STUDY OF THE DESIGN OF NATIONAL PARK OF HALABJA (PAYTAKHTY ASHTY) ACCORDING TO THE ENVIRONMENTAL AND RECREATIONAL NEEDS OF THE RESIDENTS

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ABSTRACT

Designed a national park in the name of Peace Park (Paytakhty Ashty) on an area of 25 hectares of agricultural land with a slope of 1-2 %, located at latitude N35°11''42 and longitude E46°1''18, at an altitude of 780 m from sea level, in the north-eastern side of Halabja city, which is one of the oldest cities in Kurdistan, Iraq, which is located in the plains of Shahrazur, which is the second most fertile soil in the world, then the Halabja city became a symbol of peace because of its genocide and was named the capital of peace , so the designed park it named the Peace Park. The designs for the park site were developed according to the suitability of the site and its surroundings and its topography, as well as a study of the environmental factors of the area, so that the most important negative aspects of the climate were taken into account due to the lack of humidity (17%) and high temperature (49°C) during the summer months and the opposite during the winter months (-6°C) and at the same time the presence of comfort zone during the spring and autumn months. The opinions of part of the residents, specialists in the municipality and academics in this field were also taken into consideration in the design process, as 100% of the respondents see the necessity of having a national park in their city, 61% of them like to visit the park weekly and the preferred time to visit is 62% in the afternoon, while the preferred forms of visit are collective, such as friends and families, and with a percentage of 88% of the respondents. The most preferred recreational activities in the park are sitting and resting, watching beautiful scenery (100%), children's games (95%), special places for families (94%), saliva city, sports arenas, hiking and nature tours, respectively.

Key words: National Park of Halabja, Peace Park (Paytakhty Ashty), Recreational and Environmental Needs of the Residents in Park Design.

دراسة تصميم متنزه وطني في مدينة حلبجة (ثايتةختي آشتي) حسب احتياجات السكان الترفيهية والبيئية

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المستخلص

تم تصميم متنزه بأسم متنزه عاصمة السلام وعلى مساحة 25 هكتارًا من الأراضي الزراعية بمنحدر 1-2٪ ، وتقع عند خط العرض 42"11 ° N35 وخط الطول 18"1 ° E46 وعلى أرتفاع 780 م عن مستوى سطح البحر ، في الجهة الشمالية الشرقية من مدينة حلبجة ، والتي تقع على سهول شهرزور وهي ثاني أخصب تربة في العالم . وتعد مدينة حلبجة أحدى أقدم مدن كردستان العراق ثم أصبحت رمزًا للسلام بسبب الإبادة الجماعية فيها وسميت بعاصمة السلام ، لذلك سمي المتنزه المصمم بمتنزه عاصمة السلام. تم وضع تصاميم لموقع المنتزه وفقًا لملاءمة الموقع ومحيطه وتضاريسه، بالإضافة إلى دراسة العوامل البيئية للمنطقة، بحيث تم مراعاة أهم الجوانب السلبية للمناخ من قلة الرطوبة (17٪) وأرتفاع درجة الحرارة (49 درجة مئوية) خلال أشهر الصيف والعكس خلال أشهر الشتاء (-6 درجة مئوية) وفي نفس الوقت أخذ بنظر الاعتبار فترة الراحة الحرارية خلال أشهر الربيع والخريف. كما تم أستبيان جزء من السكان المدينة واخذ آراء المتخصصين في البلدية والأكاديميين في هذا المجال بنظر الاعتبار في عملية التصميم، بحيث يرى 100٪ من المستبينين ضرورة وجود متنزه وطني في مدينتهم ، وان 61٪ منهم أبدوا رغبتهم في زيارة المتنزه أسبوعياً والوقت المفضل لزياراتهم هي فترة ما بعد الظهيرة وبنسبة 62٪، بينما أفضل أشكال الزيارات للمتنزه هي الجماعية (أصدقاء والعائلات) وبنسبة 88٪ من المستبينين.الأنشطة الترفيهية الأكثر تفضيلاً في المتنزه هي الجلوس والراحة ، ومشاهدة المناظر الطبيعية الخلابة (100٪)، وألعاب الأطفال (95٪)، والأماكن الخاصة للعائلات (94٪) ، ومدينة الألعاب ، والساحات الرياضية، والمشي لمسافات طويلة والجولات في الطبيعة على التوالي.

الكلمات الدالة: متنزه حلبجة الوطني، متنزه عاصمة السلام (ثايتةختي آشتي)، الأحتياجات الترفيهية والبيئية للسكان عند تصميم المتنزهات.

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INTRODUCTION

Great cities are known for their great parks, and one measure of any city's greatness is its ability to provide recreation, natural beauty, and signature open spaces for its citizens. As cities continue to grow, the need to optimize the use of open spaces becomes inevitably vital (1). However, Chiesura (2) posited that parks and green spaces in urban context possess qualities that enhance human wellbeing. A good design, as an essential ingredient of urban parks, is regarded as an important factor, which can influence the success of the park (3). A garden design should evolve from the various needs of its users. Some will be purely decorative places serving to display the skills of those for whom gardening is a hobby or as places of seclusion and escape from the outside world: others will be put to many varied uses by large and active families. The layout of your garden must include areas for the various activities, so if your design is going to be successful, you must have a clear idea from the outset of what you want in it (4). The parks have many recreational activities for visitors which are called recreation, which means the activity renewal changing the atmosphere and routine to bring back the activity to mind and physiological functions in human body. According to the opinions of Jefferson (5) and Ransom (6) recreation activities in park include: walking, sitting, picnic, swimming, biking, running, jogging, equestrian facility, climbing, fitness, fishing, bird watching, boating, camping, hiking, banquets, relaxing, nature appreciation, landscaping, outdoor public meeting, reading, birthday parties, children play area and sport courts for playing golf, hockey, tennis, handball, volleyball, basketball and football. Nowadays, urban green spaces and parks are known as Vitamin G, where G stands for the green space around us. Notions of beneficial effects of nearby green space have persisted throughout history. And that through its effects on moderating urban climate, health, water, air quality and carbon sequestration, reducing noise pollution, tourism and social cohesion and boosting individual spirits and biodiversity into urbans whether preventing water and wind erosion(7,8,9,10). While choosing the park site, the designer should collect the necessary data about the location such as:

A- Man-made elements: such legal, physical boundaries, private holding and public easements. Also buildings, bridges and other structures including those of historical and archeological significance. As well, roads, walks, and other transportation ways, electric lines, gas mains, and other utilities. Also land uses for agriculture, industrial, recreation, etc.

B- Natural resources: Includes topography, geology, soil types, water bodies, wildlife and vegetation in the park locations.

C- Natural forces: Including both macroclimate and microclimate of the park site such as temperature, sun angles, wind directions and precipitation types.

D- Perceptual characteristics: Includes views into and out from the site, line, forms, texture, colors and scales witch give the site its peculiar character, whether smells and sound and their sources(11). In addition to that, the key point in the site selection of public green spaces is social requirements for building a park (7).

The first place to start when developing a new park is to ask and listen to the needs of the community it will serve. It helps make every member of the community feel that they are a stakeholder in the success of the project. Start by talking to your community to identify what matters most and develop a list of essential needs, It is their park; ask them questions to help define what matters most(12). For the purpose of taking the opinions of residents of the city and knowing their recreational need inside the park, there are several means of communication and its easiest is to follow the questionnaire process, for this the questionnaires are the workhorses of consultation or is defined as a set of various questions related to each other in a way that achieves the goal that the designer seeks in designing to know the opinions and needs of users of the place. The questionnaire is also a direct communication method and an important tool in design studies, as it ensures clarity in answering the questions asked. There are four main methods of delivering questionnaires:

1.Postal: surveys are relatively straightforward and cost effective as they deliver the questions required direct to the intended respondents.
2. Online: are a passive medium and while potentially accessible to the majority of any population.
3. Telephone: interviews allow questions to be asked speedily and under close supervision
4. Face-to-face: interviews usually involve selecting a carefully controlled sample of the target audience and visiting them in their own homes (13).

The city of Halabja one of the oldest historical cities in the region and was subjected to the worst genocide in the last century with chemical weapons, and similarly considered the capital of peace, and then became the city of the province and developed urbanization and expansion in all areas of life, including the establishment of gardens and green spaces within the city, but not the level required. For this reason, we presented a study on designing a park under the name Peace Park (Paytakhty Ashty) due to the title of the city of Halabja, which it was recently called the city.

Research Objectives:

1- Designing a park that suits the region's environment and topography and meets the recreational needs of the residents
2- A park that contains various activities according to people's desires, as well as the heritage and traditions of the city, its history and the sacrifices of the city's residents and raises the tourism value in the province

Case Study

A- Park site selection For the purpose of choosing a suitable place to establish the park in accordance with the special criteria, several places and around the city were visited, after several consultations, an appropriate space was chosen 25 hectares (625 x 400m) of uncultivated agricultural land, close to Halabja city (about 3 km), is located in the northeastern part of the city. It is located at latitude N35°11"42 and longitude E46°1"18, at an altitude of 780 m from sea level (Fig. 1 and 2). As we know, park planning and design always start with identifying the location or are looking at several potential locations, the fundamental factor, is the accessibility, is the location can it be easily reached by public transport, car or bike? The easier it is to get to the park, the more use it will get (14, 15).

B- Study the environmental factors of the site: Environmental factors include climate and soil

- **Climate factors**: Climate information was collected on the study site from the Department of Weather Forecasts in Halabja city, which included data for 19 consecutive years (2001-2019) of temperature, humidity, and the amount of precipitation and winds (16). (Table 1).
- **Precipitation**: The region is characterized by abundance of precipitation during the seasons of the year, which start from the middle of the first month of October and continue until the middle of the month of May, rainfall in this region is mostly rain, the average rate of rain reaches 700 mm/ year, there are days of snow in months during the months of December and February, there are a few cases in the shape of the hail in March, April and May. The total evaporation in the city is 1400 mm/ year.
- **Temperature:** Halabja city is characterized by the presence of large differences between the temperatures during the summer and autumn, so the temperature is clearly rising from the beginning of the month of May and reaching its maximum during the month of July, and then it will take down. While it recorded the highest degree of 49.1°C. during July. The lowest temperature is -5.5°C recorded during January, while the average annual temperature is 21.5°C, (Table 1).
- **Humidity:** The relative humidity changes during the months of the year, it may reach the highest during the winter months (95%), while the lowest percentage occurs during the months of July and August (18.2%), also the average annual is 51.1 %, (Table 1).
- **The comfort zone** interval was determined by Olgyay (17). within the range of temperatures 21-27°C and relative humidity 30-70% with movement of air, sun and shading (It is the period of the day in which a person feels completely comfortable and in his activities, so that he does not feel hot or cold). When the temperatures are higher than thermal comfort and relative humidity is low it requires air movement and shading and adding amounts of water vapour, this climate condition is called the hot period, but in the

case of a temperature drop under 21°C, this requires exposure to solar radiation, and this case is called the cold period. The comfort zone in Halabja city, we note from Fig. (3), there is no month of the year that falls entirely within the field of thermal comfort, but rather a large part of the months of April, June, September, and October, and during certain times of the morning or evening and night. The percentage of comfortable days in the city is about 20% of the total days of the year. At the same time, the months of January, February, March, November and December are entirely within the cold period. This period requires that the parks be exposed to sunlight, and that the cold period in the city is equivalent to approximately 55% of the total days of the year. This requires planting deciduous trees in parks. But the months of July, August and part of the months of June and September fall within the warm period it requires shading while providing air humidity.

- Winds: While the wind is one of the environmental factors that affect the growth and survival of plants in a proper way, as their effect is mechanical as well as their physiological effect on the amount of water evaporated from the soil and plants. The most important wind that should be taken into account is the northern and north western winds, which are the prevailing winds in the region. One of its characteristics is that it is dry hot in the summer, especially daylight hours. It also occupies an amount of dust while it looks cold and dry in the winter.

- **Solar radiation**: is the decisive factor in determining the thermal environment in the earth and the main source of energy that moves the air masses in the atmosphere. In December (9.85 hours), while the longest brightness of the sun is in June (12.80 hours), and the shortest brightness is in December and January (3.20 hours) (Table 1).

- Site soil characteristics: Soil conditions at the park site include:

Topography: The topography of the land is a semi-flat surface with a slight slope of 1-2% especially towards the south and southwest, as the park is surrounded by a mountain range from the eastern side, which is Shnirwe mount, the park site also contains a number of springs of natural water, in addition to that, the site contains a large amount of groundwater.

Soil testing: A number of samples were taken from different sites and depths of the site soil for the purpose of physical and chemical analysis in the Soil Department - Sulaimani University, as shown in Table(2), that the degree of soil pH at the park site it ranges between 7.6-7.8 and the amount of calcium carbonate in it between 169.5-228.2 g / kg and the degree of electrical conductivity reached from 1.65-1.54 dS/m, while the soil tissue class did not differ, according to the layers, which are clay, the amount of organic matter in them was between 7.77-2.15 g / kg.

Table 1. Climate data for Halabja city for the periods (2001-2019)

Climate factors	Units	maximum degree	minimum degree	average degree
Precipitations	**mm**	**1081.4 (2018- 2019)**	**408.3 (2007- 2008)**	**700**
Temperatures	**°C**	**49.1 (July)**	**-5.5 (January)**	**21.5**
Relative humidity	**%**	**95% (winter)**	**18.2% (August)**	**51.1 %**
Winds	**Km/ hr.**	**7.1**	**0**	**3.1**
Solar radiation	**Hour**	**12.80**	**3.20**	**8.0**

Months	Hours of the day							
	0	3	6	9	12	15	18	21
Jan								
Fab								
Mar								
Apr								
May								
Jun								
Jul								
Aug								
Sep								
Oct								
Nov								
Dec								

Comfort zone | Hot period | Cold period

Fig. 1. The range of comfort zone in Halabja city

Table 2. The results of the park site soil analysis

Soil depth Cm	pH degree	soil texture gm/kg sand	Silt	Clay	soil type	CaCo3 gm/kg	EC m/ds	Organic matter gm/kg
0 - 12.5	7.6	480.3	166.8	352.9	Clay	169.5	1.65	7.77
12.5 - 40	7.6	480.3	133.4	386.3	Clay	179.7	1.50	5.63
40 – 55	7.7	447.0	100.0	453.0	Clay	205.4	1.54	3.65
55 – 80	7.8	447.0	100.0	453.0	Clay	220.8	1.40	2.96
80 - 120	7.8	447.0	667.0	486.3	Clay	228.2	1.54	2.15

C- Recreational needs of the city residents

Nowadays, most of the successful designs for parks are those that meet the recreational needs of their visitors. In order for the park design to achieve its goals in meeting the needs of the residents of Halabja, some interviews was held and opinions taken among the specialists and architects in the city's municipality and university professors in particular are the departments of architecture, horticulture and gardening engineering as well as intellectuals and writers and poets and musicians (Halabja known as the city of poets and writers since ancient times), also the questionnaire was conducted for a random sample of a certain percentage of the city's population in a number of high-end neighbourhoods and People with middle and poor incomes, as well as taking samples in the east, west, north, south, and city centre, so that the questionnaire will be homogeneous and represent the opinions and aspirations of the city's residents.In this way, more than 1,100 questionnaires were distributed to people, and from that number, the answer to about 1000 questionnaires was returned, which includes 1.08% of the city's population of about 92,000 individuals (18). After the process of collecting the forms, it started directly by unloading the information and extracted the data necessary for the research and turned it into the percentages as shown in Table (3). The sample of the respondents is composed of both females, 54.8% and males 42.2%, and the majority of them are among the educated and college graduates, with a percentage of 44.6%.

Table 3. Respondents' opinions on the presence of parts and recreational activities within the proposed park

Parts of the park or events	Like	Fair	Don't like
A place to sit and rest	100	0	0
View garden views and roses to spend times	100	0	0
A place of worship	97.6	2	0.4
Playground	95.6	3.6	0.8
Botanical Garden	95.6	3.6	0.8
Arboretum to learn and amateur flowers	95.2	4	0.8
Chairlifts	94.4	5.6	0
A place for families	94	4.4	1,6
Cycling place	94	4.8	1.3
A place to teach and to climb mountains	93.2	4.8	2
A place for boat rides and fishing	92.8	4.4	2.8
Roaming and walking place	92.8	5.2	2
Restaurant and cafeteria	92.4	7.6	0
Yards of lawns and flowers	92	6.8	1.2
A place for daily exercise and fitness	91.2	5.6	3.2
Places to run, marathon and nature tours	89.6	7.6	2.8
Amusement parks	89.2	5.2	2.4
Picnic Place	88.4	10.8	0.8
A special place for personal events	82.8	12.4	4.8
Open Air Theater	82.8	11.6	5.6
A place to teach and ride horses	82.8	11.6	5.6
Private gardens for birds and butterflies	81.6	11.6	6.8
Reading places	81.6	16.4	2
Sports yards	81.1	10	8.4
Zoo	78	16	6
A place dedicated to tents and cabins	76.6	16	4.4
Indoor and outdoor swimming pool	62.4	29.8	8
Place of events and mass gatherings	60.4	26.8	12.8
A place dedicated to weddings and birthdays	58	33.6	8,4
A place dedicated to annual exhibitions	56	33.2	10.8
Museum of chemical bombing of Halabja	41.6	36.8	21.6

RESULTS AND DISCUSSION

A-Park site: The site that was chosen to construct the proposed park is very convenient due to its proximity to the city, it is easily accessible and connected to the city in several major ways, also the park location is high in relation to the city level and is surrounded by three beautiful agricultural villages and various orchids on three sides and on the fourth or east side is a very beautiful forest of pine trees and low altitude mountains as the background of the park. In the future, the city's environment will change due to the higher location of the park and the wind direction to the city, in addition, it plays as a windbreak for the city. For these reasons, the park site meets most of the criteria used in selecting the park sites (14, 19, 20).

Fig. 2. The site park view

Fig.3. A mountain and forest video over the park site

B- The environmental factors: During the study of the weather factors at the park site, we see that it is the continental climate that is hot and dry during the summer and cool and humid during the winter (Table-1), there is a big difference between the relative temperatures and humidity during the summer and winter, so you should choose the tolerant plants for a wide range of high temperatures and low humidity in the summer (49.1°C and 18.2%), but in the distant winter you must bear the low temperatures and high humidity (-5.5°C and 95%), so it is preferable to benefit Most of the trees and shrubs are deciduous and resistant plants when choosing park plants, with two lines of strong windbreaks to smooth out the environmental conditions inside the park and reduce the effects of harsh weather of the region. We also noted from Table 1 that a good amount of rain may reach its amount up to 700 mm annually, but the annual evaporation amount is more than 1400 mm and this requires providing the necessary water for the purpose of irrigation during a period from the middle of May to the middle of October, using modern and economic irrigation methods Green irrigation sprinkler irrigation and drip irrigation for the rest of the park plants (21). When studying climatic factors, we find that the length of the day and the intensity of solar radiation during the summer period (12.80 hours) (Table, 1) this increases the hot period as indicated in Fig. (1), and in order to provide thermal comfort in Iraq's park during the summer period it is required to provide shade at a rate not less than 65% of the total area of the park and by using a large tent trees, with providing evaporative cooling of fountains and waterfalls (22). On the other hand, a good topography and semi-flat shape of a land gives an indication of its suitability with different designs and models, in addition to that there is fertile and deep agricultural soil suitable for cultivation of most types of plants without the need for reclamation or soil change (Table, 2), as well as the presence of a number of eyes water Natural and abundant groundwater increases soil fertility and site simultaneously (23, 24).

C- Recreational needs of the city residents: Through the results of the questionnaire (Table, 3), it was found that 100% of those surveyed that a national park is necessary in the city of Halabja, where 61% of them like to visit the park weekly, And 88% of the respondents like to visit the park family (47.6%) or with their friends (40.8%), while only 8% of respondents visit the park individually. So the most desirable times to visit the park are in the afternoon and for up to 62.4%, and these visits are distributed according to the seasons, so that the most desirable seasons for visits are spring, summer and autumn with rates ranging from 39.9%, 25.8% and 19% respectively. These data give an indication of the necessity of preparing the park with plants whose beauty will emerge during the spring and summer months because it is the most frequent season in which visitors visit the park, as well as providing places to search 100% of respondents overlook the prowl and provide special places for families to sit (94%) (Table 3), for seating Friends, by providing gathering places and on the circular terraces, which are the most desirable forms of sitting in parks (25). Through the results of the analysis of the questionnaire forms in Table (3), it shows the sequence of favourite recreational activities among the residents of the city, so that sitting, resting and enjoying the beautiful scenery within the park comes first and at 100%, then the presence of places

of worship and piety comes second (97.6), and in the third Playgrounds, botanical gardens and Arboretum come to learn and amateur flowers. These results are evidence of the desire of the residents to have these activities and parts within their park, and they should take into consideration the design process. Also, the city of games and a place for families and the place to ride bicycles are ranked fourth. A place to teach and to climb mountains is ranked fifth. Thus, the entertainment activities were arranged in a sequence as shown in table (3), such as place for boat rides and fishing, roaming and walking place, restaurant and cafeteria, yards of lawns and flowers, a place for daily exercise and fitness and places to run, marsons and nature tours, etc. These results are somewhat similar to the results of the questionnaire obtained by the previous two studies in the city of Baghdad on park designs (26, 27). This results from the desires and leisure needs of the residents will be taken into consideration when designing the park, in order to the park design represent the views of the city residents and meet their recreational desires, so that the citizen feels that he is participating in the construction process, even with his voice.

D-The Project construction costs: The estimated cost of implementing the proposed design and setting up a park of 4 hectares (250,000 square meters) is estimated at $ 15,000,000, and this amount of money includes planning costs, the outer fence of the park, land preparation, tillage, road construction, movement corridors, sidewalks, the electricity and lighting network, telecommunications, and sewage networks and all used plants. In design, irrigation water systems, establishment of a sprinkler irrigation system, and drip irrigation system for the rest of the plants. It also includes the physical components of the needs of various recreational activities, multi-purpose sports arenas, and other components such as seating seats. Signs, statues, fountains, waterfalls, waste bins, etc. In addition, the estimated daily amount of water required to irrigate all park plants for a period of five months is 1500 cubic meters. In the last stage of the research, the results, conclusions and recommendations of the research were translated and also taken into consideration the results of a number of field visits and repeated observations of the park site to take the necessary measurements for the research, so that the research reached a proposed detailed design under the name of the Capital Garden for Peace in Halabja, as shown in figure (5).

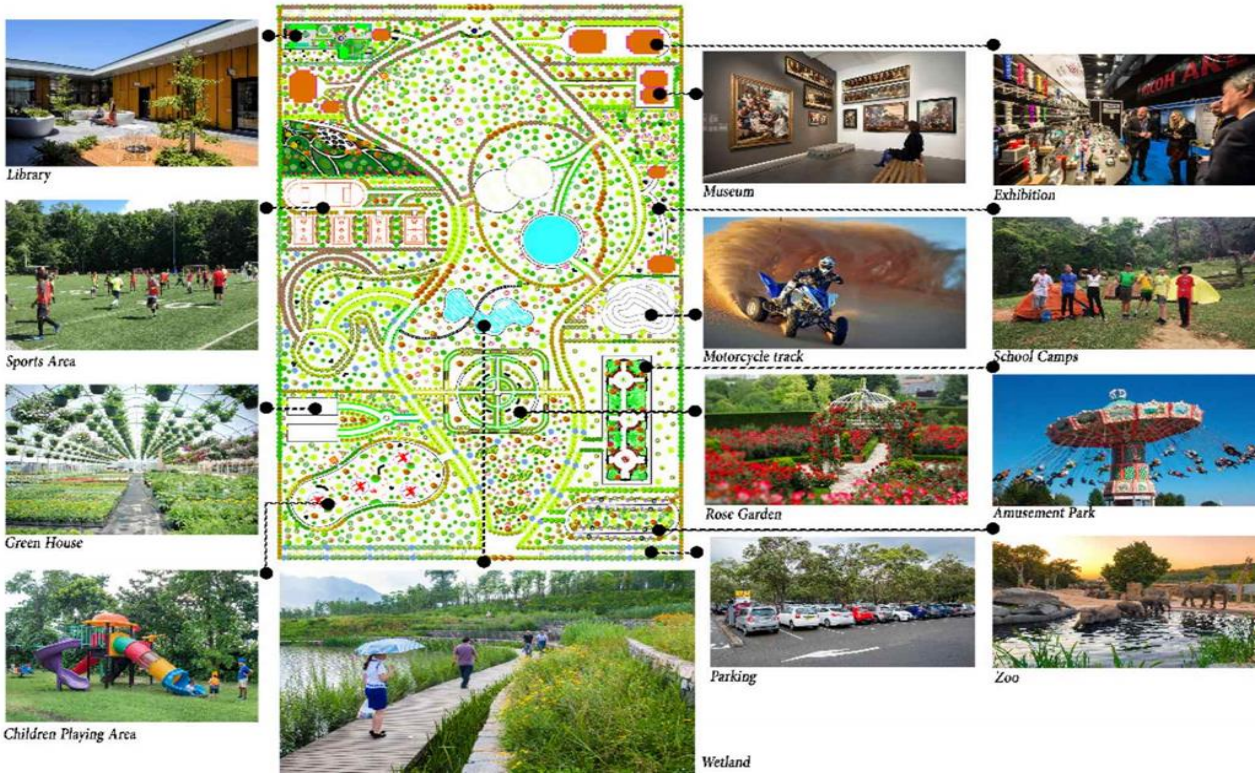

Figure 4. Suggested designs for Peace in Halabja - (Park Activities) (Designed by Authors)

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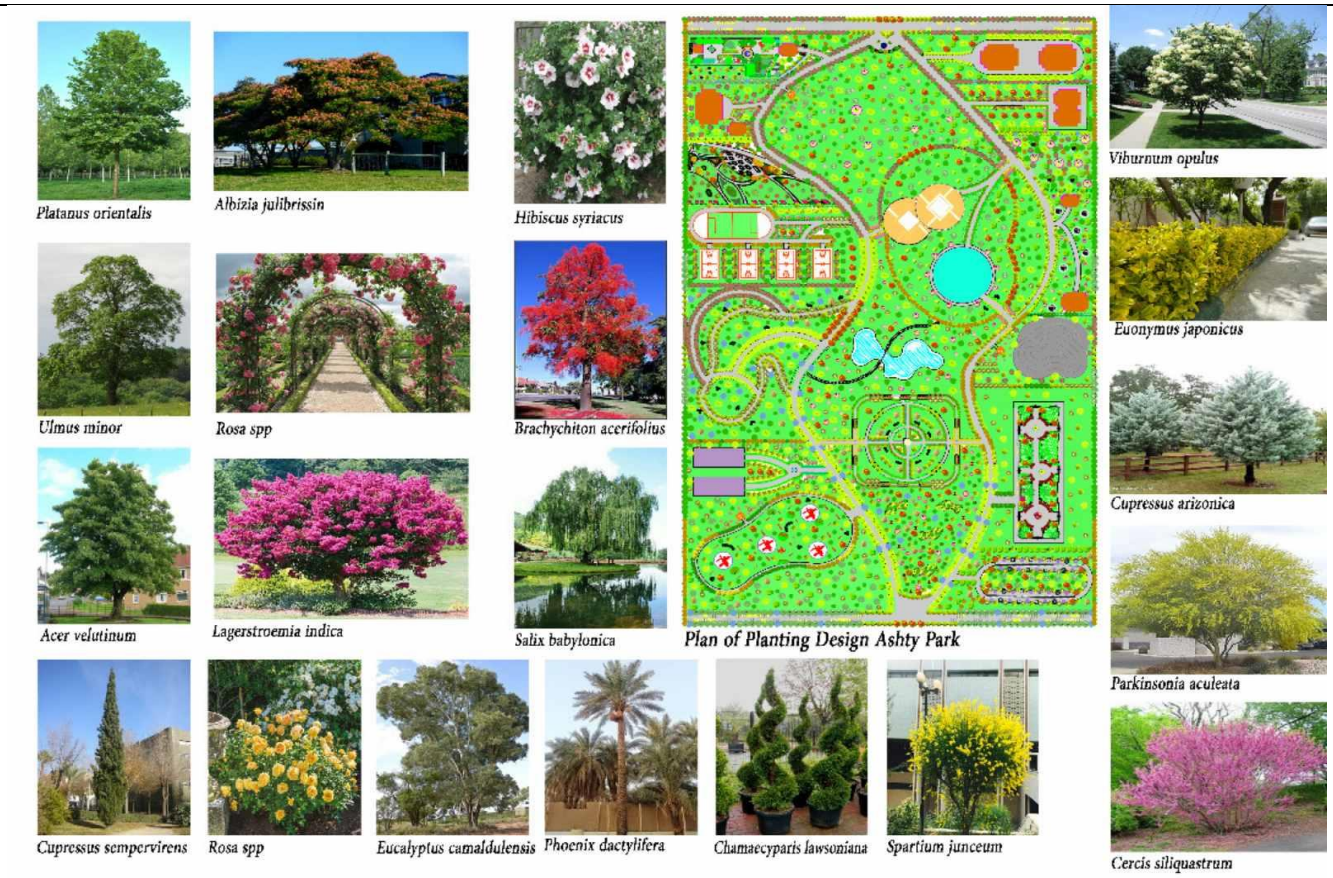

Figure 5. Suggested designs for Peace in Halabja - (Park Plants) (Designed by Authors)

CONCLUSIONS

From the results of the study, we conclude the following:

1- One of the factors of park success is its design, the better design, the park will be more successful.

2- Parks take their swords and developments from the needs and activities of their users.

3- Parks play as lungs for cities and medicine for many diseases such as psychological, physical and social, the only place to spend leisure time for all members of society and achieve their hobbies

4- The first criteria for selecting park location are the study human elements, natural and environmental sources about the site, also its cognitive and visual characteristics of the site.

5- Halabja is one of the ancient cities and is known for the poets and writers, as well as its residents are characterized by vitality and love of life and living in luxury, and this is shown by the results of the questionnaire

6- The factors that are taken into consideration when designing parks are the impacts of the site and its surroundings, environmental factors, recreational residents' needs, region traditions and customs, and construction costs

7- The suitable design style for the multi-activities park (28 leisure activities) and in the region with Continental climate is a modern style in design

Recommendations

Through the results of the study we reach the following conclusions:

1- We recommend establishing parks in cities in a scientific way by selecting the site according to the criteria and being close to the city, by studying the climatic conditions carefully and designing it according to the wishes and recreational needs of the residents

2- The necessity of studying the harsh environment of the country and its problems and interest in choosing national plants in designs, as well as interest in using water a lot in designing parks for their cooling effect in order to achieve the comfort zone that people are always searching for in parks

3- We also recommend more scientific research on this subject and study of other aspects of parks and its application, because the parks are the cultural face of each country and get to know it.

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