

Recreational Activity: A New Pattern In The Geography Of Makkah - Al-Hussainiya Suburb

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Abstract

The Kingdom of Saudi Arabia is witnessing transformations in economic life, to diversify its economic activities and not rely solely on petroleum activities. A new pattern of economic activities appeared, which is recreational activity, affecting the change in land use, especially on the city margins. In recent years, the city of Makkah has witnessed urban transformations that resulted in economic, service, and social changes. Population evacuation operations from the city center area in turn resulted from such transformations, which were matched by intensification in marginal areas, the most important of which is Al- Hussainiya suburb, which witnessed an increasing trend in recreational activities, the most significant of which is the increase in the number of cafes, football fields, and rest houses. The study concluded that the comprehensive survey has become one of the necessities for detailed studies of developments in land use as well as satellite imagery. Also, the geographical location of the suburb outside the borders of the Haram boundaries (Sacred boundaries of the Grand Mosque in Makkah) has provided potentials that have been exploited in the form of concentration of recreational activities, which helps to settle this kind of activities in the suburb by providing administrative regulations from the concerned authorities and establishing some recreation-related facilities.

Keywords: *Recreational services - suburbs - urban land use - Al- Hussainiya suburb - geography of the city of Makkah – The Kingdom of Saudi Arabia.*

Introduction:

Al- Hussainiya is one of the marginal suburbs of the city of Makkah, whose land is distributed over three administrative districts. The suburb includes many urban patterns, the most important of which are the slums that spread in the period when it was considered far from the urban administrative scope of the city, it is also that the urbanization in the suburb is transitional and closer to rural. The suburb also includes mountains, valleys, and plain areas. Many geographical factors took part for the suburb to become a fertile place for the movement of residents and their displacement from the city center, whether it was compulsory by removing the old neighborhoods to expand the Grand Mosque and establish major regional projects, or optional in terms of the saturation and completeness of the inner neighborhoods associated with the economic activities struggle over the land use and excluding the residential use for the sake of hotel and commercial activities. With the general increase in urbanization rates in the Kingdom of Saudi Arabia, which amounted to about 88.6% in 2022 and in Makkah region in particular, which reached %92.1 (according to the General Authority for Statistics data in the latest population census), the population rates increased in the cities as they approached 2.4 million people in the city of Makkah. Accordingly, it has expanded urbanely and the use of the land has been restructured. We have witnessed for several decades a continuous decline in working time under the pressure

of technological advancement, the automation of production and distribution means, and the availability of leisure time, at a time when urban pressures are increasing. As a result, an increasing part of the day hours is left for leisure and entertainment (Josy, 1983, p.491). With the city of Makkah occupying the third place in terms of population size in the Kingdom after the cities of Riyadh and Jeddah, the situation was naturally reflected upon the social and economic aspects of the population. Sequentially, it required the emergence of a new pattern of land uses, the one concerned with recreational services, which has already become a phenomenon, which currently works on sculpting and structuring the urban fabric, as well as directing and shaping the future land use map of the suburb, which in turn activates the ambitious national plans for investment in the fields of tourism and entertainment.

The main objective of this research is to study the land use in Al-Hussainiya suburb to determine the spread and development of the recreational services phenomenon, and thus evaluate and plan for its future, in addition, employing the current capabilities of the geographical reality in achieving sustainable development. Therefore, this research aims to:

- Studying recreational activities and their development in the suburb, especially in the last ten years.

- Future planning of these activities in order to achieve maximum outcome.

- Trying to define the determinants of recreational activities, pinpointing the most important planning problems and finding solutions to them, paving the way to rehabilitate the temporary and spontaneous recreational areas in Al-Hussainiya suburb into permanent, economic, and planned recreational areas in a way that serves the city's economy and creates a different source of income far from Hajj and Umrah facilities (hotels and trade).

Data and methodology:

The cities of the Kingdom of Saudi Arabia have witnessed fundamental changes in the recent period, and these changes have affected urban land use and population activities. Although cities such as Riyadh and Jeddah have also witnessed huge transformations in the recent period, the historical dimension of the city of Makkah and its global importance has deepened the power of its transformation, morphological change, and its population characteristics. Therefore, addressing its study as a whole or part of it requires the integration of several research approaches specialized in the geography of cities and urban areas, as well as modern approaches and methods in addition to field study and fieldwork, and even coexisting in it for a period of time.

Among the most important methods the geographer can follow in his research in the field of urban geography are two methods: the method or approach that deals with the study of the functional aspects of the city, and the approach that focuses on the study of the city's morphology and shape (Al-Shwawera, 2012, p. 45). The morphological approach was used, which is related to the study of the stages of city growth and the morphology of its general appearance or part of it. It was also necessary to use the ecological approach, which is concerned with studying the city from the inside and emphasizes the importance of economic and social factors in determining land uses, and helps to study the internal spatial and population structure through the study of urban social change (Mekki, 1995, p. 169).

Perhaps the spread of the private recreational services phenomenon such as football fields, cafes, and rest houses in the study area required the use of the inductive approach, which begins with observing the elements of the phenomenon in preparation for its

analysis, and observing its parts and components in order to form a general impression of the forms of links and interactions between them, and accordingly, their features, characteristics, nature, and how they occur are known (Al-Farra, 1980, p.14).

The starting point for this study was from maps and satellite imagery, from which the research derives its primary data, and upon them, the information and final results of the study are updated and presented. Many layers (shapefiles) were used from the Secretariat of the Holy Capital, especially the layers related to urbanization and roads, and the comprehensive survey method was used to collect data, for which official statistics were not available due to their recent presence and the rapid change in the districts of Makkah, or due to their informal presence: such as the acquisition of land by taking possession of it and exploiting it in storage or recreational activities or preparing it for future real estate speculation after its legalization process is complete. A digital elevation model (DEM) with a spatial resolution of 12.5m was used to study the degrees of slope. It was obtained from NASA's UAF Alaska Satellite Facility databases through the link on the web. This model is extracted from ALOS PALSAR radar images.

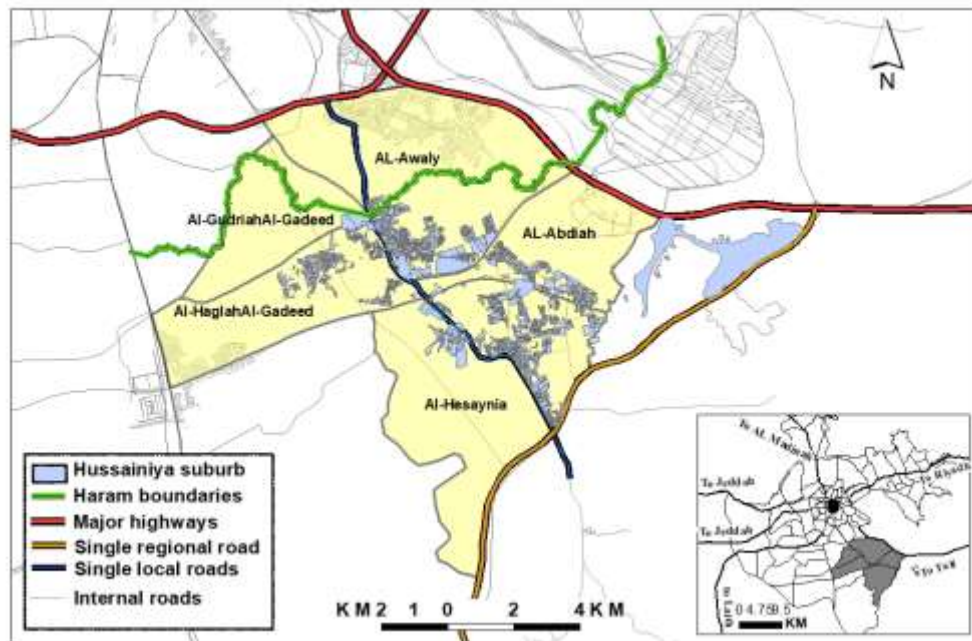
Study Area: Geographical location

Al- Hussainiya suburb is located in the southeastern corner of the city of Makkah, and its land are distributed among five administrative districts (according to the new administrative map of the city of Makkah, which was produced in 2020). Five districts are Al-Abdiya, Al-Awali, AlHaglahAlGadeed, AlGudriahAlGadeed and Al-Hussainiya districts [figure 1], given that the city of Makkah consists of ten administrative municipalities containing 101 districts.

When talking about the geographical location of the study area, it acquires special importance through its neighboring districts. From the east, there is Umm Al-Qura University, which is one of the largest educational institutions in the Kingdom, it includes tens of thousands of students and workers. As for the north, it is bordered by Al-Awali district, which is one of the districts with organized urban planning and inhabited by a high-income social class, and to the west is Al-Akaishiyah district. The entire suburb is located outside the boundaries of the Grand Mosque in Makkah, which gave it priority in housing recreational activities that are prohibited from being held within the boundaries of the Grand Mosque, including, for example, cafes².

² The cafes that offer hookahs, and not the western-style cafes that are limited to serving different types of drinks (excluding alcohol).

Figure (1) Location of Al-Husseiniyah suburb

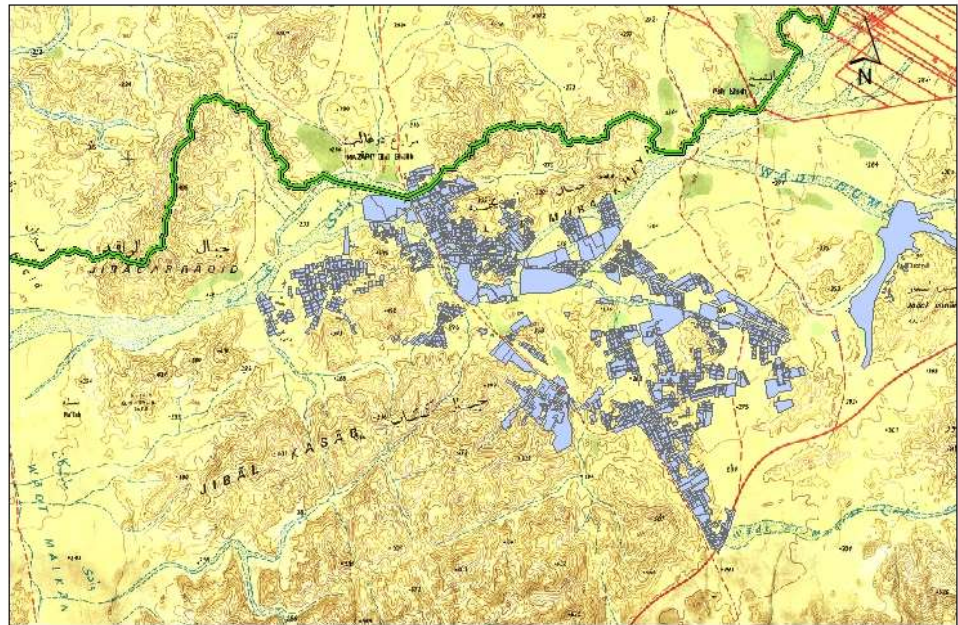


The Suburb Geomorphology:

The geomorphology controls the pattern of land use, and in the suburb of Al-Hussainiya, the mountains and valleys confined between them are considered the main appearance of the surface forms, and this indeed is considered the main determinant of urbanization and its characteristics. The district comprises some mountain groups, the most important of which are the Kassab Mountains, which are located in the west, and in the southeastern part and near the Jeddah-Taif road is Mount Asmar (Fig. 2).

Wide parts of the lower basin of Uranah valley and its branches permeate the suburb, and the passage of the main canal of the valley in the middle of the suburb has posed a danger from the torrents of Uranah valley due to the wide area of the study area. Also, one of the branches of Numan valley coming from the east converges with the stream of Uranah valley specifically south of Umm Al-Qura University in Al-Abdiyyah.

By observing the contour map of the suburb, it is noted that its land level starts from about 220 meters above sea level, and the plain and flat areas are spread. The proportion of the plain lands amounts to 72.9% of the total land, which are lands with large areas, and it is noted that its level ranges from 220 meters to 300 meters (Fig. 2).

Figure (2) Topographic map of Al-Husseiniyah suburb**Climate:**

The city of Makkah is characterized by high temperatures throughout the year, as it is located in the tropical region, and its presence among the mountains far from the Red Sea coast gave it a kind of climatic privacy. The maximum, minimum, and annual temperature rates in Makkah are 37 °C, 22.5 °C, and 29.9 °C, respectively (Ahmed, 1992, p. 22). These rates constituted Makkah among the highest rates of temperature in the world (Mirza, 2001, p. 12).

In addition, it is possible to rely on the characteristics or features of the local climate prevailing in the region to determine the identity of the urban locality. Many studies have shown that cities have their own climatic characteristics resulting from the effects of global warming, concrete buildings, paving roads with bitumen, and the diversity of activities and land uses. Accordingly, a distinction can be made between rural and urban areas in light of the average temperature, which rises in cities from the countryside by up to two degrees Celsius (Ashour, 2005, p. 8). The directions from which the winds come most were the northern side (25%), the southwest (22%), and the northwest (16.4%), while the variable winds reached (17%) (Ahmed, 1992, p. 47). The rain element in Makkah is characterized by its scarcity, fluctuation, suddenness, and locality (Mirza, 2001, p. 16). The importance of the climate element appears when talking about recreational activities in Makkah, where temperatures rise most of the year, and therefore leaving the city towards the margins to search for open areas where temperatures are relatively lower than the city center becomes a goal for the population.

Road Network and Accessibility:

Um al-Mu'minin Maria al-Qibtiyya Road is the main transport artery in the suburb, and it is called Al-Hussainiya Road. This road is exposed to dangers during rains and is closed by the Civil Defense Forces, as the middle section of it forms part of the main stream of Uranah valley, and suffers from congestion and traffic jams on days in which sporting events take place, such as local or international football matches, as these matches are broadcasted on special channels that are run in cafes and private rest houses spread in the suburb of Al-Hussainiya.

This road is linked to Al-Taif Road in the south and the Fourth Ring Road in the north. The Fourth Ring Road is considered one of the main roads that connect the districts of Makkah and facilitates traffic flow during peak hours in all marginal districts. It is also used by Makkah residents as a shortcut to access the regional roads (Taif, Riyadh, Al-Laith, Jeddah, Medina). The road bordering the suburb from the south is called Jeddah-Taif Road.

Results and Discussion:

1- land use:

Al-Hussainiya suburb is considered one of the southern marginal areas of the city of Makkah, and therefore it represents a real estate asset for urban expansion and the implementation of the aspirations of the development plans allocated for the city. The part exploited and inhabited by human uses is estimated at 14 km². Despite the recent amendment in the administrative map of the city of Makkah and the creation of a new administrative district under the name of Al-Hussainiya, it did not include all the land known to the residents of Makkah and known as the suburb of Al-Hussainiya, and therefore the suburb remained divided into five administrative districts. The random urban pattern remained the dominant pattern in the suburb (Fig. 1).

land use pattern:

Most types of land use are closer to primitive rural urbanization, despite the presence of new constructions for residential and commercial buildings, but it represents the primitive stage in urban growth, which begins with the acquisition of land and then building walls around it to determine its ownership or seize it in preparation for issuing ownership documents. Also include, agricultural lands scattered, and vacant lands that were identified by the residents and for which no final ownership documents were issued.

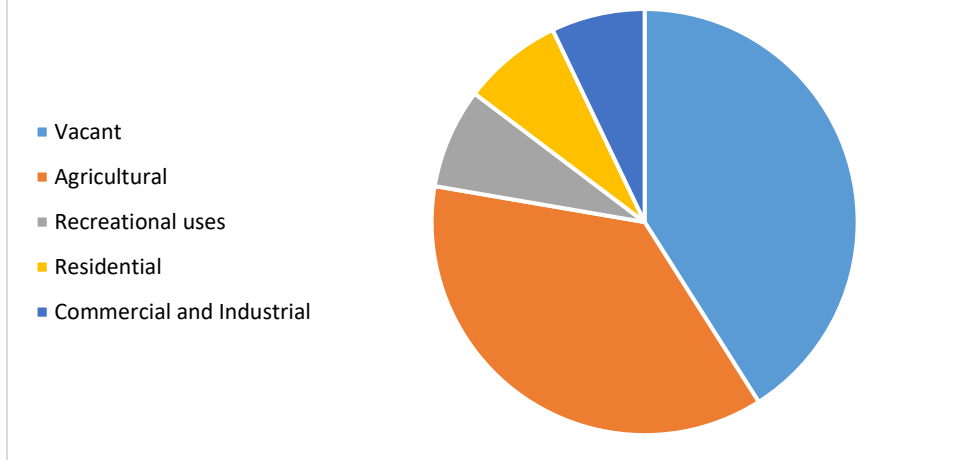
Since its inception, housing plans have not been approved by the concerned authorities except in recent years, and until now they have not yet been implemented. Therefore, the land has been variously exploited for different uses, most of which are non-residential, such as football fields, cafes, and rest houses, owing to fear of removing them due to the lack of ownership documents. A large proportion of the land is vacant and has been demarcated by fences only.

Table (1) The area of Al-Hussainiya suburb and their percentage according to the type of use

Land Use	Area (m²)	%
Vacant	5749585	41.0
Agricultural	5146700	36.7
Recreational uses	1082284	7.6
Residential	1058472	7.6
Commercial and Industrial	985652	7.1
Total	14022693	100

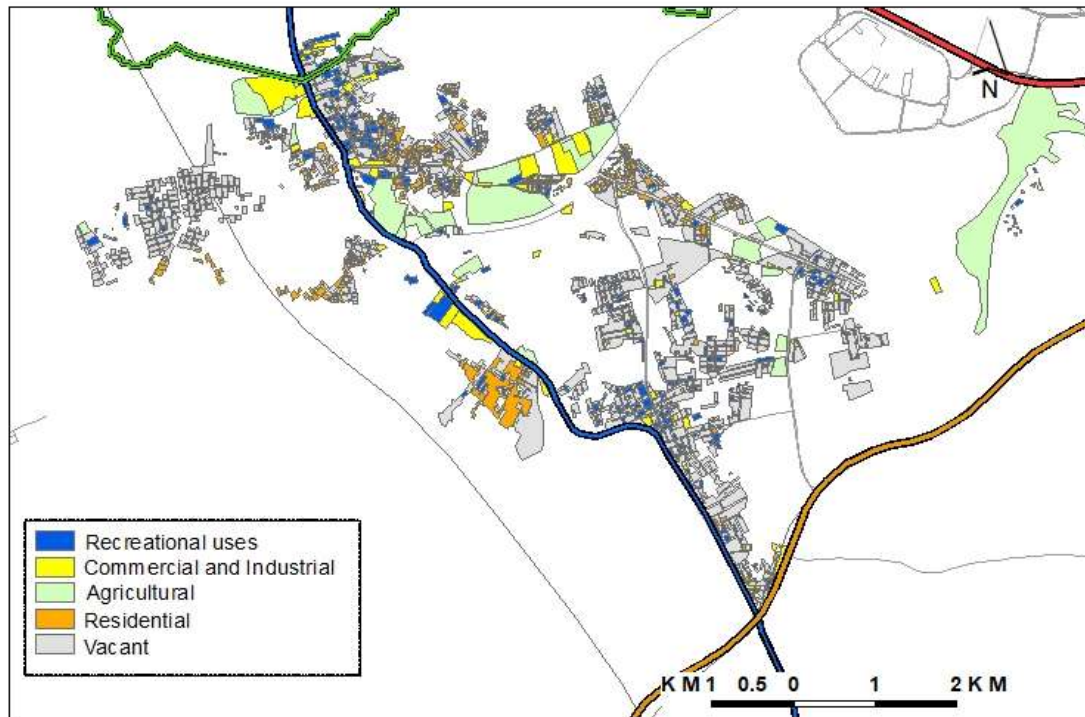
Source: From the researcher's account based on satellite imagery and field studies 2023

Figure (3) The area of Al-Hussainiya suburb and their percentage according to the type of use



The area of the Al-Hussainiya suburb is about 14 km² (Table 1). The vacant use is the dominant of the percentage of suburb land by this use reached 41.0%. While agricultural use, accounted for 36.7% of the total land. The recreational uses occupied 7.6%, which negates the character of a residential suburb, but rather it can be called a recreational suburb.

The dominance of non-residential uses is owned to several reasons; the most important of which is that most of the suburb lands do not have ownership documents issued by the official authorities. These lands are in jeopardy of clearing when setting up national or local projects, primarily roads and infrastructure. This, of course, contradicts the idea of stability that precedes the construction of a permanent residence for the individual, and therefore the owners of these lands resort to non-residential, and at the same time, inexpensive uses construction-wise in anticipation of their clearance at any time, such as the construction of a football field, a cafe, or a rest house.

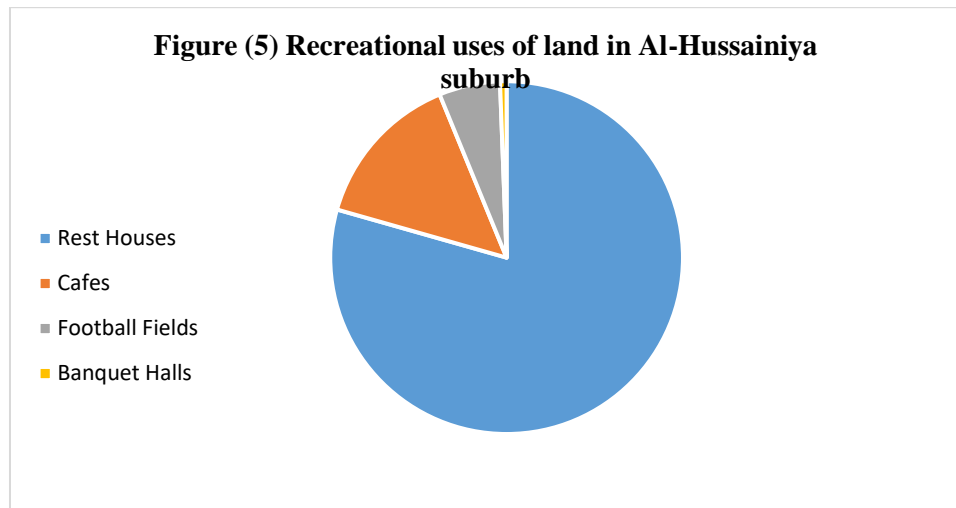
Figure (4) Main land uses in Al-Husseiniyah suburb

Each of the previous types of uses has subsidiary reasons that helped to establish it; Al-Hussainiya suburb's location outside the Grand Mosque boundary qualified it as a location to establish cafes—a law was issued that states that cafes serving the hookah (shisha) are to be located outside the Grand Mosque boundary. As for the rest houses, their prevalence is owned to the proximity of Al-Hussainiya suburb to many districts in the center and south of Makkah, and their accessibility through the Fourth Ring Road or Taif Road. While the spread of the plain lands and the soil of the valleys (Uranah Valley) enabled the spread of football fields.

Table (2) Recreational uses of land in Al-Hussainiya suburb

Land Use	Area (m ²)	Percentage of Recreational uses (%)
Rest Houses	859637	79.4
Cafes	155567	14.4
Football Fields	60995	5.6
Banquet Halls	6084	0.6
Total	1082284	100

Source: Based on satellite imagery and field studies in 2023



According to the detailed data from the comprehensive field survey, it was found that recreational activities were confined to four uses of land, which are rest houses, cafes, football fields and banquet halls (Table 2). Analyzing leisure time and considering it as a scientific goal in itself is necessary, as it has become an integral and important part of spatial, social, economic, and cultural adaptation (Dienot 1983, p. 492). The factors that led to the settlement of recreational activity in Al-Hussainiya suburb can be explained and summarized as follows:

- The rapid urban growth of the city of Makkah in the lands of the central districts of the city, crossing the borders of the Grand Mosque in Makkah, with the absence of approved plans for Al-Hussainiya suburb, as the regular plans for dividing the lands provide employment and allocation of specific use for each piece in the plan, While in the case of Al-Hussainiya, employment and allocation are done by the owner in the first place as long as it is not restricted to a specific use by the concerned authorities.

- Ownership of the majority of lands in the district is with documents that are not officially registered and do not have final documents that preserve the rights of the owner. Out of fear of removing any buildings in the event of local or national projects or removal due to construction in violation of administrative regulations, the land is invested in projects that do not cost materially, such as rest houses, cafes, and football fields. In the event of land clearance after a period, it will have returned the profit by then that compensates for the value of the removed constructions.

- Low percentage of residential areas in the due to the lack of social services (schools, hospitals, and security) and this does not encourage the establishment of housing and residential investment.

- Smoking cafes can only be established outside the boundaries of the Grand Mosque; as the special situation of the city of Makkah and its religious specificity had an impact on the requirements and legalization of the regulations for some recreational activities represented in cafes that offer tobacco products (shisha). A law was set stating that a list of conditions are applied to establishments licensed to provide tobacco products inside and outside the urban area, except for the cities of Makkah and Al-Madinah Al-Munawwarah, where licenses are prohibited for hookah cafes within the legal boundaries of the Grand Mosque of Makkah (Ministry of Municipal and Rural Affairs, 1441, pp. 3-5).

Rest houses: The area of rest houses in Al-Hussainiya reached about 859637 square meters, equivalent 79.4% of the total recreational use. Rest houses are not exclusively common in the suburb only but in the whole of Makkah: rest houses in Al-Hussainiya forms about 19.1% of the total rest houses in the city of Makkah (Bawazir, 1439 AH, p. 117).

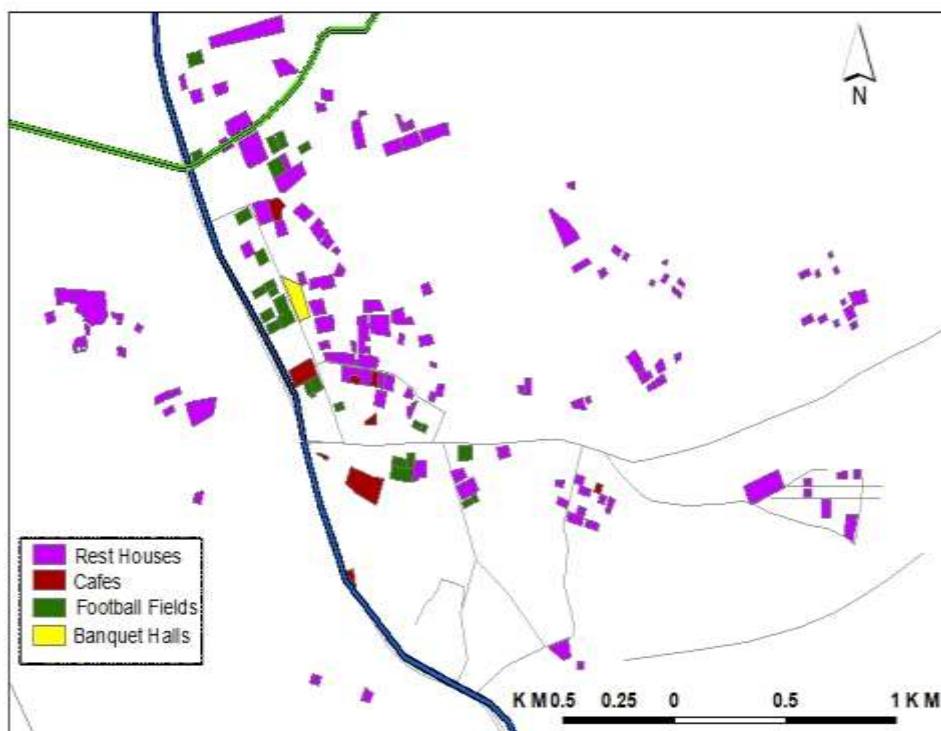
The spread of rest houses in cities is a phenomenon sweeping across Saudi cities, and many reasons explain this, the most important of which are urban changes in the nature

of life, which have created a new pattern of land uses represented in housing public and private recreation, and it has grown rapidly at across the cities, and underneath this use, there is a functional activity represented in recreational investment in the form of private forums in which families spend their free time (Al-Jukhaidib, 2005, p. 3). Also, the low prices for renting rest houses, compared to banquet halls or hotels for various social events, played a role in the spread of this recreational style. It is not possible to ignore the ease in the procedures for establishing a rest house compared to the establishment of a cafe, a banquet hall, or even a football field, facing constant contact with the control authorities by the municipalities and civil defense and even the closure of some of them if the administrative requirements are not met.

There are many types of rest houses in the suburb of Al-Hussainiya. There are rest houses equipped for simple social celebrations (graduation, marriage, honoring ceremonies, etc.), and these rest houses are segregated into two parts, one for women and the other for men. There is another type of youth rest houses, sometimes called cabins, these are rented by a group of young people to hang out in them, watch local and international matches, or have barbecue parties. There is also a special type that is not for investment and is used only by its owner for recreation with his family on holidays.

Cafes: The demographic structure of the city of Makkah affected many urban, economic, and recreational phenomena; throughout history, since the inception of the city, it welcomed many different races and geographical origins for the purpose of trade previously and Hajj and Umrah later, therefore having its own cultural specificity, which affected the diversity of recreational services, including the phenomenon of Cafes. Cafes are widespread in Al-Hussainiya suburb, and the emphasis here is on the cafes that offer hookahs, and not the western-style cafes that are limited to serving different types of drinks (excluding alcohol, of course). Two types of cafes can be classified according to the countries where they are spread in the same way they are currently in the suburb of Al-Hussainiya, which are of the Yemeni style and the Egyptian style.

Figure (6) Recreational uses of land in Al-Hussainiya suburb



Yemeni-style cafes are characterized by their vast area and are divided into two main parts, the first is closed and air-conditioned and used during the day, when the temperatures rise (a characteristic of the region in general) or when it is raining, and this section is divided into cubicles, each of which contains floor sofas that can accommodate for a group of people and is equipped with a separate TV from the rest of the other cubicles. These cubicles are contiguous and organized, and they are often separated only by a low wall, the height of which does not exceed half a meter. Sometimes the whole section is opened entirely in the form of a large hall, and the sofas are placed next to the bearing walls of that closed hall. As for the other part of the café, it is in the open air and is also divided into separate cubicles and equipped with a TV for each cubicle for freely watching different channels. Sometimes the open-air section contains closed rooms that are rented monthly to a group of people for enhanced privacy.

As for the other type of cafes, the Egyptian style cafes, where the inner section is distinguished by the presence of adjacent tables and many seats, and there are no floor sofas, offering exclusive types of hookahs (shisha) that are commonly served only in Egypt. In the closed section of the cafe, there are one or two screens for group viewing, and the outdoor section has large screens that broadcast local and international football matches. There are also some entertainment tools that are common in Egyptian cafes, such as dominoes and backgammon.

Although the number of cafes is less than the number of football fields, they occupy a larger area estimated at 155567 square meters, equivalent to 14.4% of the area of the urban part in the suburb of Al-Hussainiya. Also, despite the beginning of their appearance in small numbers over the last twenty years, their number has increased from 8 cafes in 2015 to 14 cafes in 2016, as shown in Figure (6), then they doubled in number in the last three years only, reaching 33 cafes in 2023. The cafes are mainly located near Umm al-Mu'minin Maria al-Qibtiyya Road (Al-Hussainiya Road).

Football fields: The private football fields established varied in terms of space and equipment. All the fields in the suburb were built in sizes suitable for five- or six-players teams, and those fields were concentrated near the main stream of Uranah valley, more precisely next to the part of the valley that coincides with Al-Hussainiya Road (Umm al-Mu'minin Maria al-Qibtiyya). By observing map (6), we note that the construction of these fields was mainly related to the level of the ground, the degree of slope, and the type of soil. About 94% of the fields were built on lands with a slope of no more than 15%, and they were located in flooding areas of the valley where the soil is sandy loam, and almost all of them were built on a level ranging from 240 meters to 260 meters above sea level, which is the same level that includes the lands submerged by the waters of Uranah valley when the torrents flow in Al-Hussainiya suburb.

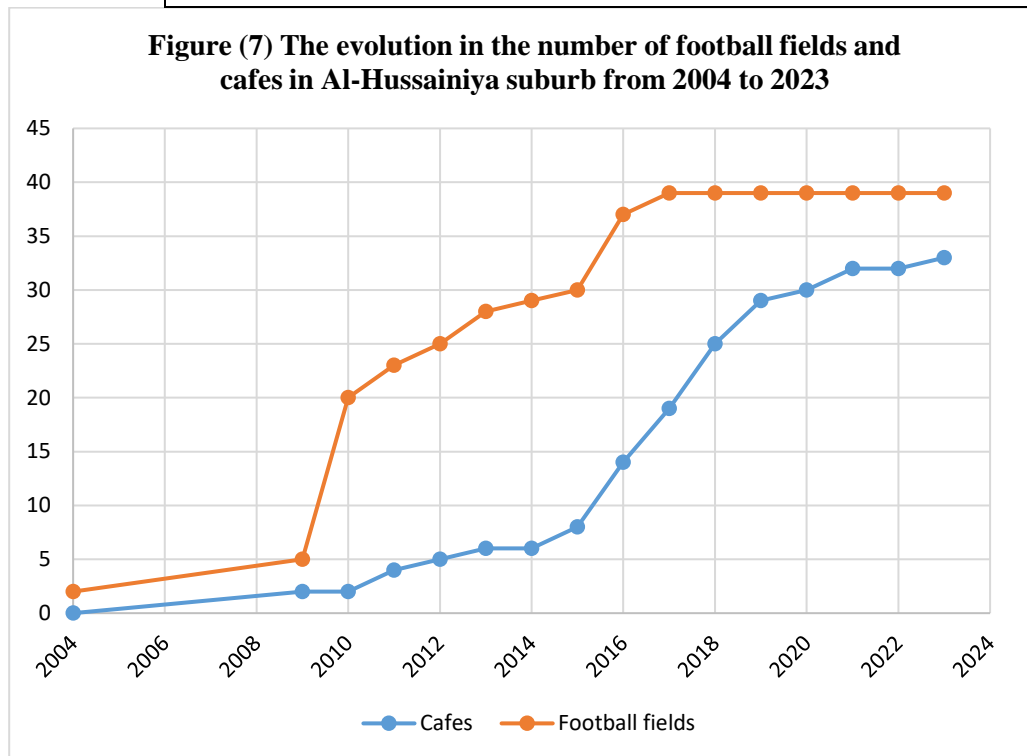
Thus, the nature of the earth's surface, the appropriate soil, and the level of the surface, in addition to the ease of access, were the main reasons for the concentration of football fields in their current location. The conditions of its geographical location negatively affected them during the rainy seasons and the flow of torrents, and it was noted that the floor of the stadiums got flooded with water during the rainy season, and some of these stadiums are besieged by torrents and closed.

Football fields occupied an area of 60995 square meters, equivalent to 5.6% of the area of Al-Hussainiya lands, and the number of fields has increased since 2004 when it was only two fields back then, and the number reached 39 fields in 2021.

<p>Table (3) The evolution in the number of football fields and cafes in Al-Hussainiya suburb from 2004 to 2023</p>
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Date	Football fields	Cafes	Date	Football fields	Cafes
2004	2	0	2016	37	14
2009	5	2	2017	39	19
2010	20	2	2018	39	25
2011	23	4	2019	39	29
2012	25	5	2020	39	30
2013	28	6	2021	39	32
2014	29	6	2022	39	32
2015	30	8	2023	39	33

Source: Satellite imagery and field study



Vacant Land:

The study of vacant lands is important because it is the spatial or real estate asset to increase recreational facilities. The vacant land is defined as the land that has not been developed urbanely for the purpose assigned to it according to the relevant laws and regulations in force at the time of the announcement³, and since the lands that have been logged do not

³ The executive regulations of the White Land Fees System, Article 1, Cabinet Resolution dated 8/9/1437 AH.

belong to any approved urban plan, they are lands that have not been designated for a specific use, so they have been included under the name of vacant lands that fall under random use. These lands are void of any kind of use, and there is no connection to public utilities: water, sewage, or electricity networks. Most of these lands are fenced with walls to define them, while others are fenced with barbed wire.

The area of vacant land is 5.7 km², which constitutes 41% of the total area of the inhabited part, and all of these lands are located outside the boundaries of the Grand Mosque. The areas of these lands vary, as the areas of the plots acquired from satellite imagery range between 200,000 square meters, for the largest, while the smallest is about 400 square meters. The majority of these plots do not have final title deeds, but merely ownership documents between the buying and selling parties, i.e. a purchase contract that has no reference in the concerned administrative departments. This is what affects the characteristics of the land in terms of real estate, land prices, and type of use.

Many of these lands have undergone a process of civil division, in the sense of dividing a large plot of land into small plots and streets, without linking it to a general plan that includes other neighboring civil plans approved by the concerned authorities.

2- Planning determinants and development opportunities:

Contour lines and slope degree:

It is safe to say that all the land use in the city is related in one way or another to the nature of the land surface, primarily the levels of elevation above sea level (contour lines) and slope degrees. Knowing the contour levels is the basis when developing a plan for the water infrastructure networks and determining the locations of the main water tanks for the districts, as well as the map of the sewage network and the locations of the lifting stations. It is also the determinant of the maps of the rainwater drainage networks. The importance of level differences manifests in calculating the quantities of excavation and filling when constructing road networks or projects with a large spatial area. As for the degrees of the surface slope, they affect the pattern of land use, and many studies linked the suitability of development and rehabilitation of land to the degree of slope of its surface, as shown in Table (4).

And due to the high real estate value of the lands located within the approved urban scope of the city of Makkah, the residents have found solutions to overcome the terrain obstacles to exploit the slopes of the mountains, thus increasing the operations of preparing the slopes of the mountains and exploiting them for residential and other uses.

Table (4): Areas of land development according to the degrees of land surface slope

Degree of slope	Development Potential
0% to 3%	Generally suitable for all development and uses.
3% to 8%	Suitable for medium-density residential development, agriculture, industrial and institutional uses.
8% to 15%	Suitable for moderate to low-density residential development, but great care should be exercised in the location of any commercial, industrial or institutional uses.

15% to 25%	Only suitable for low-density residential, limited agricultural, and recreational uses.
Over 25%	Only used for open space and certain recreational uses.
Source: Soil Surveys of Lehigh/Northampton Counties, Pennsylvania, Soil Conservation Service. 1963, 1974.	

Source: Steep Slopes, Guide - Model Regulations, Lehigh Valley Planning Commission, November 2008, p.5

One of the most important uses that were affected by the degrees of slope is the agricultural use, and by observing, which shows the distribution of land uses according to selected categories of degrees of slope, we find that the areas of agricultural lands decrease clearly with the increase in the degree of surface slope, About 65.3% of these lands are located in areas with a surface slope of less than 8%, and 87.8% of the agricultural land area is located in areas with a slope of less than 15%, while it is almost non-existent in areas with a slope of more than 25% where only 3% of the area is present. There are other uses that are not compatible with the steep slopes of the land surface, such as commercial and industrial uses. We note that 87.7% of them are located in areas with a surface slope of less than 15%, and that, of course, is due to the incompatibility of the steep land with commercial and industrial uses and transportation and storage operations.

As for the vacant lands, they differ from the agricultural, commercial, and industrial lands with regard to their association with the degrees of slope and their proximity or remoteness from the valleys and their branches; we find that 29.5% of the total vacant lands are located in areas with a degree of the surface slope exceeding 15%, and this presence is owned to the possibility of preparing, leveling, and exploiting areas that have a degree of slope, especially when the areas of the vacant lands are small. In addition, the sloping lands provide some privacy for some land uses in the recreational field, e.g., rest houses. About 25% of the total vacant land is located in areas with a slope of less than 3%, which are watersheds areas within the boundaries of the active channels.

Active channels

One of the most important determinants constraining the planning processes, especially in mountainous areas, is determining where active channels flow. Studying the active channels of valleys is imperative when building road networks and infrastructure networks such as electricity, water, and sewage lines. It is also one of the main criteria when choosing where to establish social service networks. The nature of the earth's surface helped the branches of the valleys converge near the suburb, the foremost is of course the main canal of Uranah valley, as its branches extend in the eastern of the suburb, from south to north, and Noman valley also meets the main canal of Uranah valley and pours its water load, specifically to the north of the suburb. Satellite imagery and digital elevation maps (DEM) allow for determining the passage of valleys and their branches. Many satellite images were used, especially on the dates when actual torrential flow occurred in Al-Hussainiya suburb in the years 1992, 2018, and 2019. From these images, the most important active branches and places where watersheds were identified. The course of Numan valley has been modified. After it used to pass through Umm Al-Qura University through the student section, its course was modified to pass in the south of the university. The agricultural use is the most affected use at the time of the floods, constituting about 9.6% of the endangered lands. The land used for rest houses came second in terms of exposure to danger, as it constituted 8.1% of the total area of rest houses. It is worth noting that all the area exposed to inundation is located in the eastern part of the district. The roads are not rather safe from

the dangers of torrential dangers. The road of Umm al-Mu'minin, Maria al-Qibtiyya, receives the water collected from the Kassab Mountains, which form the western half of the district, causing the closure of the main road that connects the district with the rest of the city's districts during the rainy.

The torrential drainage network:

There are no special torrent drainage channels in the district, and all the channels are considered exposed. They drain the torrents of Uranah valley, and they start from the area of the holy sites north of Arafat, penetrating the Al-Abadiyah district until the beginning of the suburb of Al-Hussainiya and extending with the main stream of Uranah valley. One of the major problems facing the urban development process in the district is the congruency of the main stream of the Uranah Valley drainage channel with the main Hussainiya road with a separating distance of about two kilometers, which leads to a complete blockage of the road until the end of the torrential runoff, and the Civil Defense Forces supervise the closure of the road in the part close to Uranah valley to prevent accidents. Umm al-Mu'minin Maria al-Qibtiyya road receives the torrential waters collected from the Kassab Mountains, west of the district; water falling on this mountains accumulates and converges with the main stream of Uranah valley at its intersection with Al-Hussainiya road. This water flows along the road obstacles the traffic and leads to complete road closure for several hours after the rain had stopped and after the passage of the transported water load through Uranah valley.

3- planning problems and development opportunities:

The road network:

One of the planning problems that Al-Hussainiya suburb will face in the near future is the traffic to and from the rest of Makkah districts. The district relies solely on Umm al-Muminin road as a connection to the rest of the districts, and this road is threatened with closure at times of torrents. These torrents are also among the reasons that prevent this road from being connected to the Fourth Ring Road. From study, many planning potentials emerged that could help in developing the road network, including the geographical location near Umm Al-Qura University; there are already ideas to link the university, located in Al-Abadiyah district, to Al-Hussainiya suburb and make use of its already-existent internal road network. This will make the district a service center for the university and tens of thousands of students and university employees, thus allowing the district to establish many student and recreational services. However, this proposal is not free of challenges. The road leading to the suburb of Al-Hussainiya is almost 8 meters wide at the beginning of the suburb, or less in other places. It also extends to meet Umm al-Mu'minin Maria al-Qibtiyya road in the same place where this road coincides with the main drainage channel of Uranah valley, and therefore it cannot be used during rainfalls. In order to achieve this proposal, it is necessary to deal with the drainage of torrents in the district and expand some parts of the roads at the expense of the neighboring lands, the most important of which is the proposed road linking Umm Al-Qura University and doubling the width of Umm al-Mu'minin Maria al-Qibtiyya road.

Torrents:

Parts of the district and its neighboring lands, with emphasis on the eastern and northern regions, suffer from torrential problems, especially in the seasons when the transported water load exceeds the capacity of the drainage channels in Uranah valley and Numan valley, causing overflows and endangering residential places and roads. Accordingly, it is proposed to carry out studies focusing on torrents— especially the capacity of the current drainage channels, to come out with the best vision to establish a strong network for the

drainage of torrents. It is possible to start at the present time to purify and strengthen the current channels of Uranah valley and Numan valley and complete the strengthening of the main channels for them. In addition, a new drainage channel must be constructed to collect rainwater coming from Kassab Mountains, located to the west of the suburb.

Entertainment:

The first step is to provide tax concessions for licensing banquet halls and rest houses in the slums, in order to settle such activity in the suburb, provided that there is a comprehensive plan approved by the concerned authorities. It is possible to take advantage of the presence of football fields by establishing an Olympic stadium south of the suburb and forming a sports system in which the available stadiums can be registered as support fields for training teams participating in the expected upcoming sporting events, in cooperation with the concerned authorities such as the General Authority for Sports and the General Authority for Entertainment. The location of the suburb on the margins of the southern city of Makkah, in addition to the presence of Al-Taif-Jeddah Road, has made it possible for the suburb to establish a camp area for those who like to go out into the wilderness, and that area can be established south of the suburb.

Environment:

The areas used as industrial workshops and commercial warehouses came second in the occupancy of, reaching 7.1 percent of the built-up area in the suburb. This percentage is expected to increase after the transportation of all industrial locations, storages, and warehouses to the city margins. It is recommended that the proposed recreational area be kept away from workshops and warehouses considering air, audio, and visual pollution. An industrial area can be established south of Al-Taif Road in the suburbs located south of the city, and all workshops could be moved to it, as it is suitable in terms of wind directions; this proposed region is considered the wind downstream for Al-Hussainiya suburb, wind direction from the north and northwest represented 42%. It is also located on Al-Taif-Jeddah road, which provides it with one of the most important elements of industrial and commercial activity, which is the road network. High-voltage electricity networks also pass through this proposed area, which provides a source of energy to serve the industrial and commercial activity in that area.

Conclusions:

The research concluded that the field study and comprehensive survey based on modern satellite visualizations have become one of the necessities for detailed studies of the marginal districts of the city of Makkah, which are witnessing continuous changes that are not monitored by the concerned authorities in light of a unique geographical dynamic. The study also indicates the capabilities provided by the geographical nature of the suburb, the most important of which is the location of the suburb, the road network, and the presence of major institutions such as Umm Al-Qura University near the suburb, and how these capabilities can be exploited in solving the planning problems of the suburb. The comprehensive survey of urban land use showed the growth and expansion of recreational exploitation represented in rest houses, football fields, cafes, and banquet halls, which accounted for about 7.6% of the total land use. Also, in the current conditions of economic openness to recreational activities that the Kingdom is experiencing at the present time, it is expected that much of the vacant land, which amounts to about 41%, will be turned into recreational activities, and therefore recreational planning and the settlement of this kind of activity in the suburb can be achieved through the administrative regulations from the concerned authorities and the establishment of some facilities related to this activity such as an Olympic sports stadium in the south of the suburb and the allocation of an area for recreational camps next to the Al-Taif-Jeddah road, This is fully consistent with the

Kingdom's 2030 vision regarding tourism and entertainment, which represents a strategic plan for development for the near future. The study showed the necessity of expanding the road network and linking it to the Fourth Ring Road, after finding fundamental solutions to the problem of torrents in the suburb to avoid its dangers, as it showed the amount of areas at risk as a result of sudden torrents. The study proposed finalizing supporting the drainage channels of Uranah and Numan valleys and establishing new channels to the south of the suburb to receive water from Kassab Mountains.

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