

Mountain Tourism as a Catalyst for Territorial Development: Participatory Governance, Patrimonial Valorization, and the Quest for Equity in Azilal Province, Morocco

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Mountain Tourism as a Catalyst for Territorial Development: Participatory Governance, Patrimonial Valorization, and the Quest for Equity in Azilal Province, Morocco

Abstract

Mountain regions often encapsulate a paradox of ecological richness and cultural heritage coexisting with pronounced socio-economic marginalization. In Morocco's High Atlas province of Azilal, this tension is evident through striking natural features, waterfalls, geological formations, and centuries-old agroforestry systems, and a resilient Amazigh (Berber) culture, set against inadequate infrastructure, high poverty rates, and environmental fragility. This study employs a multidisciplinary framework rooted in the Territorialized Tourism System (TTS) approach to explore how sustainable tourism might reconcile local development goals with heritage preservation. Using Geographic Information Systems (GIS), we integrate spatial, socio-economic, and environmental data to map tourism assets, infrastructural gaps, and land-use changes between 2017 and 2023. Findings reveal significant potential in ecotourism, cultural tourism, and adventure tourism, underpinned by a rich natural and cultural landscape. Yet, rapid land conversion and deforestation suggest that uncoordinated development could undermine environmental integrity. Moreover, persistent governance challenges, fragmented local institutions, inadequate financial support, and limited inter-village coordination, hinder equitable tourism benefit-sharing. Community-based initiatives in areas like Aït Bouguemez demonstrate that grassroots models can bolster local incomes and preserve cultural practices, but scaling such efforts requires cohesive branding, infrastructure upgrades, and participatory governance. These results underscore the need to treat tourism as an integrated, place-based system, uniting heritage, agroecology, and community enterprises in a sustainable development strategy. Ultimately, Azilal's experience highlights that harnessing mountain regions' inherent assets for tourism demands not only robust spatial analysis and careful planning but also inclusive, community-led governance to achieve long-term territorial resilience. impacts of tourism development. The selected municipalities represent an empirical illustration of the iterative processes involved in enhancing territorial resources, fostering innovation, and promoting new forms and uses of tourism within a Territorialized Tourism System in the province of Azilal.

Keywords : Mountain Tourism, Territorial Development, Patrimonial Valorization, Sustainable Tourism, GIS, Azilal.

Classification JEL : Z32

Paper type : Empirical Research

1. Introduction

Mountain regions represent ecologically and culturally significant landscapes, yet they occupy a paradoxical position within development paradigms. Despite being lauded for their biodiversity and the preservation of indigenous cultural traditions, these areas are frequently subject to systemic marginalization, characterized by inadequate infrastructure, environmental degradation, and elevated poverty levels (Bou Tferda & M'Goun, 2023). In the context of the Global South, development strategies are often implemented through top-down approaches that exacerbate local vulnerabilities. Such policies place mountain communities at the intersection of competing imperatives, compelling them to navigate the tension between ecological conservation and socio-economic development (Jacques, 2023).

Alternative forms of tourism, ecotourism, solidarity tourism, and community-based tourism, have emerged as potential levers for territorial development. These models aim to valorize local resources and foster participatory governance but can also risk cultural commodification and ecological strain (Elkaichi et al., 2024); (Oiry & Varacca, 2012). Consequently, tourism must be reimagined as a territorialized system, an integrated framework that aligns economic viability with heritage preservation and environmental responsibility (Louz et al., 2022).

Morocco's High Atlas region exemplifies this paradox. Despite the national prioritization of tourism as a development strategy (Velikov, 2013), interior provinces like Azilal remain largely peripheral to mainstream circuits. Azilal's landscapes, marked by waterfalls, rock art, and agroforestry systems, offer rich potential for sustainable tourism (Taïbi et al., 2019), and its Amazigh communities preserve vibrant cultural traditions (Gault & Saidi, 2016). However, these strengths are offset by high poverty, unemployment, and poor infrastructure (Laghssais & Comins-Mingol, 2021), symptoms of broader spatial inequalities in Moroccan development (Benkhallouq et al., 2017).

Mainstream development theories like growth pole theory emphasize urban-industrial centers and neglect peripheral dynamics (Wojnicka & Sycz, 2013). This is reflected in Morocco's coastal economic concentration, where cities like Casablanca and Agadir account for half the GDP, while mountain provinces such as Azilal contribute less than 6% (Elgraini, 2013). These centralized approaches often fail to address the fragmentation, cultural specificity, and limited agency of mountain territories (Berriane & Moizo, 2014).

In contrast, endogenous development models rooted in natural and cultural assets offer a more tailored alternative (Boujrourf, 2014); (Eddelani, 2019). For Azilal, this means positioning tourism as part of a Territorialized Tourism System (TTS) a holistic framework linking heritage landscapes, agroecological knowledge, and community-led initiatives (Oiry & Varacca, 2012). The Aït Bouguemez Valley illustrates the viability of this approach. Since the 1990s, local actors have developed homestays, artisan cooperatives, and trekking services that preserve land-use traditions while generating income (Elkaichi et al., 2024). Initiatives like the "Pays d'Accueil Touristique" further seek to decentralize tourism governance and promote iconic regional sites such as Imi n'Ifri and Aït M'hamed granaries (Benkhallouq et al., 2017). However, these efforts remain hampered by limited financing, fragmented institutional support, and weak inter-village coordination (Bernárdez et al., 2012).

Theoretical debates on territorial development provide critical insights into the paradox of mountain regions. Traditional growth models, particularly those rooted in growth pole theory, emphasize centralized industrialization and urban, centric development, often overlooking the complex socio, ecological dynamics of peripheral areas (Wojnicka, Sycz, 2013). In Morocco, this legacy is visible in the longstanding economic dominance of coastal cities like Casablanca and Agadir, which together capture roughly 50% of the national GDP, while interior mountain provinces such as Azilal contribute only 5.5% (Elgraini, 2013). Such top, down models have shown limited effectiveness in mountain regions, where they fail to address territorial

fragmentation, cultural specificity, and the importance of local agency (Berriane & Moizo, 2014).

In contrast, scholars increasingly advocate for development strategies grounded in endogenous resources, natural, cultural, and social, that shape a region's distinctive identity (Boujrouf, 2014). This shift favors place, based development models that promote local asset utilization, encourage multi, stakeholder collaboration, and embed environmental sustainability into planning frameworks (Eddelani, 2019). For Azilal, this entails reimagining tourism as a territorialized system, one that unites heritage landscapes, agroecological traditions, and community, led enterprises into an interconnected, value, generating network (Oiry, Varacca, 2012).

The viability of this approach is evident in grassroots initiatives within Azilal. The valley of Ait Bougemmaz, part of a UNESCO, recognized “agro, cultural” landscape, has experimented since the 1990s with community, based tourism models, including homestays, guided treks, and artisan cooperatives that both preserve traditional practices and generate local income (Elkaichi et al., 2024). Similarly, the “Pays d’Accueil Touristique” initiative was launched to decentralize tourism governance, empowering local stakeholders to design visitor experiences centered on Azilal’s cultural heritage, such as the dinosaur tracks at Imi n’Ifri and the ancient Amazigh granaries of Ait M’hamed (Benkhallouq et al., 2017).

Despite their promise, these initiatives remain fragmented and under, resourced. Persistent challenges, such as weak institutional backing, limited financial access, and lack of cohesive marketing, impede their scalability. According to local actors, the absence of solidarity networks between villages hinders regional coordination, resulting in competition over limited tourist flows rather than cooperative strategies to boost collective appeal (Bernárdez et al., 2012).

This study builds on such cases by adopting a multidisciplinary and spatial approach to assess the potential of sustainable tourism in Azilal. Using Geographic Information Systems (GIS), it integrates spatial, environmental, and socio-economic data to evaluate land use dynamics, tourism infrastructure, and equity challenges. It explores how participatory governance and heritage valorization—core to the TTS approach—can serve as engines for inclusive, resilient development in one of Morocco’s most marginalized yet culturally rich mountain provinces.

2. Literature Review

2.1. Theoretical Frameworks

The concept of the Territorialized Tourism System (TTS) offers a nuanced framework for understanding tourism not merely as an economic sector but as a spatially embedded system of interdependent activities. Dériz et al. define TTS as a tourism-dominated territorial system that interacts with other local systems such as agriculture, housing, and ecology, emphasizing both intra-territorial and extra-territorial “coviability” (Dériz et al., 2019). This approach is particularly pertinent in mountain regions where tourism must integrate with other land uses and local livelihoods.

Sustainability in tourism encompasses environmental stewardship, economic viability, and social equity. In the context of mountainous territories, tourism development must address ecological fragility while providing livelihoods. Trusova and Tsviliy highlight the importance of assessing environmental risks and optimizing tourism planning to foster safe, sustainable development within territorial tourist destinations (Trusova & Tsviliy, 2023).

Participatory governance is central to equitable tourism planning, particularly in rural or marginalized areas. Fernández-Tabales et al. developed a territorial governance indicator system that stresses the role of local communities in destination planning and identifies participatory processes as a pillar of tourism sustainability (Fernández-Tabales et al., 2017).

Similarly, collective action theory applied to tourism governance underscores how self-organized community efforts enhance territorial identity and management effectiveness (Storlazzi et al., 2017).

Territorial development through heritage valorization relies on leveraging cultural and natural resources. Bizzarri and Micera demonstrate that revitalizing rural heritage towns (borghi) through sustainable tourism can counteract depopulation while strengthening local identities and economies (Bizzarri & Micera, 2021). Likewise, Scaramuzzi et al. emphasize biocultural identity as a basis for inclusive and sustainable territorial development through tourism and capacity building (Scaramuzzi et al., 2023).

Territorial equity refers to the fair distribution of resources and opportunities across geographic spaces. Zuideau explores how sustainable development must consider intragenerational equity across territories to address spatial disparities and guide effective resource transfers (Zuideau, 2007).

2.2. Empirical Studies

Empirical research across mountain regions affirms the relevance of these theoretical pillars. In the Eastern Alps, Bassi et al. documented how participatory models like forest therapy and mountaineering villages reinvigorated local economies and fostered sustainable development through endogenous resource use (Bassi et al., 2022).

In Southern France, Poudray et al. analyzed how the territorialization of tourism policies around shared heritage (e.g., Chauvet Cave) shifted governance models, highlighting the tension between tourism development and regional cohesion (Poudray et al., 2018).

In Morocco, Laamrani and Zouiten revealed how territorial intelligence, when aligned with cultural heritage valorization, can drive sustainable urban development and local identity reinforcement (Laamrani & Zouiten, 2020).

2.3. Contribution of This Study

Building on these theoretical and empirical insights, this study seeks to fill critical gaps in the literature by:

- Applying the TTS model through GIS-integrated spatial diagnostics in a Moroccan mountain context (Azilal);
- Evaluating land use change and environmental risks as proxies for tourism pressures;
- Identifying barriers to equitable benefit-sharing and participatory governance at a micro-regional level;
- Proposing a replicable model for heritage-centered, community-based tourism in marginalized mountain provinces.

This study thus contributes to the growing body of research advocating for spatially informed, equity-driven, and culturally rooted tourism development models in rural and mountain regions.

3. Methodology

3.1. Study area

The province of Azilal was established in 1975 under Royal Decree No. 1, 75, 688 to enhance administrative accessibility and foster efficient governance for local economic actors. It is part of the Beni Mellal, Khenifra region, redefined in 1997 through Morocco's regional restructuring (Royal Decree No. 1, 97, 84). Administratively, Azilal comprises 44 communes (42 rural, 2 urban), organized into 2 pachaliks (Azilal and Demnate), 6 cercles (districts), and 19 caïdats (sub, districts), reflecting its predominantly rural character.

Located in central Morocco, the Beni Mellal, Khenifra region borders Rabat, Salé, Kénitra (north), Casablanca, Settat and Marrakech, Safi (west), Fès, Meknès and Drâa, Tafilalet (east), and Drâa, Tafilalet (south). Azilal Province spans 10,050 km², with its capital, Azilal town, situated at 1,362 meters above sea level (coordinates: 6°57 longitude, 31°95 latitude). It is surrounded by the provinces of Beni Mellal and Fquih Ben Salah (north), Ouarzazate and Tinghir (south), Tinghir and Midelt (east), and El Haouz and El Kelâa des Sraghna (west).

Azilal is widely recognized for its substantial natural and cultural resources, positioning the region as a critical focal point for sustainable tourism development. The province is characterized by diverse ecosystems that extend from cedar forests in the Middle Atlas to semi-arid valleys in the High Atlas, as well as by remarkable geological features, including limestone cliffs and ancient volcanic landscapes. Culturally, Azilal constitutes a stronghold of Amazigh (Berber) heritage, where traditional practices, such as the use of collective granaries (agadirs), the performance of heritage music, and the production of artisanal crafts are preserved.

One of the most distinctive geological formations in Azilal is the Imsfrane Geological Cathedral. This site features towering rock structures and panoramic vistas that attract geologists, hikers, and landscape photographers seeking to study or document Azilal's unique topography. The UNESCO Global Geopark of M'Goun (recognized in 2014) represents an additional highlight, covering an area of approximately 10,000 km² and encompassing rare geological elements, notably the dinosaur footprints. These prehistoric imprints exemplify the region's ancient geological history and serve as a focal point for both scientific research and tourism.

Ouzoud Waterfalls, recognized as North Africa's tallest cascades, further contribute to the area's appeal. The waterfalls are surrounded by lush vegetation and offer opportunities for hiking, wildlife observation, and recreation, making them a popular destination for visitors from various regions. Another significant attraction is the Ait Bougemmaz Valley, a UNESCO-recognized agro-pastoral landscape characterized by terraced fields, enduring Berber villages, and long-standing farming techniques. This valley provides insights into traditional land-use practices and fosters immersive cultural experiences.

Completing Azilal's array of attractions is the Bin El Ouidane Dam, noted for its expansive lake and scenic mountainous surroundings. This site supports multiple water-based activities, such as boating, fishing, and water sports, and appeals to visitors seeking both natural beauty and adventure-oriented pursuits. Despite the wide range of natural and cultural assets present in Azilal, tourism development remains relatively limited, attributed to fragmented infrastructure and insufficient coordination among local stakeholders. Strengthened strategic planning, investment in visitor amenities, and enhanced collaboration among communities, regional authorities, and the private sector are therefore essential to fully harness Azilal's potential as a sustainable tourism destination.

3.2. Data used

This study adopts a multidisciplinary methodology grounded in a territorialized approach to sustainable tourism development, integrating spatial, socio-economic, and institutional dimensions. The theoretical framework is based on the concept of the Territorialized Tourism System (TTS), which considers tourism as an embedded, place-based system that s natural assets, cultural heritage, and local economic dynamics. The province of Azilal, with its rich environmental and cultural resources yet persistent socio-economic marginalization, serves as the primary case study.

The core methodological tool is Geographic Information Systems (GIS), which enables the collection, integration, and spatial analysis of complex data. ArcGIS software was used to map and analyze topographic variables, including digital elevation models (DEMs), slope gradients, and altitude variations (*e.g.*, *ASTER GDEM*, *SRTM* – [NASA, USGS]). Hydrological features

including river networks and major dams were extracted from national water agency data (e.g., *Hydraulic Basin Agency 'ABH'*). Geological and pedological data were obtained from national geological surveys (e.g., *FAO geological and Soil Map*), and erosion risk was estimated using soil loss models supported by topography and land use layers (e.g., *RUSLE model (Gourfi et al., 2018)*).

A diachronic analysis of land-use and land-cover (LULC) change was carried out with multispectral Sentinel-2 imagery for 2017 and 2023 (10 m resolution). Using supervised classification in ArcGIS, the scenes were reclassified into six categories, tree cover, croplands, built-up areas, bare ground, rangelands, and water bodies, and the resulting maps were compared, in both square kilometres and hectares, to quantify conversion trends attributable to anthropogenic and climatic drivers. The classified layers derive from ESA WorldCover and Esri/Impact Observatory products, which have already been independently validated by the providers to international remote-sensing standards; consequently, no additional ground-truthing campaign was undertaken.

We selected 2017 and 2023 for three complementary reasons. First, 2017 is the earliest year with complete, cloud-filtered Sentinel-2 coverage at 10 m resolution, ensuring a methodologically robust baseline, while 2023 is the most recent full calendar year available, providing up-to-date observations. Second, a six-year interval is long enough to capture structural land-use shifts-urban expansion, agricultural conversion, deforestation-yet short enough to minimize additional confounding variables. Third, these dates bracket two pivotal stages in Azilal's development trajectory: 2017 precedes the rollout of new tourism and agricultural infrastructure programs, whereas 2023 reflects the post-COVID-19 landscape and the completion of Phase I of the Green Morocco Plan. Together, they form a meaningful window for assessing how public policies and climatic pressures have reshaped land use and land cover.

The statistics used come exclusively from the High Commission for Planning (HCP). Demographic data is based on the General Population and Housing Census (RGPH 2014), supplemented by the official count from RGPH 2024. Indicators of economic activity and unemployment are drawn from microdata from the National Employment Survey (ENE) and the annual report "Activity, Employment, and Unemployment – 2024 Results", available for free download on the HCP website (www.hcp.ma).

Tourism-related data were compiled through field inventories and secondary databases, mapping accommodation facilities (hotels, ecolodges, guesthouses) and their proximity to road infrastructure (e.g., from OpenStreetMap). Points of natural and cultural interest, such as waterfalls, geological formations, Amazigh granaries, and trekking trails, were georeferenced and categorized to highlight tourism clustering and accessibility patterns (e.g., UNESCO Geopark data, regional tourism development plans).

Tourist points of interest were filtered through five weighted criteria: (1) Heritage value, meaning an official listing such as UNESCO or the national inventory or documented scientific significance; (2) Typological diversity, ensuring a balanced representation of natural, cultural, and adventure sites; (3) Accessibility, defined as being within 5 km of an all-season drivable road and verified by network analysis in ArcGIS; (4) Existing visitor facilities, requiring at least one formal amenity such as a lodge, cooperative, or first-aid post recorded by the regional tourism authority; and (5) Environmental sensitivity, which excludes areas with very high erosion risk or critical habitats. A site had to satisfy at least three of these five criteria to be included, ensuring both tourism relevance and conservation compatibility.

To complement the quantitative analysis, we carried out 50 semi-structured interviews with key stakeholders in four "laboratory" municipalities: Tabant (Aït Bouguemez valley), Bin El Ouidane, Tilouguit (Imsfrane Cathedral) and Ouzoud (waterfalls). The purposive

sampling strategy combined (i) functional representativeness (de-concentrated state services, local authorities, tourism operators, civil-society organisations); (ii) the principle of thematic saturation, whereby additional interviews no longer yielded substantively new information; and (iii) balanced coverage of gender and upstream/downstream positions in the tourism value chain. Interviews, averaging 55 minutes, recorded and fully transcribed with informed consent, were conducted between July 2018 and June 2019, spanning both high and low tourist seasons. Verbatim transcripts were coded using Braun & Clarke's thematic analysis to extract the themes "participatory governance", "economic spill-overs" and "environmental management".

To move beyond simple association, we implemented a mixed quasi-experimental design combining: (i) a difference-in-differences comparison between three mountain tourism pilot communes—Tabant (Aït Bouguemez Valley), Aït Taguella (Ouzoud Falls area), and Zaouiat Ahansal (gateway to Taghia gorge), and a control set with broadly similar biophysical and socio-economic characteristics but minimal tourism development (Afourar, Tabia); (ii) propensity-score matching to mitigate selection bias tied to accessibility and baseline infrastructure; and (iii) semi-structured interviews with elected officials, cooperatives (including women's groups), and private operators. Triangulating these quantitative and qualitative strands helps isolate the specific contribution of mountain tourism from broader national development dynamics (e.g., INDH III, Plan Maroc Vert, post-COVID recovery).

Together, the integration of geospatial analysis, socio-economic indicators, and participatory development insights provides a comprehensive framework for evaluating tourism potential, environmental vulnerabilities, and inclusive governance strategies in mountain territories such as Azilal.

4. Results

4.1. Morphological and hydrological characteristics

A clear gradient of altitudes is observed across the region, with elevations ranging from approximately 350 m in the north and west to as high as 3,816 m in the rugged mountainous areas to the south and east. Prominent peaks such as Jbel Rat, Jbel Azourki, and Jbel Tifdaniwine stand out as major summits, reflecting the area's alpine-type topography.

The terrain exhibits a wide range of slopes, from gentle inclines (0° – 5.4°) to very steep areas reaching up to 81° . The gentler slopes are predominantly found in the central and northwestern parts of the province, making these areas more favorable for agriculture and human settlement. In contrast, the southeastern and southern parts feature extensive zones of steep slopes, especially along river valleys and mountainous regions, indicating a rugged and erosion-prone landscape.

Numerous waterways originate from the highlands, forming a dense and widespread hydrographic network. Major rivers such as Oued Al Abid, Oued Lakhdar, Oued Tissakht, and Oued Tassaout, along with tributaries like Assif n'Ait Hkim and Assif Melloul, characterize this system. Key dams—including Bin El Ouidane, Hassan I, Moulay Youssef, and Sidi Driss—play vital roles in water storage, irrigation, and hydroelectric power generation. Their presence underscores the importance of strategic water management in a mountainous province with a complex and dynamic river system.

4.2. Geological and pedological characteristics

The region exhibits a diverse and complex geological structure, with various lithostratigraphic units ranging from Cambrian formations (e.g., camb1) to more recent Quaternary deposits (e.g., Q1f, Q1tc, Q2f). Extensive Jurassic formations (J1, J2) dominate the central and eastern parts of the province, while Cretaceous units such as K1, K10, K21, and K22 are prominently distributed in the northern and central zones. Neogene deposits (N12c, N13c, N2c, N21) are

found in more localized areas, primarily toward the west. Tertiary and syntectonic deposits (T, T, Jsygma) appear particularly in the southern and southwestern parts of the region. Topography plays a significant role in shaping this geological distribution, with hydrographic features often aligning with geological boundaries. Notably, dinosaur trace fossils have been reported in several locations dominated by Jurassic formations, especially within the central part of the province.

The region's soil composition reflects substantial pedological diversity, with several major soil types present. Entisols (E) dominate the central and northeastern areas, indicating youthful soils with minimal profile development, commonly associated with eroded or mountainous terrains. Inceptisols (I), which are moderately developed soils often formed in more stable environments, prevail in the southern and southwestern zones. Calcareous soils (Xk) are widespread in the northwestern and western areas, typically found in highland regions and formed over limestone or marl, making them generally shallow. Other soil types such as Vertisols (WR), Regosols (Re), and lithosols (Kk) occur in smaller patches. Regosols and lithosols are shallow and weakly developed, often found in transitional topographic areas where erosion and deposition processes interact.

Soil erosion across the province varies significantly, with average annual erosion estimated at 6.9 tons per hectare. Erosion intensity spans seven categories, from very low rates (<1 t/ha/year) to extremely high levels (>50 t/ha/year). Northern and northwestern parts of the province, which are characterized by gentler slopes and more stable soils, generally experience low to moderate erosion rates (0–5 t/ha/year). Conversely, the southern and southeastern areas, marked by steep terrain and more fragile soils such as Inceptisols and Regosols, face considerably higher erosion risks. These regions frequently record erosion rates above 20 t/ha/year, with certain hotspots exceeding 50 t/ha/year. This spatial pattern of erosion highlights the critical need for targeted soil conservation and land management strategies, particularly in vulnerable mountainous and agricultural zones.

4.3. Land use land cover evolution

The spatial distribution and temporal changes in land use and land cover (LULC) in Azilal Province between 2017 and 2023 reveal significant landscape transformations. The region includes six primary land cover classes: water bodies, tree cover, croplands, built-up areas, bare ground, and rangelands.

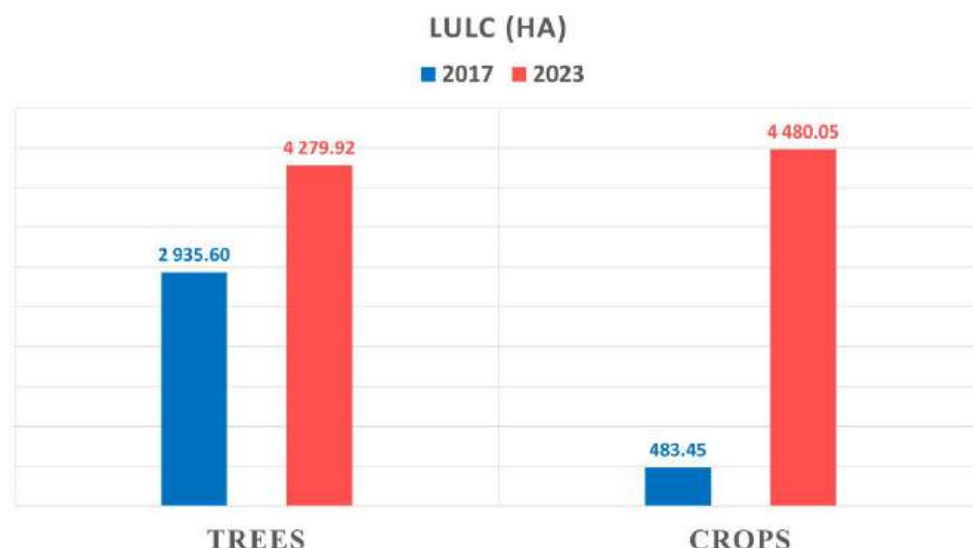
Between 2017 and 2023, notable changes occurred, most prominently the expansion of built-up areas and croplands. Built-up areas increased from 48.34 km² to 82.39 km² (~+70%), indicating intensified anthropogenic activity and urban development. Croplands also expanded substantially, growing from 293.56 km² to 448.01 km², reflecting ongoing agricultural development.

Intersecting LULC change layers with geo-referenced tourism points of interest shows that most new built-up pixels fall within 5 km of the three tourism nodes (Tabant, Aït Taguella, Zaouiat Ahansal), whereas the control communes record only marginal growth over the same period. An ArcGIS Getis-Ord hotspot analysis reinforces this spatial clustering, supporting the interpretation that mountain tourism has been a proximate driver of localized urban expansion. Conversely, tree cover experienced a noticeable decline, decreasing from 526.67 km² to 427.99 km². This reduction, particularly evident in central and southern parts of the province, may be attributed to deforestation or conversion of forested areas into agricultural or urban land. Rangelands, while remaining the dominant land cover type, showed slight reductions in overall coverage.

These patterns suggest a gradual yet significant transformation of the regional landscape, driven by factors such as urban expansion, agricultural intensification, and potentially broader climatic or socio-economic pressures.

The figure 1 shows two land-use categories, trees and crops, measured in hectares for both 2017 and 2023. Tree coverage increases from roughly 2,936 hectares in 2017 to about 4,280 hectares in 2023, suggesting a growth in forested or planted areas. Meanwhile, cropland experiences a marked expansion: approximately 483 hectares in 2017 compared to around 4,480 hectares in 2023. This shift implies a notable intensification or reallocation of land for agricultural purposes alongside a simultaneous rise in tree coverage over the same period.

Figure 1. Change in Land Use/Land Cover (LULC) for Trees and Crops in Azilal Province: 2017 vs. 2023



4.4. Roads and points of interest

The distribution of transportation infrastructure across the province reveals a relatively well-connected network, especially in the central and northern regions. Primary, secondary, and tertiary roads facilitate access to key towns and many rural areas. However, mountainous and remote zones in the southern part of the province remain less accessible due to limited road coverage, posing challenges for connectivity and mobility.

Tourism accommodations are unevenly distributed, with a concentration of hotels, inns, hostels, guesthouses, and campsites along main transportation routes and near prominent natural or cultural landmarks. Notable accommodations such as Touda Ecolodge Atlas Mountains Morocco and Gite Imarin are located primarily in the central and southern regions, reflecting a growing tourism infrastructure aimed at supporting visitors drawn to the High Atlas landscapes. Several notable tourist attractions are dispersed across the province, including waterfalls, caves, natural bridges, lakes, and cultural heritage sites. Key destinations such as the Ouzoud Waterfalls, Imi N'Ifri Natural Bridge, and the Aït Bouguemez Valley are clustered in areas known for their scenic beauty and ecological significance. Their proximity to rivers and high-relief zones highlights the region's strong potential for eco-tourism development.

4.5. Population evolution and unemployment rates

Between 2014 and 2024, the legal population across various communes in Azilal has experienced notable growth (Figure 2). Bar chart comparisons of population figures from 2014 and projected or actual numbers for 2024 show that communes such as Azilal, Afourar, Demnate, and Aït M'Hamed are among the most populous, each demonstrating significant upward trends over the decade. This increase is driven by a combination of natural population growth and internal migration, particularly toward urban and peri-urban areas.

Municipality	Population légale 2014	Population légale 2024
Algeria	21000	20000
Aguedj N'Klton	12000	12000
Ait Abbas	13000	13000
Ait Ba	8000	8000
Air Bou Oufi	11000	12000
Ait Mjako	18000	18000
Ait Mezgh	3000	3000
Ait M'Hamed	23000	23000
Ait Ouazda	15000	14000
Ait Ouedj	3000	3000
Ait Targuel	8000	8000
Ait Tamlit	19000	18000
Azzilal (Mun.)	38000	48000
Bou El Oudane	5000	5000
Bou Ayer	23000	23000
Bou Hassane	12000	12000
Bou	13000	13000
Demane (Mun.)	29000	33000
Foum Jem	10000	10000
Imil	11000	11000
Isako	2000	2000
Moudj Alou Bou Drie	13000	13000
Ouassagla	14000	14000
Ouzouli	24000	26000
Raba	9000	9000
Sidi Boukhalf	16000	16000
Sidi Yacoub	18000	18000
Tahart	15000	16000
Tahouac	4000	4000
Tyha 1	7000	7000
Tyha 2	14000	16000
Tunda N'ouaroul	12000	12000
Tunat	11000	11000
Tunouza	11000	11000
Tadit Frouka	13000	13000
Tifert N'Ala Jem	4000	4000
Tin	11000	11000
Tloguaine	11000	11000
Tunoult	7000	7000
Tup	6000	6000
Zouat Akassa	11000	11000

The two boxplots (Figure 3) compare unemployment rates in 2014 (left) and 2024 (right). The 2024 distribution is shifted higher, indicating an overall rise in unemployment over the decade. Specifically, the average for 2014 is roughly 8.99%, while for 2024 it increases to around 21.37%. The taller box for 2024 also suggests greater variability in unemployment rates, with some areas exhibiting moderate levels and others suffering from very high rates. Outliers are visible in both years, though 2024 shows a higher extreme value, signifying regions facing unusually severe unemployment relative to the rest.

The figure consists of two side-by-side box plots. The left plot is titled 'Unemployment rate 2014' and the right plot is titled 'Unemployment rate 2024'. Both plots share a common y-axis representing the unemployment rate percentage, ranging from 0 to 100 in increments of 10. The box plots show the distribution of unemployment rates for each year. In 2014, the median is approximately 8%, with the interquartile range (IQR) from about 4% to 12%. Whiskers extend from 4% to 18%. There are two outliers: one at approximately 1% and another at approximately 32%. In 2024, the median is approximately 18%, with the IQR from about 13% to 27%. Whiskers extend from 10% to 40%. There are two outliers: one at approximately 1% and another at approximately 86%.

Year	Min	Q1	Median	Q3	Max	Outliers
2014	4	4	8	12	18	1, 32
2024	10	13	18	27	40	1, 86

Across the four municipalities, most interviewees confirmed that the socio-economic benefits of tourism remain limited for local residents, short supply chains are lacking, jobs are mainly

seasonal and much of the value-added leaks to urban centres. Where a participatory management committee is operational (Tabant and Ouzoud), stakeholders report a measurable rise in accommodation and guiding revenues, attributed to better coordination of offers and pooled online promotion. By contrast, in Bin El Ouidane and Tilouguit the absence of formal consultation leads to disorganised competition and persistently diffuse tourism income. These qualitative testimonies align with the quantitative gaps observed between “treated” and control municipalities, reinforcing the case for a direct causal link between participatory governance and the local capture of mountain-tourism benefits.

While the study did not rely on formal tourism flow data from national tourism observatories due to limited availability at the commune level, qualitative fieldwork and stakeholder interviews provided indirect yet meaningful insights into tourist volumes, profiles, and economic contributions. For instance, according to local operators in Tabant and Aït Taguella, average stays range from 3 to 6 days, with a predominance of young foreign tourists followed by young domestic visitors. In 2018, the province of Azilal recorded approximately 57,915 tourist arrivals, the majority of whom were hosted in small-scale accommodations, including guesthouses, gîtes, and eco-lodges, which represented over 1,700 beds across the STT communes.

Though precise revenue figures were not accessible, multiple interviewees, including gîte managers and cooperative leaders, reported that tourism has become a leading source of household income, occasionally surpassing traditional agricultural earnings. For example, operators like Mr. Karim (Gîte Aït Ayoub) and Mr. Salah (Ryad Fatima) indicated that revenues are heavily concentrated during peak trekking seasons, with earnings highly dependent on guide services, lodging, and the sale of local products. Furthermore, the tourism typology identified includes eco-tourists, adventure travelers (trekking, climbing, canyoning), and cultural tourists, particularly those interested in Amazigh heritage, UNESCO Geopark sites, and agroecological landscapes. These observations, though qualitative, provide an initial approximation of tourism dynamics in the absence of disaggregated official data, and underscore the need for future quantitative monitoring systems at the territorial level.

One main problem is that government departments, such as those for tourism, culture, and environment, often work alone, without sharing information or making joint plans. Local communes also have very limited money and staff, which makes it hard for them to manage tourism or bring people together.

In places like Bin El Ouidane and Tilouguit, there are no local groups to organize tourism, so businesses often compete with each other instead of working together. This leads to problems like poor service, lack of promotion, and few shared facilities.

Interviews also showed that even at the village level, people like guesthouse owners and cooperatives rarely work as a team. There is often no trust, no shared meeting space, and no clear leadership. Some good examples exist, like tourism committees in Tabant and Ouzoud, but these are rare and often depend on outside support.

5. Discussion

5.1. GIS as a decision, support tool for mountain tourism and territorial equity in azilal

In the context of sustainable mountain development, particularly in Morocco’s province of Azilal, Geographic Information Systems (GIS) have emerged as vital tools for analyzing spatial complexity and informing development strategies. Azilal’s challenging terrain, ecological diversity, and dispersed infrastructure demand systemic spatial tools, with GIS uniquely suited to collect, integrate, and visualize such data. This technology enables detailed mapping of natural assets, transportation routes, tourism clusters, and infrastructural gaps (Chami et al.,

2025). In our study, a multi-criteria GIS analysis overlaid data on environmental vulnerability, population density, site accessibility, and service distribution, highlighting spatial disparities and supporting the prioritization of zones for development and tourism interventions (Farah et al., 2021).

This approach mirrors global best practices. In Portugal and across the Global South, GIS-supported accessibility models have guided rural tourism diversification and optimized development in resource-constrained regions (Babayan, 2020). In Morocco, GIS has similarly been employed to audit tourism sustainability and assess economic and environmental viability, as demonstrated in case studies such as Tangier (Haloui et al., 2021).

Beyond technical functions, GIS plays a governance role by facilitating data-driven policy-making. It allows stakeholders to simulate scenarios, forecast land-use changes, and evaluate environmental consequences, thereby enhancing the coherence of Azilal's *Système Touristique Territorialisé* (STT) (Ouacha et al., 2018). GIS also supports participatory planning through tools like interactive mapping, enabling local actors to co-create spatial knowledge and take part in decision-making, an especially critical feature in rural Moroccan settings where indigenous knowledge is indispensable (Stern & Rice, 2021).

Moreover, GIS contributes to spatial equity by exposing marginalization patterns and tailoring interventions to micro-regional realities. Traditional data systems often miss this heterogeneity, whereas GIS delivers place-based diagnostics to better direct public investment and align development with local ecological and socio-economic conditions (Löwe & Löwner, 2008).

5.2. Azilal's tourism potential and its social and environmental impacts

Azilal Province presents a compelling case for sustainable tourism development in mountain regions. Its varied topography, ranging from 350 to 3,816 meters, hosts diverse ecosystems, geological formations, and cultural landscapes suitable for ecotourism, cultural tourism, and mountain adventure tourism (Taïbi et al., 2019).

Ecotourism in Azilal is driven by natural attractions like Ouzoud Falls, Imi N'Ifri's natural arches, gorges, caves, and a dense hydrographic network. These natural assets attract eco-conscious travelers seeking immersive nature experiences. The region's geotouristic value is further enhanced by its status within a recognized global geopark, which includes dinosaur footprints and Jurassic sedimentary formations (Lamnadi, 2016). Combined with endemic biodiversity, these features position Azilal as a promising site for conservation-based tourism (Salama, 2007).

Cultural tourism thrives particularly in Amazigh communities like Aït Bouguemez, where traditional architecture, agriculture, music, crafts, and cuisine are preserved. Community-based tourism models, including guesthouses, artisan markets, and cultural festivals, help safeguard heritage and promote inclusive development (Benkhallouq et al., 2017). These models empower locals to control tourism's impacts on culture and land use, while benefiting economically.

Azilal's alpine landscape supports a growing niche in mountain tourism, offering trekking in the M'Goun Massif, rock climbing in Taghia, and canyoning in Oued Ahansal. These unspoiled terrains appeal to tourists seeking authentic, low-impact outdoor experiences (Haroon, 2002). Despite these assets, Azilal remains in the early stages of tourism development. In 2018, the province welcomed around 57,915 tourists, mostly accommodated in small guesthouses and eco-lodges. Infrastructure development is uneven, northern and central areas have better road connectivity, while southern regions remain isolated. However, recent improvements in access to key sites like Ouzoud Falls and Aït Bouguemez have boosted tourism flows (Velikov, 2013). Tourism contributes to the local economy by generating employment in hospitality, guiding, and transportation, and by stimulating demand for local products like honey, olive oil, and

Amazigh rugs. Cooperatives have emerged to support artisan entrepreneurship and value-added production (Rynjah & Sailo, 2021).

However, tourism-driven land use change is increasingly evident. Between 2017 and 2023, Azilal saw a rise in built-up areas (from 48.34 km² to 82.39 km²) and croplands (from 293.56 km² to 448.01 km²), while tree cover declined significantly (from 526.67 km² to 427.99 km²). Rangelands slightly decreased, reflecting anthropogenic pressure, agricultural expansion, and socio-economic or climatic factors (Ahbari et al., 2017).

Globally, Azilal's tourism sector is nascent compared to high-volume mountain destinations. Yet, its low-density, heritage-centered tourism provides a strategic opportunity to build a sustainable model. With careful planning, Azilal can avoid the environmental degradation associated with mass tourism while advancing rural development goals (Danelutti et al., 2015). In addition to governance and spatial equity, tourism development in Azilal raises important questions about its socio-economic and environmental impacts.

On the socio-economic side, field interviews and land use data show that tourism has helped create income opportunities, mainly through accommodation, guiding, and local product sales, but these benefits are unevenly distributed. Men and youth tend to capture most of the direct gains, while women are often involved in informal or unpaid support roles. Moreover, job creation is mostly seasonal and low-paid, with few long-term or stable positions.

Economically, communes like Tabant have experienced growth in small businesses and cooperatives, while less-connected areas like Tilouguit remain excluded. Tourism has also stimulated new markets for local products, such as honey, handicrafts, and herbal goods, especially where cooperatives are active.

On the environmental side, our GIS-based land cover analysis (2017–2023) revealed significant land conversion: built-up areas increased by ~70%, and croplands expanded by over 50%, while tree cover declined by nearly 100 km². These changes are concentrated near tourism hubs and suggest growing pressure on natural landscapes. In fragile mountain areas, this can lead to erosion, water stress, and loss of biodiversity if not properly managed. These findings highlight the urgent need for better land use planning and environmental safeguards within tourism strategies.

5.3. The paradox of Moroccan mountain regions: between marginalization and potential

Morocco's mountainous regions present a paradox: while they are rich in ecological, natural, and cultural assets, they remain among the most socio-economically vulnerable areas in the country. Covering roughly 25% of Morocco's territory and housing about a quarter of the population, mostly in rural areas, these zones are marked by widespread poverty, illiteracy, limited access to services, and geographic isolation (Jacques, 2023). Their marginalization stems from colonial and post-independence development models that favored urban and coastal areas over interior mountain regions (Lessmeister, 2011).

Although several public programs have been launched since the 1990s, such as the INDH, PERG, and PAGER, their impact has been uneven. These initiatives often apply generalized "rural" solutions, overlooking the specific challenges of mountainous territories (Montanari & Teixidor-Toneu, 2022). Provinces like Azilal continue to face major infrastructure, healthcare, and education deficits, along with limited economic opportunity (Laghssais & Comins-Mingol, 2021).

Nonetheless, these areas have considerable untapped potential. Traditional agriculture, forestry, crafts, and especially tourism represent promising pathways for inclusive growth. Tourism, if grounded in territorial logic and participatory planning, could become a key driver of sustainable transformation (Sguenfel & Khallaf, 2019).

In Azilal, a central pillar of tourism strategy is patrimonial valorization, leveraging cultural and natural heritage to foster development. The region's High Atlas terrain, marked by sites like the UNESCO-designated M'Goun Geopark, fossil tracks, and living Amazigh traditions, offers strong assets for heritage-based tourism (Taïbi et al., 2019). When tourism aligns with these heritage elements, it both enriches visitor experiences and bolsters local identity and conservation efforts (Gault & Saidi, 2016).

For instance, in the Aït Bouguemez valley, community-led initiatives involving homestays, treks, and cooperatives have generated household income and incentivized the preservation of traditional architecture and farming systems (Oiry-Varacca, 2012). Such models mirror global patterns, as seen in Nepal and Yunnan, where tourism has revitalized ethnic cultures rather than eroding them (Sguenfel & Khallaf, 2019). In Morocco, Boujrourf (2014) noted that tourism rooted in heritage has helped sustain ancestral land use in mountain oases (Benkhallouq et al., 2017). Similar approaches have emerged in the Romanian Carpathians, where mountain communities blend hospitality with traditional livelihoods to preserve and commercialize local resources.

Yet Azilal's case highlights a critical caveat: heritage alone does not guarantee tourism success. Without cohesive branding, investment, and inter-village coordination, patrimonial assets risk being underutilized. Local competition, rather than collaboration, fragments the tourism offer and weakens territorial appeal (Bernárdez et al., 2012). To unlock the full potential of heritage-based tourism, it must be paired with strategic support in infrastructure, marketing, and capacity building. Azilal's experience offers both an example and a lesson: heritage can power resilient mountain development, but only when matched by inclusive governance and thoughtful planning.

5.4. Participatory governance:

Azilal's population is overwhelmingly rural (95%), relying on subsistence agriculture and pastoralism. However, climate change and soil erosion increasingly threaten these traditional livelihoods, driving poverty rates above 40% (Jihad, 2016). Infrastructure gaps remain stark: only 65% of rural households have access to electricity and just 45% have access to clean water (Badahi et al., 2017). Literacy is another critical concern, with rates at 48%, well below Morocco's national average of 72% (Montanari & Bergh, 2014).

Tourism, while still nascent, shows promise for economic diversification. Community-managed guesthouses, such as Le Paradis in Aït Bouguemez, and local trekking cooperatives exemplify grassroots initiatives aimed at development. Yet these efforts face obstacles, including limited institutional backing, weak marketing structures, and fragmented inter-communal collaboration (Benkhallouq et al., 2017).

Empowering local stakeholders in tourism governance is critical to sustainable mountain development. However, Azilal's governance framework is still evolving. Decentralized efforts like the "Pays d'Accueil Touristique" (PAT), launched in the 2000s, aimed to include communities in itinerary planning (e.g., highlighting Azilal's fossil trackways and Amazigh granaries). While these reflect the ideals of community-based tourism, their implementation has been patchy and under-supported (Montanari & Bergh, 2014).

Field findings show that villages often function in isolation, lacking cooperative networks needed for regional tourism scaling. In the Aït Bouguemez Valley, membership in the women's Tikniwine cooperative grew from 15 to 30 active members in five years, indicating a broader distribution of tourism income across households. Over the same interval, Tabant reports 1,751 beds across 606 rooms, the largest registered accommodation capacity in the province. These gains are linked to participatory management committees, bringing together elected council members, cooperative representatives, and douar delegates, that coordinate trekking calendars, pool online promotion, and manage village micro-funds for trail maintenance. The evidence

suggests that participatory governance is a key mechanism translating tourism attractiveness into measurable local socio-economic benefits.

Taken together, these local successes illustrate that the very cooperative networks still missing in much of Azilal can, when they do emerge, replicate the positive outcomes documented in other mountain destinations, validating the idea that bottom-up, participatory governance is the decisive factor separating inclusive growth trajectories.

In Nepal's Annapurna region, robust community involvement in tourism planning enabled local control and minimized economic leakage. In contrast, Yunnan (China) experienced top-down tourism development dominated by state and private actors, which alienated residents and commodified local culture without meaningful community participation (Yu, 2014).

Southern Morocco's Anti-Atlas Mountains reflect similar struggles, where hierarchical governance models have impeded innovation in rural tourism. Research suggests that clearly defined roles and shared decision-making structures are key to improving tourism outcomes (Jihad, 2016).

Global guidance echoes these findings. A joint UNWTO/FAO (2021) report highlights the need for collaborative governance in mountain tourism, calling for partnerships across public, private, and civil society sectors to ensure benefits reach local communities. In this context, Azilal's push toward participatory governance aligns with international best practices. Though challenges in coordination and institutional capacity persist, the province illustrates incremental progress toward inclusive tourism, transitioning from top-down models to participatory approaches that build local capacity and long-term sustainability.

5.5. Equity and inclusive development:

Perhaps the most critical test for tourism in Azilal is whether it can promote equitable and inclusive development in one of Morocco's most socio-economically marginalized mountain regions. With poverty rates exceeding 40% and limited economic diversification, the stakes are high. If managed thoughtfully, tourism offers a way to generate alternative livelihoods in remote communities and reduce territorial disparities (Velikov, 2013).

Our findings reveal that while current tourism initiatives are modest in scale, they are beginning to deliver localized equity benefits. In villages where eco-lodges and guesthouses operate, such as Ait Bouguemez, income reaches households directly, and youth gain employment as guides or hosts (El Alami & El Alaoui, 2023). However, the gains remain uneven. Only well-organized or easily accessible communities reap consistent benefits, leaving peripheral villages behind, a pattern common in uncoordinated tourism development (Lessmeister, 2011).

This dynamic is echoed globally. In Nepal's Annapurna region, inclusive models, like community-managed lodges under the Annapurna Conservation Area Project, helped spread tourism revenue equitably. By contrast, in Yunnan, China, commercially driven tourism led to external profit capture and local disempowerment, with residents receiving only a marginal share of the economic value (Popescu et al., 2024).

A particularly promising outcome of community-based tourism is its empowerment of marginalized groups, notably women and youth. In Azilal, women's cooperatives, such as those producing argan oil or crafts, benefit from visitor-driven demand, creating new income and enhancing social standing (El Azhari & Lotfi, 2022). Similar trends are evident in Nepal and Yunnan, where women have increasingly taken on managerial roles and gained confidence through interaction with international visitors.

These patterns underscore that who controls the tourism value chain, local communities or outside actors, fundamentally affects equity outcomes. Inclusive governance mechanisms, like participatory planning and shared benefit models, are essential for ensuring that tourism becomes a tool for social upliftment, not exclusion (Azhari et al., 2024).

Azilal's experience contributes meaningfully to global discourse. It demonstrates that participatory governance, heritage valorization, and inclusive economic models are central to sustainable mountain tourism. While Azilal still faces institutional fragility and infrastructural gaps, unlike regions with decades of tourism investment, it also showcases resilience and innovation. Community-driven initiatives continue to gain traction, even in challenging conditions.

Ultimately, Azilal affirms that sustainable tourism in marginalized mountain regions hinges on three pillars: inclusive governance, cultural and ecological conservation, and equitable benefit-sharing. These pillars mirror global best practices advocated by UNWTO and FAO (2021), but Azilal's case enriches them by offering a grounded, real-world example from a less-developed setting. The lesson is clear: mountain tourism must be tailored to local contexts and driven by local voices to become a genuine vehicle for inclusive and resilient development.

5.6. TSS Implementation through GIS

If properly developed in the province of Azilal, the Territorialized Tourism System (TSS) model has the potential to embody the three pillars of integrated mountain tourism: participatory governance involving local communities, valorization of natural and cultural heritage, and equitable economic development. These elements form the core of sustainable tourism planning and are increasingly recognized in global best practices. Comparable approaches can be seen in community-based tourism in the Annapurna region of Nepal, participatory ecotourism in Yunnan, China, and integrated rural programs in Guatemala (Berriane & Moizo, 2014).

What makes Azilal's emerging TSS distinct is its focus on territorial networking, connecting diverse yet complementary tourism sites, and the establishment of multi-stakeholder coordination at the provincial level. This institutional innovation enhances local autonomy and strengthens the long-term sustainability of tourism initiatives (Elgraini, 2013).

From a planning standpoint, GIS are central to operationalizing the TSS vision. GIS allows planners to design tourism corridors, simulate accessibility scenarios, evaluate environmental carrying capacities, and develop zoning regulations for accommodations and ecotourism services. By integrating raster and vector datasets, such as terrain models, land use, transport networks, and service coverage, tourism pathways and development priorities can be visualized and optimized (Haloui et al., 2021).

More than a technical tool, GIS enhances governance by promoting data-informed decision-making, transparency, and inclusion. In Azilal's case, GIS contributes to the credibility and replicability of the TSS model across Morocco's mountainous regions. Its territorial intelligence to tourism planning, helping ensure that spatial and socio-economic realities are addressed in a coordinated, sustainable manner (Malah et al., 2023).

Comparative insights and policy Implications

Following our findings, a comparison with similar empirical studies allows us to better situate the dynamics observed in Azilal within a broader international and regional context.

Studies in the Annapurna region show that community-based tourism management, especially through the Annapurna Conservation Area Project, enabled equitable income redistribution and local resource preservation. This supports the positive effects seen in Tabant, where local management committees improved governance and economic benefits (Yu, 2014).

Failures of top-down models – Yunnan (China): Conversely, state-led tourism development in China's Yunnan province marginalized local communities and led to excessive commodification of culture. This reflects the situation in Bin El Ouidane and Tilouguit, where the lack of participatory structures hinders genuine economic inclusion (Popescu et al., 2024). Research by Boujrouf (2014) and Berriane & Moizo (2014) confirms that valorization of Amazigh cultural heritage and inclusive territorial governance are necessary conditions for

successful tourism projects. These conditions are partially met in Aït Bouguemez but remain lacking in other parts of the province.

Our use of GIS aligns with similar experiences in Portugal (Babayan, 2020) and Morocco (Haloui et al., 2021), where spatial data guided tourism interventions, improved accessibility, and helped reduce territorial inequalities.

In rural regions facing similar challenges, participatory tools helped adapt tourism projects to local realities and reinforced economic and social resilience (Danelutti et al., 2015).

These comparisons show that the dynamics observed in Azilal are neither isolated nor unprecedented. They confirm that: Participatory governance is a key driver of equitable benefit-sharing. Top-down approaches, still dominant in some areas, greatly limit tourism's local development impact. GIS is an indispensable tool for planning, regulating, and assessing tourism impacts at the territorial scale.

To ensure a more equitable distribution of tourism benefits and reduce local marginalization, several concrete recommendations emerge from our findings.

First, the creation of local tourism coordination platforms, such as intercommunal tourism boards, could facilitate dialogue among public authorities, cooperatives, and private actors, while also promoting joint marketing, shared infrastructure, and training initiatives.

Second, targeted support should be directed toward women and youth, including access to micro-finance for rural accommodation projects, certified guide training programs, and digital promotion tools. These actions would enhance inclusion and reduce reliance on informal and seasonal work.

Third, addressing spatial inequality requires investment in basic infrastructure, such as roads, signage, and sanitation, in underserved communes like Tilouguit, coupled with incentives for eco-tourism operators to diversify their geographic focus.

Finally, embedding participatory governance mechanisms, such as village-level tourism council, would ensure that local populations are actively involved in planning, decision-making, and benefit-sharing, with a portion of tourism revenues reinvested in community-led development initiatives.

6. Conclusion

This study of Azilal Province underscores both the immense potential and the inherent fragility of mountain territories in Morocco. Ecologically and culturally, Azilal possesses the fundamental ingredients for a thriving tourism sector: spectacular landscapes, distinctive Amazigh heritage, and a network of emerging community-based initiatives. Yet, these strengths are offset by chronic structural barriers, including weak infrastructure, limited institutional coordination, and pervasive socio-economic disparities. GIS analysis reveals ongoing land-use pressures and environmental vulnerabilities, highlighting the urgency of adopting more holistic planning and management frameworks. The TTS model emerges as a viable way forward, advocating a place-based approach that integrates resource protection, heritage valorization, and inclusive governance. In practice, this demands close collaboration among local communities, policy-makers, and private actors to ensure that tourism profits do not bypass those who live in the most remote areas. Azilal's community-led guesthouses and eco-lodges illustrate promising grassroots successes, yet scaling and sustaining these efforts call for stronger institutional and financial support, improved marketing, and concerted efforts to foster inter-village solidarity. By treating tourism as a lever for broader social and environmental objectives, Azilal can serve as a benchmark for other mountainous regions seeking equitable, sustainable development paths.

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