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# Practical Solutions for Sustainable Development in the UAE Geo Tourism Planning in the Desert Using GIS, SWOT Model and Integration of Geographic Factors

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#### Abstract

This research explores new approaches to achieving sustainable development in desert regions by harnessing their tourism potential. Among these possibilities, geological tourism plays a crucial role in promoting sustainable development. The research emphasizes the importance of tourism in providing employment opportunities and fostering development in developing countries, particularly in arid regions where inhabitants reside in vast, low-productivity areas. Deserts are characterized by diverse tourism potential, and comprehensive planning can lead to sustainable development. In the context of the United Arab Emirates, where 80% of its total area is desert, the scarcity of natural resources in these arid lands hinders rapid and sustainable development. This research builds upon previous studies indicating that geological tourism is a significant element in developing the tourism industry in arid regions. The unique topography and geological diversity in these areas can be leveraged to offer distinctive tourist experiences, such as exploring unique rock formations. Moreover, natural geological resources, such as groundwater and hot springs, can be utilized to develop sustainable tourist facilities, contributing to directing tourists toward preserving these resources. This aligns with the United Nations (SDG 8), titled "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all," which focuses on improving economic development, employment, and overall productivity, including a spotlight on sustainable tourism as part of these efforts. Additionally, the research addresses geographical factors influencing the development of deserts in the UAE, with a focus on intriguing tourist landmarks in arid environments and natural resources in the country. Analytical Hierarchy Process (AHP) was employed to compare different geological desert regions based on these factors, utilizing Geographic Information Systems (GIS) to identify the optimal region for desert tourism planning, namely the Hafeet Mountain area. Finally, strategic proposals include a SWOT analysis to identify strengths, weaknesses, opportunities, and threats, aiding in the formulation of strategic plans to develop geological tourism and achieve sustainable development in this context.

Keywords: Sustainable development, Gio Tourism planning, Desert tourism, GIS, SWOT, UAE

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## Introduction

Desert tourism possesses some contradictory characteristics. If managed properly with a focus on the specific and delicate nature of desert ecosystems, it can serve as a means for development and poverty alleviation. However, if not properly controlled, it can quickly lead to the destruction of local livelihoods and the natural environment (2). This research addresses the importance of studying the impact of geological tourism in these deserts, following an assessment of previous studies in this field, with the aim of exploring potential opportunities for economic development.

In this context, the research seeks to explore the impact of geological tourism in desert areas in the United Arab Emirates and identify potential opportunities for sustainable economic and social development. The research relies on the Analytical Hierarchy Process (AHP) to analyze and categorize tourist attraction areas, integrating Geographic Information System (GIS) as an effective tool to guide tourist interaction more accurately and efficiently.

Using GIS techniques, the topography, environmental features, and cultural landmarks were mapped and analyzed, contributing to a comprehensive understanding of the attractiveness of these regions, including the intriguing geological aspects. By combining AHP with GIS, it became possible to identify highly significant areas for tourists and determine sustainable investments.

Furthermore, the research focused on case studies to analyze geological and geomorphological tourism sites, considering them as prominent local phenomena, including unique geological factors. Each village was individually evaluated and ranked to obtain a comprehensive insight into tourist needs and preferences.

The research concludes by highlighting the use of the SWOT analysis method to analyze the specific locations, as this approach enhances sustainable planning and relies on the strengths, weaknesses, opportunities, and challenges to achieve tourism development goals in these unique areas and for overall economic development.

# Method

Development methods in desert areas, such as geological tourism, have been proposed for a better outcome. This involves identifying geological tourist attraction areas (with a focus on mountainous regions), selecting a planning area. The method used (AHP)for evaluating important criteria in desert tourism and calculating the value and impact of each criterion consisted of nine levels, as Table (1)

Nine-Point Intensity Important Scale				
Definition	Definition Intensity of importance			
Equally important	1			
Moderately more important	3			
Strongly more important	5			
Very strong more important	7			
Extremely more important	9			
Intermediate more important	2,4,6,8			

**Table 1:** Standardized Comparison Scale of Nine Levels.

The final consistency ratio, usage of which allows someone to conclude whether the evaluations are sufficiently consistent, is calculated as the ratio and the random index, as indicated (3).

Subsequently, actual planning was developed using the [SWOT] from Mountain Hafeet, which provides alternatives and policies. Geographic Information Systems (GIS) were employed in enhancing operations, analyzing data, and establishing a model for selecting the best village for tourism development.

### Case Study

The Mountain Hafeet region is situated south of the city of Al Ain, marking the border between the United Arab Emirates and the Sultanate of Oman, spanning between latitudes 28.0 to 24.03 degrees north and longitudes 55.46 to 53.0 degrees east. It extends 15 kilometers within the country with an average width of four kilometers and rises to an elevation of 1240 meters east of the city of Al Ain(4). It is the highest mountain peak in the Emirate of Abu Dhabi and the fifth highest in the United Arab Emirates. Mountain Hafeet serves as an exemplary location for mountain climbing and cave exploration, attracting numerous tourists.



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The study area includes other sites and potentials for geological tourism planning in the UAE desert, such as Jebel Al Hajar, Dalma Island, and Sir Bani Yas Island. map (1)



### Map 1; Study Area.

To choose the best scenario for geological tourism planning in desert areas, we first identified the tourism potentials and an executable implementation plan using the Expert Choice software. We conducted pairwise comparison analysis to evaluate each aspect. Subsequently, we assigned a weight to each aspect based on its priority and importance factors. We incorporated the element of geological tourism into this analysis to focus on the unique natural aspects in the geologically and geomorphologically rich desert.

Then, each attraction in each scenario was analyzed, and marks were assigned to all cases. Using Geographic Information Systems, we analyzed the spatial and geographical variables for each location, including the Mountain Hafeet area, providing additional insights into the environment and topography.

Through this integrated approach, we identified the tourist area that received the highest scores for geological tourism planning in the desert, contributing to enhancing sustainability and the tourist appeal of the study area and the UAE in general.

#### AHP Model

#### Identifying Attractions and Marking

Select important attractions marking pairwise and evaluating each mark for planning. The following table shows attraction marking.

		1							
Indicator	C1	C2	C3	C4	C5	C6	<b>C</b> 7	C8	C9
C1		4.6	4.4	4.34	2	5	2.4	3.1	2
C2			4	3	2.7	5	2	2.6	3
C3				4	3/3	3/2	/52	2	4/4
C4					3	5/2	1	2	3
C5						5	4/3	2	3/2
C6							3	2/4	2
C7								4/3	4/2
C8									4/4
<u> </u>									

Table 2: Pairwise Comparison of Desert Tourism Indicator.

Rank Average	Indicator	
0.258	A relatively mild climate due to its elevation	C1
0.176	Experiencing hot springs	C2
0.149	Holds unique natural and historical characteristics	C3
0.098	Tranquility and environmental beauty	C4
0.108	Home to a luxurious tourist resort	C5
0.057	A unique natural environment	C6
0.090	Name traces back to an ancient city and cultivated villages and Located in main road	C7
0.055	Agricultural history with palm tree farms	C8
0.029	A distinctive experience for nature and tranquility seekers	С9

Table 3: Indicator Marking Based on AHP Method.





### Select Better Alternative

In this stage analyzing pairwise a mountain areas in relation with any attractions and distinguishing each area mark. Afterwards displaying total results of area marks in Table( 4), because of the high volume of data the outcomes are summarized and a better alternative is chosen.

Table 4. Selecting A Detter Choice Dased on the Arm Method.				
Range Average	Area (Volcanic)			
0.550	Hafeet Mountain			
0.401	A hjar Mountain			
0.080	Delma Island			
0.029	Sir Bani Yas Island			

Table 4: Selecting A Better Choice Based on the AHP Method.

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Based on the results in the previous table, it is evident that:

- 1. The Mountain Hafeet region has the highest geological tourism assets (caves, sedimentary rocks), making it suitable for investment and planning for geological tourism in the UAE (5).
- 2. Meanwhile, Jebel Al Hajar ranked second in terms of suitable assets and is also promising, similar to Mountain Hafeet but requires a certain level of planning and attention.
- 3. However, Delma Island and Sir Bani Yas Island require meticulous planning for the development and investment in geological tourism as they lack some of the assets that encourage tourists to visit this area, especially regarding spatial and cultural engineering, and the scarcity of notable geological natural phenomena.

#### SWOT Model

After an exact analysis of the area by SWOT and identifying the present situation and considering appropriate planning for the future of the area, we can conclude that the principle of sustainability is reachable. Therefore providing the SWOT model in light of the importance of the factors and we conclude the following Results:

Table: 5 Swot.			
Threat	Opportunity	Weaknesses	Stringhts
Environmental impacts- Tourist pressures- Occasionally, the repetition of sandstorm days-Loss of authenticity-Pressures on local resources Cultural- challenges	-Enhancing environmental awareness-Attracting tourists- Promoting culture and heritage-Creating job opportunities-Establishing handicraft industries- Developing infrastructure- Economic development and improvement of the desert environment Increasing its- role in the UAE's Gross Domestic Product (GDP)	-Heat whether from April to September-Lack of service facilities-Lack of information about geological tourism- Difficulty in accessing mountainous areas- Occasionally, fear affects cultural heritage	- A leading tourist destination-One of the largest mountains in the UAE-Holds unique natural and historical characteristics Tranquility and environmental beauty-Home to a luxurious tourist resort- A unique natural environment-Name traces back to an ancient city and cultivated villages and Located in main road- Agricultural history with palm tree farms

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### Conclusion

After conducting surveys on geological tourism planning in the UAE desert at various sites, especially in the Emirate of Abu Dhabi and Al Ain, the following results were obtained: The Mountain Hafeet region was identified as the most potential for the development of geological tourism in the UAE desert among all locations in the region. Other sites can form a tourism circle around the area, and collectively, the group of sites can establish an axis for geological tourism in the UAE desert, presenting a distinct appearance in desert tourism spatially in the geographical expanse of the Emirati desert. This is due to its significant and diverse geological and geomorphological features capable of developing its geological tourism product.

Based on the environment's capacity to accommodate geological tourism, the (SWOT) model can provide the correct utilization of available facilities in the region and a coordinated plan. This program supplies the appropriate planning principles for geological tourism in the UAE.

### References

- 1- Calle Capitan Haya, Sustainable Development of Tourism in Deserts, Guide of Decision Marks. Madrid. Spain. 2007.
- 2- Jonson. Mark, The Ultimate Desert Handbook, R.M.P/ McGraw-Hill,2003.
- 3- Pakdin Amiri. Morteza, Project selection for oil-fields development by using the AHP and fuzzy TOPSIS methods, Expert systems with applications (2010) in press.
- 4 Ashraf Al Baroudi, "Geological Tourism Atlas in the United Arab Emirates," London, 2016.
- 5- Abu Dhabi Tourism and Culture, The Natural Heritage of Mountain Hafeet, 2012.