



## A Preliminary Study on Landscape of Bakhi Shar Park, Erbil (Hawler), Kurdistan, Iraq\*

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### Abstract

Bakhi Shar park (B.S.P) occupies an area of 5910 m<sup>2</sup> within Erbil city center. Current investigation was devoted to develop a new master plan for reorganizing the green spaces and reconstruction of B.S.P in Erbil, Kurdistan region-Iraq, in order to fit the park with resent advancement of civilization. There for an inventory of (Hard landscape and soft landscape) objects and green plantations of the park has been proposed and forwarded. Basic draft has been prepared, where, the assortment of plants been indicated clearly within it. Beside that a general list of trees, shrubs have been also assigned for the current project. However, B.S.P is plan to be established for the purpose of education, meeting, agriculture, social, activity, tourism beside being the place for gathering the retired people of various region job wise and other aims within this site. Infact, the main aim of the current investigation is confined to establish an outline property of an open garden within Erbil or any other town in Kurdistan. However, Results of a proposed questioners survey were also included.

**Keywords:** Bakhi Shar , Erbil, Landscape, Gardens, Parks.

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## Introduction

At present in Iraq or any other part of the world greenery seems to become the necessities of urban life. Parks, private and public once, or any spots of greenery have been well developed [1] and [2]. Nowadays, in respect to it is internal structure, component, appearance, and even the whole design, etc. All improvement is mainly for achievement an attractive, wonderful clear and clean environment for a suitable and healthy life [3], a way far from pollution effect and it is sources which is becoming the goal and target of advancement in our planet [4], [5] and [6].

At present, Greenery areas play a main role in the construction and have become a must in forwarding master plan of any towns and cities. The need for green spaces has been already emphasized on long ago [7], as a must for colonial establishment of people in any urban area [3]. However, it is clear the most of world's population is found to live in cities and towns, or attending to do so far one reason or other, therefor greenery should become a strategic importance in the urban establishment in future [3], [8] and [9]. However, in most cities within developed countries park and greeneries had become a must in the city design and developed master plan of the towns. However, in respect to concern region there is enough evident that.

In fact, recent information indicates and reflect that almost all sort of known gardens in Middle East, such as Persian or Ottoman garden as examples may originally had developed from a sort of adaptation or modification of the ancient Kurdish garden design [10] and [11].

Bakhi Shar in Erbil is one of the oldest public park within the city of Erbil but had not got enough attention since, in contrast recently had got some attention in it is construction. However, creating such or similar parks in Erbil or other cities in Kurdistan will undoubtedly effect on

environmental improvement to achieve more fresh and healthy circumstances. Furthermore, such activities have to be extended to all parts of Kurdistan of Iraq and even the whole Iraq.

The present study is mainly aimed for establishing and forwarding an outline landscape architecture design of an open garden (public small park) in Erbil. That may be applied in any other towns in Kurdistan and make up an innovation design of such park through it is components (Softcape and Hardscape) finally, forwarding a recent landscape design for a park that will be used by public and especially the retired people. Taking in consideration peoples point of view through a general question.

## Materials and Methods

### History of Bakhi Shar Park (B.S.P)

Erbil (Hawler) capital of Kurdistan of Iraq has a number of parks. B.S.P is one of the significant ancient park in the city center.

It is construction history goes back to the 1937. The area on which the park has established was be for a grave-yard. The founder of the park, worked on the park personally and had brought all sorts of the shrubs and trees from Kurdistan of Turkey, for example, the trees as (*Morus alba* and *Cupressus sempervirens*) which is still found in the park, their age may go back to more than (70-80) years. At the moment, the park had turned into a place where school teachers and retired employers will gather there, as they made some pergolas there in fact, it became a pensioners Center, which was renovated recently where door is open from (8:00 A.M - 7:00 P.M). According to the survey that have made visitors age is between (65) to (78) years. They visit the park in all seasons of the year. The visitors are from the various sectors namely (teachers, employees, doctors, engineers, lawyers, police, workers, and some of them

are don't have any qualifications) [12] and [13].

The park does not have any designed ancient map. Also, there is no information about the park architecture, it became an interesting point and aim to do current project on the park design and forwarding a landscape design. B. S. P is about 200m far from Erbil citadel, and has an average elevation of 409m above sea level located between latitudes  $36^{\circ}11' 18''$  N, and longitudes  $44^{\circ} 00' 42''$  E.

### Description of Research Area

Erbil city history seems to go back to more than 6000 B.C [14]. However, the

parcs and gardens was much more under normal proposed percent of modern master plan for cities nowadays (Figure 1 B) it is in fact, similar to many other cities of Iraq or most of Middle East countries. In Erbil however, greenery areas shown before to occupy only about 4.5% of the total area [15]. A noticeable number of public parks and gardens seems to have been established around the town in Kurdistan recently although it is still not sufficient but may lead to an increase in the greenery area of Erbil to about 15% and should be so in many other towns in Kurdistan [11] and [16].

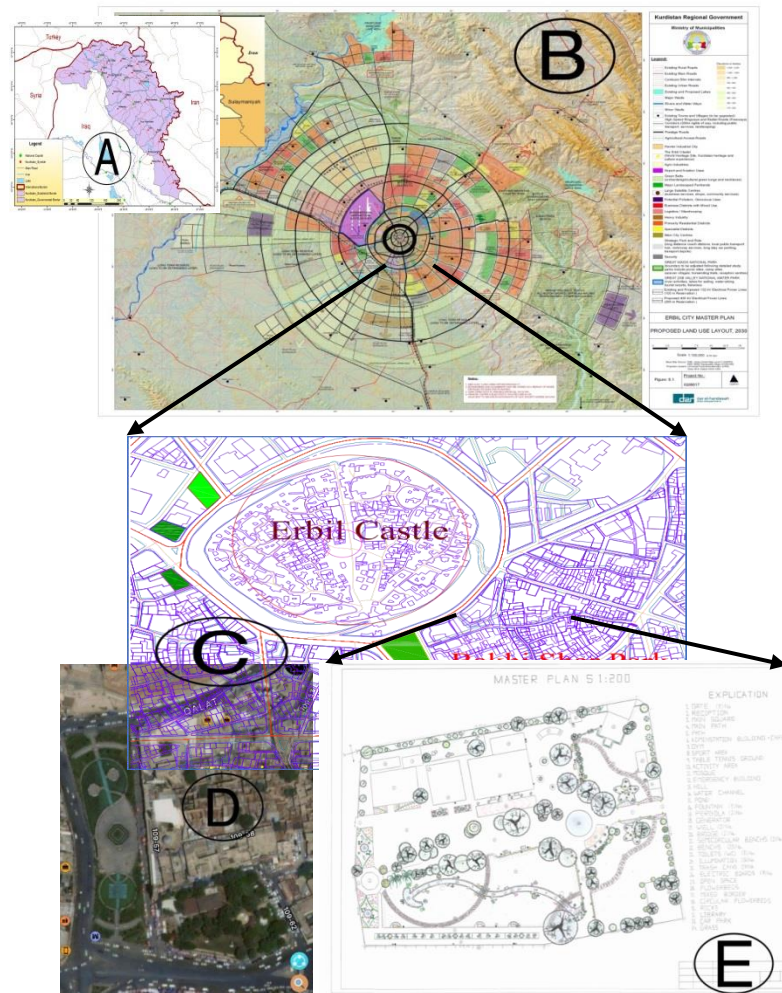


Figure 1: General map of (A) Kurdistan region Iraq. (B) Erbil (Hawler) Master Plan. (C) Location of Bakhi Shar Park within Erbil (Hawler) Province. (D) Showing the Bakhi Shar Park. (E) Master Plan of Bakhi Shar Park.

The climate is semi-arid type [17]; subtropical [18] belongs to Irano-Turanian climate [19] which is characterized by the wide range of annual and diurnal range of temperature [20]. Climate wise occurrence of the three seasons: a cold rainy winter, a mild growing period of spring and a hot dry summer all these are distinctive properties of this region [21], and [22]. However, over the past 2 decades the annual growth rate of the population in Erbil was 2.9% [23].

Erbil is laid out in a pattern of concentric rings around the old citadel in the middle of the city, with a few recently established greenery areas such as parks, gardens and street gardens [24] (Figure 1 A and B). One of the parks is B. S. P which is the concern of the present research, and it occupies an area of 5910 m<sup>2</sup> with exact location at a latitude 36° 11' 18" N and longitude 44° 00' 42" E. However, the elevation of the area is 409m above sea level (Figure 1 C, D, E).

### **Result and Discussion**

Size and the area of greenery had played an important and effective role in the planning of any settlement camps or even towns and cities all over the world. Nowadays in fact, it is going to become a must for any urban design and its location within cities [25]. Clean areas are going to become high limited in most cities that are most likely going to face pollution and congestion [25]. Ultimately it became evident that establishment of greenery area which is a continuation of landscape design of the city all over the world had mainly become facing environmental degradation throughout all sorts of pollution [3], [9], [26], [27] and [28].

In Erbil (Hawler) similar to other cities or towns in Middle East. Greenery areas had

occupied less than 5% of the total area. Up to last few decades (Figure 1 B) [15]. However, recently a number of public parks and gardens have been established in Erbil such as Peshmarga and Sami Abdulrahman park side by side to most main cities and districts in Kurdistan region of Iraq in recent years. However, the policy and the main goal is to increase the greenery area and raising size to be as close as possible to international standard ratio in which Iraqi and also Kurdish towns are still far behind [11] and [16].

Establishing and maintaining such area in Kurdistan. A country in it is both main parts (low and highland) Garmian and Qestan territory may easily be flourished with local flora the region had and still is attracting a huge number of tourists in the region that may raise to double or triple of the present number in feature. In fact, this was and still is the policy of the decision makers for improving the environmental and establishing many areas of greenery and parks [11] and [29].

Bakhi Shar Park in Erbil had undergone an innovation, beside its small size about six thousand-meter square already play a role in expanding greenery areas (Figure 1 C, D, E).

B. S. P occupies exactly an area of 2.364 donum. It was planned and performed according to a detail present landscape study. Landscape design of the mentioned spot do include Gate, paths, waterfall, water channel, tea house, benches, type of rocks as well as the flora. An example is illustrated in (Figure 1D, E) and (Figure 2) showing trees, shrubs and flowers in the spot. (Main species of which is tabulated in (Table 3)).

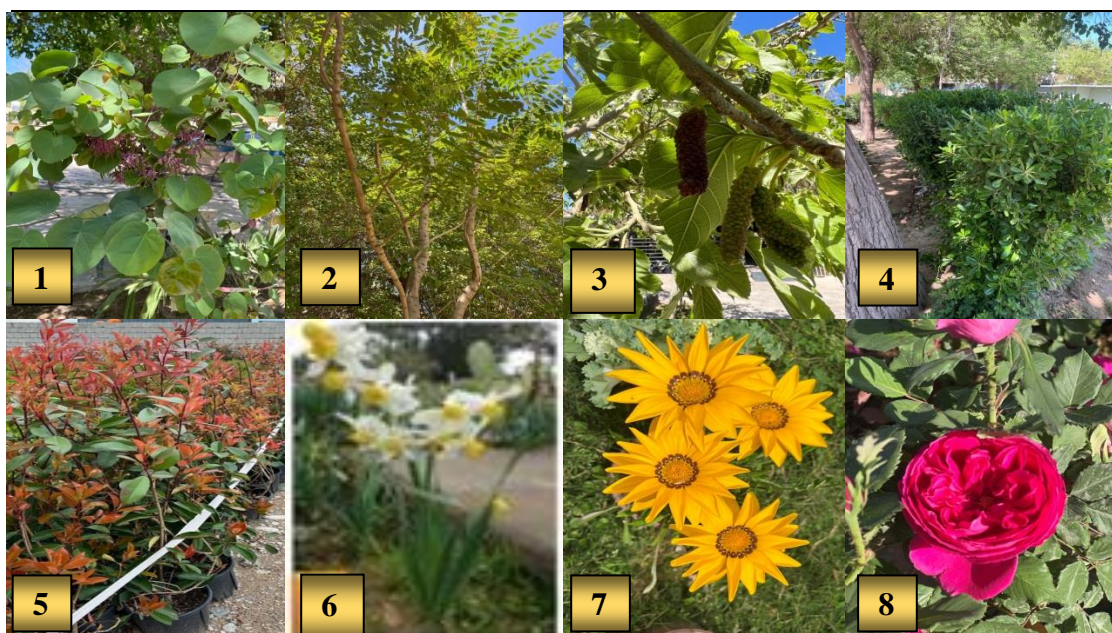


Figure 2: Some examples of the flora of Bakhi Shar park (1) *Cercis siliquastrum*; (2) *Ailanthus altissima*; (3) *Morus alba*; (4) *Pittosporum tobira*; (5) *Photinia x fraseri*; (6) *Narcissus tazetta*; (7) *Gazania rigens*; (8) *Rosa X damascina*

Table 1: Some physical and chemical properties of soil samples in Bakhi Shar Park

Parameters	Value	Unit
pH	7.83	
Electrical Conductivity (EC)	1.18	dS.m <sup>-1</sup>
CEC	14.17	Meq/100g Soil
Organic Matter	0.35	%
CaCO <sub>3</sub> (calcium carbonate)	8.24	%
Nitrogen	80.2	mg/kg
Phosphorous	5.46	mg/kg
Potassium	18.22	mg/kg
Calcium	136	mg/kg
Magnesium	75.6	mg/kg
Chloride	152	mg/kg
Bulk density	1.35	g.cm <sup>-3</sup>
Silt	31.525	%
Clay	28.975	%
Sand	39.5	%
Textures	Sandy Loam	

The general metrological, pedological and water properties of the park had been summarized in (Table 1, 2). Erbil similar to other parts of Kurdistan is within Irano-Turanian climate, therefor it is cleaning that as months of May to beginning of September is dry and hot, whereas rainy

season and temperature decline can be observed from October on word up to spring. Max humidity was recorded during January whereas wind direction was generally South West and never exceeding (7 m/s).

Table 2: Metrological Data of Erbil City (2006-2021)

No.	Years	Precipitation & Physical properties					
		Air Temperature (C°)			Rainfalls (mm)	Humidity (%)	Wind Speed (M/Sec)
		Max. Tem.	Min. Tem.	Av. Tem			
1	2006	27.72	16.46	22.09	514.6	48.25	1.51
2	2007	27.08	15.92	21.5	273.4	48.5	2.11
3	2008	27.52	16.5	22.01	297.5	43.16	2.35
4	2009	26.48	16.45	21.47	311.9	45	2.22
5	2010	28.59	17.99	23.29	233.76	45.91	2.36
6	2011	26.3	16.05	21.18	286.2	49.83	2.14
7	2012	26.14	17.13	21.63	230.7	49.08	2.11
8	2013	27.22	16.16	21.69	387.1	51.16	1.46
9	2014	28.01	16.41	22.21	345.2	50.91	0.52
10	2015	27.82	16.35	22.09	344.7	50.33	1.008
11	2016	27.59	16.22	21.9	323.3	49.66	1.49
12	2017	28.66	16.08	22.37	265.1	49.16	1.4
13	2018	27.6	18.1	22.9	642	40.7	3.9
14	2019	27.1	17.2	22.2	446.2	40.9	3.7
15	2020	27.6	17.8	22.8	422.3	37.3	3.9
16	2021	28.8	18.5	23.8	247.8	32.1	3.9

Plant trees within Bakhi Shar Park make up more than 15 most of them are native and natural. All were spotted and planted within landscape gardening in fact, trees of Bakhi

Shar Park take up a dendrologically sketch. Whereas the plan is to plant shrubs and have been in such away to be as close as to its natural habitation as possible (Figure 3).

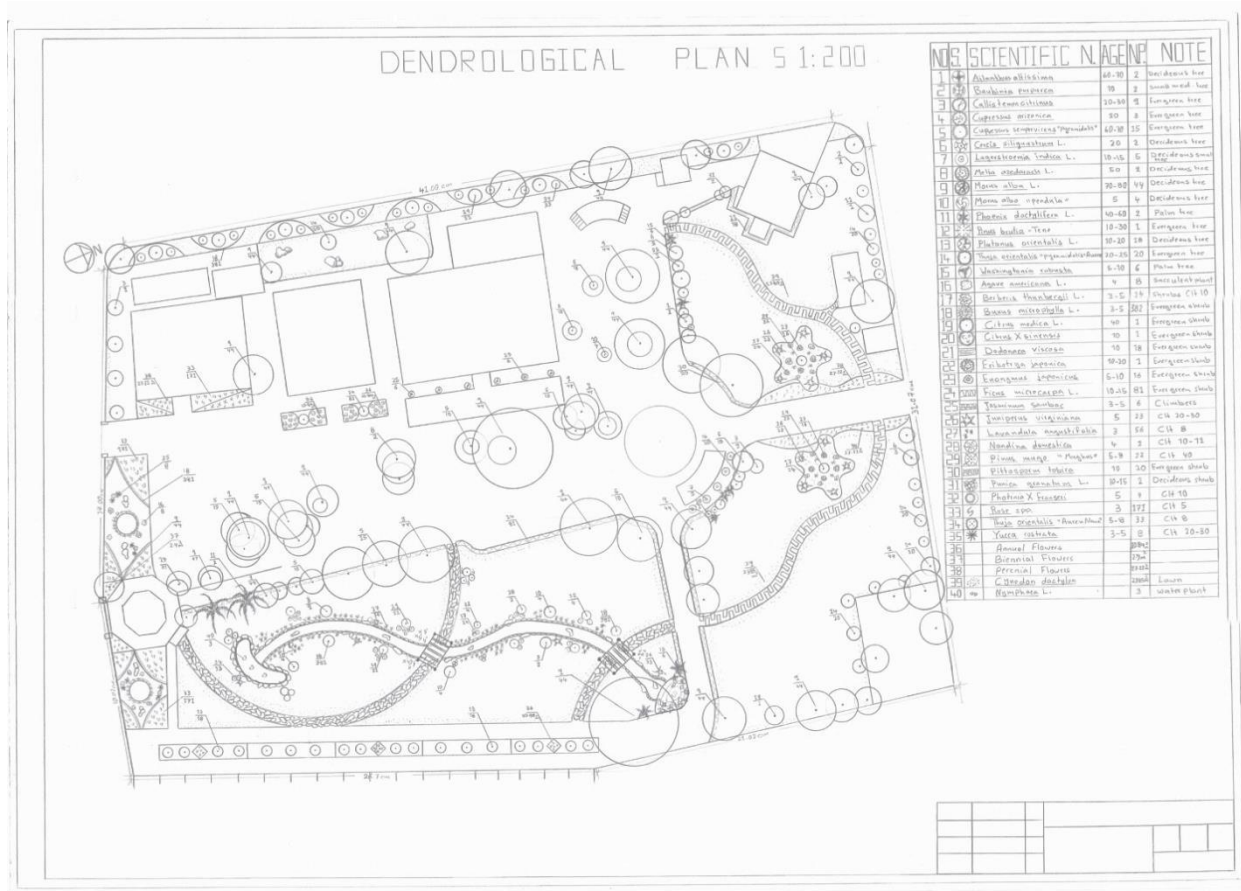


Figure 3: Dendrological Plan in Bakhi Shar Park

Flowers and grasses contribute the main part of greenery in the park. The plotted ones make up more than 25 of naturally and cultivate plants which are either native to Kurdistan or from other origin. The survey of the plantation within of Bakhi Shar park. Clarify local names, common name and taxonomic nomenclature for some representative samples of plant for future

proposed Bashi Shar Park which been forwarded and listed down below (Table 3). In fact, the final artificial (hard) landscape of Bakhi Shar Park incudes, road, illuminate, different benches, crash cans, tea house, bridges, water channel, water fall, pond, and different types of rocks in Kurdistan.

Table 3: Example list of Plants in Bakhi Shar Park in Erbil Center.

<b>A. Trees</b>		
Scientific Name	English Name	Kurdish Name
<i>Ailanthus altissima</i>	Tree of heaven	زمانی بالنده
<i>Bauhinia purpurea</i>	Camels foot	پئی حوشتر
<i>Callistemon citrinus</i>	Bottle brush	فلچه شووشه
<i>Cupressus arizonica</i>	Arizona cypress	سەر وو زیوین
<i>Cupressus sempervirens</i> "Pyramidalis"	Italian cypress	سەر وو هه‌میشه سه‌وز
<i>Cercis siliquastrum</i> L.	Judas tree	نهر خه‌وان
<i>Lagerstroemia indica</i> L.	Crepe myrtle	گوله قاوه
<i>Melia azedarach</i> L.	China berry tree	دار ته‌سبیح
<i>Morus alba</i> L.	White mulberry	تووی سپی
<i>Morus alba</i> "pendula"	Weeping mulberu	شوره توو
<i>Phoenix dactylifera</i> L.	Date palme	دار خورما
<i>Pinus brutia</i> "Ten"	Turkish pine	کازی زاوینته
<i>Platanus orientalis</i> L.	Oriental plane	چناری رۆژ هه‌لات
<i>Thuja orientalis</i> "Pyramidalis Aurea"	Oriental thuja	تویا هه‌رهمی
<i>Washingtonia robusta</i>	Mexican fan palm	واشنطونیا
<b>B. Shrubs</b>		
<i>Agave americana</i> L.	Century plant	نه‌گافی
<i>Buxus microphylla</i>	Boxwood	بوکسس
<i>Berberis thunbergii</i> L.	Japanese barberry	به‌ر به‌ریس
<i>Citrus medica</i> L.	Citron	ترنج
<i>Citrus sinensis</i>	Orange	پرتقال
<i>Dodonaea viscosa</i>	Hopbush	ده‌دوینیا
<i>Eriobotrya japonica</i>	Loquat	یه‌نگی دنیا
<i>Euonymus japonicas</i>	Japanese euonymus	شمشار
<i>Ficus benjamina</i>	Ficus	مطاط
<i>Jasminum sambac</i>	Jasmine	یاسمین
<i>Juniperus virginiana</i>	Eastren red cedar	هه‌فر نیت
<i>Nandina domestica</i>	Heavenly bamboo	ناندینا
<i>Pinus mugo</i> "Mughus"	Swiss mountain	کازی بالا کورت
<i>Pittosporum tobira</i>	Japanese pittosporum	پیتسپورم
<i>Punica granatum</i>	pomegranate	هه‌نار
<i>Rose spp.</i>	Rose	گوله‌سباح
<i>Thuja orientalis</i> "Aurea Nana"	Thuja	تویای توپی
<i>Yucca aloifolia</i>	Spanish dager	یوگا
<i>Lavandula angustifolia</i>	Lavender	لافینده‌ر
<b>C. Flowering Plants</b>		
<i>Perunia X hybrida</i>	Garden petunia	پتونیا
<i>Viola tricolor</i>	Pancy	چاوه پشیله
<i>Tagets erecta</i>	french marigold	جه‌عفسری
<i>Begonia Spp.</i>	Begonia	بیگونیا
<i>Gazania rigens</i>	Gazania	گزانیا
<i>Dianthus barbatus</i>	Sweet William	قرنفل
<i>Rosa X damascina</i>	Damask Rose	رؤزا
<i>Chrysanthemum Spp.</i>	Mums	داودی
<i>Dahlia spp.</i>	Dahlia	دالیا
<i>Narcissus tazetta</i>	Paperwhite	نیزگز
<b>D. Aquatic plants</b>		
<i>Nymphaea alba</i> L.	White Water lily	زنبقی سپی
<b>E. lawn</b>		
<i>Cynodon dactylon</i>	Lawn	چیمه‌ن



In fact, the landscape innovation design was performed in such a way to represent the greenery in all cities of Kurdistan, with considering most standers of retired people and almost all existing population. Such landscape design may be regarded as one of the start step and in order to establish similar or bigger park in various locations with Kurdistan and may be regarded as a pioneer in such aspect of greenery designing in the region that undoubtedly will follow by much more comprehension plans in future.

In order to get the precise information on the opinion, need, request and hope of the Erbil citizen. A list of question was prepared and a number of questioners were forwarded. The survey covered (125) person regardless of their age, sex and standard of education. The results were illustrated in (Table 4,5,6,7) and (Chart 1,2,3,4,5). All statistical analyses were forwarded on the conducted landscape innovation of the ancient Bakhi Shar Park within Erbil (Hawler) Kurdistan region. It was found that the people who spend their time in this park are mostly men and it can be said that 100% of the visitors of this park are male. Whereas, generally women do not have any presence in this park. In addition, age wise visitors in this park were 65 to 78 years old in most cases, and it can be said that the majority of cases, involve retire people who spend time in this park. However, visitors involve all sorts of community level such as (Teachers, Engineers, Employees, Lawyers, Peshmarga ... etc).

The results show that high percentage of the participants are in the age range of 65-78 years, most of these people have reached their retirement age and have enough vacation time. So, they spend their time in the park rather than staying at home (Table 4) (Chart 1).

Table 4: Explain visiting times in a month of Bakhi Shar park

No. of visiting/month	No. of people	%
1-5	11	8.8
6-10	17	13.6
11-15	13	10.4
16-20	14	11.2
21-25	25	20
26-30	45	36

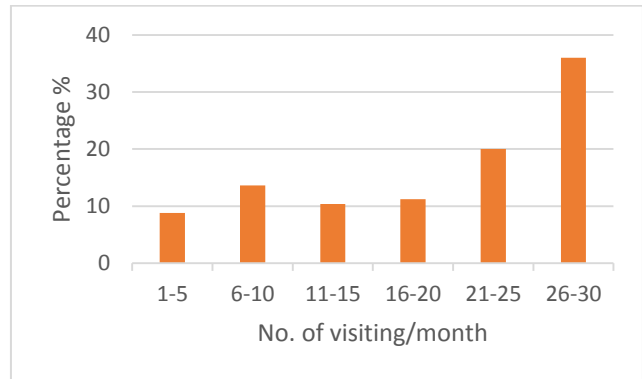


Chart 1: Explain visiting times in a month of Bakhi Shar park

Survey result indicated that about 43.2%, of park and attendance for meting and rest whereas, (31.2%) of the visitors are for the greenery and to enjoy the garden. However, only (19.2%) attended the park for rest and relaxation. The unique design of Bakhi Shar Park and water fountains do an attractive sound that may create a soothing environment. It will turn the park into a place for relaxation and for from crowd situation and busy sounds daily (Table 5) (Chart 2).

Table 5: Explain spending time with park components

Parts of the park	No. of uses	%
Gym	16	12.8
Library	18	14.4
Café	20	16
Entertainment	13	10.4
Garden	39	31.2
Relaxation	21	19.2
Walking	10	8
Sport	9	7.2

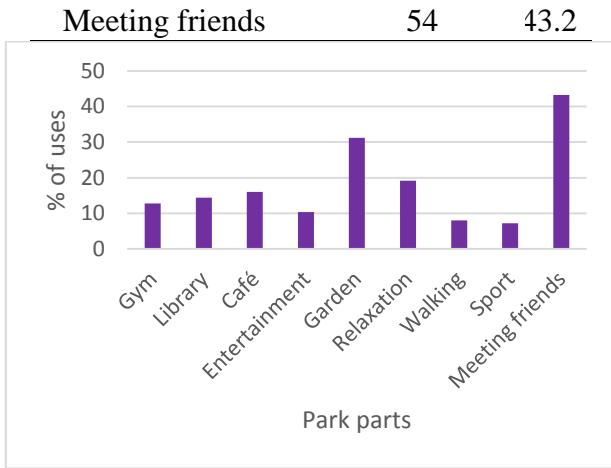


Chart 2: Explain spending time with park components

The greenness and beauty of the garden is one of the most important aspects needed for which an annual budget should be considered to maintain the attractiveness of the park. In addition, to that considering it as a place for middle-aged and elderly people, cafes, toilets, medical center and mosque are the places that are most used by them in Bakhi Shar Park, so giving attention and consideration to their renovation to attract more tourists is required (Table 6) (Chart 3).

Table 6: Explain which parts in this park to be renovate

Park parts to be renovated	No. of people	%
Gym	10	8
Library	6	4.8
Café	22	17.6
Mosque	17	13.6
Garden	39	31.2
Medical center	17	13.6
Toilets	18	14.4
Fountains	10	8
Gate	7	5.6
General greenery	43	34.4

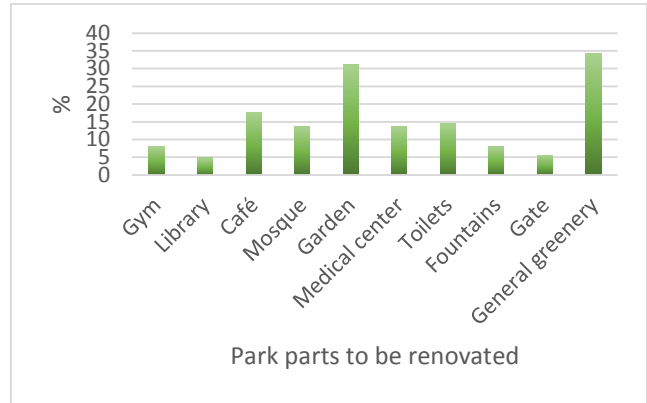


Chart 3: Explain which parts in this park to be renovate

The results of (61.6%) refer to the lack of a car park, which shows the importance of this issue for tourists who visit this park the important of attraction of visitors and tourist had as already have been referred to by [30]. 32% clarified the lack of transport aids and 20.8% mentioned problems related to suitable furniture. The current study resulted in need to give much more attention to the car park and transport as well as to allocation of a budget of the park beside other less important items referred to in table below (Table 7) (Chart 4).

Table 7: Explain which part in this park missing

Missing parts	No.	%
Car park	77	61.6
Nosiness	5	4
Chairs and table	26	20.8
Transport aids	40	32
Pedestrian paths	11	8.8

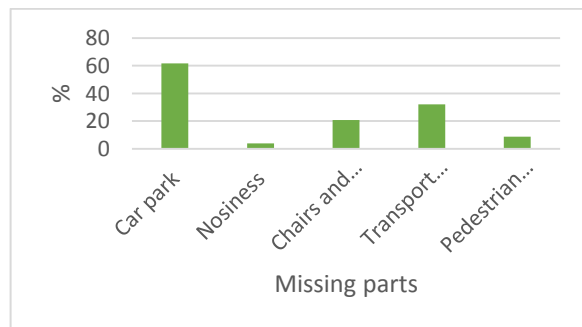


Chart 4: Explain which part in this park missing

## Conclusions

- 1- Increasing greenery areas and innovation of present once needs more attention.
- 2- Allocating a budget for conservation and maintenance of such parks in necessary.
- 3- Presence of such park in towns and cities is becoming an urgent requirement for any future master plan of cites.
- 4- Present study is one of the pioneer investigation in this respect and may follow with more comprehensive studied on other parks in Erbil and other towns in Kurdistan.

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## دراسة أولية لمضمون وتصميم (Landscape) للمتنزه باخي شار في أربيل (هولير)، كردستان، العراق \*

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### المستخلص

تحتل حديقة باخي شار (B.S.P) مساحة 5910 متر مربع داخل مركز مدينة أربيل، تم تكريس البحث الحالي لوضع خطة رئيسية جديدة لإعادة تنظيم المساحات الخضراء وإعادة تشييد BSP في أربيل، إقليم كردستان العراق، لتلائم الحديقة مع الواقع الحضاري الحالي، فقد تم جرد جميع المكونات للحديقة (Hard landscape and Soft landscape) كما تم توضيح ما موجود من الأشجار والشجيرات في الحديقة واقتراح المسودة الاساسية لمستقبل المتنزه. تمت الإشارة أيضاً إلى مجموعة متنوعة من النباتات (الأشجار وشجيرات) في قائمة واحدة للمشروع، ومع ذلك فإن خطة BSP هي التي سيتم إنشاؤها لغرض التعليم والاجتماعات والزراعة والاجتماعية والنشاط والسياحة بالإضافة إلى كونها مكاناً لجمع المتقاعدين من مختلف المناطق الوظيفية والأهداف الأخرى داخل هذا الموقع. في الواقع ان الهدف من هذه الدراسة هو بشكل أساسي إنشاء وإحالة مخطط تفصيلي لحديقة مقترحة داخل أربيل أو أية مدينة أخرى في كردستان. كما تم تضمين النتائج بمسح المستجوبين في المنطقة لاستبيان اهدافهم.

الكلمات المفتاحية : باخي شار، أربيل، لاند سكيب، حدائق، متنزهات