



A Multi-Criteria Landscape Assessment and Re-innovation of Darwaza Park in Ranya City: A Sustainable Master Plan

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ABSTRACT

Greenery in any place generally indicate the integration of natural elements, including trees, shrubs, grass, and flowers, which enhance ecological balance, aesthetic value, and overall quality of life. Public parks as an example do function as vital leisure areas for metropolitan populations, enhancing physical and mental health. The current inquiry was dedicated to developing a new master plan for rearranging the green areas and re-establishment of Darwaza park in Ranya, Kurdistan region of Iraq, in order to fit the park with resent advancement of civilization. Darwaza Park occupies an area of 50570 m² within Ranya a serve as a main public park that highlights the significance of urban greenery in the region, however it suffers from considerable design shortcomings. Present study is to evaluate the present condition of this Park, point out deficiencies in its design, and forward ideas to improve its functionality and usage. The primary aims encompass rectifying deficiencies in softscaping, hardscaping, urban furnishings, and inadequate accessibility for various users. The research utilized multiple approaches, encompassing soil analysis, meteorological data evaluation, landscape assessments, and survey questionnaires. Performed for the first time in the town, analysis of local meteorological data, and a quantitative survey of 155 park visitors to assess user needs. Results indicated a significant lack of shaded areas (covering only 15% of the total area) and an inefficient irrigation system. Soil analysis revealed high pH levels and compaction, limiting the diversity of plant species. Furthermore, 78% of users expressed dissatisfaction with current urban furnishings and accessibility. Based on these findings, the study proposes a new Master Plan that integrates sustainable 'softscape' and 'hardscape' solutions, optimizing spatial distribution and ecological resilience. This re-innovation serves as a strategic model for upgrading urban green spaces in the region.

Keywords: Landscape Re-innovation, Public Park, Sustainable, Darwaza Park, Ranya.

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INTRODUCTION

Recently, the significance of urban green spaces (UGS), particularly public parks, has intensified in response to rapid urbanization and the dwindling availability of open spaces. In urban contexts, greenery represents the strategic integration of vegetation into cityscapes, serving as a cornerstone for sustainability, aesthetic enhancement, and human well-being [1]. It includes many forms such as parks, vertical gardens, green roofs, and vegetation-clad structures, each distinctively enhancing the urban environment. There are many different aspects that contribute to the significance of greenery in the Kurdistan Region of Iraq, including the economic, cultural, psychological and environmental aspects. Greenery can mitigate urban climates by diminishing the urban heat. It may reduce temperatures by 0.5 to 2.9 °C [2]. In addition, act as a natural air filter, mitigating air pollution so enhancing air quality by absorbing pollutants and carbon dioxide [3]. Beyond environmental services, exposure to green environments is documented to provide substantial psychological benefits, including stress reduction and an overall enhancement of the quality of life for city dwellers [4, 5].

Landscape gardens are created by integrating softscape (vegetative materials) and hardscape (non-living structural materials) components to create a harmonious theme that enhances the surrounding environment [6]. In urban areas, landscapes are essential for establishing green spaces such as parks and gardens, which create the microclimate, increase biodiversity, and foster physical and mental well-being [7].

Historically, public parks have been integral to urban settlements, serving as vital sanctuaries for recreation and human-nature interaction. Beyond their aesthetic appeal, public parks are defined as curated landscapes that integrate botanical collections, functional structures, and diverse facilities managed for conservation, research, and public exhibition [9]. Within the framework of urban green infrastructure, these spaces are essential for maintaining ecological integrity and fostering environmental resilience. Strategically, the development and professional administration of such parks are paramount to sustainable urban growth, as they not only stimulate local economic vitality but also significantly enhance the 'livability' index of urban communities [10]. Consequently, the modern functional park is no longer merely a decorative space, but a multifunctional urban organ that supports social cohesion and educational activities.

The redesign of urban parks has become a modern necessity, driven by the need to address the evolving demands of city dwellers and the inevitable physical degradation of existing infrastructures [11, 12]. Furthermore, re-innovated public gardens may promote social inclusion by establishing accessible and inclusive environments for all community members. [13]. Consequently, renovating a public park and garden require a careful balance of softscape and hardscape components to provide a setting that is both practical and visually appealing. Softscape features include the natural parts of a garden, including plants, trees, and flowers, which enhance the landscape's ecological and sensory attractiveness. Hardscape components include non-living features such as paths, benches, and water installations, which provide structure and functionality. The amalgamation of these components is essential for establishing a cohesive and sustainable public garden that fulfills user requirements while improving the urban landscape [14, 15]. Urban parks are recognized as primary venues for leisure and recreation, playing a fundamental role in the daily lives of city dwellers. Beyond their social utility, these spaces are essential components of urban greening strategies, contributing significantly to carbon sequestration and the mitigation of climate change impacts. Moreover, by providing residents with high-quality scenic vistas and distinctive open environments, public parks become indispensable for optimizing the utilization of urban land and enhancing the overall spatial quality of the city [16, 17, 18].

Darwaza Park stands as the most significant public green space in Ranya, Kurdistan Region, serving as a vital ecological and recreational hub for both residents and visitors. Despite its importance, the park currently fails to meet its potential due to a lack of cohesive integration between its 'softscape' and 'hardscape' components. As Ranya undergoes rapid urbanization, the deficit of functional open spaces has become more pronounced, with existing greenery failing to operate as a unified urban system. Detailed preliminary analysis revealed critical deficiencies in several areas: inadequate vegetation density (softscape), poorly integrated pedestrian circulation (hardscape), and a lack of standardized urban furnishings. These shortcomings directly impact user comfort and the park's overall functionality. The main objectives of this study are: to create suitable planning criteria and operational attributes that facilitate public utilization, accessibility, and comfort in an open park. however, to establish a novel design plan for Darwaza Park by integrating softscape and hardscape elements. Moreover, to develop an innovative landscape design that improves environmental quality, aesthetic appeal, and social utility of the park. By utilizing Darwaza Park as a case study, this research establishes a foundational framework for assessing and re-innovating urban parks across the Kurdistan Region, aiming to align public space utilization with contemporary landscape engineering standards.

Materials and Method

Description of Research Area

Ranya District

Ranya District is strategically located in the northwest of Sulaymaniyah Governorate, Kurdistan Region of Iraq. Geographically, the district is positioned at coordinates 36°15'14" N latitude and 44°52'59" E longitude (Figure 1), with an average elevation of approximately 615 m above mean sea level. The district center lies roughly 104 km from Sulaymaniyah city, covering a municipal area of approximately 27.15 km² [19]. Tectonically, Ranya is situated at the interface of the High Folded Zone, characterized geologically by Quaternary sedimentary deposits comprising layers of gravel, sand, silt, and clay [19]. Hydrogeological data indicates that the groundwater table fluctuates between 20 and 40 meters below the ground surface [20]. Topographically, the city is framed by natural landmarks: bounded by Kewarash Mountain to the north and Hajila Mountain to the west, while overlooking Dokan Lake to the south. The district exhibits a Mediterranean climate pattern, distinguished by cold, wet winters and hot, dry summers [21].

However, the current ratio of public parks and green spaces in Ranya falls significantly below the benchmarks established by contemporary urban master plans (Figure 2). This deficit is not unique to the district but represents a prevalent challenge across the Kurdistan Region and the broader Middle East. Quantitative assessments indicate that green infrastructure constitutes a negligible fraction of the total urban footprint. Despite recent municipal initiatives to construct several public parks, a substantial greenery deficit persists, with the total green coverage estimated to

reach merely 3% of the city's area. Similar trends of insufficient green infrastructure are documented in neighboring communities [23, 24]. This scarcity is further exacerbated by rapid demographic pressures; notably, Ranya has experienced a cumulative population growth of approximately 40% over the past two decades [25].

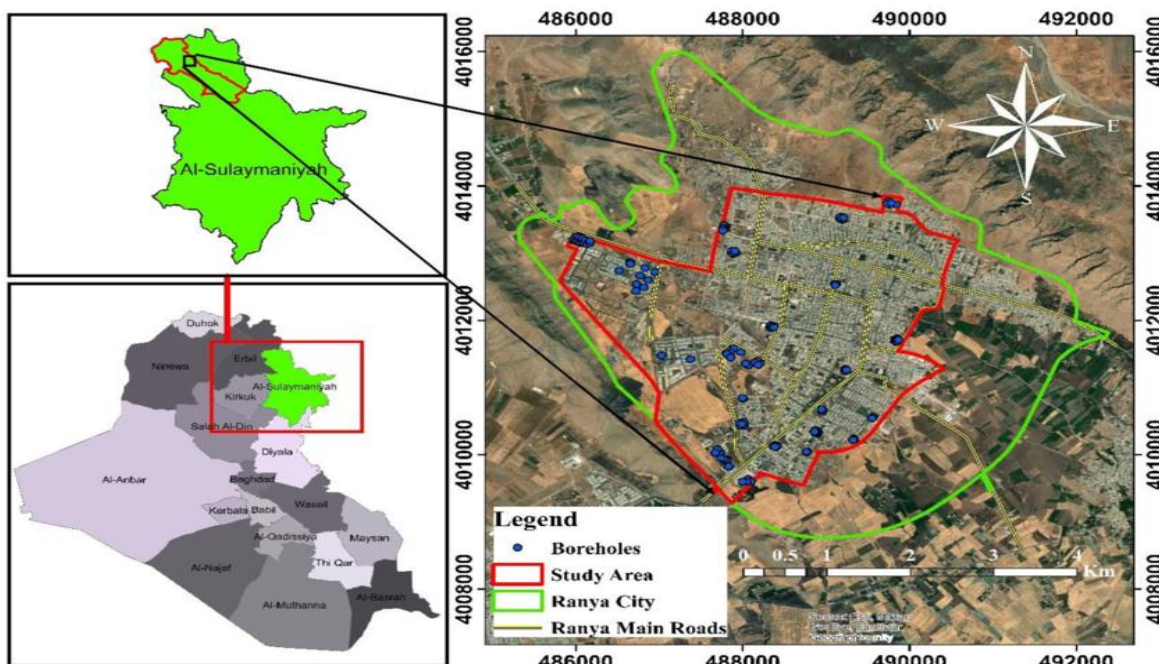


Figure 1. Ranya City in The Iraqi Map [21].

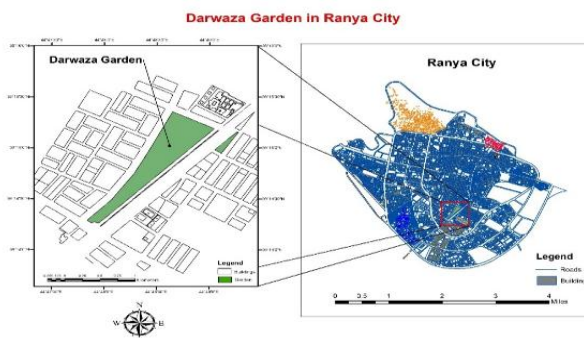
Darwaza Park

Darwaza Park constitutes the largest public green space in Ranya City, encompassing a total area of 50,570 m². Situated approximately 2 km from the historic town center, the park is geographically located at latitude 36.2437° N and longitude 44.8776° E, with an elevation of approximately 570 m above sea level (Figure 2). The park serves as a vital recreational hub, offering an inviting atmosphere for both residents and tourists. Architecturally, the site features diverse hardscape components, including primary and secondary gates, an amphitheater, fountains, sculptures, gazebos, and playgrounds. However, site analysis indicates that the majority of these structures—along with utility facilities such as the water storage, wells, and power generation units—require significant renovation and modernization. Complementing these structures are softscape components comprising mature trees, shrubs, and extensive lawns, which establish a tranquil environment for communal events.

Functionally, the park has evolved into a central social and cultural node, particularly following the recent installation of shaded pergolas. It operates daily from 8:00 AM to 12:00 AM (midnight). The site attracts visitors from diverse socio-economic and professional backgrounds across all seasons [26], underscoring its role as a preferred leisure destination [1]. Despite its significance, the park lacks archived landscape design plans or historical architectural records. This documentation gap positions Darwaza Park as a critical subject for this study, which aims to develop a comprehensive landscape master plan to revitalize its urban identity.



A



B

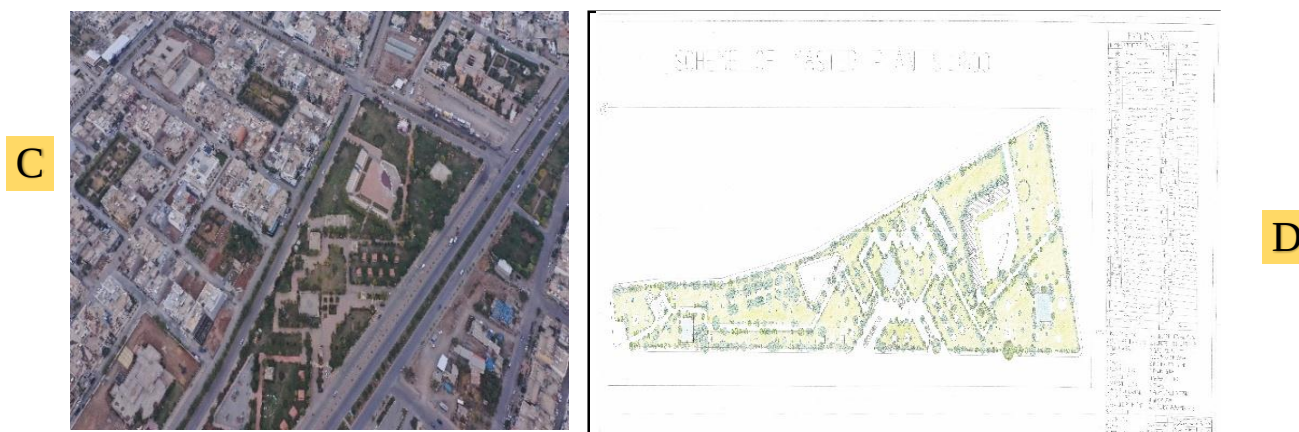


Figure 2: (A) Ranya Master plan. (B) Location Darwaza Park with in Ranya district. (C) Showing Darwaza Park. (D) Master plane of Darwaza Park.

Data Collection

Soil Sampling and Analysis

On 1st June 2025, ten random composite soil samples were collected from the study site. Samples were taken from the topsoil layer (0–30 cm depth), representing the active root zone for vegetation. Standard laboratory analyses were conducted to determine the physicochemical properties of the soil, ensuring its suitability for the proposed softscape interventions [27].

Meteorological Data Assessment

Long-term meteorological data regarding the study area were officially acquired from the Food and Agriculture Organization (FAO) database. The dataset covers a 16-year period (2008–2024) and includes critical climatic parameters: mean air temperature, precipitation rates, relative humidity, and wind speed. This data was analyzed to select climate-resilient plant species [28].

Site Survey and Landscape Mapping

A comprehensive spatial survey of the park was conducted to quantify existing landscape components, and master plan was subsequently represented graphically (Figure 2).

Softscape Inventory: This involved a detailed botanical census, identifying plant species, quantifying their abundance, and assessing their maturity status and health condition.

Hardscape Analysis: Existing structural elements were measured to determine their dimensions and spatial footprint. Based on field measurements, a graphic representation of the current site was generated according to standard graphic design principles [29]. Subsequently, Computer-Aided Design (CAD) software (AutoCAD 2021) was utilized to digitize the site plan and develop the proposed 2D master plan revisions, ensuring precise scaling and legible symbology [30].

Questionnaire and Social Survey

An extensive questionnaire designed to analyze visitor demographics, to present study on landscape innovation. Collected data from 155 various visitors to Darwaza Park in Ranya. Questionnaire was designed and disseminated using Google Forms to facilitate accessibility and maximize participation. Additionally, QR codes directing to the online survey were carefully positioned in many areas across the Park. This method is essential for modifying the park's design to accommodate its varied user demographic. According to the study of [1], the questionnaire encompasses several facets, including biographical details, visit frequency and duration of replies. It further examines preferences for vegetation, assessments of botanical variety, and accessibility, particularly for those with impairments. Furthermore, it solicits input on stylistic elements, rehabilitation requirements, and the need for innovation in landscape design.

Result and Discussion

Urban greenery plays a pivotal role in enhancing the quality of life by delivering multifaceted environmental, social, and economic benefits. However, the magnitude of this influence varies depending on the size and strategic location of the green space. Within the context of urban design, green infrastructures—including parks, gardens, and vegetation—are fundamental for mitigating climate change, purifying air, and regulating microclimates [31, 32]. In the Kurdistan Region, particularly in Ranya City, the necessity for the re-innovation of public spaces like Darwaza

Park has become critical. This urgency is driven by two main factors: the accelerating demands of a growing urban population and the significant physical deterioration of existing park amenities. As urban lifestyles evolve, static infrastructure becomes obsolete, necessitating adaptive landscape modifications [33]. This situation mirrors findings from similar regional studies, such as the master plan assessment of Bakhi Shar Park in Erbil [1]. The limitations of the current spatial configuration are illustrated in the previous master plan of Darwaza Park (Figure 3), which highlights the lack of cohesive zoning and functional integration required by modern standards.

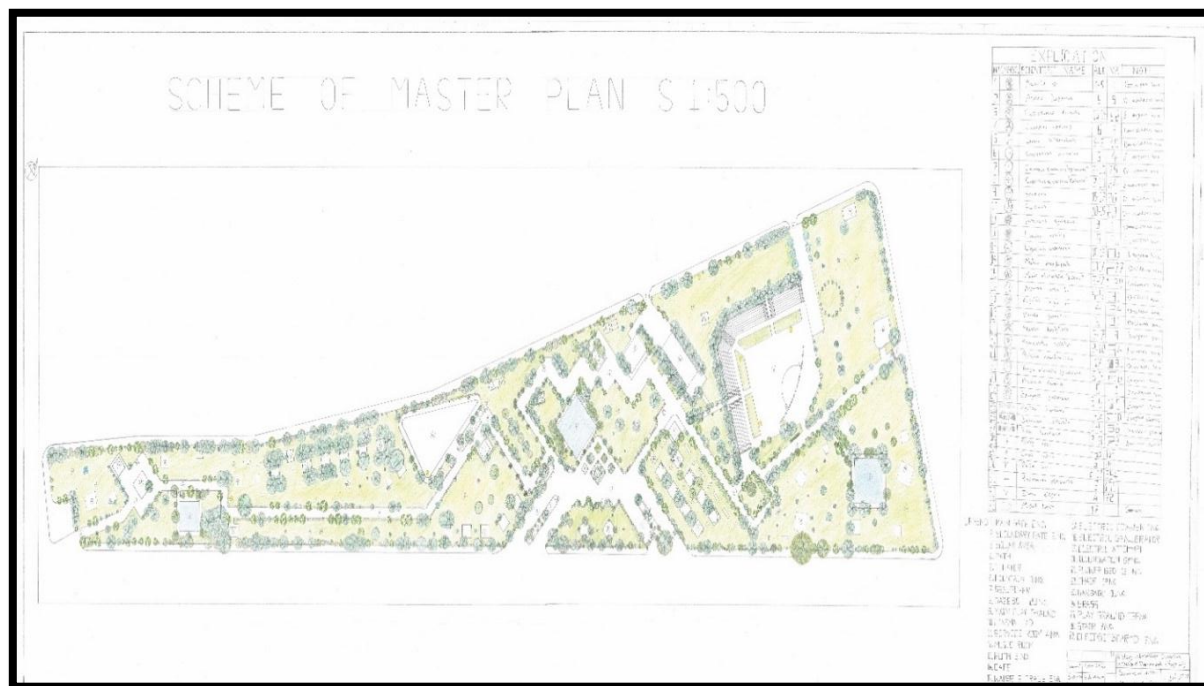


Figure 3. Old master plan of Darwaz Park in Ranya

Present design of contemporary Darwaz Park, is an attempt to full fill the existing gap in previous design such as essential elements, including an administrative office for park management, allocated forest zones, adequate parking facilities, a fitness area, well-designed walking paths, a central playground, recreational amenities for adolescents, a plant nursery, a library, a varied aviary for birds, a mosque, few cafes, a restricted assortment of trees, shrubs, and flowers, along with ornamental plant displays. Furthermore, the park suffers from poor-quality lawns. The figure (4) illustrates some examples of flora at Darwaz Park.





Figure 4: Same examples of tree and flora of Darwaza Park: (1) *Ligustrum japonicum*, (2) *Robinia pseudoacacia*, (3) *Fraxinus* sp. (4) *Melia azadirach*, (5) *Thuja orientalis* "pyramidalis", (6) *Jasminum officinalis*, (7) *Myrtus communis*, (8) *Rosa* sp.

Shown in (Table 1) presents the results of soil analysis performed in Drwaza Park.

Table 1. Some physical and chemical properties of the soil in the study area*

Parameter	Value
pH	7.95
EC (dS.m ⁻¹)	0.38
Nitrogen (mg/kg)	96
Phosphorous (mg/kg)	5.66
Soluble Potassium (mg/kg)	77.1
CaCO ₃ (%)	12.41
Organic matter (%)	2.29
Bulk density (g/cm ³)	1.09
Magnesium (Meq/L)	0.35
Calcium (Meq/L)	0.9
Chloride (Meq/L)	0.5
CEC (emole/kg)	27.6
TEXTURE	Clay
Sand (%)	14.61
Silt (%)	28.75
Clay (%)	56.64

Source: (University of Duhok-College of Agriculture Engineering-College Lab).

The meteorological data for Ranya from 2008 to 2024, as demonstrated in (Table 2), indicates significant trends and fluctuations throughout the years.

Table 2. Meteorological Data of Ranaya (2008-2024) (FAO, 2025)

No.	Years	Air Temperature (C°)			Rainfalls (mm)	Humidity (%)	Wind Speed (M/Sec)
		Max. Tem.	Min. Tem.	Av. Tem			
1	2008	23.74	11.35	17.56	636	29.38	1.44
2	2009	22.87	11.32	17.09	947	33.70	1.38
3	2010	25.06	12.78	18.93	816	31.09	1.40
4	2011	22.53	10.89	16.70	1,042	34.20	1.39
5	2012	23.10	11.39	17.23	997	35.48	1.41
6	2013	23.09	11.40	17.26	1,087	33.24	1.42
7	2014	23.57	11.96	17.78	954	34.63	1.38
8	2015	23.67	11.94	17.80	1,113	34.60	1.40
9	2016	23.52	11.94	17.72	1,155	33.67	1.42
10	2017	24.03	11.83	17.92	764	32.40	1.41
11	2018	24.13	12.83	18.47	1,350	37.26	1.38
12	2019	23.48	11.92	17.70	1,594	35.55	1.38
13	2020	23.70	11.95	17.83	962	34.83	1.43
14	2021	25.48	12.63	19.06	576	27.72	1.45
15	2022	24.56	12.52	18.53	736	31.91	1.40
16	2023	24.72	12.61	18.78	404	26.22	1.42
17	2024	24.89	11.54	18.11	529	27.87	1.39

Present report a new master plan design for Darwaz Park, according international criteria as shown in Figure (5). It complies all previously missing aspects including hardscape and softscape characteristics, especially the main components in the public park. In order to assure engaging and sustainable environment for attendance. The new plan has presented a comprehensive strategy that amalgamates contemporary landscaping methods. Moreover, in reference to [34] who illustrated that the softscaping components, like shrubs, trees, and grass, enhance the ecological vitality of urban environments, elevating the general quality of life for residents.

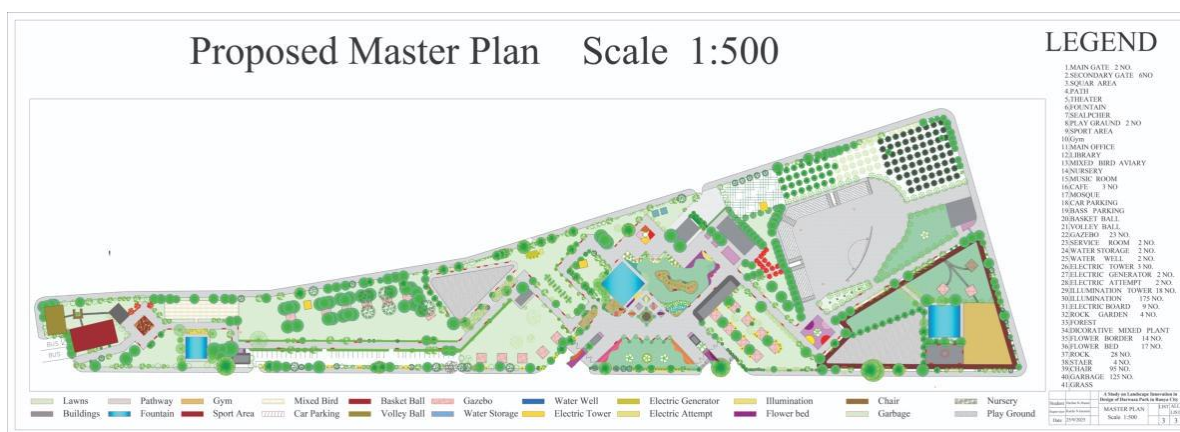


Figure 5. New Master Plan of Drwaza Park

However, with regard to climatic and soil test (Table 1, 2) from Drwaza Park, appropriate plant species been chosen for the location, ensuring optimum development and sustainability as shown in (Table 3).

Table 3: Selected New Plant Varieties for the New Master Plan at Darwaza Park

Scientific Name	English Name	Kurdish name
A. Trees		
<i>Acacia SP</i>	Wattle and mimosa	نەكاسیا
<i>Callistemon viminalis</i>	Bottlebrush	فلچه شووشه
<i>Carpinus betulus</i>	Hornbeam	نارومند
<i>Cercis siliquastrum</i>	Judas tree	نەرخەوان
<i>Cupressus arizanica</i>	Arizona Cypress	سەرۆو زیوین
<i>Cupressus arizonica "pyramidal"</i>	Arizona Cypress	سەرۆو زیوین هەرمی
<i>Cupressus sempervirens "pyramidal"</i>	Italian Cypress	سەرۆو هەمیشە سەوز هەرمی
<i>Cupressus sempervirens "Horizontal"</i>	Italian Cypress	سەرۆو هەمیشە سەوز
<i>Fraxinus SP</i>	Ash. European ash	بناو
<i>Fraxinus SP</i>	Ash. European ash	بناو
<i>Hibisens syriacus</i>	Rose of Sharon	نەسرین
<i>Laurus nobilis</i>	Bay laurel	غار
<i>Lagerstroemia indica</i>	Crape myrtle	دار قاوه
<i>Ligustrum japonicum</i>	Japanese privet	لانگستروم
<i>Magnolia grandiflora</i>	Southern Magnolia	مەگنولیا
<i>Melia azadirach</i>	China berry tree	دار نەسبیح
<i>Morus platanifolia "fruitless"</i>	Fruitless Mulberry	دار تو بی بەر
<i>Olea europaea "bonsai"</i>	Olive Bonsai	ز میتون بۆنسای
<i>Pinus brutia</i>	Turkish pine	سنەوبەری زاوینە
<i>Platanus orientalis</i>	Oriental plane	جنار
<i>Phoenix dactylifera</i>	Date palm	دار خورما
<i>Pistacia SP</i>	Chinese pistachio	دار فستەق
<i>Populous alba L.</i>	White poplar	سپیدار زیوی
<i>Populous nigra L.</i>	Black poplar	سپیدار
<i>Robinia pseudoacacia</i>	lack locust	رۆبینیا
<i>Ulmus Japonica</i>	Japanese elm	ئەلمەس
<i>Washingtonia robusta</i>	Mexican Fan Palm	واشنتونیا
B. Shrubs		
<i>Berberis thunbergii</i>	Japanese barberry	بەربەریس
<i>Buxus microphylla "pyramidal"</i>	Boxwood	بۆکسەس هەرمی
<i>Buxus microphylla</i>	Boxwood	بۆکسەس
<i>Cycas circinalis</i>	Queen Sago	سایکس
<i>Euonymus japonicus</i>	Japanese spindle tree	شمشاد
<i>Juniperus * media "old gold"</i>	Juniper 'Old Gold'	جاننپیتەرس
<i>Jasminum officinalis</i>	Jasmine	یاسەمین
<i>Lavandula angustifolia</i>	English lavender	لافەندەر
<i>Myrtus communis</i>	Common myrtle	مۆرتیک
<i>Pinus mugo</i>	Mountain pine	
<i>Photinia * fraseri "mini stand"</i>	Red Robin	فاتونیا
<i>Pyracantha Navaho</i>	Navaho Firethorn	گیوژی زینە

<i>Rosmarinus officinalis</i>	Rosemary	روزماری
<i>Thuja orientalis</i> "pyramidalis"	Golden Pyramid Thuja	ثویا هیرمیی
<i>Viburnum lucidum</i>	Laurustinus	
C: Succulen		
<i>Agave angustifolia</i>	Caribbean agave	
<i>Agave potatorum</i>	Butterfly Agave	
<i>Aloe vera</i>	Aloe vera	
<i>Carnegiea gigantean</i>	Saguaro	
<i>Kroenleinia grusonii</i>	Golden barrel cactus	
<i>Opuntia ficus-indica</i>	Prickly pear	
<i>Sempervivum tectorum</i>	Houseleek	
<i>Trichocereus macrogouns</i> var. <i>pachanoi</i>	San Pedro cactus	
<i>Yucca elephantipes</i>	Spineless Yucca	
<i>Yucca faxoniana</i>	Faxon yucca	
<i>Yucca glauca</i>	Soapweed Yucca	
D: Flower		
<i>Rosa banksiae</i>	Lady Banks' rose	
<i>Rose</i> "baby"	Baby rose	
<i>Rose</i> "BM"	BM rose	
<i>Rosa damascene</i>	Damask rose	
<i>Rose</i> "mini"	Miniature Rose	
<i>Rosa</i> sp.	Rose	
E: Perennial		
<i>Dahlia pinnata</i>	Dahlia	
<i>Narcissus poeticus</i>	Daffodil	
<i>Tulip</i> sp.	Tulip	
F: Annual		
<i>Canna indica</i>	Indian shot	
<i>Cosmos bipinnatus</i>	Cosmos	
<i>Geranium dissectum</i>	Cutleaf Crane's-bill	
<i>Verbena hybrid</i>	Verbena	
<i>Zinnia elegans</i>	Zinnia	
G: Grass		
<i>Calamagrostis acutiflora</i>	Feather reed grass	
<i>Cortaderia sellona</i>	Pampa's grass	
<i>Pennisetum alopecuroides</i>	Fountain grass	
<i>Pennisetum staceum</i> "rubrum"	Purple fountain grass	
<i>Lolium perenne</i> "Esquire"	Perennial Ryegrass	
<i>Poa pratensis</i> "Evora"	Kentucky Bluegrass	
<i>Festuca arundinacea</i> "Tomahawk"	Fescue	
<i>Festuca arundinacea</i> "straletta"	Tall fescue	
<i>Cynodont dactylon</i>	Bermuda grass	

The (Table 4) displays demographic information of the 155 participants who completed the questionnaire for the research on Darwaza Park in Ranya.

The majority of participants were male (66.5%), while females comprised 33.5%, showing a predominance of men among park visitors or survey responses. The predominant age group was 31–40 years (47.1%), followed by 41–50

years (20%) and 21–30 years (16.1%). Visitors under 20 constituted 9.7%, and those aged 51–60 represented 7.1%. surprising by, no participants exceeded 61 years of age.

The majority of respondents were married (70.3%), whilst 29.7% were single. This may indicate that the park is often used by families. The majority of participants had a bachelor's degree (36.8%), but a significant percentage earned a diploma (31%). Individuals without formal education constituted 20%, while 12.3% of the respondents had advanced academic qualifications, including master's or doctoral degrees.

Table 4. Demographic Characteristics of Participants in the Darwaza Park Questionary (n = 155)

Details		Percentage of Participation
Gender	Male	66.5%
	Female	33.5%
Age	Under 20 years	9.7%
	21-30 years	16.1%
	31-40 years	47.1%
	41-50 years	20%
	51-60	7.1%
	above 61 years	0%
Social Status	Married	70.3%
	Single	29.7%
	non-educated	20%
Level of Education	Diploma	31%
	Bachelor	36.8%
	Higher degree (Master/PhD)	12.3%

This chart (6.A) illustrates the frequency of park visits among 155 respondents, revealing that only 12.9% visit the park daily, whilst 27.7% do so weekly. A marginally smaller portion, 26.5%, engages in monthly visits, while the predominant group, 32.9%, indicated infrequent excursions. The data indicate that although a segment of the population exhibits regular visitor patterns, the majority utilize the park intermittently, underscoring opportunities to promote more frequent participation. Likewise, the image (6.B) indicates that 31% of participants allocate less than one hour in the park, while the predominant group, 69%, remains for more than one hour.

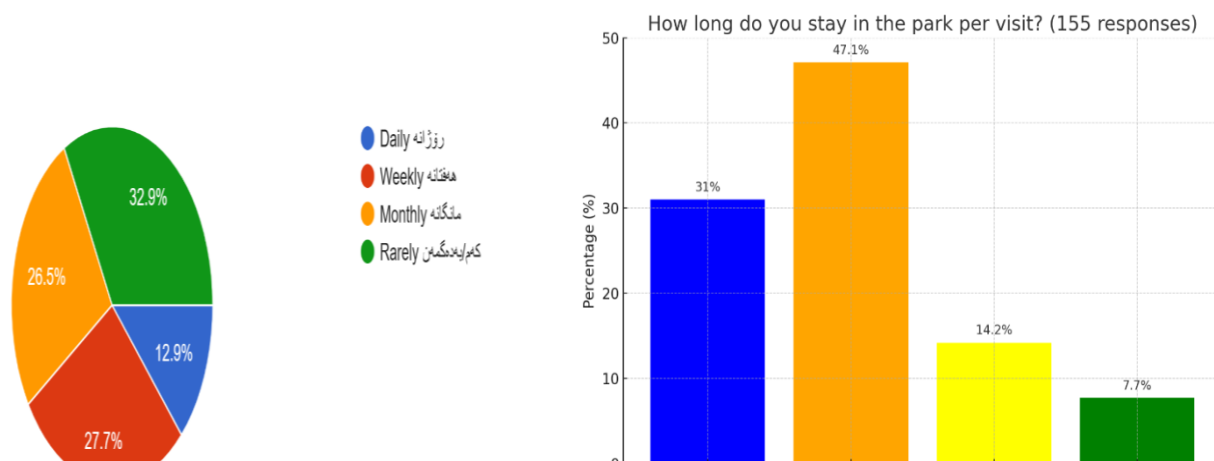


Figure 6. A. Frequency of Park Visit & Figure 6.B. Duration of Time Spent in the Park by Visitors

The chart (7) describes the preferences of visitors about the sort of vegetation. Blossoms are the preferred choice, selected by 45.8% of participants, whereas trees rank closely, with 36.1% of respondents indicating a desire for more shade-providing and ecologically advantageous vegetation. Moreover, 15.5% of individuals like shrubs, and grasses separately.

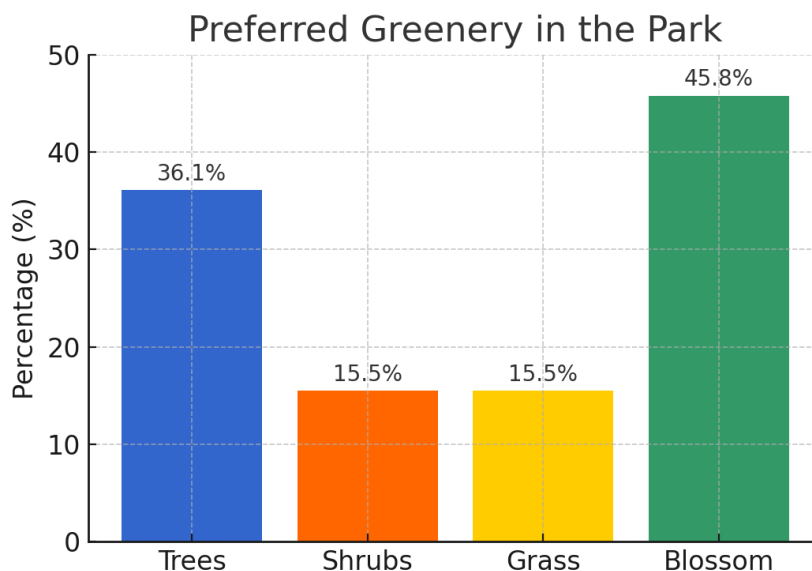


Figure 7. Visitor Preferences for Types of Vegetation in the Park

The graphic in shown (8) concern is on the deficiency of shaded spaces, noted by 32.9% of respondents. Inadequate irrigation systems account for 29.7%. Insufficient seating is a notable deficiency, identified by 27.1% of respondents. Ultimately, 10.3% cited awkward paths, potentially impacting accessibility and overall visitor experience. The findings conclude the need of enhancing shade, irrigation, and seats to improve the park experience.

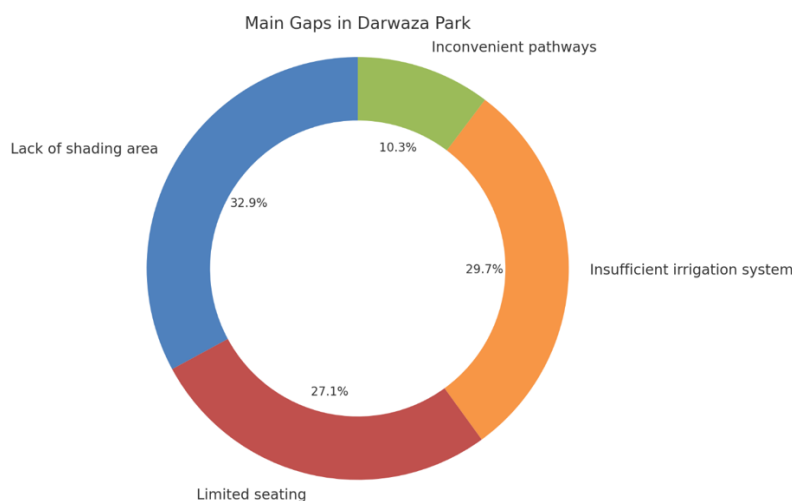


Figure 8. Primary Deficiencies Identified by Visitors in Darwaza Park

The chart (9) shows the significance ratings for six essential elements: (Shade/Gazebo/Shelters, Seating Area, Pathways, Green Space, Lighting, and Irrigation System). The majority of respondents (110) ranked Shade. The Seating area and lighting had a similar pattern, with around 100 replies. Pathways received somewhat fewer (82) evaluations than shade and seats, however still maintained a robust majority in that classification. (118) comment green space has become a paramount concern. The Irrigation System received (110) answers. All six traits were highly preferred, with "very important" being the predominant selection in every category.

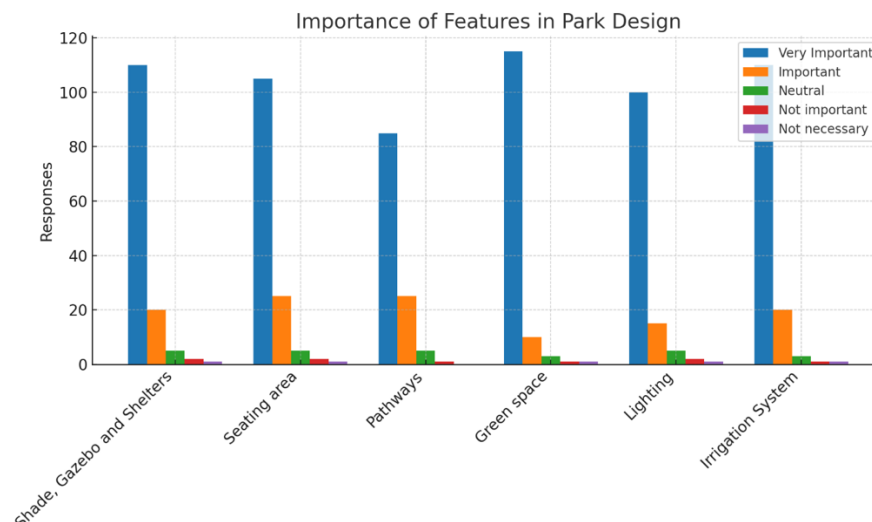


Figure 9. Visitor Importance Ratings for Key Park Design Elements in Darwaza Park

Conclusion

Efficient maintenance of urban greenery is crucial for preserving the ecological integrity of public gardens. Landscape design of Darwaz Park in Ranya is illustrated through background knowledge, questionnaire as well as the real need for area deficiencies of its current design, including insufficient softscaping, hardscaping, accessibility, and vital facilities. The study has highlighted the necessity for innovation in park design to enhance utility, use, and ecological equilibrium. A detailed master plan for the best of our knowledge was presented to rectify these weaknesses by using modern landscaping methods and necessary amenities. Such design may be used as basis for furthermore park development in the Kurdistan region, and other parts of Middle East.

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تقييم متعدد المعايير Landscape وإعادة تطوير حديقة دروازة في مدينة رانيا: خطة رئيسية مستدامة

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الخلاصة

تشير المساحات الخضراء في أي مكان عمومًا إلى تكامل العناصر الطبيعية، بما في ذلك الأشجار والشجيرات والأعشاب والزهور، مما يعزز التوازن البيئي والقيمة الجمالية وجودة الحياة بشكل عام. وتعد الحدائق العامة، على سبيل المثال، مناطق ترفيهية حيوية لسكان المدن، حيث تُحسن الصحة البدنية والنفسية. وقد خُصصت هذه الدراسة لوضع خطة رئيسية جديدة لإعادة تنظيم المساحات الخضراء وإعادة تأهيل حديقة دروازة في رانيا، بإقليم كردستان العراق، لتواكب التطورات الحديثة في المدينة. تمتد حديقة دروازة على مساحة 50570 مترًا مربعًا في رانيا، وتُعد حديقة عامة رئيسية تُبرز أهمية المساحات الخضراء في المناطق الحضرية، إلا أنها تعاني من قصور كبير في التصميم. تهدف هذه الدراسة إلى تقييم الوضع الحالي للحديقة، وتحديد أوجه القصور في تصميمها، واقتراح أفكار لتحسين وظائفها واستخدامها. وتشمل الأهداف الرئيسية معالجة أوجه القصور في تنسيق المساحات الخضراء، وتنسيق المساحات غير الطبيعية، والتجهيزات الحضرية، وعدم كفاية إمكانية الوصول لمختلف المستخدمين. استخدم البحث مناهج متعددة، شملت تحليل التربة، وتقييم البيانات المناخية، وتقييمات المناظر الطبيعية، واستبيانات المسح. ولأول مرة في المدينة، تم تحليل البيانات المناخية المحلية، وإجراء مسح كمي شمل 155 زائرًا للحديقة لتقييم احتياجات المستخدمين. أشارت النتائج إلى نقص كبير في المناطق المظللة (تغطي 15% فقط من المساحة الإجمالية) ونظام ري غير فعال. وكشف تحليل التربة عن ارتفاع مستويات الرقم الهيدروجيني (pH) وتماسكها، مما يحد من تنوع أنواع النباتات. علاوة على ذلك، أعرب 78% من المستخدمين عن عدم رضاهم عن التجهيزات الحضرية الحالية وسهولة الوصول. بناءً على هذه النتائج، تقترح الدراسة خطة رئيسية جديدة تدمج حلولاً مستدامة للمساحات الخضراء والصناعية، مما يحسن التوزيع المكاني والمرونة البيئية. ويُعد هذا التجديد نموذجًا استراتيجيًا لتطوير المساحات الخضراء الحضرية في المنطقة.

الكلمات المفتاحية: Landscape، المنتزهات العامة، المستدامة، منتزه دروازة، رانيا.