ГЛАСНИК Српског географског друштва 106(2) 89-106
BULLETIN OF THE SERBIAN GEOGRAPHICAL SOCIETY 2026

Original scientific paper UDC 338.48(65)
https://doi.org/to_be_assigned

Received: September 29, 2025
Corrected: May 25, 2026
Accepted: July 9, 2026

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MODERNISATION OF THERMAL TOURISM AND ITS CONTRIBUTION TO LOCAL DEVELOPMENT IN MOUNTAINOUS AREAS. THE CASE OF OULED TEBBENE, FROM SETIF PROVINCE, ALGERIA

Abstract: Thermal tourism constitutes a promising developmental alternative for isolated mountainous regions. However, the impact of modernizing this sector on local development remains insufficiently analyzed within the Algerian context. Consequently, this study aims to evaluate the contribution of modernizing thermal complexes to the local development of the mountainous municipality of Ouled Tebbene (Southern Setif Province). The methodological approach relied on a field survey utilizing a questionnaire administered to 275 visitors, complemented by semi-structured interviews with sector officials and a statistical analysis of socio-economic development indicators covering the period 2015-2024. The findings indicate that the modernization of thermal tourism has effectively stimulated tourist flows and generated employment opportunities. Nevertheless, the study reveals the persistence of high unemployment rates and a continuous decline in net migration, suggesting that reliance on thermal tourism as a standalone strategy is insufficient to address the deep-rooted structural imbalances inherent to mountainous territories.

Keywords: isolated areas, visitors, employment opportunities, Ouled Tebbene, Algeria

Introduction

Rural areas are characterized by a multidimensional socio-economic vulnerability. Regardless of the geographical context-wether within developed western nations (Cavallo et al., 2025; MacDonald et al., 2000) or developing countries (Fellahi, 2021) these territories confront profound structural challenges. Foremost among these constraints are rural out-migration, infrastructural deficits, and depressed income levels (Tsamos et al., 2025), a reality consistently corroborated by recent empirical studies across diverse economic settings.

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Given the failure of conventional development policies rooted in traditional economic growth theories to eradicate spatial disparities (Barca et al., 2012), a compelling need has emerged to adopt place-based development approaches. This paradigm focuses on the valorization of local resources, transforming them into territorial competitive advantages through what is conceptualized as endogenous development (Ray, 1999). In this context research that tourism activities within rural and mountainous regions can act as a vital catalyst for diversifying income streams and mitigating socio-economic vulnerability. Such initiatives revitalize local economies and facilitate their structural integration into the broader national economic fabric (Lun et al., 2016).

Consequently, thermal springs hold paramount importance. They serve as natural resource uniquely suited for sustainable exploitation within the thermal tourism sector, acting as a potent catalyst for local development underpinned by endogenous strategies. Empirical evidence corroborates this dynamic; the experience in the maresme region of Spain demonstrates that modernizing thermal spa facilities and upgrading their services amplified economic benefits to 1.712, alongside yielding tangible social dividends (Torres-Pruñonosa et al., 2022)

The conceptualization of rural local development has undergone a profound paradigm shift. The traditional dichotomy is obsolete. We have moved beyond the binary division between the exogenous development model reliant on the external infusion of capital, knowledge, and technology and the strictly localized endogenous model (Karchegani et al., 2024). In their place, a new synthetic framework has emerged neo-endogenous rural development. This paradigm conceptualizes development as an intertwined, networked process. It hinges on the strategic integration of local assets and actors with external institutions and macro-level forces. Consequently, rural development either can emerge organically from the grassroots or be catalyzed top down by national government. Ultimately, it is the dynamic synergy and continuous interaction between these dual scales that serve as the primary engine for sustainable rural development (Gkartzios & Lowe, 2019).

Within this context, thermal springs located in mountainous regions constitute a local resource capable of attracting financial investments and tourist flows into isolated environments, thereby serving as a robust catalyst for socio-economic rural development (Sharpley, 2002). Consequently, the adoption of sustainable mountain tourism frameworks as a strategic imperative for the development of mountainous areas ensures that the valorization of thermal resources bolsters the socio-economic well-being of local communities, while concurrently preserving fragile mountain ecosystems (Boudjemaa, 2023; Keller, 2018).

Therefore, modernization within the context of thermal tourism is conceptualized as the transition of thermal stations from the traditional therapeutic and balneological model, which focuses exclusively on natural mineral water treatments towards a comprehensive health and wellness tourism industry. This transformation is fundamentally underpinned by hospitality quality standards and the diversification of recreational and complementary services(Smith & Puczkó, 2014). According to the tourism-led local development model, such modernization stimulates the economic multiplier effect; every investment directed toward upgrading thermal complexes generates local value added and induces positive spillover effects on transport, services, and local commerce (Kurek et al., 2020). Furthermore, it enhances the territorial attractiveness of the region, fostering private sector initiatives, job creation, and the development of local products and services, which ultimately contributes to demographic stability and population retention (Chrobak-Žuffová et al., 2025).

Algeria, with its vast territorial expanse and diverse natural tourism resources ranging from the Mediterranean coast in the north to the Sahara desert in the south (Ahmed et al., 2024) coupled with its abundant cultural and civilization heritage is strongly positioned to become a prominent tourist destination contingent upon the optimal utilization of these resources (Zerkak & Souman, 2024).

Accordingly, Algeria is strategically shifting towards positioning the tourism sector as a vital engine for economic growth given its evident contribution to national incomes globally (Belahcene & Brahim Ali, 2025; Laifa & Benhassine, 2023; Mecerhed & Touat, 2020), alongside its socio-cultural dividends. This orientation aligns directly with the national strategy aimed at the valorization of all tourism assets to achieve sustainable development beyond the hydrocarbon sector (Ministère de l'Aménagement du Territoire, de l'Environnement et du Tourisme, 2008).

Algeria possesses over 200 natural thermal springs, the majority of which remain sub-optimally exploited. The Tourism Development Master Plan (SDAT 2030- Schema Directeur D'Amenagement Touristique) highlights the significant discrepancy between territorial potential and current operational realities; modern thermal stations complying with international tourism standards are scarce, representing substantial missed opportunities for local development. Consequently, thermal tourism constitutes a fundamental pillar in Algeria's strategy to establish tourism poles of excellence (poles touristiques d'excellence), affording it a crucial role in the revitalization of inland rural areas. Within this spatial strategy, thermal tourism has been explicitly designated as a priority sector among the development projects of these tourist poles.

Within this framework, Algeria is actively developing thermal tourism products to enhance overall sectoral efficiency (Rais & Bencharif, 2022). Such tourism products hold substantial weight in the international market due to their integrated health, therapeutic, and recreational properties. This is further compounded by a growing and increasingly diversified domestic demand across various social strata, cementing thermal tourism as a primary resource for both recreation and medical treatment (Kourim & Korikar, 2025).

Despite this official policy orientation and the considerable scholarly attention, thermal tourism in Algeria has received with numerous researchers underscoring its importance and advocating for its role as a key driver of tourism sector revitalization (Fertas et al., 2022; Kourim & Korikar, 2025; Rais & Bencharif, 2022) a critical analytical gap remains. The existing literature is predominantly descriptive, focusing heavily on identifying tourism potential, promoting therapeutic characteristics and assessing general macroeconomic contributions. However, it has largely neglected the specific impact of modernizing thermal tourism on local development in mountainous regions, particularly concerning its precise socio-economic ramifications for rural local communities.

Therefore, this research aims to determine the extent to which infrastructure and service modernization projects within the thermal tourism sector of the mountainous region of Ouled Tebbane contribute to generating local developmental dynamics and alleviating geographical isolation. This objective is addressed through an empirical evaluation grounded in the perspective of both local stakeholders and visitors to the region's thermal complexes.

Study area

Ouled Tebbene region is located along the Boutaleb mountain range in northeastern Algeria, in the far southwest of Setif city, and it is one of its sixty municipalities. It covers an area of

177.80 square kilometers, with a predominantly mountainous character and a dense vegetation cover of 83%. The most prominent of these mountains are: Jebel Guedil 1747 meters , Tender mountain 1600 meters (Center for Studies and Achievements in Urban Planning, 2010). As for the plains, they are located in the heart of the region's territory, surrounded by mountain ranges on all sides. It is the population concentration area, and most human activities, including agriculture, are practiced there (Rais & Bencharif, 2022).

The region is located 100 km from the Mediterranean Sea; therefore, it is subject to the influence of the Mediterranean's climate. The region's terrain and elevations also influence the climate, making it more moderate. In general, the region is characterized by a semi-arid climate, despite differences between the lower and higher regions in terms of dryness and humidity and the influence of the mountainous heights on the region's climate (Figure1).

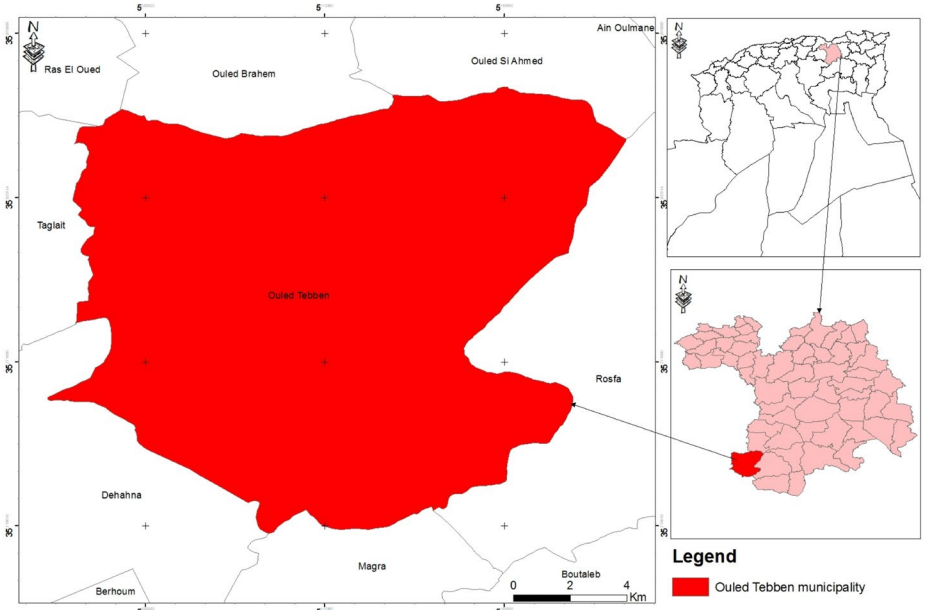


Fig.1. Location of Municipality of Ouled Tebbene, Setif, Algeria

Source: Authors, 2025.

The reasons for choosing Ouled Tebbene region for this study are many. First, the region abounds with great tourism potential thanks to its important location and picturesque nature. It also has a multifaceted historical and cultural heritage (Zeraib et al., 2022). In addition, it is considered a reservoir of thermal mineral waters that makes it an excellent therapeutic hub. This has qualified it to receive great attention from the concerned authorities, which have given great importance to the tourism sector, recently (especially thermal tourism, thanks to its therapeutic and recreational dimension). According to the analyses conducted in the health laboratory of Setif, the waters of the baths are very hot alkaline (70°C), of good microbiological quality. They are calcareous sulfurous waters rich in minerals suitable for treating several diseases, including: rheumatic diseases, the effects of osteoarticular trauma, some neurological disorders, skin diseases, diseases of the digestive and urinary systems, diseases of the nose, ear, and throat (ORL), and growth diseases in children.

Materials and Methods

This study employed a questionnaire and a field survey to collect data from visitors to the thermal spas in Ouled Tebbene area about their attitudes. Given the exploratory nature of this research within the study area, an analytical method was adopted to examine the field survey forms. In addition, a comparative method was applied based on comparing socio-economic development indicators collected from official government institutions and departments, as well as comparing the general situation of the tourist expansion area before and after the completion of the modern thermal spas. Moreover, the findings and conclusions derived from the obtained data and statistics were generalized (Ivanović, 2024; Lagha, 2021). A quantitative approach was also employed (Berkoune, 2025), alongside a descriptive method to explain some qualitative aspects of the study.

The study sample was randomly selected. 275 visitors to the thermal spas were questioned; they represented 50% of the average number of people who visited each of the four thermal spas in the study area per day during one year. The data collection was carried out during the winter months and the beginning of spring (January, February and March 2025), when demand for thermal spas increases.

The questionnaire administered to visitors was structured into several sections designed to collect demographic, socio-economic, and educational data, alongside a specific dimension dedicated to evaluating service quality and pricing. To establish face validity, the survey instrument was submitted to a panel of three specialized academic experts. The reviewers confirmed the appropriateness and relevance of the questions and measurement items comprising each section of the questionnaire.

Furthermore, in order to obtain information related to the thermal tourism sector in this study area, interviews with employees of different departments, most notably the Directorate of Tourism and Traditional Industries, as well as officials and managers of thermal spas, were conducted. Lastly, a review of some references, ministerial decisions and articles related to the subject of this study was conducted. The statistical results obtained of quantitative tools and various data were translated into the form of tables, maps, charts, and topographical images.

Results

The results we have reached below.

Visitors' Data

Gender and Age

Table 1 shows the distribution of the number of visitors to the baths according to gender and age. The percentage of males is 20% higher than females. This is because men often go alone and on all days of the week, while women rarely go alone and that happens on weekends. As for the age factor, the age groups were divided into four categories. The percentage of visitors between the age (41-65) years old is higher, representing (34.90%) of the population; this is due to the increased awareness of individuals in this group category of the importance of thermal spas. The elderly category (66 years and older) who come primarily for therapeutic purposes ranks second (31.27%).

Table 1. Distribution of the number of arrivals to thermal spas by gender and age factors

		Number	Percentage (%)
Gender	Males	165	60
	Females	110	40
Age	18-25	38	13.81
	26-40	55	20
	41-65	96	34.90
	Over 66	86	31.27

Source: Authors' Field Survey, 2025.

Educational Level and Place of Residence

Table 2 highlights the relationship between the frequency of visits to thermal spas and the educational level and place of residence. The survey reveals a high percentage of university graduates (31.27%), as they are the working class and have a high percentage of members in society now. Those with a secondary education (27.27%) follow this. Then, comes the percentage of uneducated people (24%), which is no less important in terms of its high percentage than the previous percentages, as many members of this group are currently elderly and have not entered school previously. As for the level of frequency of baths according to place of residence, a high percentage of visitors come from outside the city (29.09%), specifically the neighboring cities (M'Sila, Bordj Bou Arreridj, Batna), then people from the same city visit the area due to the proximity factor.

Table 2. Distribution of the number of arrivals to thermal spas by educational level and place of residence

	Uneducated	Number	Percentage (%)
Educational level		66	24
	Primary	23	08.36
	Middle	25	09.09
	Secondary	75	27.27
	University	86	31.27
Place of residence	Same village	59	21.45
	Same city	70	25.45
	Out of the city	80	29.09
	The capital	51	18.54
	Out of the country	15	05.45

Source: Authors' Field Survey, 2025.

Thermal spas Data

Reasons for Frequent Visits to the thermal spas

Structures and Prices

In Table 3, the reasons and the frequency of visiting the mineral baths are summarized. We note that the reason for treatment is the dominant one (36.36%). This percentage is influenced by the high incidence of diseases related to the therapeutic properties of the region's baths, especially joint and rheumatic diseases. Visiting thermal spas for entertainment is considered as an unprecedented leap brought about by thermal tourism. As for the statistics on the frequency of visits to thermal spas, they show an increase in the percentage of people who visit once a week (44.36%). A percentage that coincides with the weekends,

followed by the category of visitors who visit two to three times a month (37.09%), who come mainly from neighboring states and even other cities (Figure 2).

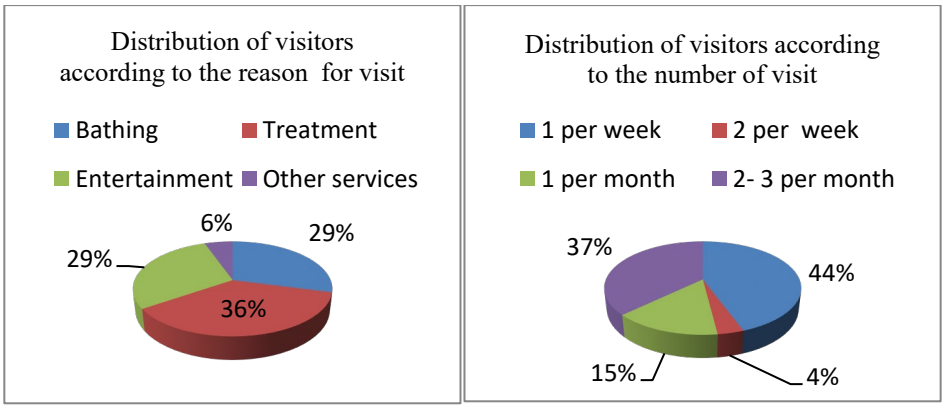


Fig. 2. Distrubution of visitors of thermal spas according to the reason and number of visits

Source: Authors, 2025.

Table 3. Distrubution of visitors of thermal spas according to the reason and number of visits

		Number	percentage(%)
Reason of visit	Bathing	80	29.09
	Treatment	100	36.36
	Entertaiment	80	29.09
	Other services	15	05.45
Number of visits	1/ week	122	44.36
	2/ weeks	10	03.63
	1/ month	41	14.90
	2-3/ months	102	37.09

Source: Authors' Field Survey, 2025.

Structures and Prices

From Table 4, it can be seen that the most prominent services available in the thermal spas are identified according to their sufficiency and prices. It is obvious that the catering, accommodation, and shower facilities received the satisfaction and acceptance of most visitors (61.81-80%) in terms of sufficiency. However, (20-38.18%) of the interviewed visitors complained about the lack of catering services in hotels and in collective accommodation facilities, such as bungalows, especially during various holidays when the number of visitors increases. In addition to that, some of them complained about the cramped bathrooms used by individuals and families. Regarding prices, they were largely acceptable; 80-84% of visitors stated that the prices were within the average range, especially for collective baths, whose costs are generally in line with the financial circumstances of Algerian families. For the visitors who complained about high prices, they were those related to traditional dishes, collective accommodation, and individual showers.

Table 4. Evaluation of arrivals for the level of basic services provided in thermal spas terms of sufficiency and prices

Structures		Level of sufficiency		Prices		
		Sufficient	Insufficient	Low	Medium	High
Feeding	number	170	105	00	231	44
	(%)	61,81	38,18	00	84	16
Housing	number	200	75	00	220	55
	(%)	72,72	27,27	00	80	20
Bathing	number	220	55	0.5	225	45
	(%)	80	20	01.81	81.81	16.36

Source: Authors' Field Survey, 2025.

Other Services

Table 5 identifies the other essential services that should be guaranteed in all modern spas, such as swimming pools, entertainment facilities, and good treatment. It is evident that most visitors gave positive feedback about the level of services provided by these facilities, yet some complained about the lack of recreational facilities, such as gardens and outdoor facilities, as well as poor road paving. Additionally, they criticized the hotel staff who lack adequate training in dealing with visitors (Figure 3).



Fig. 3. Entertainment space in the thermal tourism complex EL-Montazeh in Ouled Tebbene

Source: Authors, 2025.

Table. 5. Evaluation of visitors 'satisfaction with the quality of additional services offered at thermal spas facilities

Service		Vehicule Parking	Swimming pools	Entertainment areas	External arrangement	Good treatment
Sufficient	Number	275	247	180	200	240
	(%)	100	89.81	65.45	72.72	87.27
Unsufficient	Number	00	28	95	75	35
	(%)	00	10.18	34.54	27.27	12.72

Source: Authors' Field Survey, 2025.

Socio-economic development indicators

The data presented in table 6 highlight specific local development indicators that have exhibited either progression or regression following the modernization of thermal tourism within the study area. A pronounced increase in visitor arrivals, the generation of new employment opportunities, and the expansion of commercial retail units within the Tourist Expansion Zone are observable across various temporal phases between 2015 and 2024. Specifically, the volume of visitor arrivals reached 201,587 in 2024, representing a substantial surge from a baseline of fewer than 54,000 visitors in 2015. Concurrently, 187 employment positions were generated by 2024, and 21 new commercial units were established, compared to a baseline of only 5 units in 2015.

Conversely, the year 2021 recorded a marked decline in visitor members alongside a corresponding contraction in associated services. This downturn coincided with the periods of general and subsequent partial, lockdowns mandated during the COVID-19 pandemic, during which operational activities were strictly limited to individual bathing cabins, while collective thermal pools were subjected to mandatory closure.

Table 6. Local development indicators in the study area (2015 – 2024)

Years / Development indicators	2015	2018	2021	2024
Number of visitors	54000	175525	106120	201587
Newly created jobs	42	72	63	187
Number of shops	05	11	09	21
Uempoyment rate (%)	04,03	05,39	11,29	23,32
Population number	12281	13291	14136	15041
Natural increase rate (%)	02,31	02,15	01,80	01,38
Net migration rate (%)	0,81	0,53	0,49	0,35
Population growth rate (%)	03,12	02,68	02,29	01,73

Source: Tourism Directorate and Programming Directorate, 2026.

Notwithstanding the positive implications of the preceding statistical data, the unemployment rate has registered a persistent upward trajectory, escalating from 4.03% in 2015 to 23.32% in 2024. Furthermore, as illustrated by the data in Table 6, although the absolute population of the Ouled Tebbane municipality continues to expand, the population growth rate is characterized by a decelerating pace. This deceleration represents a prevailing demographic phenomenon observed across the Setif Province and the entirety of the Algerian national territory, with the local growth rate declining from 3.12% in 2015 to 1.73% in 2024. Finally, an analysis of the net migration rate indicates that, although it remains positive (with in-migration consistently exceeding out-migration), the rate is undergoing a continuous, albeit gradual, contraction, dropping from 0.81% in 2015 to 0.35% in 2024.

Discussion

After observing and analyzing the data in the attached tables and figures, the following conclusions can be drawn:

The age group (41-65 years) lives in a state of psychological and family stability and is aware of the plan for dividing time, especially, if the children have passed the stage of childhood. At this age, the burdens and responsibilities of raising them are less, which facilitate the movements of parents without major obstacles. As for the group (over 66 years), the percentage of those who visit mineral thermal spas is also high, as most of its members suffer from chronic diseases, such as rheumatism, arthritis, and various chest diseases.

When considering the educational level, results reveal that the percentage of visitors to the thermal spas was higher among the more educated group, as the frequency of visits to baths has become closely related to the level of awareness of individuals about their therapeutic and recreational importance, and their role is no longer limited to bathing only. As for the number of visits or the level of frequency of the baths' visits, an increase in the percentage of visitors once a week is noted, as most visits occur on weekends (Friday and Saturday). This particularly includes visitors from the municipality and neighboring areas due to geographical proximity. As for those coming from the capital, their frequency of visits to the area is estimated at once every one to two month, according to the respondents' answers.

Despite its isolation, Ouled Tebbene region occupies an important strategic location, as it is located on the borders of three cities (Setif, M'Sila, Bordj Bou Arreridj), which made it a point of connection. Consequently, an increase in the percentage of visitors from neighboring cities is said to be due to the geographical proximity factor. People coming from the capital city, Algiers, also represent a good percentage (18.54%), although it is 260 Kilometers away from the region. Despite this considerable distance, people do visit this area because of the available new thermal spas that were built in a modern way that is compatible with the needs of tourists. As a result, its services have become widely popular around the country.

The region is also characterized by its mountainous nature, which gives it picturesque natural scenery interspersed with roads that cut through these mountains. Such a landscape allows tourists to wander around comfortably and practice hiking or jogging long distances (Boufrida et al., 2024; Fertas et al., 2022; Kherrour et al., 2018). The responsible authorities are working on developing and supporting all what contributes to stimulating the advancement and achieving comfort and tranquility for the visitor at the regional level (Figure 4).



Fig. 4. The beauty of nature in the region of Ouled Tebbene

Source: Authors, 2025.

The mountains surrounding the region on all sides had a positive impact on it. Thanks to this special feature, the area is distinguished by historical and cultural characteristics that are unique to other regions (Boukhalkal & Touhami, 2024; Mechiat &

Dekoumi, 2023), as it has many antiquities, shrines and historical landmarks that are known for the history of the region and the characteristics of its inhabitants (Figure 5).



Fig. 5. Lords and traditional industries in Ouled Tebbene

Source: Authors, 2025.

In implementation of the strategy of the Tourism Development Master Plan (TDMP), which was announced in 2010 and amended in 2015 by the Directorate of Tourism and Handicrafts (DTH) of Setif, Ouled Tebbene region was declared a tourist expansion area in 2022. The execution aimed at promoting the tourism sector in the short, medium and long terms.

The study area received great attention from the state, and huge sums of money were allocated to encourage private investments to promote this sector and keep pace with global developments. This allowed for the development of the region and the construction of facilities that provide comfort to visitors, such as hotels, bungalows, children's games and swimming pools (Figure 6).



Fig. 6. Hotels and Bungalows in the tourism district Ouled Tebbene

Source: Authors, 2025.

There are many development and recreational projects that are in the process of being implemented, such as: major shopping centers, camping centers and natural parks. All of this has led to an increase in the level of awareness of individuals about the tourism and recreational concept (Figure 7).

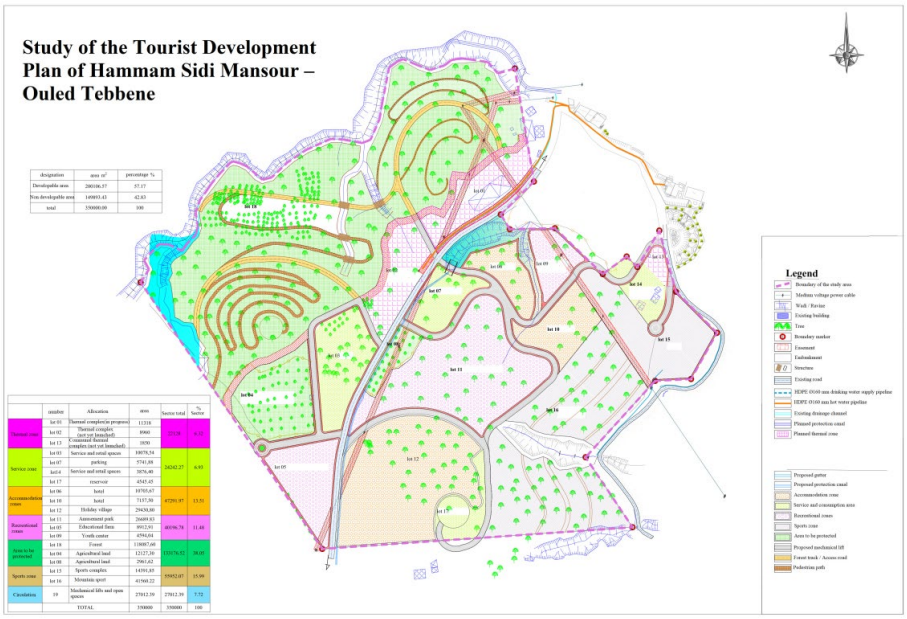


Fig. 7. The thermal tourism area and the futur projects in Sidi Mansour, Ouled Tebbene

Source: Authors, (DTH), 2025.

The modern construction of baths and their initial operation in 2016 had a positive impact on increasing tourist flows to the region. This, in turn, led to an improvement in the region's development level. Numerous services were provided and significant infrastructures were constructed to accommodate the growing number of visitors, and, consequently, succeeded in stimulating tourism in the region. It should be noted that urban expansion also increased around the geographic area of the thermal region**.** Consequently, it is evident that the modernization of the thermal tourism exerts a tangible impact on the development reality; investments directed towards the development and upgrading of thermal spas have genuinely generated stimulatory development outcomes for the local economy.

Nevertheless, unemployment rates have exhibited a continuous increase. This paradox is attributable to sustained population growth and a concurrent entry of new youth cohorts into the labor market, juxtaposed against a sluggish pace of economic expansion. This imbalance indicates that relying exclusively on the thermal tourism sector, as a lever for local development is insufficient to eradicate structural unemployment in mountainous regions. This is particularly notable given that the primary development objectives underpinning the revitalization of the regional tourism sector were fundamentally centered on generating additional employment opportunities and mitigating unemployment. In this regard, the advancement of thermal tourism must be synchronized with the development of ancillary socio-economic sectors associated with thermal activities. Furthermore, it necessitates the creation of supplementary tourism niches commensurate with the territorial characteristics of the region such as mountain, historical, cultural and eco-tourism capitalizing on the area's inherent potential.

The decline in the population growth rate within the study area does not constitute an exceptional case. Rather, this trend is observed across all municipalities within the Setif province and represents a generalized demographic transition currently unfolding throughout Algerian society. However, the contraction in the net migration rate implies that the modernization of thermal tourism lacked sufficient momentum to trigger reverse migration. Consequently, it failed to recuperate the demographic losses incurred during previous decades, specifically over the 1977-2008 period, which were driven by either development deficits or the prevailing security instability during the 1990s. Although the majority of outmigrants retain ownership of agriculture land parcels across the Ouled Tebbene municipality, sustained reverse settlement remains strictly contingent upon the provision of a comprehensive integrated socio-spatial environment, extending well beyond the mere modernization of thermal spas.

Challenges and Suggested Solutions

From the results obtained above, it can be said that Ouled Tebbene region is a tourist area par excellence, with distinct touristic potential, thanks to its unique location and diverse history. However, after evaluating the progress of the thermal tourism sector in the region, it is obvious that despite the efforts made and the positive results achieved on all levels, there are several difficulties facing the path to further development. Among these challenges, we find:

- Poor quality of medical services and their mismanagement: They are among the most significant obstacles to the development of this type of tourism. Tourists in general and sick tourists, in particular, require specialized medical and paramedical support to ensure optimal use of their medical tourism destination.
- Weakness of complementary services: This is manifested in the deficiency of existing hotels that do not meet international standards, especially with regard to food, and the lack of training for their staff, who lack adequate qualifications regarding dealing with tourists. Although the region has distinctive natural, cultural and historical characteristics, it also witnesses a severe shortage of tour guides and escorts who are required for the promotion of the tourism components of that region. In addition, there is a lack of complementary recreational facilities and the fragility of the infrastructure (e.g. roads, transportation and fueling stations, communications, and the Internet.
- Lack of security and civil protection services: Given the region's isolation and relative distance from cities that provide such services, urgent intervention to rescue and provide medical aid to those affected in such circumstances is very challenging and highly required.
- As for the suggestions of this study, we can say that developing thermal tourism requires more effort. Improving a successful strategic plan capable of withstanding the obstacles facing the sector, making good use of tourism resources, and linking the tourism development plan with other economic development plans are some possible ways (Meftah et al., 2022; Taklit, 2024). Such an execution could be achieved through the following steps:

- Considering the important role of forests and mountainous areas, which is evident in the increasing number of visitors, as they perform several functions that serve the tourism sector (Rabehi et al., 2023). Caring for forests helps achieve sustainable development, which relies heavily on protecting natural resources such as wildlife, along with preserving inherited civilizations (Douli & Slimani, 2016). Moreover, to attract local and foreign tourists, it has become necessary to make efforts to improve various types of transportation and all related infrastructure. For example, the cable car is an important means of transportation that reflects the lifestyles of mountain dwellers; it provides valuable services to them, and contributes significantly to facilitating access to mountain villages. It is an environmentally friendly means of transportation that contributes to preserving mountain nature (Kelfaoui et al., 2021; Sari Hassoun et al., 2021).
- Training tour guides and escorts to acquire sufficient knowledge, information, concepts, skills, attitudes, and values that collectively constitute a suitable background for them. Such a way helps them identify and promote the region's tourism potential and highlights the material and moral importance of tourist resorts to aid their marketing, especially since the motivation for travel is sometimes related to education and culture purposes. We often find that visitors seeking medical treatment share the same characteristics with those of ecotourists, cultural tourists, and sports tourists. This provides numerous opportunities for health resorts to develop other products and services across markets for various tourism sectors in rural areas. Training and qualification processes should also be intensified for employees working in the tourism sector and various related facilities, particularly with regard to acquiring the skills and culture of dealing with tourists and improving the quality of services provided in this regard (Bouchemal & Chaouche, 2023; Chebli et al., 2021).
- Employing Information and Communication Technology (ICT) tools, which are very powerful for sustainable tourism development and enhancing local development opportunities (Slaouti, 2023), particularly in mountainous areas that suffer the most from marginalization. Since the Algerian (Hammamet) thermal tourism heritage is shrouded in a thick fog, even at the local level, let alone at the global level, ICT tools' use is becoming crucial. E-tourism and the increased reliance on the Internet in management and marketing currently play a fundamental role in promoting tourism sales (Gharbi, 2024; Guemide et al., 2019). Algeria has long suffered from isolation and outdated management of this sector, but in recent years it has gradually begun to adapt to the growing digital transformation in managing the tourism sector. Tourism media, in its various forms, is also regarded as an important means of promoting tourism to attract the largest number of tourists; practicing marketing methods through specialized media in this field is the best solution nowadays.
- All in all, the success of the tourism sector is a complex mix of services supervised by many different bodies distributed between the public and private sectors (Ahmed et al., 2024). With the aim to create an efficient tourism industry

that improves the level of services and adds value to the level of local development in rural areas, the Algerian government should play an important role in facilitating cooperation between different sectors, by providing an opportunity for coordination, exchange of information and expertise, and integration of roles between them.

Conclusion

This research clearly demonstrates that the mountainous region of Ouled Tebbene possesses significant potential to become a leading tourism hub, given its natural and historical endowments coupled with a strategic geographical location. This potential is particularly pronounced in the thermal tourism sector, which has shifted from its traditional therapeutic function into a growing tourism and leisure industry capable of attracting private investment.

However, socio-economic indicators have revealed pronounced developmental paradoxes. While the modernization of thermal spas successfully amplified tourist influxes by over 250% between 2015 and 2024, thereby revitalizing local commerce and generating new employment opportunities, the unemployment rate paradoxically continued its upward trajectory, reaching approximately 23%, alongside a recorded contraction in net migration.

The findings indicate that the modernization of thermal tourism alone is insufficient to achieve comprehensive local development. Relying on thermal tourism activities as the sole lever for local development is constrained by other structural determinants, notably sustained population growth, infrastructural deficits, and a lack of ancillary services.

Consequently, a strategic paradigm shift in local development is imperative: transitioning from unilateral focus on the modernization of thermal tourism towards an integrated developmental approach. This necessitates the diversification of tourism activities to encompass mountain, ecological, and cultural tourism, alongside infrastructure investments, local human resources capacity building, and the operationalization of robust coordination mechanisms between the public and private sectors.

Conflict of Interest: The authors declare no conflict of interest.

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