500 meters (Source: the researchers)

law's requirements.

By using GIS, clear boundaries for protected areas around the Kasbah (500 m) can be established and compliance monitored, preventing any violations or infringements.

Emerging trends in GIS application on cultural heritage conservation highlight its ability to not only monitor and protect heritage but also to enhance public engagement and understanding GIS allows for the visualization of historical data and the simulation of future scenarios, helping to predict the impacts of urban development and tourism growth As these technologies evolve, they will likely play a larger role in the integration of heritage conservation with tourism, ensuring that cultural sites like the Beni Yellman Casbah are preserved for future generations while benefiting from the positive aspects of tourism.

The first study Emerging trends in GIS application on cultural heritage conservation: a review, published in Heritage Science (2024) focused on emerging global trends in GIS applications It highlighted their importance in monitoring changes in historical sites, assessing environmental and human impacts, and formulating sustainable protection strategies. This study adopted a comprehensive and academic dimension, opening broad horizons for how GIS can evolve to shape long-term heritage protection policies and link them to sustainability.

In contrast, our study (Preservation of Urban Heritage and Promotion of Tourism within the Framework of Algerian Law Using GIS – Case Study: Beni Yellman Casbah, M'sila) was practical and centered on the Algerian context. It did not only highlight the technical potential of GIS but also sought to connect it with the Algerian legal frame-

work, particularly Law 03/03, which regulates the protection of urban heritage. Through the case of the Beni Yellman Casbah, the study demonstrated how digital maps and buffer zones can be transformed into practical legal tools that assist local authorities in monitoring, while at the same time promoting tourism by planning tourist routes in line with protection requirements.

On the other hand, both studies agree that GIS is no longer merely a technical tool but has become a strategic means for heritage conservation. Each highlighted the role of GIS in continuous monitoring, accurate documentation, and linking spatial data with decision-making.

Key differences between the two studies: the first study is theoretical in nature and provides a general review of global trends, whereas the second study is practical and tailored to a specific local context (the Beni Yellman Casbah, Algeria). Furthermore, the article *Emerging trends in GIS application on cultural heritage conservation* focuses on sustainability and long-term protection policies, while the Algerian study integrates legal protection with tourism development, showing how spatial tools can be transformed into executive mechanisms for the legislative framework.

The second study (Abbas, 2024) focused on the archaeological site of Ur in Iraq. It relied on integrating multi-source data, including satellite imagery, aerial photographs, ground-penetrating radar (GPR) data, in addition to precise field surveys.

Its primary objective was to establish an integrated geospatial database that assists in identifying archaeological features and monitoring changes in the natural landscape, with emphasis on the technological and integrative dimensions of geospatial techniques.

The study was characterized by a multidisciplinary approach, highlighting how digital technologies can foster collaboration among various stakeholders and provide continuous monitoring tools to ensure the sustainability of historical assets for future generations.

In contrast, our study *Preservation of Urban Heritage and Promotion of Tourism within the Framework of Algerian Law Using (GIS): Case Study of the Urban Heritage of the Beni Yellman Casbah, M'sila*.

was distinguished by its focus on the Algerian local context, with a specific integration of GIS within the legal framework, particularly Law No. 03/03 on the protection of urban heritage. It highlighted how digital maps and buffer zones can be transformed into practical legal tools to support local authorities in monitoring and control. Both studies emphasized the role of establishing spatial databases as a means to enhance preservation and

ensure sustainability.

As for the differences, the Iraqi study entitled *Application of GIS in Archaeological Site Detection and Cultural Heritage Preservation* concentrated on archaeological detection using advanced geospatial technologies (GPR, satellite imagery, historical comparisons), with a stronger emphasis on the scientific and technical aspects of uncovering archaeological features.

In our study, however, the focus was on legal protection and tourism development, where GIS was employed to activate national legislation and translate it into practical executive mechanisms, while highlighting the link between heritage preservation and the promotion of sustainable tourism.

The study entitled *Leveraging GIS for Sustainable Tourism Development*, published in *Applied and Computational Engineering in 2025*, demonstrates how Geographic Information Systems can play a pivotal role in sustainable tourism development. It focused on a wide range of applications, including mapping tourism resources, planning infrastructure and accessibility, designing personalized travel routes, risk management, environmental impact assessment, resource management, and environmental conservation. This study highlights the comprehensive dimension of GIS in reshaping future tourism practices from a perspective of sustainability and inclusiveness.

From the comparison, it becomes clear that the study *Leveraging GIS for Sustainable Tourism Development* approached GIS as a global and strategic planning tool for sustainable tourism development, whereas our study focused on the legal and institutional dimension within the Algerian context, highlighting the relationship between urban heritage protection and the promotion of sustainable tourism.

Conclusions

In the context of this research, which addresses the topic of preserving architectural heritage and promoting tourism using (GIS) in light of Algerian Law No. 03/03, the study focused on the architectural heritage of the Bani Yelman Kasbah in the M'Sila province. The research highlighted the importance of preserving architectural heritage as a part of the nation's identity and culture, and the necessity of integrating modern technological tools such as GIS into preservation efforts. Law No. 03/03 is one of the key laws supporting the protection of architectural heritage in Algeria, providing a legal framework that contributes to organizing and encouraging work on preserving heritage sites, including promoting the use of modern technologies in this field. The study also demonstrated that the use of GIS in preserving the architectural heritage of the Bani Yelman Kasbah significantly improves the efficiency of documentation and monitoring pro-

cesses for these sites. Furthermore, GIS is an effective tool in boosting tourism by providing visitors with accurate information about the history and location of heritage landmarks, which helps attract tourists and stimulate the local economy.

In conclusion, the integration of architectural

heritage with modern technology within a well-defined legal framework proves to be an effective tool for achieving a balance between preserving history and developing tourism, contributing to maintaining the community's identity and promoting sustainable economic development in heritage areas.

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Збереження міської спадщини та просування туризму в рамках алжирського законодавства з використанням ГІС. Тематичне дослідження: міська спадщина Касби Бені Єлл-ман, Мсіла

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Це дослідження розглядає інтеграцію геоінформаційних систем (ГІС) з алжирською законодавчою базою щодо охорони спадщини, з особливим акцентом на Закон 03/03, який містить кілька положень, спрямованих на захист об'єктів спадщини від занедбання або посягання. Випадок Касби Бені Єллман у провінції Мсіла – міського поселення, що датується IX століттям – був обраний для демонстрації того, як просторові технології можуть сприяти документуванню та збереженню спадщини. Це дослідження має на меті підкреслити важливість використання геоінформаційних систем (ГІС) для захисту та документування архітектурної спадщини, одночасно сприяючи розвитку туризму шляхом узгодження його з алжирськими законами, що стосуються захисту міських археологічних пам'яток, зокрема Законом 03/03. Для картографування та визначення меж Касби Бені Єллмана, а також шляхів доступу до неї, дослідження спиралося на польові дослідження, які поєднували дані Глобальної системи позиціонування (GPS) з ArcGIS 10.8 для геоприв'язки ділянки, визначення її меж, шляхів доступу та навколишніх буферних зон. Аналіз виявив райони, найбільш вразливі до заворушень, та надав інструмент, заснований на доказах, для підтримки місцевих органів влади у впровадженні положень Закону 03/03. Дослідження продемонструвало, що геоінформаційні системи (ГІС) є ефективним інструментом для охорони та документування архітектурної та міської спадщини. Вони сприяють впровадженню законів про охорону спадщини відповідно до Закону Алжиру 03/03, зокрема у визначенні буферних зон, визначених законом. ГІС також підтримує прийняття рішень та покращує туризм, пов'язуючи просторову точність з дотриманням законодавства. Крім того, дослідження підтвердило потенціал застосування цієї технології до багатьох об'єктів, багатих на міську, архітектурну та природну спадщину.

Ключові слова: міська спадщина, туризм, збереження, геоінформаційні системи (ГІС), закон 03/03, буферні зони, Касба Бені Єллман, провінція Мсіла.

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