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"Analytical Perspective of Baghdad Urban Water Front Land Use Utilization"

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Abstract

Urban waterfronts are vital components of the urban landscape for cities with such areas. There are legal as well as planning implications for optimizing land uses within. An essential element to a successful policy for developing land strips along the river basin is a clear definition backed by a legal framework. A review of number of examples from different parts of the world indicates no universal approach to dealing with areas adjacent to water bodies . A survey of land uses along the waterfront of the city of Baghdad clearly indicates underutilization, which constitute a social and economic loss to urban residents.

المستخلص

تكتسب استعمالات الارض في المناطق المحاذية لضفاف الأنهر أهمية كبيرة نظرا للإمكانات الوظيفية والبصرية التي تقدمها تلك المواقع. تتجه مدن العالم التي تخترقها الأنهار الى وضع سياسات مبتكرة وفعالة للتعامل مع الواجهة المائية لما لهذه المناطق من تأثير واضح على مجمل التطور العمراني للمدينة. التنمية الحضرية مرتبط بالاستغلال الأمثل للواجهة النهرية مما يتطلب وضع تشريعات وخطط تتلائم مع أهميتها وما تقدمه لسكان المدن من فرص اقتصادية واجتماعية وترويحية. يستعرض البحث نماذج مختارة لسياسات تعتمدها مدن في التعامل مع فضاءات الواجهة النهرية يبرز من خلالها عدم وجود اجماع حول أسلوب احادي في التعامل. الواجهة النهرية في مدينة بغداد ومن خلال استعراض القوانين والتعليمات ذات العلاقة اضافة الى اجراء مسح ميداني لاستعمالات الارض ضفاف النهر ضمن المنطقة المركزية يتضح وجود اختلالات واضحة بما يشكل فرص اقتصادية واجتماعية ضائعة لسكان المدينة.

1. Objective of research

The main objective of this research in its first part is to review a sample of policies that needs to be followed to deal with waterfronts within urban areas. This objective is met through presenting an overview of international case studies of selected cities which successfully dealt with this aspect. The second part of the research is an attempt to assess the uses of the land adjacent to the Tigris river waterfront within the city of Baghdad, and evaluate the compatibility of current land uses to planning, legal, and urban design policies. The evaluation is in light of existing and declared statutes and policies put in place in order to achieve maximum benefits, and allow the proper exploitation of waterfront at various levels of development potential.

This article in general is trying to tackle the following questions:
- What is the appropriate land uses of urban waterfronts?
- What are the principles that guide urban design of land adjacent to the river?
- What are the existing Laws that govern land uses within waterfronts in Iraq?
- What is the nature of land uses adjacent to the Tigris River in Baghdad.
- The conformity of the current land uses to declared planning and legal requirements

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3. Research hypothesis

The research assumes that there is clear imbalance in the utilization of the waterfront contrary to legal and urban design objectives laid out in legislations and urban master plans within the city of Baghdad .This condition is due to the lack of a clear policy and vision in dealing with theses critical areas that are of utmost importance for a city like Baghdad, which is situated within the dry arid climate region. In addition, the research assumes that the current land uses do not reflect the optimal use of these spaces, and thus is reflected negatively on the environmental, economic, and social development of the city.

For the purpose of testing the hypothesis, a land use field survey was conducted and results were analyzed through the use of Arc Map GIS software to derive indicators supporting the hypothesis.

3. Background

Urban Waterfronts for cities dissected by rivers are among the most important natural resources possessed by these cities. Benefits provided by the river to the city cannot be confined to aspects of aesthetic and recreational advantages, but extends also to the economic and social aspects, so dealing with areas adjacent to river banks pose critical issues and should be of interest to urban planning professionals and the general population of the city alike.The continual increase of urban residents in general generates pressure on land through competition between various and sometimes incompatible land uses. The clearest form of competition is evident in the increased demand for land for uses that offer higher financial returns directly at the expense of uses that provide free public service to residents. The banks of the rivers in cities may be among the most obvious losers in such a competition, given the limited supply versus high demand on the ground within this land strip given the natural attraction characteristics for a wide range of economic activities. Among the principal goals adopted by decision-makers with respect to urban waterfronts is that these banks should be available primarily to provide efficiently for the needs of the city's environmental, economic, social and entertainment demands of city residents, in order to maximize benefits that are sustainable for generations to come.

4. Urban Waterfront Definition

There is no specific definition agreed upon of the concept of urban waterfront. Reviewing the literature on the subject highlighted several definitions of public waterfront in urban areas. Among those is the definition of (Breen & Rigby 1994) which views the water front as "the urban edge of the water in cities and municipalities of all sizes, and water can be a river, lake , Sea , Gulf or channel that includes a wide range of uses such as wildlife reserves, or cargo ports, which can be planned in an integrated projects, or scattered with random order over long periods of time due to multiple owners. Waterfronts also can include buildings that are not on the Water directly but linked visually and historically to it through a wider project. " Many of the waterfront definitions river has dealt with it from the standpoint of functional use as reported by Glazer & Delaporte 1980 that describes the waterfront as the harbor area within urban areas, and is located on the coast and along the rivers and be the final point for water shipping channels. The federal Coastal Zone Management Act (CZMA) of 1972 defines waterfronts as "any developed area that is

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densely populated and is being used for, or has been used for, urban residential, recreational, commercial, shipping, or industrial purposes"(Goodwin,1998,p241)

Any definition should be derived from local conditions of the river basin, as well as the functional nature of visual and historical aspects of these waterfronts. Therefore, we find that the Department of irrigation and drainage in Malaysia has defined the waterfront as the urban space that fall within fifty meters from both sides of the river's edge, While Kenyon 1968 presented a description of river waterfront as the area adjacent to:

A. Shipping ports used on a large scale.
B. Located within walking distance (305 meters) 1,000 feet from the water's edge.
C. Falls within the ordinary scope and fabric of an Urban area.

Furthermore, for the purpose of issuing waterfront land use regulations, the City Planning Department of the city of New York has been identified the waterfront as the distance extending from the water's edge at its highest level all the way to a depth of 244 meters (800 feet) inland. This distance is set since it represents the common length of city blocks. In addition, it represents the maximum distance to maintain the visual corridors to the river waterfront.

Iraqi laws define waterfronts in general as the distance from the water edge at its highest level extended 100 meter inland, where certain restrictions are placed on permissible uses within the 100 m strip of land. This definition will be adopted by this article to analyze land uses within the selected study area of Baghdad's waterfront.(Iraqi Legislation,2011)

5. Dealing with Urban Waterfronts

the Relationship between waterfronts and cities is usually a historic one. Rivers were one of the most important modes of transport, and waterfronts were important commercial sites for the supply and export of goods of all kinds in addition to being areas for the enjoyment of nature. Over time and with change of technology this relationship has undergone considerable transformations ranging from periods of recovery to shrinkage in importance, and to revival of the role of these waterfronts to be an integral part of the physical structure of cities.The outlook of river waterfronts evolved in historic cities and generally passed through three phases:

Phase one is the pre-Industrial Revolution, where they were treated from an environmental perspective and rivers were considered essential supplements to the survival of human settlements on its banks did not take into consideration the consequences of dealing irresponsibly with water as a precious resource.

Phase two is the stage of the Industrial Revolution, where the relationship with the river in the cities based on the utility and the river considered as one of the inputs to the industrial process, which was done in accordance with market mechanisms.

Phase three is the current stage namely the post-industrial revolution where the relationship between the river front and city dwellers has taken an aesthetic perspective serves mainly recreational and entertainment activities and dealing with the river became according to social pressures and diverse desires of the population.

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Urban waterfronts are a vital part of the national heritage, and these areas hold the historical roots of this heritage, and provide an important natural outlet in crowded urban areas. In many instances these waterfronts contain vast untapped territories which can be a nucleus to re-generate and revitalize urban areas and provide some of the best opportunities for urban renaissance. The desired outcomes of waterfront renewal should not be measured through the number of jobs generated or realized increase in the price of real estate property, but also requires the need for a broader perspective and long-term impact that can be accessed.The Issue can be complicated which require to strike a balance between appropriate land uses and functions. The intention here is not to create mixed uses mixed, or finding giant projects with a variety of land uses. There are experiments carried out by many cities around the world to revive the its waterfronts, including the mega project of Canary Wharf in the city London, where some believe that the project is not sustainable and tabbed enormous investments within a short time span, while other projects may take an entire generation to accomplish. Perhaps one of the most important lessons learned from projects of this size is the need to follow parallel development of the vast river bank within a reasonable period of time.

General principles for any initiative to deal with the river and the waterfront in order to achieve sustainable development are:
- Simulates the spirit of the place and location but connected to the city as a whole.
- Look unique in its design and not duplication.
- Provides sustained public spaces and elaborate design.
- Respect the city's history and architectural heritage, but while avoiding the reproduction of the past.
- Integration with the surrounding areas and linking the waterfront with rest of the city.
- Easy and a short access distance from surrounding districts.
- Respond to the nature of demand for these areas and maximize the existing potential.
- Take advantage of the waterway for entertainment purposes and practical aspects.
- Attract uses that offer added value of feeling secure and calm generated by the presence of water.
- Protect and improve water quality and natural life.

Research and contemporary studies on the development of waterfronts started since the sixties of the last century, including a study of Hoyle in 1960, and Kenyon in 1968. The research continued to expand in the eighties, and nineties to include other topics including water transportation, impact of politics and urban planning on waterfronts such the study of Gordon in 1996, and Fanstein in 2001. The impact of architecture on the waterfront was looked at in the study of Maline in 1996 and the impact of urban design as in the study of White in 1993. Other studies discussed the relationship between the development of waterfronts and its integration with the city from the perspective of urban planning as in the study of Meyer in 1999, and Hoyle in1989.

Other studies have addressed the relationship between the waterfront river and water body next to it, for example, the study of Lynch in 1976, has designed the exploitation of the river on the basis of the degree of integration between waterfront and water as part of a more comprehensive study of rehabilitation (River Baramana) in Australia. As a result of the diversity of uses land along the river, the waterfront was divided

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into three main uses (housing, employment, and recreation areas) and created three levels of integration, namely, (high, medium and low). Results of the study confirmed that about half of the occupants of the waterfront have used the river or acknowledged it importance in their district, while others did not give this issue any importance.

6. International Waterfront Planning

To get acquainted with policies adopted by major cities in the world with significant waterfront areas, New York city comprehensive waterfront plan “Reclaiming The City’s Edge” is selected. The plan is prepared by the Department of City Planning in the city in 1992 to regulate land uses within the waterfront, where the plan provided a clear vision of the form that waterfronts should be on in the twenty-first century to include the following:

(Reclaiming, 1992, p1)
- Parks and open spaces with ample and diverse activities to be made accessible to resident of the city and surrounding areas.
- Enable people to swim fish and use boats in clean water.
- Rehabilitation and care for natural sites.
- Industries related to the water must be brought back to prosperity in specific locations serviced with efficient infrastructures.
- Ferries cross the city back and forth, integrated with an interconnected systems linking bicycle paths and pedestrian corridors to ease traffic congestion and air pollution.
- Creating panoramic vistas to enjoy the beauty of rivers.
- Meet the housing needs of the city through housing projects and job opportunities catering to different levels of income in an attractive setting.

The plan organized the waterfront into four main functions, namely:
1. Natural waterfront consists of beaches, wetlands and wildlife sites and critical ecosystems and the waters of the river itself.
2. Public waterfront includes parks, squares, piers and sidewalks and public areas which provide visual contact with the water.
3. Working waterfront water-related industries as well as water transportation.
4. Redevelopment waterfront include land uses that have been changed recently or areas that are used in an inefficient manner and have the potential to achieve a positive addition when changed.

This categorization system determined that 30% of the water front should be allocated to the natural waterfront, and identified 100 sites within the waterfront to be Public. In addition, the plan proposed the rehabilitation of 50 public park as well as transforming 25 public street to end at the waterfront. 40 site were selected to create corridors and spaces for public use surrounding commercial and residential sites. The plan also proposed the establishment of between 50,000 and 70,000 housing

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units within land parcels that will be re-zoned. The working waterfront will occupy six specific sites with a total area of 2,555 acres.

One of the most important objective of the Comprehensive Plan of New York City is to promote uses that have direct relation and should be close to the river's edge, so the plan proposed three land use categories within the waterfront:
- Water Dependant Uses, which must be adjacent to the river, including marinas, harbors, repair of boats, water transport, recreational buildings, beaches and fishing piers.
- Water Enhancing Uses include mainly recreational and cultural uses including retail trade and Leisure, which promotes universal access and comfort to the public. Other uses can be added such as sports centers, museums and galleries, parks, museums and galleries, parks, games, swimming pools, hotels, and restaurants.
- Non Water Related Uses which do not require a water location and their presence near the water edge do not add to the value of the waterfront, and the ability of the public to enjoy the public side of a river, examples parking fields, warehouses, Industrial installations, private residences and office buildings.

One of the most important characteristics of this plan is to emphasize the principle of free public access to the waterfront which is considered as precious resource to the city. It was a major goal of this plan to secure and maintain corridors to ensure freedom of access. Thus, the plan recommended that 15 - 20% of any use on the front river should be kept at the disposal of the general public. This ratio were approved to strike a balance between the desire of the city's residents to enjoy the waterfront, and the cost of maintenance and the provision of public amenities ,as well as costs borne by investors for the development of some waterfront sites.(Reclaiming, 1992, p 51)

7. River Waterfront in Iraqi legislations

Tigris River occupies a special place in the history of the city of Baghdad, where the river is closely linked to the urban fabric and the waterfront is one of the most important components of the natural landscape of this fabric and a point of stability which gives the city its distinctive character. The river is basically the central nerve of the city and an essential hub of Baghdad where both sides grow almost equally around it. The forecast contained in the “Perspective of Baghdad 2030” issued by the Mayoralty of Baghdad anticipates that residents of the city of Baghdad will reach 9.88 million by the year 2030. The perspective emphasized on the great importance of the Tigris River within the urban landscape of the city, and regarded as one of the symbols of nature affecting the shape of the city and has a large dominance on the climate and general environment. (Perspective, 2006)To talk about a number that is close to 10 million people living within a city which already suffers from great pressures over the land , and more particularly in the provision of environmentally friendly spaces and aesthetically pleasing to activities of recreational, social and cultural nature. These facts place a paramount importance on developing efficient land use management policies , where the waterfront must be given a special attention due to its limited supply and competing demands.

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A number of Laws and regulations were issued prescribing the manner of dealing with land adjacent to rivers in Iraqi cities in general, and the city of Baghdad in particular. The Baghdad city master plan law that governs land uses within the city, prepared by the polish firm “POLSERVICE” in 1971 is valid till the present. The plan which is a legal document stressed that the presence of the Tigris River is one of the most important features of the city of Baghdad, and its multiple curvatures add beauty and distinctive personality to the city, hence considers the Tigris River as the backbone of the city.

In this sense, the master plan regarded the “Tigris River Belt Zone”, which is a strip land area with a width of about 2-3 km along the Tigris River. (Master Plan, 1971)

The city of Baghdad Master plan has divided the Belt Zone within the city into three sectors. These sectors are:

1. The northern section represented by the Green Zone north of the city which includes orchards, parks ,forests, and residential areas including Adhamiya sectors and Kadhimiya.
2. The central section represented by the central area where business centers, and associated activities are located .It represents the heart where all other function are tied to.

3. The Southern Section represented the region south of the city where Industrial Services, activities and storage are located.

On both sides of this belt (Tigris belt), self-contained residential sectors were designed, and connected to the river belt from one direction and to surrounding external areas from other directions.
The master plan proposes taking advantage of the waterfront through the creation of a diversity of land uses on its banks. The vision includes creating multi story housing sites, as well as parks, tourist attractions, hotels, restaurants and pedestrian paths. In addition, the plan proposes linking the river banks to inland areas through green corridors that lead directly to the waterfront. The plan also proposed the creation of a rapid river transportation network to utilize the strategic location of the river right in the middle of the urban fabric to facilitate movement of passengers. Needless to say that hardly any of the vision presented in master plan has been realized due to protracting military conflicts within the country.

The Building Controls of the city of Baghdad which regulate design and construction according to the zoning plan has merely recognized land uses in the area of Abu Nawas street adjacent to the Tigris River. This street represent only a small portion of the waterfront ,and thus ultimately left the majority of the waterfront unregulated. In paragraph 2,2,3,1 of the controls, land uses in the street were restricted to residential and tourists related activities, where building heights should not exceed three times and half the size of the land parcel and a maximum of five stories. New construction must not exceed three stories. With regard to determining land uses along the Tigris River within the city limits of Baghdad, the Master Plan has indicated that building controls should be in accordance to the Shores Utilization Law.

The ”Shores Utilization Law” No. 59 of 1987 is a legislation issued by the central government ,which regulates the exploitation of shore land areas of the River Tigris and Euphrates, and its neighboring territories, as well as securing passage of flood

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water, and prevent pollution regardless of the type of relationship to property land rights .(Iraqi Legislation,2011)

Article III of the Act states the following:

“It is not permitted to use any land covered by the provisions of this law for agriculture, planting, or create a project ,or to build without the approval of the Ministry of Irrigation and the Ministry of Agriculture.”

The Law separated the land adjacent to the river into two parts. The first is the river bank which is not exposed normally to floods even during high water levels, and the second section is the low elevation land below the river banks which can be considered as a beach that can experience periodic floods.
Article IV of the law identified certain permissible uses of land behind the river bank. Uses permitted are orchards, cultivation of seasonal crops, and the construction of housing for owners of these parcels conditional to the fact that no permanent structure can be erected less than one hundred meters from the river edge. The beaches which are the lower elevation exposed land area can be exploited according to the law for seasonal crop cultivation and the establishment of tourist public buildings conditional to the fact that the beach width is not less than one hundred and fifty meters.
The shore utilization law, however, gave waterfronts within urban areas a distinguished characteristic, and authorized municipalities to regulate land uses within city limits in accordance to the vision and needs of their land use master plans. The Mayoralty of Baghdad in its outdated “Land Use Mater Plan” reiterated the compliance to the articles of law 59 as far as exploiting the waterfront without taking advantage of the leverage empowering municipalities to formulate their own waterfront land use code. Nonetheless, given the specificity of the city of Baghdad as the nation’s capitol, regulation No. (2) for the year 2000 was issued by the central government to be known as “Regulations to Prevent Encroachment on The Tigris River Trim Line within The City Limits of Baghdad”. These regulations stipulated vacating 15 meters strip of land from the river basin edge (Trim Line) inland. Thus, this 15 meters strip is considered as the river’s right of way for the purposes of river monitoring, maintenance and dredging. Furthermore, in the year 2000, Regulation 121 was issued prohibiting the construction, or granting any building permit within the river Trim Line.
The” River Trim line” stated in these regulations is the distance confined between both sides of the river basin which allow the maximum water discharge within the city Baghdad of 3000 cubic meters per second in waterfront segments where river banks is not veneered with stone. In segments where the river bank has stone cladding, the trim line is therefore the distance between the stone retaining walls edges of the river banks.
It is evident that the Iraqi legislature, as well as physical plans has stressed the importance of the waterfront in urban areas in general, and within the city of Baghdad in particular. Land uses adjacent to rivers are of exceptional value to the urban fabric, and must be dealt with in an extreme caution so as to keep this limited strip of land accessible to the general population, and put it into the best uses in order to maximize the potential offered by these areas for social , economic , and environmental development .

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8. Field survey of the Tigris River Waterfront

For the purpose of testing the research hypothesis, the central section of the Tigris waterfront within the city of Baghdad has been selected as the study area. The area extends from the new Adhamiya Bridge to the north until the Jadiriya Bridge to the south as shown in figure 1. The total length of the waterfront along the study area is about 13 kilometers. Within this strip of the river, most of Baghdad's districts that are characterized by intensive land use are located on either side of the study area. Functions include residential, commercial and governmental, in addition to spaces that are currently untapped. To identify the nature of land uses, a comprehensive field land use survey of the river bank within a 100 meters strip of land from the edge of the river was undertaken. This distance is stipulated in the law of Shores Utilization law no. (59) as mentioned earlier.

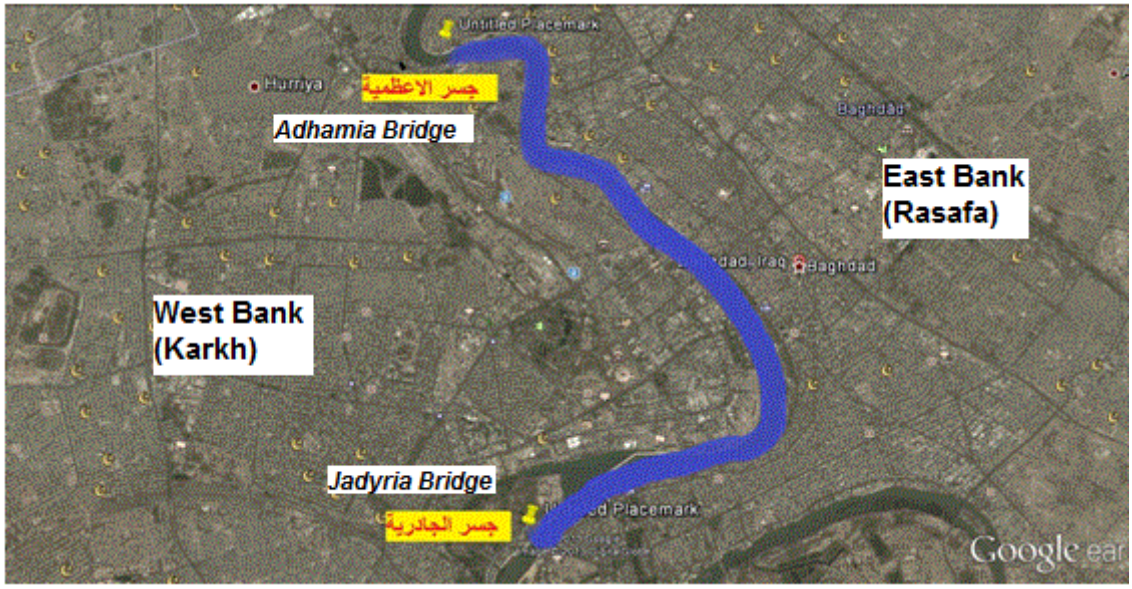

Figure 1 Waterfront area of the Tigris River under study

Through the survey it became clear the existence of eight major land use categories within the study area. The uses are residential, governmental, religious, green open spaces, untapped spaces, commercial leisure activity, streets, in addition to a single area which is an artificial lake created within a short distance from the river edge as seen in figure 2. The total area under study within the 100 meters depth of the waterfront was 3039180 square meters, or around 304 hectares. The study area is subdivided into eight segments with each segment represents the area confined between two bridges. The study area starts from Adhamiya Bridge to the north of the city, and ending at the Jadiriya Bridge to south.

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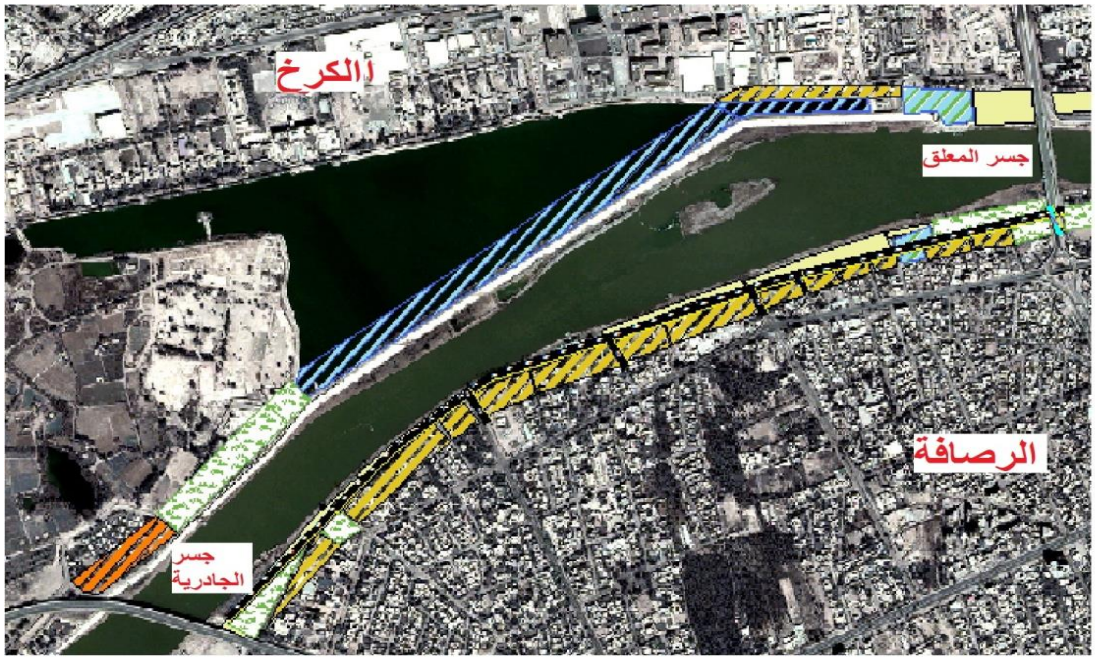

Figure 2 Jadyria Bridge- Suspension Bridge segment of the study area

Table 1 Total land area of segments along a 100 meters wide strip of waterfront

Study Area Segment	Left Bank,m^2	East Bank,m^2
Jadyria Bridge- Suspension Bridge	322554	267922
Suspended Bridge - Republic Bridge	375215	533199
Republic Bridge - Sinak Bridge	55371	56772
Sinak Bridge – Wathba Bridge	59619	60101
Wathba Bridge – Ahrar Bridge	95489	102374
Ahrar Bridge - Bab Al Mo'adem Bridge	91674	110785
Bab Al Mo'adem Bridge - Sarafiya Bridge	202723	135921
Sarafiya Bridge - Adhamiya Bridge	238176	313640
Subtotal	1440821	1580714
Total Area	3039180 m^2	

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Confined between the Suspended Bridge and the Republic bridge. It can also be seen that in certain segments of the study area the majority of land uses are residential with limited public access to the river bank for non residents of these districts referring to the segment between Ahrar and Wathba bridges.
Government buildings have a share of 12.46% of the waterfront, while recreational areas Exploited commercially did not exceed the rate of 2.64% of the total area. Streets running along the waterfront and within the 100 m strip occupied about 2.74% of total area, while religious buildings did not exceed the rate of 0.15%.An artificial lake adjacent to the river and within a walking distance from the river edge led to the loss of up 4.18% of the waterfront due to lack of public access to either the lake or river. Figure 5 summarizes the rates of land uses and overall within the study area.

Water Body %	*Religious %*	*Streets %*	*Government Buildings %*	*Green Open Space %*	*Recreational %*	*Untapped Areas %*	*Residential %*	*Study Area Segment*
4.18	*0*	*2.03*	*0.65*	*1.39*	*2.64*	*1.90*	*6.63*	*Jadyria Bridge- Suspended Bridge*
0	*0*	*0.49*	*4.30*	*11.56*	*0*	*6.72*	*6.83*	*Suspended Bridge - Republic Bridge*
0	*0*	*0.00*	*0.80*	*1.22*	*0*	*0.00*	*1.68*	*Republic Bridge - Sinak Bridge*
0	*0*	*0.00*	*1.33*	*0.00*	*0*	*0.00*	*2.62*	*Sinak Bridge – Wathba Bridge*
0	*0*	*0.00*	*0.00*	*0.00*	*0*	*0.82*	*5.70*	*Wathba Bridge – Ahrar Bridge*
0	*0.15*	*0.00*	*3.88*	*0.47*	*0*	*0.00*	*1.13*	*Ahrar Bridge - Bab Al Mo'adem Bridge*
0	*0*	*0.16*	*1.51*	*4.18*	*0*	*0.00*	*5.87*	*Bab Al Mo'adem Bridge - Sarafiya Bridge*
0	*0*	*0.05*	*0.00*	*8.30*	*0*	*0.40*	*9.37*	*Sarafiya Bridge - Adhamiya Bridge*

Table 2 Land Use categories percentages per study area segments

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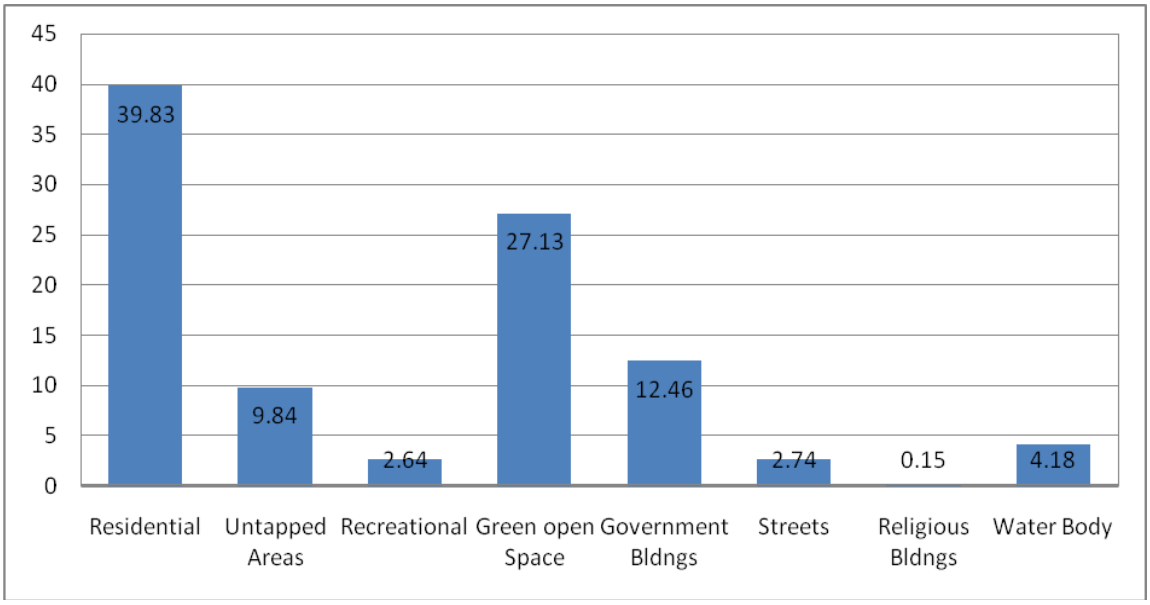

Figure 3 Land use in the study area

9. Conclusions

Initial indications of this study show clearly a defect, and imbalance in the nature of land uses within the waterfront under study resulting in missed development opportunities whether recreational , environmental, or residential; not only for citizen of Baghdad in particular, but to the local economy of the city in general. The most prominent feature of this imbalance is the low percentage of leisure areas that exploit the river to provide a breather to the city's population. In addition, the high percentage of private residential use dramatically reduces the chances of exploiting the waterfront for public interests, and limits the freedom of access to the river bank.

the Proportion of green open spaces with just over a quarter of the total area constitutes a low rate for a city located in a dry and arid climate region, thus limiting chances of creating favorable micro climate zones. The presence of governmental uses on the river is not justified since their presence is not necessary in these sites, and limit utilization to a few hours in the day time, thus depriving the population of these spaces for the most of the day. The other issue that exacerbates the problem is the creation of an artificial lake within walking distance of the river bank while at the same time inaccessible to the public. This peculiar practice resulted in the loss of approximately 5% of the waterfront.Analyzing the results of the survey indicates that approximately 10% the waterfront is still unexploited despite the apparent lack of green and recreational areas along the river. Furthermore, the analysis indicated that the nature of present uses and urban design of parts of the waterfront does not enable access to the general public, as well as limiting visual contact with the river which in itself is a moral and physical loss to residents.

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10. Recommendations

The apparent inefficiency in the handling of land use functions along the waterfront requires the development of procedures and legal frameworks to reduce the loss of the significant benefits offered by the presence of a historic river which passes into the heart of the urban fabric of the city of Baghdad. Procedures that must be implemented to improve the existing situation vary in terms of financial cost and the time period to achieve them. Among the measures recommended:

- Developing a special urban design scheme for the waterfront strip in the form of a master plan, and building controls specifically for this area in order to regulate land uses, as well as height, bulk and density of structures

-The preparation and implementation of a specialized management commission with financial and legal support from the central and local government due to the extreme importance of Baghdad as the political and economic federal capital

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- Urban design principles and practices should give priority to land uses promoting recreational, environmental, and open green spaces uses over other land uses.

- Achieve easy access to the river through a redesign of the transportation network surrounding the river waterfront so as to achieve connectivity, and facilitate access to water vistas.

-Guarantees free public access to river banks throughout the day and night.

- Expanding existing areas which afford spaces free of charge to the public for recreational purposes, provide shade from the elements, and employ public sculptural arts to create attractive public spaces within the strip adjacent to the river.

- Increase compliance of current land uses the vision and objectives stated in the city's master plan and laws in force.

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