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## **Morphology of land Uses in Aqaba City during the Period (2000-2020)**

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### **Abstract:**

The aim of this research is to identify the morphology of land usage in the city of Aqaba from the year 2000 through 2020, utilizing satellite data analysis and visualizations of topographic maps studying land uses and spatial organizations and relationships between all relevant users in the study area. By relying on GIS and remote sensing software, with the aim of providing a holistic picture that contributes to identifying the current reality of land uses and future forecasting within the actual territories, the study found that the importance of integrated management based on an analysis of the morphology of land use contributed most to sustainable planning. Morphological projections relating to land uses contributed the most to correct decision making in pursuit of a more holistic planning process for the study area.

### **Key words:**

City Morphology, Sustainable Planning, Spatial Analysis, Geographic Information Systems, Remote Sensing, Future Projections

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**The Study Problem**

The city of Aqaba is a dynamic phenomenon with changing characteristics. The Aqaba Special Economic Zone has witnessed, during the recent times since the beginning of the current century, rapid developments in the patterns of land uses, which were necessarily associated with significant changes in the structure of economic activities in the city's function, and with the significant development in the size of tourism, industrial, and economic investments. The city has witnessed fundamental changes in its structural form, which has led to an increase in the size of the local population through successive migrations from other Jordanian governorates to the Aqaba Governorate, or from outside Jordan to the governorate as expatriate workers. These movements have affected the distribution of the population as well as the structural changes of the land uses in the city. Aqaba has in the process become multifunctional and diversified - no longer limited to just one strength, but expanding its tourism, industrial, and commercial capabilities all at once. Taking advantage of its most valuable asset, that being Jordan's only port city and seaside destination, which must be taken into account in preparing special economic development plans for the advancement and development of the region. Neglecting to know the morphology of land uses, its spatial development, and the historical form of urban distribution, inevitably leads to insufficient development plans in any sustainable form. In addition, there are certain limitations which need to be considered in future projections of growth of land uses, which is primarily that the entire Red Sea shoreline is limited 27 km. In light of the above, the study attempts to answer the following questions:

1. What does the spatial classification look like in the morphology of land uses in the city of Aqaba during the period (2000-2020)?
2. What is the size of the change in the types and distribution of land uses during the study period, and what is the percentage of change.
3. What are the problems facing the current land use patterns and what does the spatial organization of the future land uses look like?

**Objectives of the Study**

The study aims to identify the speed of changes and transformations in the morphology of land uses in the city of Aqaba during the past two decades, which did not receive sufficient attention from the study and research, and therefore the research aims to achieve a set of goals that revolve around:

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1. Analyse the spatial organization form in the land uses map in Aqaba, and highlight the morphological changes that have occurred in the types of land uses, the spatial distribution patterns, and the trends of development and change in the city of Aqaba.
2. Classification and analysis of the change in morphology patterns of land uses in the city of Aqaba during the period (2000/2020) using modern digital technologies, represented by the use of geographic information systems, and remote sensing techniques.
3. Production of digital maps showing the extent of change in the morphology of land uses in the study area, a study of the historical development and development in the morphology of land uses for the city of Aqaba, and an analysis of the results of the interaction between these two developments, during the time period (2000/2020).
4. Establishing a classification for the patterns of land uses in the study area, based on the managed classification of space visualizations during the period (2000/2020).

### **The Study Importance**

The importance of the study lies in identifying the strategies and policies that are initiated in determining the spatial pattern of the morphology of land uses in the city of Aqaba, through an analysis of the land uses map, and the changes that have occurred. Which then allows us to comprehensively advise the decision makers in the future planning in a sustainable manner, and to help give a clearer and holistic view of the reality of use during the past two decades, with the aim of revealing changes in the patterns and areas of land uses - and in particular, the tourist usages; to take the proper procedures in choosing the optimal location for all other forms and usages, in light of Aqaba's existing capabilities.

### **Study Justifications**

The study is based on a number of justifications for dealing with the morphological development of land uses in the city of Aqaba, due to the great expansion and development witnessed by the city since the beginning of the current century, which calls for providing an integrated and comprehensive vision in managing this development of the city of Aqaba, which is the only seaport in Jordan, which requires providing an optimal management to deal with all developments regarding the patterns of land uses, especially in light of the relatively limited area of Aqaba's 27 km. shoreline along the Red Sea.

### **Time and Spatial Framework of the Study**

The limits of the study are of three types that control the study process, as follows:

1. Spatial boundaries: It is represented by the city of Aqaba, which is located in the south of Jordan, and overlooks the coast of the Gulf of Aqaba on the Red Sea. The city is about 330 km south of the Jordanian capital, Amman.
2. The objective limits: It is the study of the reality of land uses in the city of Aqaba, and follows the historical development of the morphology of land uses, and analysis of the spatial organization of this development, in terms of spatial extent and spatial domain.
3. Temporal limits: It is represented by studying the morphological development of land uses in the city of Aqaba, from the beginning of the twentieth century to the present time (2000-2020), taking into account future expectations and projections.

### **Study Methodology**

The study relied on Multi- Classification Analysis, with the aim of controlling and measuring the economic, social and natural factors affecting the structure and morphology of land uses in the study area. Also, the Geographic Information System techniques used in preparing maps and processing raw statistical data in the study, converts digital data into information, and projects it onto digital maps using ARCGIS 10.3 software. The study relied on the use of the Spectrum Rapid program to study future expectations and projections in the evolution of the morphology of land uses in the study area, and the study relied on the chronological approach to study evolution during the time period (2000-2020), and the descriptive analytical approach, to describe the natural and human characteristics of land use patterns. These changes that have occurred are then put through digital analysis of satellite visualizations, by conducting a supervised classification, conducting spatial analysis, reclassification, and overlay, based on the satellite imagery of the Land sat TM satellite with the aim of preparing the geographic database for the study area using geographic information systems techniques and remote sensing.

The study also relied on its methodology on studying and evaluating the reality of land uses by analyzing the structural and organizational plans for the study area.

### **Review of Literature**

The existing studies of cities generally, are many and varied, due to the extent diversity and the nature of the city, as well as the diversity of interests and specializations that it studies. Therefore, previous studies that dealt with the subject of spatial analysis of the morphology of land use and its development, and the impact of this on the form of applied spatial organization of cities describe them rarely at the local level. Most of the studies that dealt with the topic focused on economic, social and natural factors without addressing the morphology of land use and its evolution over time, and the impact of this on the

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form of spatial distribution in the study area, and from those studies presented by Yichen et al. (2020). In their treatment of the topic of efficiency of urban land use, built in China during the period (2006-2020), the study relied on the methodology of using DEA-based analysis, and they stressed the importance of sustainable planning of land uses in urban built areas, and based on efficiency in addressing variables over time. They also reviewed all land use plans, which did not take into account variables and elements of analysis based on future projections of sustainable growth. Peter Lee and Matthew (2019) Peter Kim and et al (2019) Min kim, et al, and Philp Tierney, Glem Mattack (2018) discussed sustainable land uses planning in coastal areas, and these studies examined optimal land use for coastal areas, through the use of remote sensing techniques and geographic information systems, and they stressed that in light of the continuous increase in social activities in coastal areas, and the tendency of many countries towards investing in coastal areas for the tourism industry, it will lead to fundamental changes in the structure of the ecosystem in coastal areas, especially in developing countries, which may then incur many problems, according to the description of a number of researchers. While others touched on the occurrence of positives on local communities by creating a balance between the ecosystem and the social system in coastal zone management, in light of the optimal spatial distribution of land uses, based on clear foundations that do not affect the architecture of coastal areas.

A number of studies by Narma and others (2019) focused on how to model changes in land uses in coastal areas, using geographical information systems, the study examined the extent of spatial change in coastal forests adjacent to beaches in Malaysia, and the impact of that on land uses over the second half of the last century, and the study relied on a number of space visualizations, and remote sensing software, and geographic information systems in the process of spatial analysis. This study realized the importance of using these techniques in the process of tracking and sustainable monitoring in all forms of change in spatial spillage in the study area.

The previous discussion indicates the study literature, the need to follow all stages of development in the use of land in cities, through the use of advanced technologies to monitor the shape and extent of land use changes over time, with the aim of providing an integrated holistic framework in the sustainable development process. This study is a continuation of the previous studies, in an attempt to reveal the nature of the change in the morphology of land use during the period (2000-2020) in the city of Aqaba, through the holistic approach to all the elements of the subject referred to.

Al-Rawashdeh (2016) in his study which was entitled "Aqaba City between the perspectives of area expansion and stressful areas indicated a crisis study" he

found that the expansion witnessed by the city of Aqaba was affected by a number of natural and human determinants, and spatial expansion through the city's growth stages. The study suggested a set of solutions in addressing population growth and spatial expansion within optimal development parameters.

### **Study area**

Aqaba is the only coastal city in Jordan, and its only seaport to the outside world. Aqaba is located in the southernmost part of Jordan on the coast of the Red Sea. The city is 330 km south of the Jordanian capital, Amman, as shown in figure (1). Aqaba oversees geographically the neighboring countries through land crossings and other nearby ports. The following borders:

1. The Durra land border crossing with the Kingdom of Saudi Arabia, located south of the city of Aqaba.
2. The sea port, the border station of the passenger terminal, which links Jordan with Nuweiba port in Egypt.
3. King Hussein International Airport.
4. The Wadi Araba land crossing point, which is connected to the city of Eilat.

The city includes many important industrial facilities, free trade zones, and King Hussein International Airport. Aqaba is part of the Golden Tourist Triangle, which includes both the Wadi-Rum and Petra Archaeological Reserves, which makes it one of the most important tourist sites, both at a regional and international level.

Aqaba is governed by the Aqaba Special Economic Zone Authority, which is financially and administratively independent, and it has been responsible for managing and organizing everything related to the city of Aqaba since the year 2000, when Aqaba was transformed according to the decisions of the Prime Minister to a 'special economic area', which contributed to turning the city of Aqaba into a city with low taxes and duty-free customs, which made it an attractive point for major residential building projects such as: Ayla Resorts, the Saraya of Aqaba and Marsa Zayed. Aqaba is characterized by the availability of all elements of tourist attractions, represented by the extensive hotel and tourist facilities, in addition to the rich, natural marine life in the waters of the Gulf of Aqaba, where the Gulf of Aqaba becomes a semi-closed water basin. The Gulf of Aqaba itself extends to a length of 180 km, and a width ranging between 6-25km, with a depth of between 800 to more than 1800 meters. It is characterized by a high salinity rate when compared with other seas, reaching 40g/liter compared to the global salinity rate of 35g/liter.

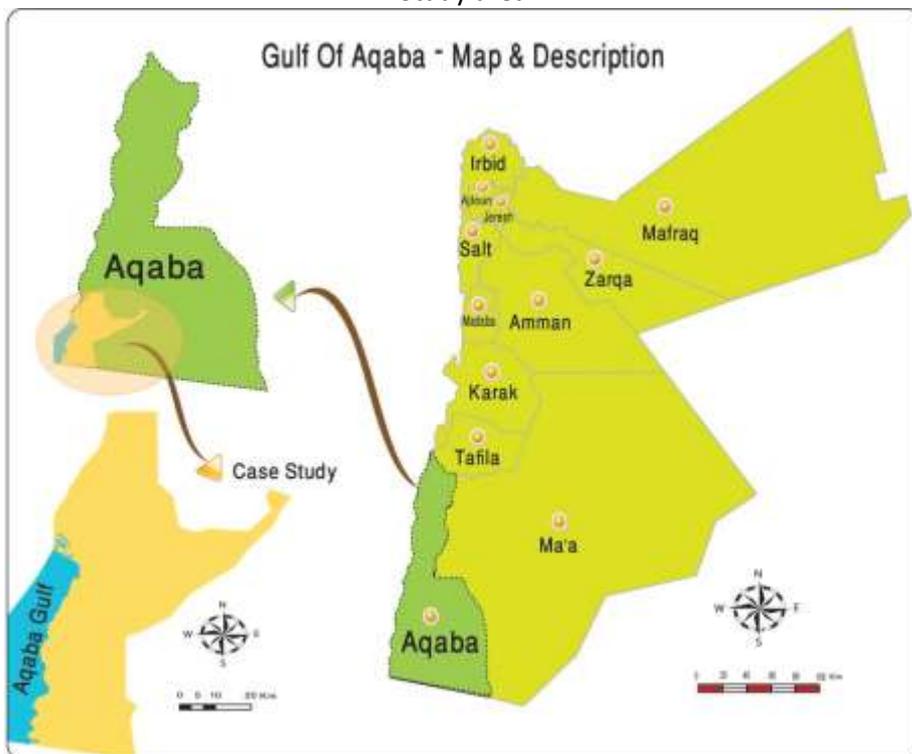
The Aqaba Gulf shoreline is distinguished by the diversity of environmental systems, and among the most important of these are the coral reefs, where 120 types of hard corals and 180 types of soft corals live in the waters of the Gulf of

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Aqaba. The Jordanian coast overlooking the Gulf of Aqaba is also characterized by the presence of rich environments for seaweed, within clusters. Its depth ranges from one to forty meters.

The total area of the Aqaba Governorate is 6904.7 km<sup>2</sup> and represents 7.7% of the total area of the Kingdom, and the estimated population is currently 203,200 individuals, as of 2020. The Aqaba Governorate and its center, Aqaba, consists of two districts, namely: the Kasbah of Aqaba and the District Al-Qweirah, and there are two districts in the governorate, namely: Wadi Araba District, and Al-Deesa District, and there are five municipal councils in the governorate.

Figure 1  
Study area



Source: Prepared by the researchers, using ARCGIS10.3 software

### The concept of city morphology and its relationship to the spatial organization of land uses

The concept of city morphology includes the study of the internal structure of cities, patterns of land use and its evolution over time, so morphological studies are concerned with studying the evolution of the city shape and its plan, where (Carter 2019) indicated that studies of city morphology include the study of both the general plan of the shape of the city, and the study of land uses within the

city, and the most important factors affecting this use, which contribute to a comprehensive study of the city's spatial landscape.

It includes a study of the morphology of Aqaba city in identifying the categories of land use during the period (2000-2020), including the residential, industrial, tourism, and logistical uses of transport, and transportation. The existing employment within the city of Aqaba is as a result very diversified, characterized by a multiple of job descriptions. It is not based solely upon the industrial or tourism activities, for example, and the consequent spatial developments of all sectors need to be weighed up against the others in order to maximize the overall sustainability of city life and future prospects. The morphology of Aqaba city and its development over time will need to maintain a careful balancing act of planning interests and competing forces through a set of sequential and interrelated procedures that are designed with the aim of finding an optimal balance of land uses within the study area, especially given the limited availability lands on the coast of the Gulf of Aqaba.

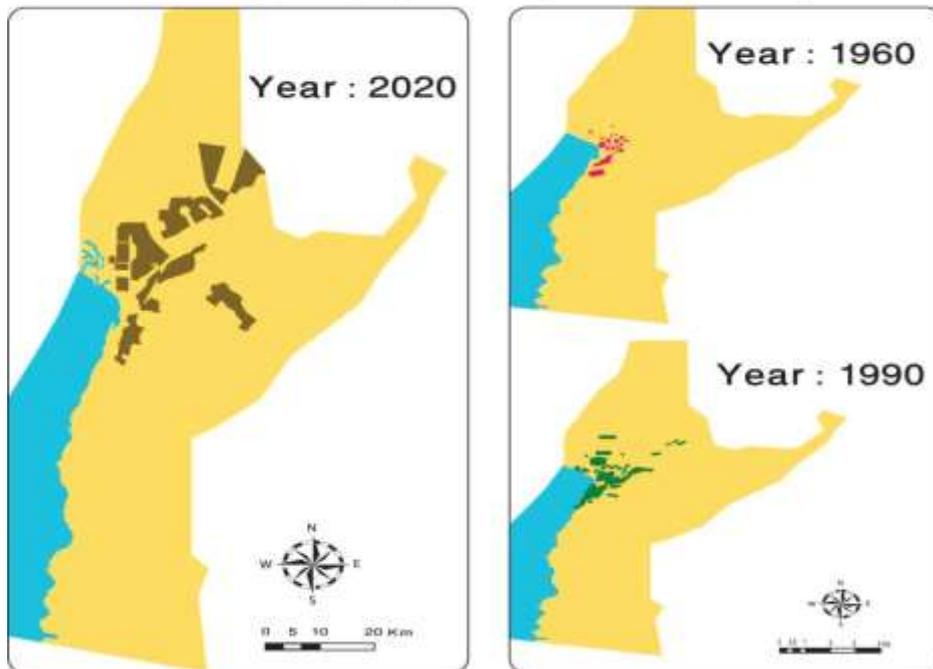
This imposes the process of developing a holistic approach to planning land uses in all areas of tourism, industrial, domestic services, population, and logistics, based on the data of future scenarios for tourism and industrial developments (e.g. Al Azmi et al., 2012; Masa'deh, 2016; Bazazo et al., 2017), as well as patterns of future land uses in the study area, in a manner that takes into account the specificity of the site and its direct link with the local, regional and global neighborhood; all this, while taking into account the existing land use plans to preserve the archaeological sites, and to achieve an optimal and balanced distribution of residential, commercial, craft, logistical, and public service facilities. The results of the analyses revealed the patterns of residential use in the study area, using the digital classification of spatial patterns, with the presence of an accelerated development in the growth of the population and its spatial spread within the study area.

The population of Aqaba has continued to increased over the years, especially since the declaration as a 'duty-free zone'. The population in 1952 was 2,853, and then in 1979 the population reached 27,000, and in 1994 the population reached 61,673, and then in 2020, the population has reached 203,200, which indicates a significant increase. The spatial spread in the study area as shown in Figure (2), due to migration from the governorates to the city of Aqaba, as well as migration from the areas surrounding the city of Aqaba within the same governorate, has led to an expansion of residential areas. Historically, the old Aqaba Castle was the primary nucleus of urban development, and any spatial extensions were to the north and north-east. There was no extension of housing to the south or near the coast.

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Figure (2)

Land use, structure, and change in the Aqaba city



Source: Prepared by the researchers, using ARCGIS10.3 software

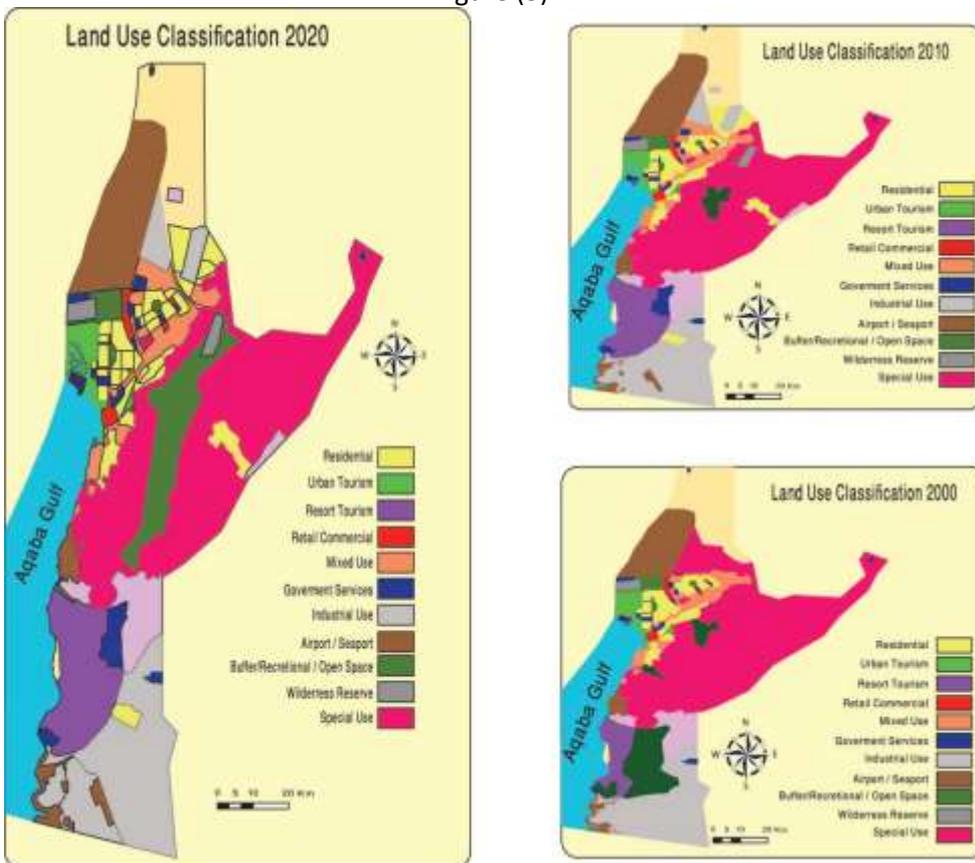
Land use during the period (1952-1960) is characterized by natural and unplanned growth, as the study area grew in the absence of laws regulating land usages, and residential communities were concentrated near the port and the coast. While the morphology of the shape of the city changed in 1962 and the trend began to extend in-land towards the north and northeast. The process of adjusting the borders with the Kingdom of Saudi Arabia was completed in 1965, at which time Jordan obtained six thousand square kilometres along the coast of the Gulf of Aqaba, and then began to formulate land use plans in the study area, according to a sustainable scientific approach. Aqaba was one of first Jordanian cities in regulating land use, and in 2002 adopted the Aqaba Special Economic Zone, a comprehensive master plan for land use, which include a number of areas:

1. The first area, the city of Aqaba, with its tourism and commercial uses.
2. The port area includes the main port, container port, and the southern industrial port.
3. The coastal region, which includes tourism and recreational uses and hotel facilities, and the region is characterized by the presence of coral reefs.
4. The southern industrial zone near the Saudi border, which is a complex of a number of industries.
5. The industrial area near King Hussein International Airport.

6. Environmental reserves and areas to protect heritage and cultural, archaeological, historical and natural diversity in Aqaba and its diversity, and it includes: five environmental areas, coral reserves, archaeological reserves, and marine natural reserves.

By extracting qualitative and quantitative information for land uses in the study area, Land sat-TM visualization has been compiled using remote sensing and geographic information systems, based on detection of change in the post-classification comparisons method, by comparing heterogeneous periods using topographic maps, we have the presence change in land use during the period (2000-2020), as shown in Figure (3).

Figure (3)



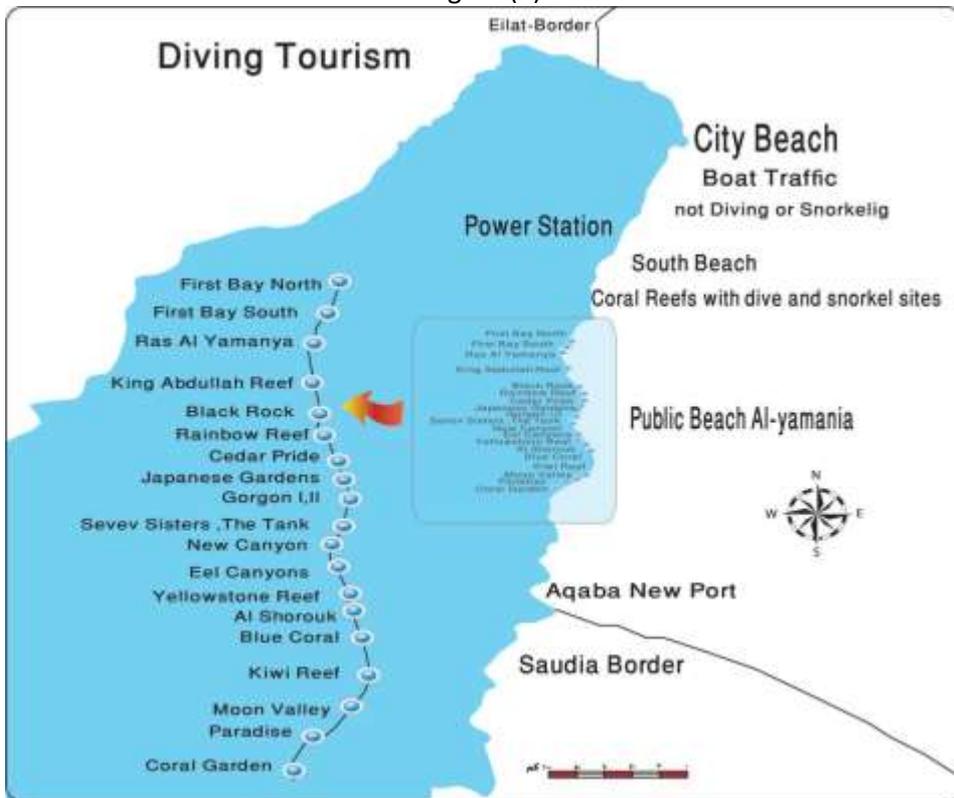
Source: Prepared by the researchers, using ARCGIS10.3 software

Using the NDVI index to study the morphology of qualitative change during the period (2000-2020), and using the ARC GIS 10.3 software, the nature of the coast of the study area was identified, based on the digital height model DEM, where the beaches in terms of morphology were divided into three regions distinct in terms of their sand content, and the topography of the surrounding areas, and is represented by the northern section of the city of Aqaba, which has sandy beaches, and is characterized by the presence of seaweed. The second section

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extending from the central port region to the southern region of the coast, which is characterized by a heavy presence of coral reefs, and these sites are host to the activities of diving, tourism, and under-water attractions, as shown in Figure 4; and the sandy beaches in the southern port area, with the presence of artificial reefs, which have become a site for fish habitats and diving tourism, is also evident within new environmental systems. The marine park area on the south shore of the study area, which is a coastal strip with a length of 7 km and a width of 400 meters, which was created in 2017, with a view to preserving the marine environment and biodiversity, and the morphology of the uses of the marine park beach is characterized by four main sections: the region restricted to protected, and the entertainment and tourism, diving, swimming area, beach area.

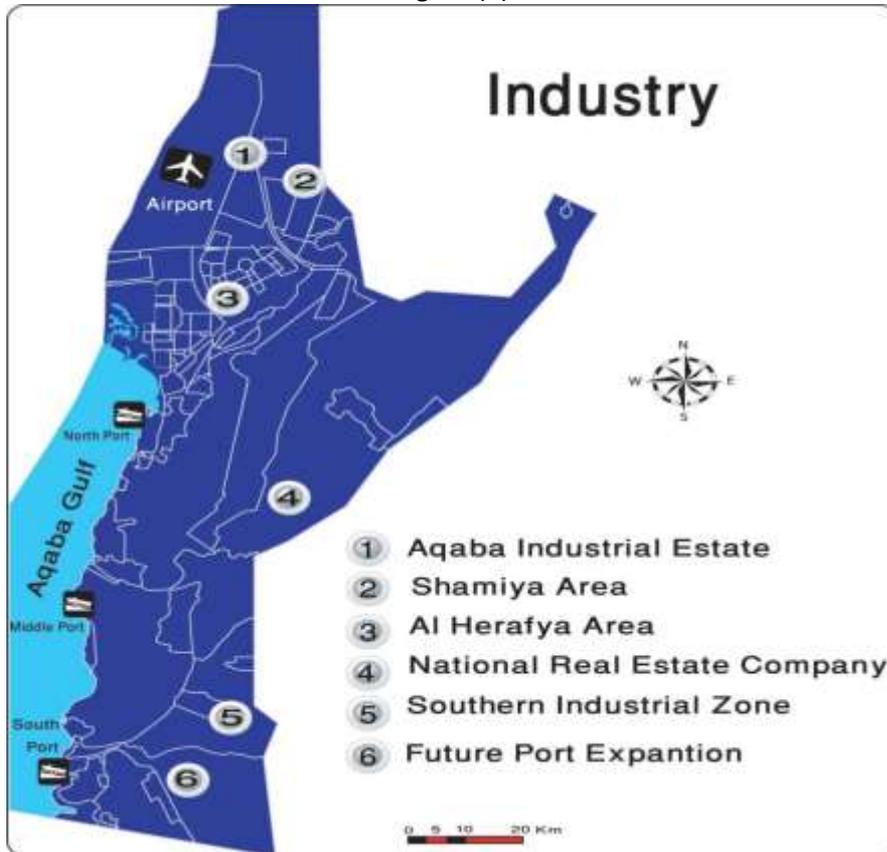
Figure (4)



Source: Prepared by the researchers, using ARCGIS10.3 software  
 Industrial use is an important part of the morphology of Aqaba city, where industry activity is an important and vital part of the study area. The general plan of the study area included specific geographical areas for expansion in both light and heavy industrial use, as light industries are characterized by spatial distribution far from residential and tourist areas on the road to the back of the southern region near the container port; and the second region in the northern part of the study area as shown in Figure (5), inside the International Industrial

City, which is characterized by the geographical proximity to the air freight building at King Hussein International Airport. While the southern industrial zone, which is one of the available investment opportunities in the study area, has an area of 12 million square meters. The southern industrial complex includes most of the chemical plants, fertilizers, Potash Company and the Thermal Station. The region includes the industrial port, which contains four berths with a total length of 630 meters, and light industries are also present, in the craft area in the northeast of the city.

Figure (5)



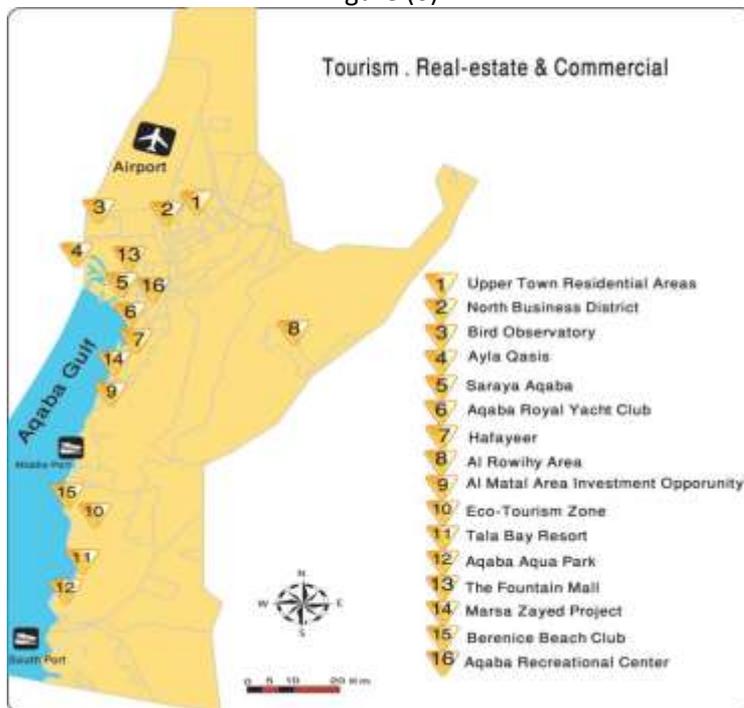
Source: Prepared by the researchers. Using ARCGIS10.3 software

The tourist use in the study area shows the presence of a large number of tourism activities that are practiced along the coast of the Gulf of Aqaba, such as: swimming, sea sports, diving tourism, glass boats, and water skiing. The land uses in the tourism field can be classified as investment tourism in the form of major projects in the region. In the northern region of Aqaba, there are developments such as the Ayla Oasis project, the Saraya Aqaba project, the Marsa Zayed project, and a number of hotels with international classification, while in the southern region there are the resorts of TalaBay and Baranees.

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The most prominent uses that have changed the morphology of the study area is the Ayla Oasis, which is a substantial change and development of the waterfront along the Red Sea coast in Jordan. The inclusion of several in-land water bays and inlets have added an additional 17 km of waterfront to the Aqaba coast, and as an exclusive multi-use project, Ayla offers a well-studied mix of residential, tourism and commercial opportunities. With a total area of 4.3 million square meters, it includes three artificial lakes with a total area of 750,000 square meters and includes 17 in-land beaches. One million cubic meters of sea water is pumped into the lakes daily, and this pumping process is characterized as being environmentally friendly, as it depends on solar energy. The upper and middle lakes rise from sea level by 6 meters and 3 meters respectively, and are suitable for swimming and water sports, while the lower lake is located at sea level and acts as a marina for the project.

Figure (6)

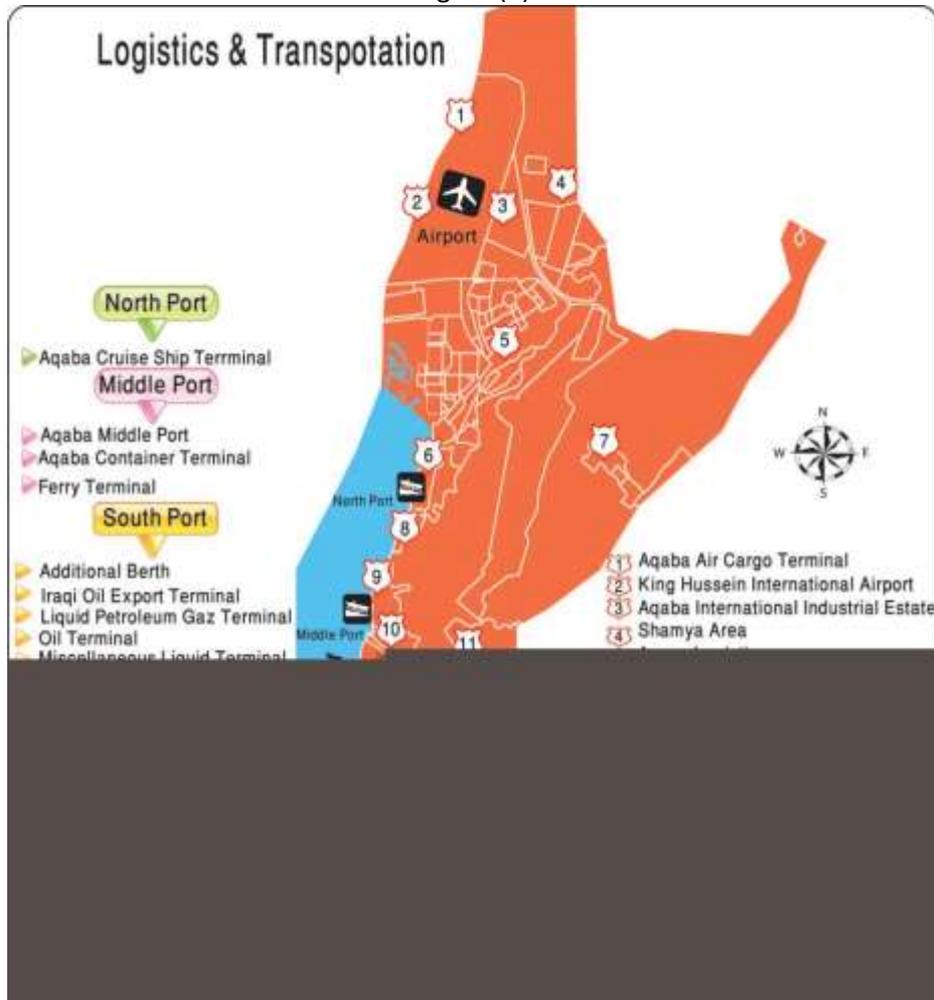


Source: Prepared by the researchers, using ARCGIS10.3 software

The main port area is one of the most prominent land uses in the study area, and it includes 12 berths with a total of 2,108 linear meters, and it is used to handle various goods, while the central port includes six berths, which are the Mu'tah floating berths, the common berth, and three berths for Cruise Class Ships with a passenger terminal. The industrial port area has four berths, namely: the oil berth, the gas berth, the eastern industrial berth, and the eastern industrial berth, as shown in Figure (7). The study area is characterized by the presence of

King Hussein International Airport, which is located to the north of Aqaba, and is located on a land area of 2223 hectares.

Figure (7)



Source: Prepared by the researchers, using ARCGIS10.3 software

## Results

1. It is found through the study how important it is to know the morphology of land use in guiding land use in the field of sustainable planning, and identify the areas exposed to the dangers of torrents, the dangers of pollution of water sources, the dangers of construction in potential landslides, and the risks of environmental pollution.
2. An extrapolation of the future development in the city of Aqaba depends on identifying the morphological composition of land uses, with the aim of identifying future planning trends.

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3. It was revealed through the extraction of qualitative and quantitative information for land uses during the period (2000-2020) the extent of change in the patterns of uses in the study area, using remote sensing and geographical information systems.
4. The randomness of planning for land uses leads to many economic, social and environmental risks, especially in the case of arbitrary orientation in the uses of the land, which leads to the distortion of the urban fabric due to the random expansion of communities, and the change of uses according to changing requirements without criteria governing those variables.
5. The results of the analysis revealed the patterns of land uses in the city of Aqaba, using the digital classification of spatial patterns, with the presence of a clearly defined spatial organization of the places of spread of residential, industrial, and tourist communities within specific spatial axes.
6. The study concludes the importance of using remote sensing and geographic information systems applications in analyzing changes in the morphology of land uses in Aqaba city, and the directed digital classification that shows the spatial and spatial extent of the land uses categories.
7. The study revealed a clear variation in patterns of land uses during the study period, in terms of area and spatial distribution resulting from the expansion in all areas in the city of Aqaba.

### **Recommendations**

1. Evaluating the structure of land uses in the study area to identify strengths and weaknesses notes, take advantage of available opportunities via Information Technology for instance (i.e. Shannak et al., 2010; Karajeh & Maqableh, 2014; Yassien & Mufleh, 2017; Bajnaid et al., 2019), and avoid constraints and limitations through the spatial distribution of land uses.
2. Preparing a guideline for regulating land uses in the city of Aqaba, within a clearly defined approach, and taking into account future developments and projections.
3. Building national capacities for planners to understand the nature of the relationship between the dynamics of land use morphology and to learn about global experiences that responded to this, which contributes to preparing viable development strategies.

### **References**

Al Azmi, N., Al-Lozi, M., Zu'bi, Z., & Dahiyat, S. (2012). Patients attitudes toward service quality and its impact on their satisfaction in physical therapy in KSA hospitals. *European Journal of Social Sciences*, 34 (2), 300-314.

Abu-Jaber, M., (1991), Morpho-sedimentological controls on the environmental management of the Jordanian coast of the Gulf of Aqaba. Unpublished master thesis. Duke University, USA.

Aqaba Special Economic Zone Authority (2019), Draft ASEZ master plan, 2010-2030, Amman Institute.

Bajnaid, A., Elyas, T., & Veltri, G. (2019). Utilizing matrimonial web sites among Saudi users: An empirical study. *Digest of Middle East Studies*, 28(1), 164-193.

Bazazo, I., Alansari, I., Alquraan, H., & Alzgaybh, Y. (2017). The influence of total quality management, market orientation and e-marketing on hotel performance. *International Journal of Business Administration*, 8(4), 79.

Dawoud and Mulla (2018), Environmental impacts of seawater desalination: Arabian gulf case study. *International Journal of Environment and Sustainability*, 1(3), 22-37.

Eppink et al (2014), An initial assessment of the economic value of coastal and freshwater wetlands in west Asia in land 2014, 3, 557-573; doi:10.3390/land3030557.

European Union (2019), Measuring Progress in the Implementation of Integrated Coastal Zone.

Karajeh, H., & Maqableh, M. (2014). Security of cloud computing environment. The 23rd IBIMA Conference on Vision 2020: Sustainable Growth, Economic Development, and Global Competitiveness, USA, 2202-2215.

Masa'deh, R. (2016). The role of knowledge management infrastructure in enhancing job satisfaction at Aqaba five star hotels in Jordan. *Communications and Network*, 8(4), 219-240.

Shannak, R., Obeidat, B., & Almajali, D. (2010). Information technology investments: A literature review. The 14th IBIMA Conference on Global Business Transformation through Innovation and Knowledge Management: An Academic Perspective, Istanbul-Turkey, pp. 1356-1368.

United Nations Educational, Scientific and Cultural Organization (UNESCO), (2006), A Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management.

Yassien, E., & Mufleh, M. (2017). The impact of ERP system's usability on enterprise resource planning project implementation success via the mediating role of user satisfaction. *Journal of Management Research*, 9(3), 49-71.