

Vernacular Landscapes: The Impact of their Diversity on the Geomorphology and Tourism in the Jordanian Badia

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Abstract

This study examines the effect of the diversity of the landscape on the geomorphological tourism industry in the Jordanian Badia and explores the contribution of geomorphological features in the Jordanian Badia to the Jordanian tourism sector. The study relies on combining theory and practice in addition to combining more than one approach such as the symbolic-physical approach, the organizational approach, and the perceptual-conceptual approach which focus on the possibility of developing geomorphological tourism based on the system's inputs and outputs.

The study found the importance of diagnosing a landscape in the Jordanian Badia based on the analysis of the Digital Elevation Model (DEM) derived from the Shuttle Radar Topography Mission (SRTM) and Geographic Information System (GIS). The results of the analysis showed the presence of great terrestrial diversity within the study area. The results also divided the nature of the areal spread of geomorphological phenomena in the Jordanian desert in terms of morphological structure into four distinct regions in terms of their biological content and the topography of the surrounding areas, which led to the diversity of land cover patterns and their uses. The study contributes theoretically to extracting geomorphological characteristics to identify all geomorphological features in the study area, and practically to help decision-makers exploit those geomorphological characteristics in order to increase the number of tourists, prolong their stay, and achieve their goals.

Keywords: Geomorphological Tourism, Landscape, Ecotourism, Sustainable development, Tourism exclusivity.

Introduction

Tourism industry is an important revenue stream for the Jordanian economy; because of Jordan's distinctive tourist advantages and attractions, whether they are cultural, historical,

archaeological, or entertainment (Masa'deh et al. 2018; 2019). The Jordanian Badia is characterized by its great diversity in the shapes of the surface of the earth sources (Bazazo & Alananzeh, 2020), resulting from environmental factors; the most prominent of which are the climate, vegetation cover, and water sources (Jawabreh et al., 2023a; Bazazo & Alananzeh 2016). Geomorphology can show the beauty and splendor of earthly shapes, explain the story of their origin and development, bring tourists to them, and practice their activities and residence there.

The concept of geomorphology or the science of the earth's shapes is determined by focusing on the study of natural landscapes (such as mountains, plains, valleys, rivers, deserts and coasts) and the reasons for their origin and development over time. Geomorphology is a word of Greek origin, and it is divided into three parts (Geo) meaning Earth, then Morpho (meaning shape and Logos) meaning science. That is, geomorphology is the science of studying the shapes of the Earth's surface. The current study relied on this concept in formulating a new tourism pattern within the study area through geomorphological tourism. Where the focus is on the study of Landscape in the Jordanian Badia, depending on the analysis of natural landscapes to understand the history, development, and prediction of future changes through a set of ground observations and digital models (Khoshraftar, 2021).

Thus, the study uncover the components of geomorphological tourism in the Jordanian Badia to plan and develop them with the aim of reaching an optimal use of the tourist sites in the Badia. In addition to exploring the contribution of geomorphological features to Jordanian tourism and creating a modern tourism pattern through which diversity can be added to the Jordanian tourism product.

The tourism industry is one of the most important economic sectors that currently capture Jordan's attention (Jawabreh et al., 2023b; Alshawagfih et al., 2015; Al-Dmour et al., 2017; Masa'deh, 2017; Obeidat et al., 2017; Alananzeh et al., 2023; Alananzeh et al., 2018; Chiu et al., 2019; Obeidat et al., 2019; Jawabreh et al., 2023c). Geomorphological tourism is one of the new types of tourism, and the opportunities for development in the Jordanian Badia are increasing due to the diversity in land cover, and due to the comparative advantage and the competitive advantage of the study area, which qualifies it to be an important attraction at the regional and international level in the pattern of geomorphological tourism (Tarhini et al., 2015; Bazazo and Alananzeh, 2020). This contributes to diversifying the tourism product in the Jordanian Badia, despite the lack of studies related to the analysis of the land cover landscape and its impact on the development of geomorphological tourism in the study area, as geomorphological phenomena represent an important resource for tourism, which has not received adequate attention in the tourism development plans in Jordan.

The study area has distinct and unique geomorphological features. This is due to the diversity in the landscape of the land cover, the diversity of the natural factors that contributed to the formation of the Jordanian Badia, and the resulting rock formations and ground forms with the utmost magnificence and beauty, which is an essential element in developing the pattern of geomorphological tourism.

The study is based on several justifications highlighting the need for such research to fill the void in the literature of tourism management and to complement what others have started in order to plan and develop tourist sites in the Jordanian Badia. The study of landscapes in the Jordanian Badia represents an important component of tourism development that has not received sufficient attention. The majority of studies related to this aspect were confined to the study of the desert, without reference to the role of geomorphological tourism and its importance in this field, despite what the Jordanian Badia enjoys in the diversity of all the vocabulary of the landscape which qualifies it to be an important attraction point in developing this style.

Therefore, the study aims to identify all the components of the land cover landscape available in the Jordanian Badia to develop them with the aim of reaching an optimal use of the tourist sites in the Badia and exploring the contribution of geomorphological features to Jordanian tourism and creating a modern tourism pattern through which diversity can be added to the Jordanian tourism product and identify and analyze all land cover components available

in the Jordanian Badia. In addition to work on developing the Jordanian Badia by encouraging the geomorphological tourism pattern and developing and promoting tourist sites in the Jordanian Badia, by conducting a natural survey of the land cover there. Moreover, the study analyzes the spatial and regional variation of tourist sites in the Jordanian Badia, highlight the spatial character of tourist sites, and understand their location among other regions of Jordan. Finally, the study provides recommendations and proposals that would improve geomorphological tourism in the Jordanian Badia and create a geographical database that can be relied upon in developing geomorphological tourism in the study area in the future.



Fig.1:The Jordanian Badia Map and satellite image

Source: The researcher's preparation based on the satellite visual (Land sat-7)

Literature Review

Previous studies that have dealt with the relationship between landscapes, geomorphology and tourism are characterized by their scarcity at the international level. They have not been addressed at the local level. Most of the studies that dealt with the subject focused on hydrological and geological factors without addressing the sociology of the landscaping components and its relationship to geomorphological tourism and the extent of its impact on development plans that lead to sustainable tourism planning in the Jordanian Badia. Among those studies presented by Ibert et al. (2019) in their treatment of the land cover issue in the Jordanian Badia, and its impact on the regulation of land use by focusing on hydrogeological data and its impact on the structure of the Jordanian Badia, and they emphasized the role of the natural landscape regulation process in influencing the Human activities.

Alananzeh et al. (2018), Abuhashesh et al. (2019), Al Fahmawee and Jawabreh (2022b) Al-Bakri and Salahat (2019) Aubrecht (2019) and Petutschnig et al. (2019) have discussed the role of natural factors in influencing the landscape of land cover in the Jordanian Badia and the extent of changes that occur due to the decline of land cover due to natural and human factors. They asserted that in light of the continuous increase in the impact on the land cover, the spread of negative human practices towards nature, and the increase in human activities, it will lead to fundamental changes in the structure of the land cover landscape in the Jordanian Badia, which leads to many problems according to the researchers' description.

While a number of other studies have dealt with parts of the subject of the study in dealing with the Jordanian Badia in various hydrological and geological aspects without

directly referring to the development of geomorphological tourism. Some examples of these studies are the works of Al Fahmawee et al. (2023); Rawashdeh et al. (2018); Al Dein (2021); Al Fahmawee and Jawabreh (2022.) These studies deal with the most important causes of changes in the biological diversity environments in the Jordanian Badia, the distribution of the biological environments within the study area, and the vital characteristics of the Jordanian Badia using the Geographic Information System (GIS) and Digital Elevation Data (DEM) and the creation of digital maps of the areas of biological diversity in the Jordanian Badia. The study found the variation in the components of vital environments and their impact on the size and nature of natural habitats and the extent of the resulting biological effects, especially in the extent of the apparent variation in risk rates exposed to many areas in the Jordanian Badia, and the shape and distribution of risk areas using geographic information systems techniques. The study concluded the importance of a clear understanding of the components of vital environments in affecting biological diversity, and the geographical distribution of natural reserves in the Jordanian Badia.

Previous discussion indicates that the landscape elements of the land cover and its impact on geomorphological tourism were not taken into consideration and that the literature also indicated a number of negatives resulting from the imbalance of the nature of the relationship between the natural components within the study area. This study comes as a continuation of previous studies (Al Fahmawee, Jawabreh, 2022a) in an attempt to uncover the relationship between the landscape of land cover and geomorphology, and sustainable tourism development in the Jordanian Badia, through the comprehensive approach to all the elements of the aforementioned topic, as it represents a case study that imposed the nature of the region many measures and dynamics for its modeling according to the method of totalitarian. The study took into account the geomorphological characteristics of the Jordanian Badia, in continuation of previous studies conducted by researchers in an attempt to shed light on geomorphological tourism in the Jordanian Badia, and to understand the form of organization and spatial relationships between the tourist sites in the Badia.

Research Methodology

The study's approach requires combining more than one approach at the same time, such as following the symbolic-material approach, the organizational approach, and the cognitive-conceptual approach, with the aim of highlighting the regional character of the geomorphological tourism pattern in Jordan. Badia, in accordance with the comprehensiveness of the above-mentioned trends and their integration within the framework of objective analysis, based on inputs to reach the required outputs. The chronology method was used to study the changes affecting the land cover landscape over various time periods. With the aim of reaching the general principles and laws that govern the factors affecting the development and growth of the Jordanian Badia over time, and many methods have been used in analyzing and representing data, such as cartographic representation in the form of maps, shapes, graphs and pictures to represent the study area using multiple software for the geographic information system, such as the ARC IMS software. The ARC GIS 10.3 program, and it is considered one of the components of the (ESRI ARC GISK) package. The study relied on the graphical theory in the study of the landscapes of land cover in the Jordanian Badia through the (ARC Globe) program in the form of a matrix (Graph Matrix). The preparation of a graphic model, through which the study area is shown in three-dimensional form, and the study also relied on several methods, including: topographic maps with scales (1:50000), and geological maps with a scale drawing (1:400000) were used to study the surface properties in the study area, the satellite visualizations (Land sat-7) were analyzed by using Erdas Image software.

Study Area

The Jordanian Badia is a natural museum of various natural phenomena. The Jordanian Badia is located to the east of the mountainous heights, where it starts from the east of the Hejaz Railway. Its average height is (600-900 m), and its area is estimated at (75%) of the area of the Hashemite Kingdom of Jordan. It has an area of seven million hectares, as is crowded in figure

(2), and most of it is affected by the arid desert climate. It is interspersed with a group of valleys and desert depressions, such as: Wadi Al-Yatum and Dana in Tafila, and it contains a number of wide bottoms, such as: Al-Quwira and Qaa Al-Disi, and in terms of vegetation cover, Arum, Qaisum and Qubba plants spread in the valleys, while the Shannan plant prevails in other areas. The vegetation cover in the region is little, and it is exposed to desertification processes, because of the prevalence of dry climate and sand dunes.

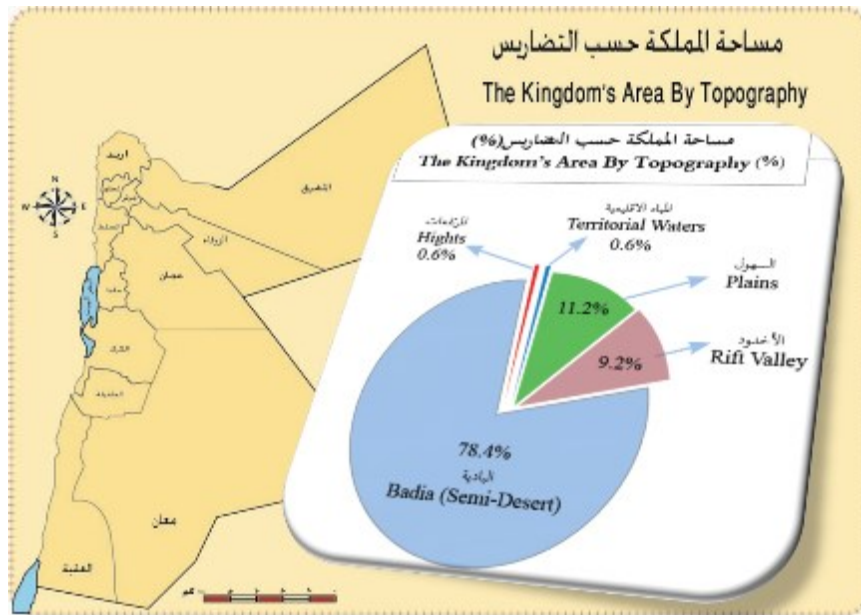


Fig. 2: Jordan's Area by Topography

Source: Prepared by the researchers using ARCGIS 10.3 software

Geomorphological features influenced by climatic factors play an important role in the tourist attractions in the Jordanian Badia; due to its intertwined nature and linked to any part of the Jordanian Badia. These factors include natural resources, including climate, plants, water, and wildlife. The climate of the Badia is characterized by being moderate and attractive to tourists in summer and winter compared to the desert climate. The rains in this region are characterized by their extreme paradoxes, as the rates of raindrop significantly from west to east, and from north to south, which constitutes an important element in the diversity of vegetation and grass cover in the Badia (Bani Domi et al., 2022).

The characteristic of the daily thermal variability in the Jordanian Badia is among the most important main characteristics, from a geomorphological point of view, and the clarity of this characteristic is intensified in the Al-Hammad Desert, which leads to the activity of air operations and their effect on the landscapes. There are many pieces of evidence that show the existence of successive climate changes that the Jordanian Badia was subjected to, which was reflected in the nature of the surface, especially during the rainy periods during the fourth time, which the Jordanian Badia had undergone, which was a geomorphological factor of great importance, which was reflected in the rock formations in the Badia. The best example of running water in the Badia during the Pleistocene Rainy Era are those major valleys, such as Wadi Al-Yatum in the Negada Badia, which bear many geomorphological forms that attract researchers and tourists from different parts of the world.

The Jordanian Badia includes many forms of its own picturesque land, and its uniqueness in terms of its representation of its local environment through the colors of its rocks, the extent of its slope and shapes, and the factors of weathering, erosion, and sedimentation that it has gone through. Many natural factors are mixed in the geomorphological divisions of the Jordanian Badia, as is illustrated by Figure (3).

The Jordanian Badia is divided into four geomorphological patterns, which are illustrated by the following:

1. The Hisma sand desert in the far south, and The Hisma from a geomorphological point of view, is a crumbling plateau of sandstone rocks.
2. The land of Najada: Najada covers an area of one thousand four hundred square kilometers from southern Jordan and consists of granite rocks.
3. Basaltic free zone: It extends in the northern regions of Jordan, and consists of a series of basaltic effluents that emerged from the depths of the earth during ancient geological eras.
4. The deserts of Hammad and the land of flint: These are the inland valleys of Jordan, and their lands are spread by flint and are distinguished by their flat surface.

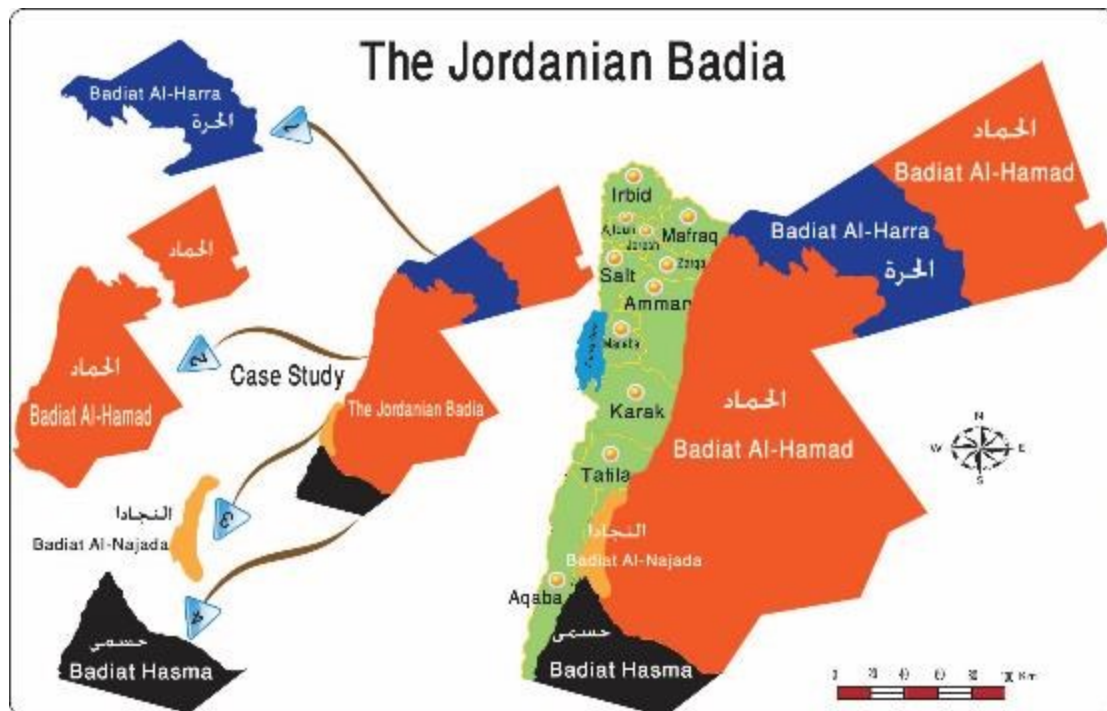


Fig. 3: Spatial Divisions of the Jordanian Badia

Source: Prepared by the researchers using ARCGIS 10.3 software

Landscape Land Cover and the Spatial Organization of Land Use

The concept of landscaping the land cover in the Jordanian Badia includes the study of the general structural and structural composition of the Jordanian Badia and the patterns of land use and their evolution over time. Therefore, landscape studies are interested in studying the evolution of the spatial shape, spatial relations, and the form of spatial organization in the Jordanian desert. As the landscape is the visible part of an area of land, with its natural features (forms, earthly bodies, and living organisms, of plant and animal species), and the mechanisms of interference in activities and uses (Bazazo et al., 2022).

The results of the analysis of the landscapes of the land cover patterns in the study area, using the numerical classification of the patterns of spatial-area propagation, revealed the existence of a large land diversity within the study area, as shown in Figure (4) by extracting the qualitative and quantitative information for the uses of the land cover landscape through the classification directed to the visuals (Land sat- TM) using remote sensing and geographic information systems.

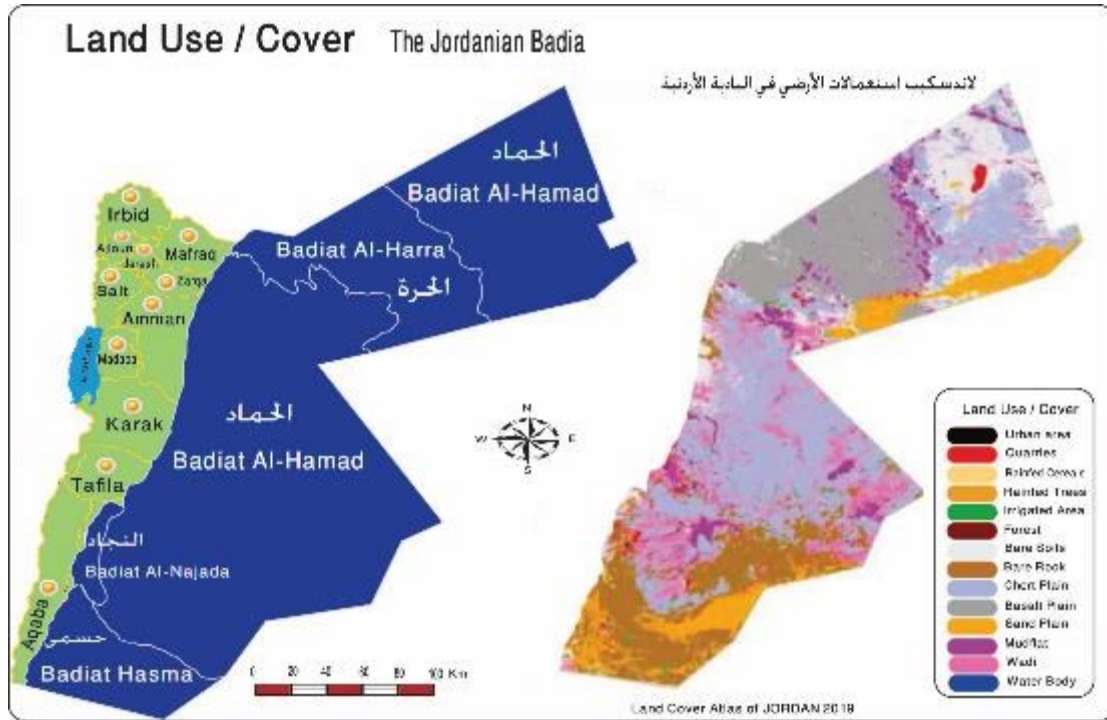


Fig. 4: The Jordanian Badia
 Source: Prepared by the researchers using ARCGIS 10.3 software

By relying on the (NDVI) index to study the landscape of the land cover in the study area, and by using (ARC GIS 10.3) software, the nature of the areal spread of geomorphological phenomena was identified by relying on the digital elevation model (DEM). The Jordanian Badia was divided in terms of its morphological composition into four distinct regions in terms of its vital content and the topography of the surrounding areas. Figure 5 shows the results of the visual-oriented digital classification (Landsat-TM) for the year (2019), the spatial spread of the cover landscape varieties Lands in the Jordanian Badia. Through the Digital Change Detection analysis, it appears that there are many indicators used in the detection of Synoptic Analysis that led to the diversity of land cover patterns and their uses.

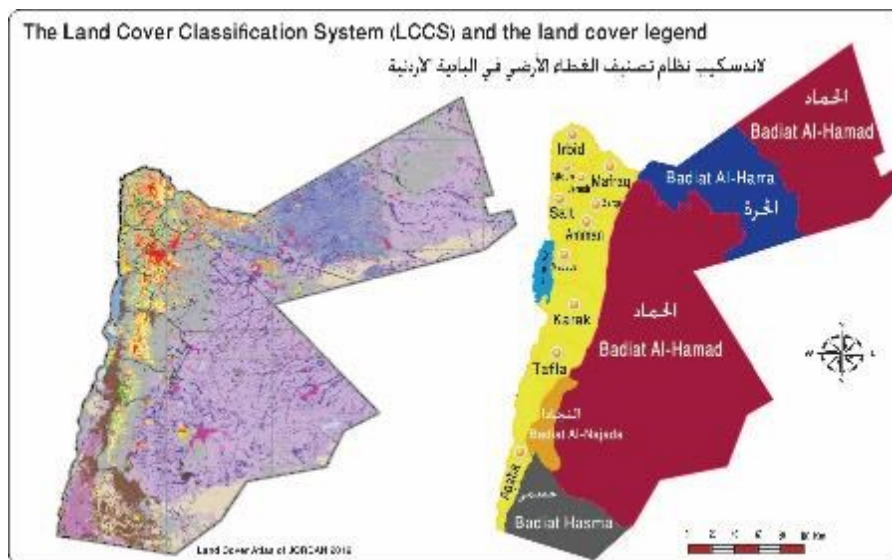


Fig. 5: The visual-oriented digital classification (Landsat-TM)
 Source: Prepared by the researchers using ARCGIS 10.3 software.

The Landscape of Land Cover in Badia Hisma

The Hisma Badia is located in the southern part of the Jordanian Badia on the Saudi border, and has an area of (720000) dunums, and is administratively affiliated to the Governorate of Aqaba. It is a plateau of sandstone rocks, which have been exposed to many tectonic factors over time, which have contributed to the diversity of the land cover landscape in many geomorphological forms, which combine stony plateaus, depressions, and bottoms, such as the bottom of Disi and Abu Suana, and the hills, mountains, and slopes of similar beautiful colors, and contrasting rocks with attractive geomorphological diversity.

The Hisma Badia includes the Rum Nature Reserve, which has unique biodiversity, which was listed by UNESCO in (2011) as one of the most important natural world heritage sites. The Hisma Badia also contains a unique biological diversity, as (119) species of birds, (138) types of animals, and (187) species of plants have been recorded, indicating rich biodiversity. The Hisma Badia's topography is distinguished by its diversity, as the highest mountain peak in Jordan was recorded within the Hisma Badia, which is the summit of Mount Umm Damir (1854 AD) and the summit of Jabal Rum (1754 AD). The Hisma Badia enjoys a dry climate, in which the maximum temperatures in the summer season reach 45 degrees Celsius, and in the winter season it drops to (16) degrees Celsius, and the annual rate of precipitation ranges between (100-50) mm annually, decreasing in some dry seasons to what is less than 50 mm, and it is spread in the Hisma desert, the different types of sand dunes that attract tourists from different regions of the world.

Landscape Cover in Badia Alhurra

The Jordanian Hurra is part of the Harat of the Levant and one of the most important Arab ones and is also known as the Plateau Basalt Badia. The Jordanian Free Zone covers an area of (11,278 km²), equivalent to (13%) of the area of Jordan, and its height ranges between (1123 m) in the far northwestern part (525 m) at the Azraq Basin. It is a series of successive volcanic eruptions. Formed between the Miocene and Holocene periods, volcanic mountains are spread in the desert, which rises to more than (1015 m), such as Jabal Qais, Tal Rumah, and Jabal Al-Artin. The landscape cover is characterized by many unique geomorphological characteristics, resulting from the basaltic flows. Badia Alhurra is also characterized by unique geomorphological and geological characteristics, which could contribute to the development of a pattern of geomorphological tourism in the Jordanian Badia.

The free Badia is rich in biodiversity, and provides natural habitats for a number of aquatic and terrestrial organisms. It is considered a haven for migratory birds, which has made it an important area for birds in the world; it includes 274 species of birds. The Al Hurra includes the Shaumari Wildlife Reserve, which is the first wildlife reserve in Jordan, with an area of (21,000) acres. The Azraq Wetland Reserve has an area of (12,000) acres, while the Azraq reserve contains different communities of plant types, increasing its biodiversity.

Landscape Land Cover in Badia Al Hammad

The Badia of Al-Hammad covers most of the Jordanian Badia, with the exception of the Badia Al-Hurra, Hisma, and Al-Nijada. Al-Hammad is a geomorphological topographical designation for the lands of which 50% is covered by stones. The landscape classifies the land cover in the Badia of Al Hammad according to the type of rocks it covers, such as basalt, limestone, and flint rocks. These are covered by rock exposures dating back to the ancient eras, while the rest of its surface covers the formations of the modern marine, continental, and erupting eras. As for the sedimentary layers, they tend gently from the North-eastern and Southwestern sides towards the center, to take a semi-flat to undulating position, leaving their depressions as spacious yards for the winds.

The Badia of Al-Hammad is called the land of flint or desert squinches, and it is characterized by the lack of vegetation cover, the presence of limestone and gravel cover on the surface, and its severe flat surface as a result of carving. The Hammad Desert is dominated by perennial plants that tolerate scarcity of water and high temperatures, as they have adapted

themselves through their long roots and gummy leaves, such as wild thyme, dung, wormwood, qaisum, shafallah and sidr.

Landscape Land Cover in Badia Al Najada

The Najada desert extends within the series of granite rocks in southern Jordan, within the heights of Ras al-Naqab to southern Aqaba. Igneous rocks consist of granite, diorite, and basalt compounds. The landscape of the area is characterized by many faults and earth faults, and many networks of valleys descend on the sides of these heights, some of which end in the east to Wadi al-Yatim, and some of them pour west into Wadi Araba, which led to the formation of flood fans with huge complexes of sediments that arise at the mouth of the sloping valleys. From the granite heights, which produce rock debris, whose sizes and shapes range from huge boulders, some weighing a few tons, to large stones smoothed or rounded sides, gravel, sand and clay materials.

The highlands are distinguished by their absence of vegetation; Because of the dry climate conditions, where the average annual temperature is twenty-five degrees Celsius. Plants that endure high drought degrees such as juniper, thorns, and other thorny plants can grow there. The summer temperatures reach 45 degrees Celsius, and the precipitation rates in the winter are low (50-300 mm / year), as they are distributed into areas (80%) of which the rainfall does not exceed (80 mm / year). (30%) in the months of July and August, and (60%) in January, with an annual rate of (50%) equivalent to average annual evaporation of (3500) mm.

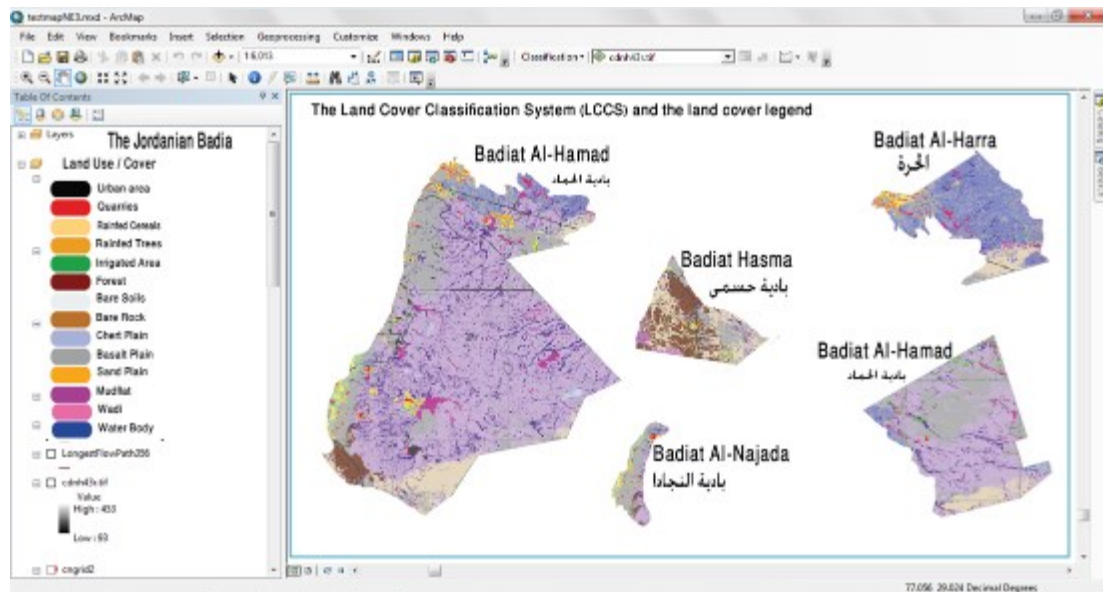


Fig. 6: Landscape, the land cover, sections of the Jordanian Badia
Source: Prepared by the researchers using ARCGIS 10.3 software

Findings and Recommendations

The Jordanian Badia is an integrated geomorphological system consisting of many landforms with attractive landscapes, and these shapes are considered an open natural museum, which is an important element in developing the pattern of geomorphological tourism in the study area, which has attracted tourists since ancient times; for recreational and therapeutic purposes. The study area is characterized by the diversity of animal, plant, and birdlife and the diversity of lifestyles, which represent the habitats in which many animals live, which necessitates preserving the biodiversity available in the study area.

The Badia is a natural museum that contains a great diversity of shapes on the surface of the earth, which is an important element in the diversity of Jordanian tourism products. The movement of tourists through the Jordanian Badia from the Free Badia to the Hisma Badia in

the south witnesses a unique diversity in the terrestrial shapes and the animal and plant life over a distance of not more than 350 km. Geomorphology is of great importance in highlighting the beauty and splendor of the terrestrial shapes in the Jordanian Badia, explaining the story of its origin and development, bringing tourists to it, and practicing their activities and residence there.

Geomorphology plays an important role in highlighting the beauty and splendor of earthly shapes, explaining the story of their origin and development, attracting tourists to them, and practicing their activities and residence there. The forms of landscapes of land cover in the Jordanian Badia show great diversity and complexity. The Jordanian Badia can be divided into four geomorphological regions: Badia Al-Hurra, Badiyah Al-Hammad, Badiya Hisma, and Badia Al-Najada. Each of these areas includes many forms of its own picturesque land, which show the splendor of the landscapes, and show its individuality in terms of its representation of its local environment through the colors of its rocks and the extent of its slope and shapes and the factors of weathering, erosion, and sedimentation that it has gone through, and its history that attracts tourists from different parts of the world to enjoy. By watching it and practicing its tourist activities, in addition to providing opportunities for researchers and scholars interested in studying antiquity and the natural history of the environment.

Achieving integration between the planning region and the tourist region in the Jordanian Badia is an aim to achieve the demands of comprehensive tourism development, as this contributes to setting development strategies for the Badia and planning and developing the Badia in an integrated, weighted, and sustainable manner. This study comes with all its concepts related to the diagnosis of the land cover landscape in order to be a scientific tool that helps in analyzing the current situation in the Jordanian Badia, in preparation for developing a clear-cut strategy for developing the pattern of geomorphological tourism, especially in light of the continuous increase in demand for this type of tourism.

The wild and plant life in the Jordanian Badia is affected by the landscape of the land cover in the Jordanian Badia, as many plants and herbal species spread in the Badia in its different sections depending on the influence of temperature and the amount of rain, *Anabasis Articulata* Al-Ajram is one of the largest shrubs that grow in the Jordanian Badia between Azraq, Bayer and the cliffs of Ras Al-Naqab, including the Ma'an and Al-Jafr basins. As for the valleys of the southern part of Al-Hammad, between Jurf Al-Dervish, Bayer and Ma'an, they are dominated by Qaisum bushes with wormwood, saila, and jerbaa, and meadows, reeds, and browns predominate in Al- Azraq.

Emphasis must be placed on preserving the geomorphological systems in the Jordanian Badia, through the creation of a system of protected natural areas and their effective and sustainable management. The principles of integrated management of geomorphological ecosystems must be applied and integrated into the national tourism plans and strategies for land use in the Jordanian Badia. Taking into account the inclusion of the Jordanian Badia region within the UNESCO natural world heritage system, and working on the inclusion of the elements of environmental impact assessment and its relationship to biological diversity in the planning and implementation processes of programs to develop the pattern of geomorphological tourism within the study area.

Developing institutional capabilities and unifying them within one agency that directly supervises the management and development of the pattern of geomorphological tourism, and conducts more studies within the region of the study area; With the aim of identifying the dynamics of the land cover landscape in order to build a pioneering model for the development of geomorphological tourism in the Jordanian Badia.

Conclusion

It is no longer possible to hide the natural museum and the great diversity in the forms that the Badia contains as an important element in the diversity of the Jordanian tourism product. The Badia is a natural museum that contains a great diversity of shapes on the surface of the earth. Geomorphology is of great importance in highlighting the beauty and splendor of

the terrain in the Jordanian Badia, explaining the story of its origin and development, bringing tourists to it, and practicing their activities and residing in it.

The study shows that the Jordanian desert has its own landscape. Many natural factors are mixed into the geomorphological divisions and are divided into four geomorphological patterns: the sandy desert of Hasma in the far South, the basalt land of Najada and Harra, and the Hammad deserts. The analysis of landscape patterns of land cover in the study area, through visual-oriented classification (Land sat-TM), using remote sensing and geographic information systems, revealed the presence of great land diversity within the study area. Relying on the (NDVI) index to study the land cover landscape, and using (ARC GIS 10.3) software, the nature of the areal spread of geomorphological phenomena was identified. Digital Elevation Model (DEM) revealed that there is a unique diversity of land cover patterns.

Therefore, geomorphological tourism development and planning plans in the Jordanian Badia must be based on a comprehensive framework for all tourism sites, with special attention to environmental protection and integration as a major part of all studies related to tourism development plans in the Jordanian Badia. Also, attention must be paid to the uniqueness of the tourism image of the Jordanian Badia, by adding the local dimension in the tourism designs to all tourism projects in every tourist site in the Badia, so that each tourist site has a distinctive shape and beauty related to its nature. Attention must also be given to highlighting the advantages of each tourist site in the marketing campaigns to solve tourism integration between the various tourist sites in Jordan through a comprehensive tourism development plan in cooperation with the various relevant authorities in its implementation

Study Limitations

This study has the following limitations

1. Spatial framework: It includes the Jordanian Badia, and its area is (70,000 km²), with all the forms it contains of the earth's surface, which is illustrated in figure (1).
2. Thematic Framework: It includes the analysis of all the characteristics and components of the landscapes of the land cover in the Jordanian Badia, using the techniques of geographic information systems (GIS) and remote sensing (RS).
3. The time frame: includes the analysis of all the geomorphological features of the Jordanian Badia, based on aerial photos and satellite visuals, produced within the UTM Land sat satellite panels for the year 2019.

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