# STUDIES ON ENVIRONMENTAL, URBANIZATION, AND LANDSCAPE

**EDITORS:**
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**Assoc. Prof. Dr. Kübra YAZİCİ**

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Head of the Department of Landscape Architecture,
Faculty of Agriculture, Yozgat Bozok University

Kübra YAZICI was born in Van in 1987. She graduated from Atatürk University, Faculty of Agriculture, Department of Landscape Architecture, in 2008. In 2011, she completed her Master's degree at Van Yüzüncü Yıl University, Institute of Science, Department of Horticulture, with her thesis titled "Adaptation of Silver Birch (Betula pendula Roth.) to the Ecological Conditions of Lake Van."In 2015, she earned her Ph.D. from Ege University, Institute of Science, Department of Landscape Architecture, with her thesis titled "*Analysis of the Ornamental Plants Sector under the Ecological Conditions of Tokat Province and Determination of Suitable Production Areas Using GIS*."

From 2012 to 2015, she worked as a Research Assistant in the Department of Horticulture, Faculty of Agriculture, Tokat Gaziosmanpaşa University. Between 2015 and 2020, she served as an Assistant Professor in the same department. Since 2020, she has been working as an Associate Professor in the Department of Landscape Architecture at Yozgat Bozok University, where she also serves as the Head of the Department of Landscape Architecture and a Senate Member of Yozgat Bozok University.

Assoc. Prof. Dr. Kübra YAZICI has taken active roles in the scientific and organizing committees of international and national conferences, congresses, and symposiums, including chairing several congresses. She has published numerous articles in indexed journals and presented many papers both nationally and internationally.

Kübra YAZICI, who is fluent in English, is married and has two children. She currently works as the Head of the Department of Landscape Architecture at the Faculty of Agriculture, Yozgat Bozok University.

**Prof. Dr. Bahriye GÜLGÜN**
Faculty Member, Department of Landscape Architecture
Faculty of Agriculture, Ege University

Born in 1967 in İskenderun, Prof. Dr. Bahriye GÜLGÜN graduated from the Department of Landscape Architecture, Faculty of Agriculture, Ege University, in 1988. She completed her master's degree in 1992 at Ege University's Graduate School of Natural and Applied Sciences, Department of Landscape Architecture, with her thesis titled *"Studies on Methods to Obtain Continuously Flowering Plants Under Regional Conditions Using the Photoperiodic Responses of Kalanchoe blossfeldiana (V. Poelln)."* She earned her Ph.D. in 1997 from the same institution, with her dissertation titled *"Investigating the Possibilities of Growing and Producing Eustoma grandiflorum (Raf.) Shin as a Cut Flower and Potted Plant in the İzmir Region,"* thus obtaining the title of Doctor of Science.

From 1993 to 2001, she served as a Research Assistant in the Department of Landscape Architecture at Ege University's Faculty of Agriculture. Between 2001 and 2009, she worked as an Assistant Professor in the same department. From 2010 to 2015, she held the title of Associate Professor, and since 2016, she has been working as a Professor.

Prof. Dr. Bahriye GÜLGÜN has actively participated in numerous national and international scientific events in the field of landscape architecture. She has served on the scientific and organizing committees of various international and national conferences, congresses, and symposiums. Additionally, she has taken on editorial roles, served as a member of editorial boards, and acted as a peer reviewer for various academic journals. Her work includes articles published in indexed journals, internationally refereed conference papers, and authorship of professional and academic books in the field of landscape architecture.

Since 2013, she has led numerous social responsibility projects within the scope of the *Community Service Activities* lesson at Ege University, earning various awards for her efforts. She is proficient in English.

# PREFACE

Dear readers,

The quality of society life changes along with the development of science, therefore; the studies that contribute to this development emerge with a combination of scientific thoughts and research methods. This may well explain why most of the studies are carried out in the field of landscape architecture. Landscape Architecture discipline, which plays an important role in studies such as nature conservation, biological restoration, urban and rural use planning, includes design and landscaping studies for the organization of spaces in the immediate environment of people.

Landscape architects introduce artistic and scientific principles as well as new insights into the planning, design, management, building conservation and restoration, and natural environments. As a consequence, Landscape architecture is in a strategic position among all scientific fields that work with a focus on sustainable environment with climate change. The direction of research has also altered with the changing environment. In the studies, the concept of sustainability has been discussed from different perspectives.

This book, published in December 2024, encompasses chapters on the relationship between the landscape and the city by Turkish researchers who are experts in Landscape Architecture. The topics of the chapters are; Climate Change in Cities, Therapeutic Recreation, sustainability, Ecological Approaches in Cities, Urban Ecosystems, Land Readjustment, Socıal Infrastructure in Urban Qualıty of Lıfe, Landscape Archıtecture in The Dıgıtal Age, Programming Models Used In Plant Design Concept of Temporary Space, and Application Examples, Changing and Developing City Structure, and Recycling Park. All these issues are important for the environment, urbanization, and landscape.

For this reason, I hope that the book we have prepared will be useful for users.

We thank Turkish landscape architect academicians who contributed to the book. The Landscape and The City, to our valuable scientists who supported them with their professional experiences, and to İksad Publishing employees who contributed to the publication process.

**Editors**

Prof. Dr. Bahriye GÜLGÜN

Assoc. Prof. Dr. Kübra YAZICI

# CHAPTER 1

## INVESTIGATING ALTERNATIVE WATER SOURCES IN DENSELY POPULATED URBAN AREAS

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## INTRODUCTION

Water, which emerged with the formation of the Earth and predates human history, is a renewable resource. Ulusoy (2007) has revealed that the oldest known rocks on Earth, located in Greenland's Isua region, contain water that is approximately 3.8 billion years old. About two-thirds of the Earth's surface is covered with water. Of the water present on Earth, 97.5% is saltwater, while the remaining 2.5% is freshwater. Of this freshwater, 2% is found in glaciers in polar regions, and only 0.5% is readily accessible for use. The scarcity of potable water is one of the most significant challenges faced today.

A portion of the water needed on Earth is supplied by rainfall and snowmelt. Globally, runoff from rain and melting snow constitutes a significant part of the Earth's water mass movements. However, due to factors such as unsustainable usage, climate change, environmental pollution, rapid population growth, wars, and unplanned migrations, the amount of available water is rapidly depleting. Sahin and Manioglu (2011) stated that securing potable and usable water, as well as meeting the water demands in agricultural and industrial sectors, is becoming increasingly challenging for countries. Additionally, water scarcity is exacerbated by the unequal distribution of water resources among regions based on population density. Turkey, along with regions like the Middle East and North Africa, is among the areas with the lowest per capita water availability in the world. According to Maden (2011), the water shortages in the Middle East, in particular, have heightened the strategic importance of water, leading to international conflicts.

In the last century, global water consumption has increased sixfold. Changes in consumption habits, along with economic and industrial developments, and unplanned population growth, have driven water demand to rise by approximately one percent annually, and it is projected to continue increasing significantly over the next 20 years. Kooy et al. (020) concluded that this trend plays a crucial role in shaping the economic and political policies of countries.

The high cost of methods to obtain clean water and the limited availability of freshwater resources have driven people to seek alternative solutions. Despite the rising water demand alongside population growth, it is not feasible to increase the desired clean water resources. Consequently, Asano

and Levine (1996) claimed that the search for alternative water sources has become a critical issue in many countries.

Policies aimed at minimizing water consumption, particularly in wealthy nations, are focused on conserving potable water resources. İnci et al. (2011) stated that these targeted policies have led to the improvement and widespread adoption of water conservation technologies worldwide in recent years. Currently, due to the economic challenges associated with desalinating seawater, collecting rainwater has become a cost-effective, reliable, and accessible method for obtaining usable water. As water scarcity intensifies, societies are increasingly turning to alternative water sources and prioritizing efforts to minimize water consumption. Santos et al (2017) claimed that rainwater harvesting contributes to water conservation by reducing the use of available water resources. In water-rich countries, rainwater is used to recharge groundwater to ensure sustainable management of water sources. In water-scarce regions, on the other hand, the use of rainwater contributes to savings on municipal water supply.

The centralized and densely packed nature of urban developments has led to several significant challenges. Existing building stocks are often unsuitable for the integration of rainwater harvesting systems and necessary plumbing modifications. Additionally, there is a public reluctance to use collected rainwater, further compounded by the increasing disappearance of green spaces due to the proliferation of concrete structures. As a result, the ground's water absorption capacity has nearly diminished, exacerbating water management issues. These problems continue to escalate over time.

To mitigate these issues, numerous ideas and projects are being proposed and implemented under the concept of 'sponge cities.' Sponge cities aim to enhance urban water management through innovative design and infrastructure solutions that increase the ground's water absorption capacity and utilize rainwater more effectively. This study specifically examines the feasibility of implementing rooftop water collection systems in densely populated areas. By assessing current water needs and projecting future demands based on population growth, the study proposes solutions that consider the structural integrity of buildings. The goal is to capture rainwater on rooftops and reintegrate it into the surrounding soil, thereby enhancing water conservation and management in urban environments

## METHODOLOGY

Each country typically has a municipal or governmental agency dedicated to collecting and analyzing statistical data related to population demographics. This data includes important metrics such as population changes over a span of time—whether from ten years ago or projections for ten years into the future—as well as the current and anticipated numbers of men and women in a given area. These statistics are essential for urban planning, resource allocation, and policy-making.

In Turkey, the Turkish Bank of Provinces (İller Bankası) plays a crucial role in this context. It is commonly utilized to estimate population figures for specific regions and time frames. The projections provided by the Turkish Bank of Provinces are widely used in planning and decision-making processes at both the local and national levels, helping to inform infrastructure development, public services, and economic strategies. The accuracy and reliability of these estimates are vital for effectively addressing the needs of Turkey's diverse and rapidly changing population.

When assessing water demand, it is crucial to accurately project the future population growth and design infrastructure that meets these anticipated needs. This approach is necessary to ensure that the constructed facilities will remain adequate for many years, minimizing the need for future modifications or rehabilitation. To achieve this, population estimates are often calculated using the Turkish Bank of Provinces Method, a widely recognized technique in Turkiye for projecting population figures. This method provides a formula that is instrumental in planning and designing long-lasting infrastructure that can accommodate population changes over time. The specific formulation used in this method is as follows:

$$P = 100 * \left( \left( \sqrt[a]{\frac{N_y}{N_e}} \right) - 1 \right) \quad (1)$$

where

$P$ : Growth rate factor

$N_y$ : Current population

$N_e$: Previous population

$a$ : Year difference between current and previous

If the growth rate factor exceeds 3, it is rounded down to 3. If the growth rate factor is less than 3, the calculated value is accepted as the growth rate factor and is used in the subsequent population projection formula. The population projection formula is as follows:

$$N_n = N_y * \left(1 + \frac{\mathrm{P}}{100}\right)^{35+n} \quad (2)$$

where

$N_n$ : Future projection of population

$n$ : The number of years for which the projection is desired

As the population in the region increases, the pressure on infrastructure and water distribution systems also intensifies, leading to a rise in water waste and loss. Additionally, population density increases the demand for water and complicates the efficient use of existing water resources. When these factors are combined, the per capita water consumption also tends to increase. In Table 1, the per capita water consumption determined by the Turkish Bank of Provinces based on population density is presented.

**Table 1:** The per capita water consumption determined by the Turkish Bank of Provinces

| Population | Water Consumption (lt/day/person) |
|---|---|
| ≤ 3,000 | 60 |
| 3,001 – 5,000 | 70 |
| 5,001 – 10,000 | 80 |
| 10,001 – 30,000 | 100 |
| 30,001 – 50,000 | 120 |
| 50,001 – 100,000 | 170 |
| 100,001 – 200,000 | 200 |
| 200,001 – 300,000 | 215 |

The Gould and Nissen formula is commonly applied to estimate the potential for rainwater collection from building roofs. An analysis of building stock in Turkiye reveals that most roofs are sloped, and their surface areas can typically be determined by calculating the projected triangular area. Figure 1 illustrates the technical drawing and calculation method for an example

building roof, providing a detailed approach for determining rainwater harvesting potential. The Gould and Nissen formula is presented as;

$$S = R\ x\ A\ x\ Cr \tag{3}$$

where

S : Rainwater harvesting potential
R : Total Rainfall during the period
A : Projected Area
Cr : Runoff coefficient

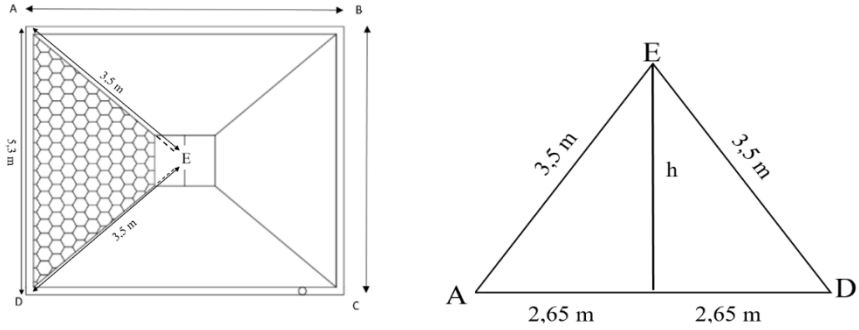


**Figure 1:** The technical drawing and calculation method for an example building roof

The area of a triangle, where the height is determined using the Pythagorean theorem, can be calculated by multiplying the base length by the height and then dividing the result by two. For a roof consisting of four triangular projections, the total roof area can be determined by multiplying the area of a single triangle by four. Once the roof area is established, the potential rainwater harvest from the structure can be calculated using Equation 3. After estimating the rainwater harvesting potential, the location and capacity of the storage unit are determined based on the building's structural analysis. In a zero-energy green building concept, it is preferred to place rainwater storage units on the roof, utilizing gravitational force for water distribution. However, any planned structure on the roof must first undergo a structural analysis, as legally required. Structural analysis software such as SAP2000 considers live

and dead loads, along with snow, wind, and seismic loads, providing users with detailed information through various load combinations. This ensures that any additional weight, such as a rainwater tank, is within the building's structural capacity and meets safety standards.

## CASE STUDY

The Villakent residential area, located in the Menemen district of İzmir, has been selected as the case study site. This region is characterized by a high population density and significant slopes, making water supply feasible only through deep drilling or by sourcing water from the nearby river. The primary aim of this study is to determine the 10-year water demand of the residents in the area and explore the extent to which rainwater harvesting systems can be implemented across buildings to contribute to groundwater recharge.

As part of the analysis, it is first essential to determine the population growth rate in Villakent. Given that Villakent has only undergone significant development in the past 10-20 years, relying on early population data might yield inaccurate results. For this reason, population data for the most recent two years was extracted from the Turkish Statistical Institute system. The data shows that in 2021, Villakent had a population of 2,136, which increased to 2,471 by 2023. Based on this data, the population growth rate can be calculated using Equation 1, as demonstrated below:

$$P = 100 * \left( \left( \sqrt[a]{\frac{N_y}{N_e}} \right) - 1 \right) = 7.556 \quad (4)$$

While this calculation is based on data from the last two years, the rapid growth of the region is clearly evident. As noted in the methodology section, if the population growth rate exceeds 3, it should be adjusted to a maximum of 3. Therefore, for this analysis, we will assume a growth rate of 3 to estimate the potential population of Villakent over the next 10 years. Accurately predicting population projections for future years is vital, particularly for countries already experiencing water stress, as it plays a key role in effective urban planning and sustainable water management strategies. The projected population for Villakent in 10 years can be calculated using Equation 2, as shown below:

$$N_n = N_y * \left(1 + \frac{P}{100}\right)^{35+n} \approx 9{,}344 \quad (5)$$

Following the calculation of the projected population for the next 10 years, we can determine the per capita water demand using Table 1 and subsequently estimate the total water requirement for the region. As indicated in Table 1, in areas with a population between 5,001 and 10,000 people, the per capita water demand is estimated at 80 liters per day per person. Based on these figures, the projected annual water demand for the Villakent settlement 10 years from now is approximately 272,845 tons. As illustrated in Figure 2, the Villakent settlement spans an area of roughly 2 million square meters.

**Figure 2:** The area of Villakent settlement

Alkan (2023) highlights that the soil composition in the Villakent settlement predominantly consists of Miocene-aged limestone. Soils derived from limestone generally exhibit excellent drainage properties, allowing water to rapidly permeate into the deeper layers of the soil. However, this characteristic also significantly reduces the soil's capacity to retain moisture, which is crucial for sustaining local vegetation and groundwater recharge.

As shown in Figure 3, the slope gradient in the Villakent area varies between 20% and 30%. This steep gradient, combined with the efficient

drainage associated with limestone soils, results in a reduced capacity for water retention within the basin. Consequently, the rapid runoff and limited infiltration lead to a decrease in locally available water resources, thereby intensifying the need for alternative water sources. The inclination of the terrain and the resulting drainage challenges underscore the importance of strategic water management practices in regions like Villakent, where conventional water resources are insufficient to meet the growing demand.

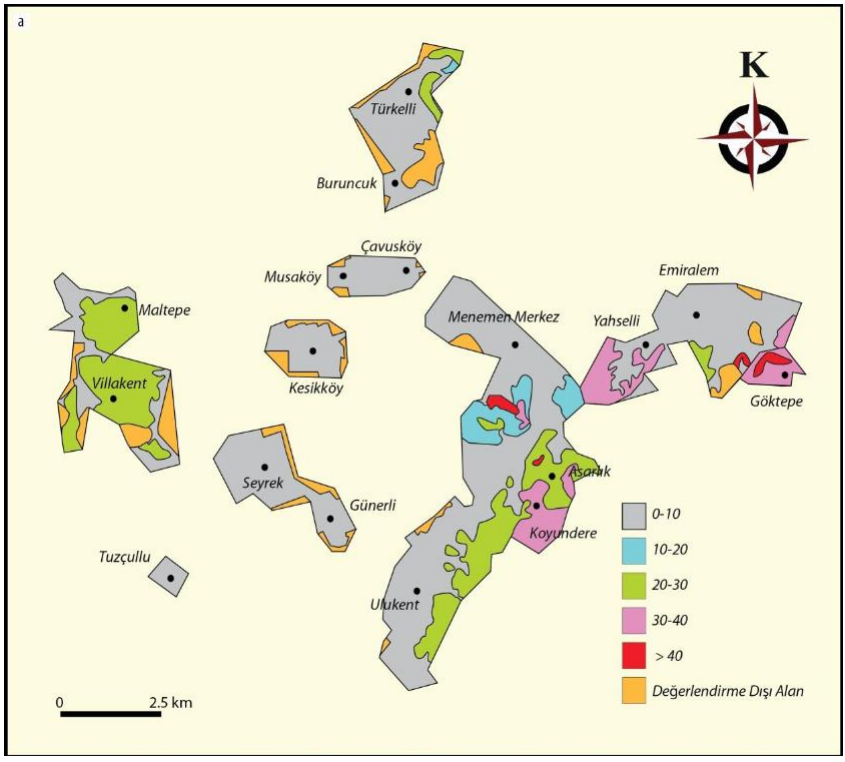


**Figure 3:** The topographic map of Menemen district (Alkan (2023).

In the initial project design, the settlement was planned to cover 2 million square meters with 2,000 villas, aiming to accommodate a population of 5,000 residents. The design allocated 60 square meters of green space per person. Based on this projected population, the annual water demand is estimated at 127,750 tons, as indicated in Table 1. Correspondingly, the designated green area within the settlement was planned to cover 300,000 square meters. By applying this figure in conjunction with Equation 3, the average rainwater

harvesting potential for this green space can be calculated. Assuming the region's annual average rainfall is 700 mm and applying a coefficient of 0.7 for a moderately maintained garden, it is estimated that approximately 147,000 tons of rainwater could be harvested annually. This calculation suggests that the project was initially conceived to be largely self-sufficient in terms of its water requirements.

However, given the current population of 2,471 residents, the Villakent settlement is nearing its design capacity. Although it currently maintains a sustainable water management system, the rapid population growth observed suggests that the settlement may exceed its intended capacity within the next decade. This underscores the importance of adaptive planning and sustainable resource management as the population continues to grow, necessitating the exploration of additional water sources and more efficient usage strategies to ensure long-term viability.

## CONCLUSION

The Villakent residential area in Menemen, İzmir, presents a unique case for evaluating sustainable water management practices in rapidly growing urban regions. With a steep population growth rate, driven by recent development, it is crucial to reassess the area's long-term water demand and supply. This study highlights the critical need for integrating advanced water resource strategies, such as rainwater harvesting, to supplement conventional water supply methods, particularly as deep drilling or river-based water sourcing becomes increasingly insufficient.

The study demonstrates that Villakent's population is projected to grow significantly over the next decade, increasing the total water demand to approximately 272,845 tons annually. Given the region’s Miocene-aged limestone soil composition and steep topography, natural groundwater recharge is limited, as the highly permeable soil and steep slopes contribute to rapid runoff and poor water retention. These conditions emphasize the necessity of alternative water collection methods.

Rainwater harvesting emerges as a promising solution to mitigate the region's water challenges. The initial design of Villakent, with green spaces covering 300,000 square meters and a potential rainwater harvesting capacity of 147,000 tons per year, was largely self-sufficient for its originally planned

population. However, with the current population nearing 2,471 and expected to more than double within the next decade, the settlement risks exceeding its water capacity. This rapid population growth highlights the need for adaptive, forward-thinking planning to maintain sustainable water supplies.

The findings underscore that while Villakent's initial infrastructure was designed for sustainability, population growth may soon outpace the existing water management system's capabilities. This raises concerns about the region's long-term water security. Therefore, implementing rainwater harvesting on a larger scale, improving water conservation practices, and exploring additional water resources are critical steps toward ensuring the settlement's viability. The case study of Villakent serves as an important model for other rapidly expanding urban areas facing similar challenges, illustrating the need for adaptive water management strategies in the face of population growth and environmental constraints.

Ultimately, this study demonstrates that proactive planning, combined with sustainable water management strategies like rainwater harvesting, is essential to address the water needs of expanding urban settlements like Villakent. Without strategic interventions, the settlement may face water shortages, necessitating a shift toward more integrated, resilient water supply solutions.

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# CHAPTER 2

## PERCEPTIBILITY CHANGES OF IMAGES IN URBAN SILHOUETTES: IZMIR*

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**Description:** This part of the book is summarised from a master's thesis.Karadan D., Evaluation of the place of urban images in the city skyline through history: Izmir city case, Ege University Graduate School of Natural and Applied Sciences.

## INTRODUCTION

City silhouettes provide visual insight into urban landscapes, aiding in perceiving city elements and connections. Urban images, crucial to the silhouette, reflect cities and vary in historical and cultural significance by location, becoming emblematic.

The study analyzes changes in urban image visibility shaping the urban silhouette and its spatial dimension. Silhouette views of a specific region were assessed over two time periods, supported by descriptive analyses and a survey involving experts from various disciplines. The research investigates alterations in the visibility of significant urban images within the silhouette of the chosen region across the two time periods.

In conclusion, the study highlights significant changes and diversification in urban silhouette images, with a general decrease in perceptibility of unchanged images. Additionally, there's a noted rise in elements negatively impacting the urban silhouette, notably the dominance of tall buildings over other structures.

## 1. CONCEPTUAL FRAMEWORK

Cities, as complex systems constantly undergoing change and development, shape the cultural, economic, and social relations of societies (Cullen, 1971). They possess unique elements and symbolic details, showcasing their dynamism and diverse characteristics (Lynch, 1960; Altuntaş, 2016). In an effort to create distinctiveness and identity, cities strive to establish their own images by associating their names with these elements and symbolic details (Özdemir and Karaca, 2009). The concept of image, which emerged in the early 1960s (Eraydın, 2016) and can be defined as a representation formed in the mind of concrete and abstract information about the environment (Özdemir, 2011), holds significant importance in understanding and defining the environment-human relationship, shaping physical and psychological behaviors, and strengthening feelings of belonging to the city (Eraydın, 2016). The occurrence of an imaginative association is related to the thoughts developed towards the observed entity as a result of observations. Fundamentally, humans have a desire to perceive the physical environment they inhabit (Dülger Türkoğlu, 2002). Urban silhouettes facilitate the reading

of elements related to the environment in broad perspectives to aid environmental perception.

While silhouette generally refers to views depicted with single-color outlines, for cities, it also encompasses representations or photographs where colors are prominent. These representations or photographs enable the creation of a mental image of the city by allowing all components of the city to be read at once (Gül and Şevkin, 2017). From an architectural perspective, the urban silhouette is defined as the representation and perception of the city through elements located on the horizon line and converging in a panoramic manner on the plane of the picture, forming the physical environment (Altınışık, 2016; Arslan, 2019). According to Kozaman (2007), the urban silhouette, which enables the visual comprehension of the city, facilitates the perception of spatial elements involved in the formation of the city and the relationships between these elements. Thus, the urban silhouette contains data not only about physical characteristics but also about cultural and social characteristics (Akarsu, 2009). In this context, urban silhouettes, which embody historical and cultural accumulation and emerge as visual compositions, provide a reference for creating a lasting visual impact on the environment (Bostancı, 2008).

In this context, urban silhouettes, as a strong expression of urban identity, are a distinctive element in the recognition of cities since they are unique for each city (Arslan, 2019). Therefore, one of the important building blocks of city silhouettes, which are influenced by the physical environment, are structures that dominate the cityscape and provide a sense of location. These structures play a crucial role in marketing cities on international platforms, highlighting local values in a globalized world, and in terms of competition between cities. These points, which can also be described as sign elements, are images entrenched in urban memory that influence the perception of cities, such as urban entrances, squares, significant buildings, and streets. In urban memory, structures generally perceived on a historical and monumental scale stand out as strong images (Akarsu, 2009). According to Griouard (1985), urban silhouettes take shape with dominant structures and are accumulations of various processes (Kostof, 1991; Akarsu, 2009). In this regard, it is possible to say that natural, cultural, social, spatial, and temporal changes are influential in the formation and development of urban silhouettes. Urban silhouettes are a composite created by these factors (Kozaman, 2007).

The starting point of this research is to identify urban images within urban silhouettes and to elucidate the changes in their perceivability over the historical process. In this context, the area between the İzmir Kordon Officer Army House and the Historical Elevator in the Konak district of İzmir province was selected as the research area. The research examines the spatial changes and development of İzmir city, starting from the pre-Republic period and continuing to the present day. Elements that have become emblematic of the city's image over time were identified, and the changes in the perceivability of these identified urban images throughout the historical process were scrutinized.

## 2. MATERIALS AND METHODS

### 2.1. Materials

The study area is located in the Konak district, which serves as the city center of İzmir province. İzmir Bay marks the western boundary of the study area, while Kadifekale lies at its eastern boundary. In delineating the study area's boundaries, the coastline was used for the western boundary, and the area's elevation status, as indicated on the topographic map, was considered for the eastern boundary. The Izmır Kordon Officer House (Dr. Mustafa Enver Bey Street) is situated at the northern boundary of the study area, while the Historical Elevator (Dario Monero Street) is positioned at the southern boundary (Figure 1).

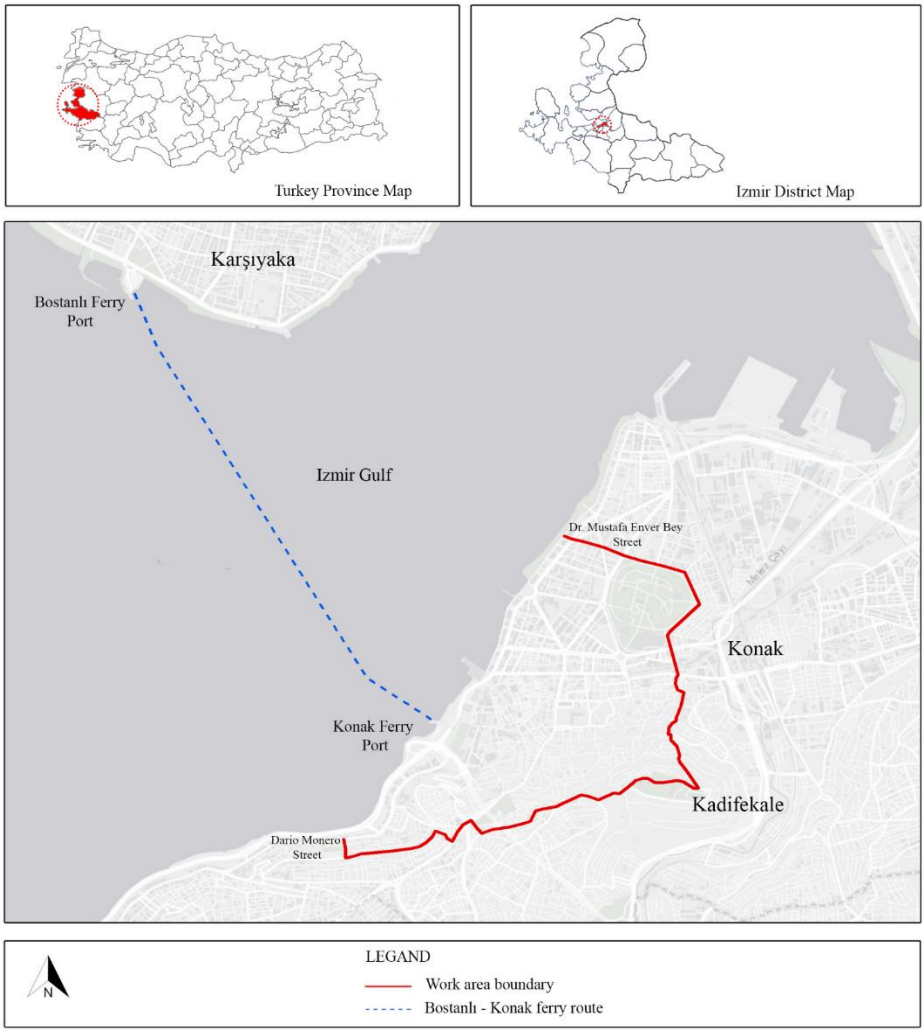


**Figure 1:** Location of the research area

The silhouette of the area located between the İzmir Kordon Officer Army House and the Historical Elevator, as seen from the Bostanlı-Konak ferry route, facing towards Konak over the sea, along with panoramic details related to the silhouette, is shown in Figure 2.

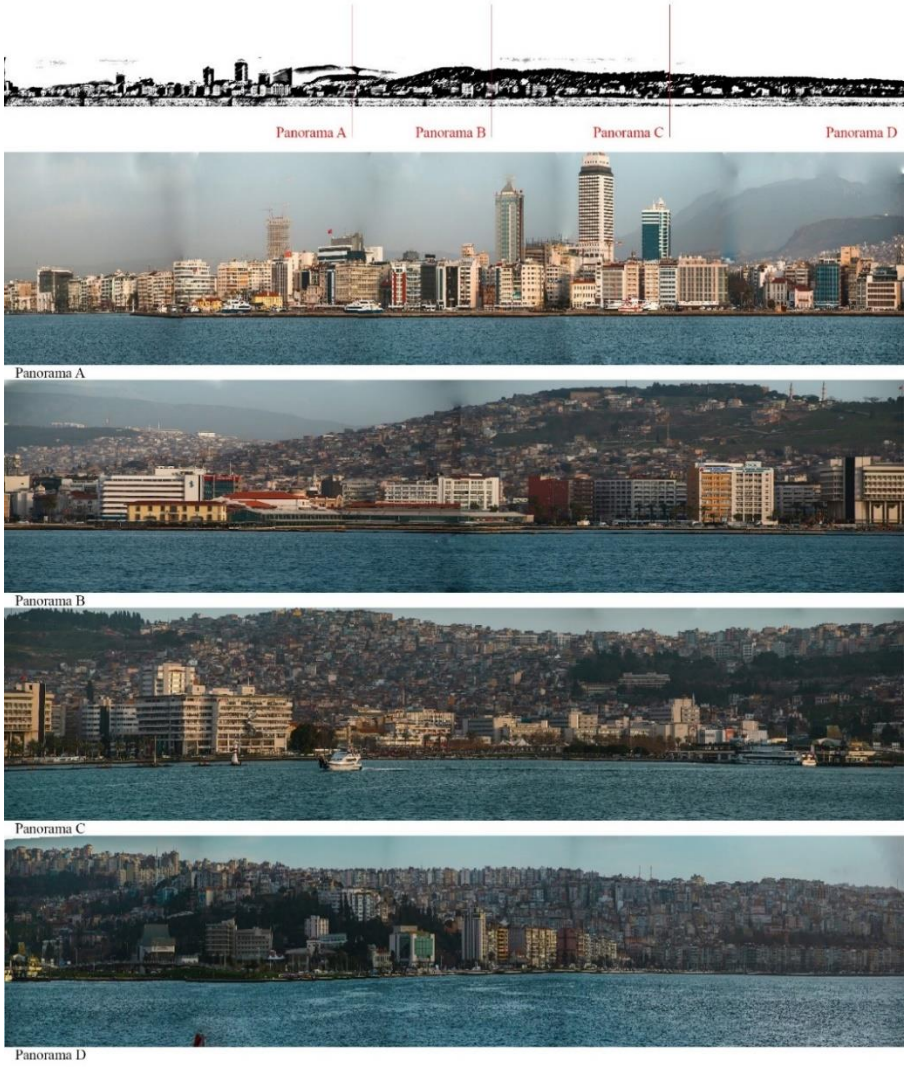


**Figure 2**: Details regarding the silhouette and panoramic view of the research area

Since the relocation of İzmir's urban settlement to Kadifekale, the research area has served as the primary hub of city life. Over time, it has seen the intensive development of historical, cultural, and commercial structures that have had a significant influence on the city as a whole. As a result, this area has functioned as a bustling city center catering to various needs, spanning from ancient times to the present day.

The selection of the area between Izmir's Kordon Officer Army House and the Historical Elevator as the focus of research is based on several significant factors:

- Its status as one of the oldest settlements in Izmir, indicating its historical importance.
- Its central location, serving as a focal point for centuries due to the city's relocation to Kadifekale and its expansion towards the harbor area.
- Its rich historical and cultural heritage, witnessing centuries of changes and developments.
- Its role as a thriving commercial center for many years, serving as the gateway to Europe from the Aegean Region.
- Its profound historical significance, bearing the marks, culture, and history of numerous civilizations due to past power struggles, all of which are vividly reflected in the area.

These selections provide a robust foundation for comprehensive research into the area's multifaceted history and significance.

## 2.2. Methods

The methodological flow of the research consists of four stages. Firstly, a review of the literature was conducted, and the selection of the research area was made. At this stage, the research hypothesis was formulated, and the research framework was established. In the data collection and processing stage, the research method and evaluation criteria for the method were determined. This stage includes elucidating the historical and spatial development of the research area, identifying the urban images in the area, determining their perceptibility, and questioning the changes in their perceptibility over time. An original survey form suitable for the research framework was created for the survey to be conducted with the expert group selected based on the criteria determined for the coverage. The selected expert group was composed of professionals from different disciplines working on urban studies and visual arts, employing a multidisciplinary approach (Figure 3).

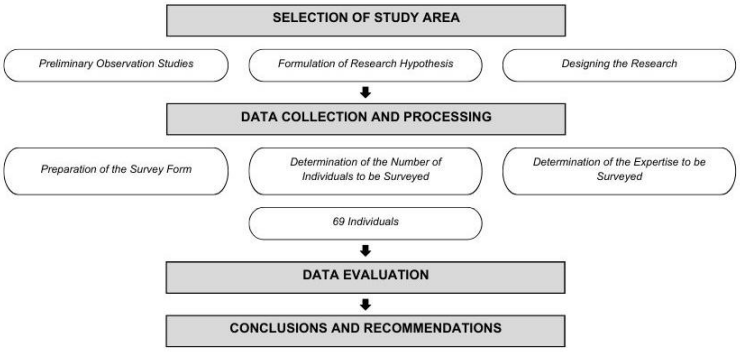


**Figure 3:** Methodology of the study

The determination of the number of experts to be surveyed took into account their diverse professional backgrounds. Based on the number of graduates from universities and/or faculties in Izmir in 2019, and considering a 90% confidence interval and a 10% margin of error, the calculated number of experts to be surveyed was determined to be 69. Accordingly, the survey was conducted with 13 landscape architects, 12 architects, 11urban planners, 8 surveyors, 8 civil engineers, 4 archaeologists, 4 photographers, 3 sociologists, 3 historians, 2 geographers, and 1 art historian.

In preparing the survey forms for the research, we consulted references from Aksoy (2009), Altuntaş (2016), and Sakıcı (2017) to create an original survey form tailored to the purpose and scope of the research. The survey included both open-ended and closed-ended (rating scale) questions directed towards the participating experts.

Finally, statistical analyses were conducted on the surveys, and the findings were interpreted to conclude the research. Subsequently, recommendations were developed based on the results.

## 3. RESULTS

### 3.1. General Informations

The validity and reliability analysis of the 75-item scale used in the research was examined by a statistical expert using Cronbach's Alpha coefficient, and it was found to have a high level of reliability.

Firstly, the demographic characteristics of the experts were determined. Gender, age, education level, and duration of residence in Izmir of the participant experts are presented in Table 1. Additionally, it is observed that 81.17% of the experts reside in central districts of Izmir, while 11.6% live in non-central districts such as Torbalı, Urla, Menderes, Aliağa, Bergama, and Karaburun.

**Table 1:** Demographic data of experts

| **DEMOGRAPHIC DATA** | **RANGE** | **NUMBER** | **RATE** |
|---|---|---|---|
| Gender | Female | 35 | 51.00 |
| | Male | 34 | 49.00 |
| Age | Under 30 years old | 47 | 68.11 |
| | 30-39 | 8 | 11.59 |
| | 40-49 | 5 | 7.25 |
| | 50-59 | 4 | 5.80 |
| | 60 years and older | 5 | 7.25 |
| | **Minimum: 22** | **Maksimum: 64** | **Average: 32** |
| Education | Bachelor's degree | 44 | 63.77 |
| | Master's degree | 15 | 21.74 |
| | Doctorate | 9 | 13.04 |
| | - | 1 | 1.45 |
| Length of Residence | Since birth | 26 | 37.68 |
| | 0-5 years | 9 | 13.04 |
| | 5-10 years | 17 | 24.64 |
| | 11-15 years | 3 | 4.35 |
| | 16-20 years | 11 | 15.94 |
| | 20 years and over | 3 | 4.35 |
| | **Minimum: 3** | **Maksimum: 58** | **Average: 21** |

*"-" Not specified*

The initial step to assess experts' familiarity with the research area and their perspectives regarding it involved presenting panoramic images depicting the current urban silhouette. Using these images as a reference, experts were asked to evaluate the significance of the area, identify images associated with the city within its boundaries, and evaluate the importance of these images for Izmir.

**Table 2:** Importance level of the research area

| | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| | **Lowest** | **Low** | **Medium** | **High** | **Highest** | **No Idea** |
| Importance Level | 2.90 | 2.90 | 2.90 | 37.68 | 53.62 | 0.00 |

According to the data presented in Table 2, 91.3% of the experts consider the area to be important. Furthermore, when categorizing images associated with the city within the research area, historical structures prominently emerge. Additionally, detailed information about the images categorized within each category can be found in Table 3. These images were analyzed in an open-ended manner, with participants providing multiple images in their responses. Based on the responses, each image was segmented into percentage slices within its category. Upon examining the categorized images, the Clock Tower stands out in historical buildings, the Hilton Hotel in skyscrapers, high-rise and massive structures, the Pasaport Ferry Port in public and institutional buildings, the Arkas Art Center in private or privatized buildings, and the Kordon in landscape elements, open, and green spaces.

**Table 3:** Images associated with the city in the research area

| **CATEGORIES** | **RATE** | **IMAGES** | **RATE** |
|---|---|---|---|
| - | 2.07 | - | 100 |
| | | **Total** | **100** |
| Historical Buildings | 44.51 | - | 5.42 |
| | | Clock Tower | 28.68 |
| | | Historical Elevator | 17.06 |
| | | Konak Pier | 17.06 |
| | | Kadifekale | 13.95 |
| | | Izmir Government Mansion | 6.20 |
| | | Kemeraltı Bazaar | 5.42 |
| | | Hans and passages | 2.32 |
| | | Great Kardıçalı Han | 1.56 |
| | | Konak (Waterside) Mosque | 1.56 |
| | | Agora Ruins Site | 0.77 |
| | | **Total** | **100** |
| High&Massive Structures | 3.10 | Hilton Hotel | 100 |
| | | **Total** | **100** |
| | 34.13 | Pasaport Ferry Port | 22.23 |

| | | | |
|---|---|---|---|
| | | Izmir Metropolitan Municipality Building | 11.11 |
| | | Konak Ferry Port | 10.10 |
| | | Izmir State Theatre Konak Stage | 9.09 |
| | | Ege University Atatürk Cultural Center | 7.07 |
| | | Izmir Stock Exchange Palace | 7.07 |
| | | Izmir Chamber of Commerce Building | 6.06 |
| | | Izmir Girls' High School | 5.05 |
| | | Izmir Kordon Officer House | 4.04 |
| | | Izmir Museum | 3.03 |
| | | Izmir State Opera and Ballet, Elhamra Stage, and National Library | 2.02 |
| | | Kantar Police Station | 2.02 |
| Public&Institutional Buildings | | Izmir Provincial Directorate of Culture and Tourism Building | 2.02 |
| | | Izmir Central Bank Building | 2.02 |
| | | Dokuz Eylül University Rectorate Building | 1.01 |
| | | Ege Obstetrics and Gynecology Training and Research Hospital Konak | 1.01 |
| | | General Directorate of Foundations Izmir Regional Directorate Building | 1.01 |
| | | Izmir Karataş High School | 1.01 |
| | | Social Security Institution Building | 1.01 |
| | | Izmir Provincial Police Headquarters Building | 1.01 |
| | | Turk Telekom Regional Directorate Building | 1.01 |

| | | | |
|---|---|---|---|
| | | **Total** | **100** |
| Private/Privatized Structures | 5.16 | Arkas Art Center | 46.66 |
| | | Sabancı Cultural Center | 13.33 |
| | | İş Bank Building | 13.33 |
| | | French Cultural Center | 6.67 |
| | | New Karamursel Building | 6.67 |
| | | Ege Palas Hotel | 6.67 |
| | | Swissotel Grand Efes | 6.67 |
| | | **Total** | **100** |
| Landscape Elements, Open and Green Spaces | 11.00 | Kordon | 31.26 |
| | | Cumhuriyet Square | 31.26 |
| | | Varyant | 9.37 |
| | | Konak Square | 6.25 |
| | | Kültürpark | 6.25 |
| | | Bahribaba Park | 6.25 |
| | | Pagos Mountain | 3.12 |
| | | Alsancak | 3.12 |
| | | Atatürk Monument | 3.12 |
| | | **Total** | **100** |

*"-" Not specified*

According to the participating experts, the structures they associate with the city are important for the following reasons:

- They are accumulative elements in terms of historical, cultural, and social aspects,
- They play a role in the spatial development process of the city and are effective symbols in the formation of the city's identity and memory,
- Due to their high recognizability and visibility, they are important for providing promotion, location, and orientation information for Izmir.

Since the research focuses on the changes in the city silhouette from the pre-Republic period to the present day, the subsequent sections of the study include various analyses and comparisons.

## 3.2. Pre-Republic Period

Pre-Republic Period silhouette images were identified and evaluated in terms of their perceptibility in the period panorama using a perceptibility evaluation scale. Accordingly, the urban image with the highest perceptibility,

at 79.7%, was determined to be the "Customs Building ", while the urban image with the lowest perceptibility, at 62.32%, was the "Izmir Prison" (Table 4).

**Table 4:** The perceptibility of the images in the city silhouette before the pre-Republic Period

| | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| **IMAGES** | **Lowest** | **Low** | **Medium** | **High** | **Highest** | **No Idea** |
| Kadifekale&Pagos Mountain | 4.35 | 4.35 | 24.65 | 39.12 | 27.53 | 0.00 |
| Clock Tower | 13.05 | 13.05 | 23.19 | 17.39 | 31.87 | 1.45 |
| Izmir Government Mansion | 5.80 | 13.05 | 30.42 | 26.08 | 24.65 | 0.00 |
| Sarıkışla | 15.95 | 15.95 | 31.87 | 17.39 | 17.39 | 1.45 |
| Customs Building | 2.90 | 4.35 | 13.05 | 36.22 | 43.48 | 0.00 |
| Elevator | 4.35 | 5.80 | 11.60 | 34.77 | 43.48 | 0.00 |
| Pasaport | 2.90 | 4.35 | 15.95 | 44.93 | 31.87 | 0.00 |
| Konak Mosque | 10.14 | 24.65 | 21.73 | 27.53 | 14.50 | 1.45 |
| St. Rock Hospital&Monastery | 10.14 | 29.00 | 18.83 | 26.08 | 14.50 | 1.45 |
| Izmir Prison | 20.29 | 42.03 | 17.39 | 10.14 | 7.25 | 2.90 |
| Aya Fotini Church | 10.14 | 18.83 | 23.19 | 24.65 | 20.29 | 2.90 |
| Konak Square | 2.90 | 7.25 | 17.39 | 33.34 | 36.22 | 2.90 |
| French Consulate | 5.800 | 10.14 | 21.75 | 36.22 | 15.95 | 10.14 |
| Civil Architectural Structures | 2.90 | 5.80 | 15.94 | 27.53 | 44.93 | 2.90 |
| Izmir Gureba-i Müslimin Hospital | 15.95 | 30.42 | 20.29 | 21.74 | 8.70 | 2.90 |
| Izmır Chamber of Commerce | 10.14 | 8.70 | 23.19 | 40.57 | 13.05 | 4.35 |
| Izmir Theater | 7.25 | 18.83 | 29.00 | 24.64 | .18.83 | 1.45 |
| Izmir Sports Club | 13.05 | 39.12 | 26.08 | 13.05 | 4.35 | 4.35 |
| Mosques | 5.80 | 14.50 | 29.00 | 30.42 | 18.83 | 1.45 |
| Baths | 13.05 | 27.53 | 33.32 | 11.60 | 11.60 | 2.90 |

Subsequently, within the same panorama, the notable features and elements adversely affecting the city silhouette during the pre-Republic period were examined. The remarkable features in the city silhouette during this period included monumental structures, residential and religious buildings, public and institutional structures, landscape elements, and open green spaces. The

primary monumental structures included the "Clock Tower", while residential and religious buildings featured "yalıs", public and institutional structures included the "Elevator", and landscape elements and open green spaces included the "Pagos Mountain".

When examining the factors negatively affecting the city silhouette during the period, the majority of participating experts stated that there was no significant negative influence on the silhouette. However, some observed drawbacks were noted. These included informal settlements resembling shantytowns, unplanned and irregular urbanization, continuous rows of adjacent residential buildings, overcrowding and excessive construction, buildings extending over the sea, unused or idle land areas.

The participating experts generally evaluated the city silhouette during the pre-Republic period as attractive, complex, original, dense, lively, and disorderly (Table 5).

**Table 5:** General perceptions of the pre-Republic Period city silhouette

| | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| | **Strongly Disagree** | **Disagree** | **Undecided** | **Agree** | **Strongly Agree** | **No Idea** |
| Appealing | 5.80 | 17.39 | 21.73 | 44.93 | 8.70 | 1.45 |
| Complex | 1.45 | 11.60 | 11.60 | 53.61 | 18.84 | 2.90 |
| Green | 11.60 | 33.31 | 29.00 | 17.39 | 5.80 | 2.90 |
| Original | 5.80 | 15.94 | 23.19 | 39.12 | 13.05 | 2.90 |
| Intense | 0.00 | 5.80 | 11.60 | 49.27 | 27.53 | 5.80 |
| Lively | 2.90 | 7.25 | 13.05 | 60.85 | 13.05 | 2.90 |
| Natural | 13.05 | 21.73 | 30.44 | 21.73 | 11.60 | 1.45 |
| Regular | 18.84 | 59.41 | 11.60 | 7.25 | 0.00 | 2.90 |

### 3.3. Present

Similar to the analysis conducted on the silhouette of the pre-Republic Period, the urban images identified in the present silhouette were listed, and their visibility was assessed using a scale of evaluation with expert participants. In this context, the urban image with the highest visibility, at a rate of 88.40%, was determined to be the "Hilton Hotel," while the urban image with the lowest visibility, at a rate of 47.82%, was the "Şadırvanaltı Mosque" (Table 6).

**Table 6:** The perceptibility of the images in present city silhouette

| IMAGES | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| | **Lowest** | **Low** | **Medium** | **High** | **Highest** | **No Idea** |
| Kadifekale ve Pagos Mountain | 10.14 | 8.70 | 21.73 | 27.53 | 24.65 | 7.25 |
| Clock Tower | 7.25 | 14.50 | 21.73 | 18.84 | 31.88 | 5.80 |
| Izmir Government Mansion | 10.14 | 15.94 | 14.50 | 26.09 | 27.53 | 5.80 |
| Konak Pier | 2.90 | 4.35 | 10.14 | 34.78 | 42.03 | 5.80 |
| Historical Elevator | 11.60 | 20.29 | 20.29 | 14.50 | 27.52 | 5.80 |
| Pasaport Ferry Port and Kantar Police Station | 2.90 | 5.80 | 17.39 | 29.00 | 33.31 | 11.60 |
| Konak (Waterside) Mosque | 10.14 | 30.41 | 29.00 | 8.70 | 13.05 | 8.70 |
| Izmir State Theatre Konak Stage | 2.90 | 17.40 | 26.09 | 30.41 | 17.40 | 5.80 |
| Great Kardıcalı Han | 2.90 | 40.59 | 27.52 | 10.14 | 7.25 | 11.60 |
| Izmir Museum | 5.80 | 24.61 | 29.00 | 17.39 | 14.50 | 8.70 |
| Izmir Girls' High School | 5.80 | 20.29 | 39.12 | 11.60 | 15.94 | 7.25 |
| Arkas Art Center | 4.35 | 8.70 | 34.77 | 26.09 | 15.95 | 10.14 |
| Cumhuriyet Square | 2.90 | 5.80 | 23.19 | 33.32 | 26.09 | 8.70 |
| Izmir Stock Exchange Palace | 5.80 | 14.50 | 33.34 | 27.52 | 10.14 | 8.70 |
| Hilton Hotel | 2.90 | 0.00 | 2.90 | 26.09 | 62.31 | 5.80 |
| Swissotel Grand Efes | 4.35 | 2.90 | 8.70 | 33.32 | 43.48 | 7.25 |
| Passtel Mall | 8.70 | 15.94 | 39.12 | 13.05 | 10.14 | 13.05 |
| Heris Tower | 4.35 | 10.14 | 26.08 | 29.00 | 21.73 | 8.70 |
| Konak Square | 2.90 | 7.25 | 29.00 | 24.62 | 26.09 | 10.14 |
| Bahribaba Park | 4.35 | 17.39 | 29.00 | 27.51 | 13.05 | 8.70 |
| General Directorate of Foundations Izmir Regional Directorate | 8.70 | 14.50 | 33.30 | 29.00 | 7.25 | 7.25 |
| Hisar Mosque | 14.5 | 30.42 | 26.09 | 15.94 | 5.80 | 7.25 |
| Şadırvanaltı Mosque | 13.05 | 34.77 | 31.88 | 8.70 | 4.35 | 7.25 |
| Ziraat Bank Building | 5.80 | 23.18 | 26.09 | 23.18 | 13.05 | 8.70 |
| Afyon Han | 11.60 | 29.00 | 33.31 | 10.14 | 2.90 | 13.05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Türkiye Maritime Company | 2.90 | 18.82 | 29.00 | 23.18 | 14.50 | 11.60 |
| DoubleTree by Hilton | 0.00 | 8.70 | 18.84 | 36.22 | 24.64 | 11.60 |
| The Old Monopoly Building | 10.14 | 24.65 | 39.13 | 5.80 | 10.14 | 10.14 |
| Mahall Bomonti | 5.80 | 15.94 | 24.64 | 20.29 | 21.73 | 11.60 |
| Izmir Chamber of Commerce Building | 0.00 | 10.14 | 17.39 | 39.13 | 23.20 | 10.14 |
| Movenpick Hotel&Resorts | 4.35 | 2.90 | 17.39 | 40.58 | 24.64 | 10.14 |

In the current city silhouette, the most notable elements consist of skyscrapers, high-rise and massive buildings, historical structures, public and institutional buildings, landscaping features, open and green spaces, and residential fabric. The key highlights include the "Hilton Hotel" among skyscrapers, high-rise, and massive buildings, "Konak Pier" within historical structures, the "Izmir Metropolitan Municipality Building" among public and institutional buildings, "Bahribaba Park" within landscaping features, open and green spaces, and "shanty-type construction" within the residential fabric.

According to expert, the factors negatively affecting the present city silhouette are as follows:

- Skyscrapers, high-rise, and massive buildings
- Haphazard urbanization
- Increased urbanization and incongruous building forms
- Crowded, dense, and suffocating urban appearance
- Some public and institutional buildings
- Use of tinted glass and reflective exterior cladding in buildings
- Intensive contiguous development along the coastline
- Destruction of green areas, imbalance between buildings and green areas
- Commercial use of ground levels in coastal residences for different purposes
- Declared as deteriorated or demolished old buildings.

The expert participants generally evaluated the present city silhouette as complex, dense, artificial, and irregular (Table 7).

**Table 7:** General perceptions of the present city silhouette

| | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| | **Strongly Disagree** | **Disagree** | **Undecided** | **Agree** | **Strongly Agree** | **No Idea** |
| Appealing | 7.25 | 31.87 | 20.28 | 29.00 | 4.35 | 7.25 |
| Complex | 0.00 | 1.45 | 8.70 | 50.71 | 29.00 | 10.14 |
| Green | 14.50 | 52.16 | 14.5 | 7.25 | 1.45 | 10.14 |
| Original | 8.70 | 33.34 | 31.87 | 14.50 | 1.45 | 10.14 |
| Intense | 1.45 | 1.45 | 8.70 | 40.58 | 37.68 | 10.14 |
| Lively | 4.35 | 8.70 | 15.94 | 56.52 | 4.35 | 10.14 |
| Natural | 13.05 | 43.48 | 23.19 | 10.14 | 0.00 | 10.14 |
| Regular | 26.08 | 43.48 | 13.05 | 5.80 | 1.45 | 10.14 |

## 3.4. Comparisons Regarding the Pre-Republic Period and Present City Silhouettes

In the continuation of the research, comparisons were made to reveal spatial changes and perceptions regarding these changes. At this stage, various generalizations and adjectives were made regarding the silhouettes to evaluate comprehensive perspectives on the two periods. Subsequently, similarities and differences between the two periods were examined (Table 8).

**Table 8:** Similarities and differences between the pre-Republic Period and present city silhouette

| **SIMILARITY** | **RATE** |
|---|---|
| No similarity | 10.13 |
| Some (historical) structures (Konak Pier, Clock Tower, Elevator, etc.) | 23.19 |
| Ferry Terminals | 11.60 |
| The irregular and haphazard urbanization increasing towards the foothills of Pagos Mountain | 11.60 |
| The weakening of the connection between the city and the sea due to intense urbanization around the port and coastline | 11.60 |
| Kadifekale and its surroundings | 11.60 |
| Coastline | 10.13 |
| Topographic structure | 4.35 |
| Contiguous orderly structures | 2.90 |
| The area's centralization / attractiveness to the city center | 2.90 |
| **DIFFERENCE** | **RATE** |
| No idea | 10.13 |
| Building heights | 43.48 |

| | |
|---|---|
| Spread-out structures causing disharmony (slum development and vertical construction) | 20.29 |
| Lost, degraded, and diminished greenery | 11.60 |
| The suppression of assets with historical and cultural value among other structures and elements | 7.25 |
| Void and occupancy ratios | 5.80 |
| Mosques | 1.45 |

## 3.5. Opinions Regarding Some Given Propositions

To ascertain the current situation and identify elements to be considered in future steps, participant experts were provided with some propositions regarding the current state of the research area, including building densities, architectural features of buildings, floor heights, colors and textures, cultural and historical activities, and the balance between buildings and greenery (Table 9).

**Table 9:** Opinions about some of the given propositions

| PROPOSITIONS | RATING SCALE | | | | | |
|---|---|---|---|---|---|---|
| | **Strongly Disagree** | **Disagree** | **Undecided** | **Agree** | **Strongly Agree** | **No Idea** |
| I would like the building densities to change. | 2.90 | 2.90 | 2.90 | 42.03 | 47.82 | 1.45 |
| I would like the building forms to change. | 0.00 | 7.25 | 10.14 | 44.93 | 34.78 | 2.90 |
| I would like the building floor heights to change. | 2.90 | 4.35 | 5.80 | 34.77 | 47.83 | 4.35 |
| I would like the colors and textures of the buildings to change. | 0.00 | 4.35 | 18.84 | 44.93 | 27.53 | 4.35 |
| I would like the buildings not to conceal the prominent cultural and historical heritage of the city. | 1.45 | 0.00 | 1.45 | 26.09 | 68.11 | 2.90 |

| | | | | | | |
|---|---|---|---|---|---|---|
| I would like the balance between buildings and greenery to change. | 1.45 | 1.45 | 1.45 | 23.19 | 68.11 | 4.35 |

## 4. DISCUSSION AND CONCLUSIONS

In this study, the changes in the visibility of urban images within the silhouette of the region between Izmir Kordon Officer and the Historical Elevator axis, as seen from the Bostanlı-Konak ferry route towards Konak, have been examined over the historical period. The survey findings have been analyzed individually and comparatively. Based on the data obtained, solution proposals regarding the research area have been developed.

The research area is the most prominent and recognizable reflection of the city's rich cultural heritage. It is also at the focal point of urban life, making its importance extremely high. However, due to intense urbanization pressure, the research area has lost its dynamics and turned into a depressed area. In this area, where horizontal development opportunities are limited, vertical development is rapidly becoming more prevalent. Accordingly, approaches that will improve the quality of urban life should be pursued, and the boundaries of this already diminished area should not be further stretched. To ensure that the identity elements in the city silhouette do not lose their value and that historical and cultural heritage is preserved and reflected, development and transformation activities compatible with the urban fabric and potentials should be carried out. In this regard, it is necessary to prepare urban plans and projects that take into account the development and transformation of the area.

The structures identified with the city include historical buildings, public buildings, landscaping elements along with open and green spaces, private buildings, and skyscrapers. The images associated with these structures are respectively the Clock Tower, Pasaport Ferry Port, Kordon, Arkas Art Center, and Hilton Hotel. Especially the Clock Tower and Kordon are highly recognizable images in the city's memory. The city's association with the Clock Tower, the prominent visibility of the Hilton Hotel's tall structure from many points in the city, the Pasaport and Kordon area being one of the city's most important and popular recreational areas as a whole, and the Arkas Art Center providing various contributions to the city despite its personalized structure with historical and architectural features are the main reasons for the

prominence of these images. At the heart of the importance of these images associated with the city in the research area lies their status as historical, cultural, and social artifacts, their active witness to the spatial development process, and their role as influential urban symbols in the formation of the city's memory.

When the pre-Republic period and present city silhouettes are comparatively examined in the research area, it is evident that there are clear similarities and differences shaping the silhouette. Especially the images shaping the silhouette have undergone changes both structurally and in terms of visibility. In the evaluation process, in addition to many variables, many buildings suffered damage, became unusable, or were demolished due to the fire the city experienced in 1922. Primarily due to this reason and some misguided decisions and practices, structures identified in the pre-Republic period city silhouette such as Sarı Kışla, Izmir Prison, İzmir Theater, İzmir Sports Club, baths, etc., are among the city images that cannot sustain their existence today.

There are many images that persist between the pre-Republic period and present city silhouettes but whose visibility has changed over time. When evaluated proportionally, the images experiencing a decrease in visibility are, in order, the Historical Elevator, Konak (Waterside) Mosque, Konak (Atatürk) Square, Pasaport area, Kadifekale, Arkas Art Center, and Konak Pier. The Historical Elevator, originally a prominent landmark serving transportation and scenic functions, was one of the city's important landmarks. However, changes in its proximity to the sea over time and its gradual overshadowing by other structural elements are the main reasons for the decrease in visibility. Today, thanks to the dense greenery in its vicinity, the Historical Elevator can be perceived from the sea surface. The location of the Konak Mosque on a transit axis in the city square and its surrounded by tall and massive structures have diminished its visibility. Konak (Atatürk) Square, Pasaport area, and Arkas Art Center also experience decreased visibility. These images being situated along a transit axis along the Kordon and being subject to the pressure of dense and dynamic structures (high-rise buildings, taverns, cafes, restaurants, etc.) containing reflective surfaces, advertisement boards, etc., could explain the decrease in their visibility. Kadifekale has lost its connection with the city center over time. Despite various efforts to reconnect it with the city and

revitalize it, these efforts have proven to be insufficient. Konak Pier, deviating structurally and functionally from its pre-Republic period appearance, has transformed into a shopping center and almost become ordinary. However, despite the decrease in its visibility, it still stands out among the city's highly visible structures due to its location, historical, and architectural features. When evaluated proportionally, the structures whose visibility has increased are, in order, the Government Building and the Clock Tower. The Clock Tower's visibility and popularity have increased due to its use as a promotional icon for the city. Therefore, it is located at the forefront of the city's first points of contact. The Government Building also complements the view as it is visible behind the Clock Tower when looking at the city silhouette, and it stands out among the images with increased visibility due to its historical texture.

Since the other structures identified in the present city silhouette did not exist in the pre-Republic period, no evaluation has been made regarding these structures. The structure with the highest visibility in the present city silhouette of the research area is the Hilton Hotel. When the images in the present city silhouette are evaluated individually, it is noticeable that the visibility of the assets other than high-rise buildings is generally low. This situation is due to the rapid, irregular, and vertical urbanization pressure.

The noteworthy elements of the city, including historical buildings, public and institutional structures, residential and religious buildings, and landscaping elements, show similarities between the pre-Republic period and the present silhouette. However, there have been differences in the attractiveness of these elements. There is an observed increase in the attractiveness of historical and monumental structures. This is due to the increasing historical and cultural accumulation over time. On the other hand, there is a decrease in the attractiveness of public buildings. This can be attributed to the departure from the care and aesthetic understanding shown in construction towards a focus solely on function in modern times. The increase in the attractiveness of residential fabric is mainly attributed to the undeniable forms of skyscrapers and high-rise buildings. The decrease in the attractiveness of religious buildings is similar to the reasons mentioned above, as the increasing prevalence of high-rise building forms reduces the visibility of these structures in the silhouette. Additionally, there is also a decrease in the attractiveness of landscaping elements and open and green spaces. This is a

result of the loss of the balance between voids and solid elements due to increasing building density.

In the pre-Republic period silhouette, there were few elements considered to have a negative impact other than informal settlements and irregular and haphazard urbanization. However, the region of Pagos Mountain and its slopes, where informal settlements and irregular urbanization were observed, stands out as one of the most prominent points in terms of topography. Therefore, the negativities in this area directly catch the eye and disrupt the silhouette. Looking at the present silhouette, there is an increase in elements that negatively impact the silhouette. Foremost among these are skyscrapers/high-rise and massive buildings. These structures, with their vertical forms and mass dominance, attract attention and suppress other elements of the city, ultimately being defined as structures that negatively affect the city silhouette. Among these structures, particularly Hilton Hotel and Heris Tower stand out. Their location in the city center contributes to their prominence. Irregular urbanization, increasing construction, and the emergence of incompatible building forms lead to distortions in the silhouette and the appearance of a crowded, dense, and suffocating urban view. Especially, the rapidly increasing use of filmed glass and reflective facade claddings in high-rise buildings attracts attention, overshadowing other elements. Additionally, the adjacent layout of coastal residences hinders the penetration of the unique sea breeze, known as the "imbat" wind, which is essential for macroclimate and bioclimatic comfort, into the city's coastal areas.

When questioning whether there is a statistically significant difference between the general opinions expressed regarding the pre-Republic period and present city silhouette, we found that the underlying factor driving the observed changes is rapid urbanization. Among these changes, it has been observed that while the attractiveness, greenery, originality, liveliness, and naturalness of the city have decreased from the pre-Republic period to the present day, complexity and density have increased. Although there is no distinct distinction in terms of orderliness, it is observed that due to the impact of informal settlements and irregular urbanization, regular development has not been achieved in the city in both periods. The destruction of natural areas and greenery, replaced by standardized residential and commercial structures, suppresses the distinctive identity characteristics of the city, negatively affecting its attractiveness,

originality, and liveliness. Similarly, the increasing density in the urban structure and urban life leads to complexity for the same reasons.

Similarities between the pre-Republic period and present silhouette include irregular and haphazard urbanization, intense development along the coastline leading to the disruption and devaluation of the sea-coast-city relationship, the city's topographic structure, contiguous built structures, and the development of the city center at the same point. Differences are particularly evident in building heights. Additionally, mismatched building forms, reduction in green spaces, and changes in the ratio of voids to occupied areas are noted. The primary cause of these differences is rapid urbanization and the implementation of urban plans and projects that do not align with the potential of the city.

In the city silhouette, it is expected that the distinctive cultural and historical heritage of the city should not be overshadowed, hidden, or trivialized. The balance between built structures and green spaces in the city silhouette has been disrupted. Increased structural elements have reduced greenery in the city, especially with the dominance of high-rise buildings. This dominance has created density, making the city feel suffocating, almost like being walled in and concretized. Varying building heights have led to an imbalance and mismatch in the silhouette's appearance. As a result, the silhouette that emerges is detrimental to the vibrancy of the city and does not allow for easy interpretation.

As a result, it is not possible for all images in the city to be highlighted and made visible in the silhouette. However, as mentioned above, the main reasons for the changing city silhouette and the changing perceptibility of urban images are rapid urbanization and the negative effects it brings, along with the disregard for topographic structure, climatic comfort, area capacity, and urban potentials. In this regard, a significant portion of the city's identity elements are experiencing loss of value, and their perceptibility is gradually decreasing. To effectively address this issue, the following steps should be prioritized:

- Understanding the holistic significance of urban potentials.
- Establishing strong connections between cultural heritage and values, considering cultural accumulations.
- Creating multi-stakeholder and functional urban plans by integrating various professional disciplines.

- Consulting residents' opinions in decision-making processes.
- Clearly defining permissions and restrictions outlined in building and zoning regulations.
- Evaluating geographical and climatic characteristics of the city in various planning decisions, especially in site selection.
- Ensuring a well-planned relationship between ground and form.
- Paying attention to elements that obstruct the spread of the unique "imbat" wind in Izmir, and removing these barriers during future transformation activities.
- Prioritizing the basic needs and comfort of residents by increasing the amount of open green spaces, establishing city parks, and maintaining a balanced ratio of voids and built-up areas.
- Highlighting the images that give identity to the city and ensuring a harmonious transition between these structures and elements that disrupt the silhouette.
- Conducting revision and restoration works in accordance with the structure and texture of the buildings and the urban fabric.

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# CHAPTER 3

## A GREEN SOLUTION FOR URBAN ECOSYSTEMS: VERTICAL GARDENS

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## INTRODUCTION

Urban areas are dynamic and constantly evolving environmental structures where human life and activities are concentrated. Cities that have developed rapidly since the Industrial Revolution have become the center of economic, social, and cultural changes, while natural areas have quickly given way to urbanization. The urbanization process is a striking indicator of how human settlements transform the natural environment. This change directly and indirectly affects the balance of urban ecosystems.

Urban ecosystems can be defined as interactive systems consisting of living and non-living components in densely populated urban areas. These systems have become regions where urbanization and population are concentrated, and where energy, products, and services are consumed. Urban ecosystems are exposed to higher human impact compared to natural ecosystems. Due to the recent influx of migration to cities, urban landscapes have rapidly transformed into urban land uses, leading to the fragmentation of large green spaces and the creation of new urban ecosystems (Dattilo and MacGregor-Fors, 2021).

Increasing population and rapid urbanization have also brought about many environmental problems (Çetinkale Demirkan and Akat, 2017; Çakar et al., 2018). Issues such as air pollution, heat island effect, loss of biodiversity, and noise pollution negatively affect the quality of life for urban residents. The intense work pace and rapid urbanization of our current conditions have led to an increased need and interest in urban open green spaces, especially in metropolitan areas (İlhan et al., 2024a). Developing green infrastructure solutions in urban areas is important to reduce the effects of environmental problems. In this direction, landscape architecture and sustainable design approaches play a critical role in solving these problems. The presence and planning of green spaces are of great importance in preventing these problems. While establishing the balance in the interaction between humans, space, and nature through urban open green spaces, the quality of life is also increased, in addition to the protection and improvement of environmental conditions (Akat and Çöp, 2019; Çetinkale Demirkan and Akat Saraçoğlu, 2021). Incorporating natural areas in cities is seen as a powerful strategy to bring back butterflies, insects, birds, and wildlife (Lehmann, 2021). In this context, vertical garden applications come to the fore. Vertical gardens contribute to the improvement

of urban ecosystems with their aesthetic, ecological, and functional benefits. Vertical gardens have the potential to integrate nature with urban environments, increasing both aesthetic and ecological values. Vertical garden applications, enriched with various techniques and planting methods, stand out as an important tool in increasing the livability of urban areas.

This study will comprehensively address the concept of vertical gardens, application techniques, planting approaches, and the benefits these systems provide to urban ecosystems. Additionally, the solutions vertical gardens offer for sustainable urban development and their impact on quality of life will be evaluated.

## 1. THE CONCEPT OF VERTICAL GARDENS

“Vertical greenery”, "living walls", "green walls", and "green facades" are all terms used to describe vertical gardens, which are environments where plant materials are grown on the vertical surfaces of structures using various growing media (Tzortzi, 2018; Gür and Kahraman, 2020). Vertical gardens are seen as a modern planting method that integrates nature with urban environments while providing many aesthetic and functional benefits (Osmanlıoğlu and Asilsoy, 2021). These gardens are plant designs that are created by creating a living space on vertically positioned structural elements with their own physiological properties (by clinging, wrapping) of plants growing in soil, walls or plant boxes, or by creating a green area on the facade of the building with the help of structural materials (Erdoğdu 2014; Kanter, 2014; Tabu, 2019; Gür and Kahraman, 2020; Gür and Kahraman, 2022).

**Figure 1:** Example of a vertical garden - Madrid / Spain (Lehmann, 2021).

## 2. VERTICAL GARDEN APPLICATION TECHNIQUES

The techniques that can be used in vertical garden applications are essentially divided into four categories: panel system, metal fence system, modular system and cable-supported system (Çelik et al., 2015; Güney Başkan 2019; Kalay and Sarıman Özen, 2021).

### 2.1 Panel Systems

In vertical garden systems, plants can be applied to the building surface in two main ways. In the first method, plants are applied directly to the building surface; in the second method, an additional supporting material is mounted on the building surface, and plant design is carried out on it. Panel systems protect the building from adverse weather conditions such as rain and wind, extending the life of the building shell. Additionally, they provide thermal insulation on the building's exterior facade, offering economic benefits for the building (Güney Başkan, 2019).

#### 2.1.1 Soil-Based Panel Systems

Vertical garden systems consist of modularly designed units. These units are arranged in cells to meet the watering needs of the plants they contain. Each cell has plants planted in soil-filled containers. The plants are typically watered

using a drip irrigation method, and excess water is drained out of the system through drainage channels (Örnek, 2011; Tabu, 2019).

### 2.1.2 Hydroponic Panel Systems

In this system, vertical garden application is achieved by mounting planted panels on the building surface. The Hydroponic Panel System is a technique where plants are grown in water containing dissolved nutrients. There is no soil used in this system. The water and mineral needs of the plants are met through a drip irrigation method. Irrigation is carried out through the drip system on each panel. The recycling capacity of the water in the system reduces water expenses (Örnek, 2011; Tabu, 2019).

**Figure 2:** Hydroponic panel system application - California / USA (Url-1).

### 2.1.3 Aeroponic Panel Systems

In this system, vertical garden application is achieved by mounting planted panels on the building surface. The Hydroponic Panel System is a technique where plants are grown in water containing dissolved nutrients. There is no soil used in this system. The water and mineral needs of the plants are met through a drip irrigation method. Irrigation is carried out through the drip system on each panel. The recycling capacity of the water in the system reduces water expenses (Örnek, 2011; Tabu, 2019).

### 2.1.4 Felt Systems

It is known that plants obtain the necessary minerals for their vital functions from the soil. However, research has shown that plants can also survive with external mineral supplementation in some different materials. In vertical garden systems, felt material that acts as a kind of soil for the plants is

used, and the irrigation water is supported with mineral additives. Mineral additives suitable for the planted plant species are made. The felt layer that meets the moisture needs of the plants is covered with waterproof insulation material at the points where it meets the wall surface, preventing damage to the walls. These various layers are integrated within a frame. The excess water in the system is collected in a drip tray under the frame and can be reused for irrigation with the help of a pump (Örnek, 2011; İpekçi and Yüksel, 2012).

**Figure 3:** Felt system application- San Francisco / USA (Url-2).

## 2.2 Metal Fence Systems

Metal fencing systems built in the traditional way are a common application. In this system, metal fences of various designs are used. In this approach, it is important to prefer plant species with climbing or trailing characteristics. Plants can be planted directly into the ground or grown in pots. The water needs of the plants are met through a drip irrigation system. In the drip irrigation system, water is delivered to the root zone of plants through drippers located in the plastic pipes on the soil surface (Akat Saraçoğlu, 2021). In these systems, it may take a long time for the plants to cover the surface. Metal fence systems are generally used to hide or cover outdoor walls, balconies, courtyards, and similar areas (Lambertini and Leenhardt, 2007;

Shewek and Magdy, 2011; Uffelen, 2011; Kırıt and Sağlık, 2018; Lotfi et al., 2020).

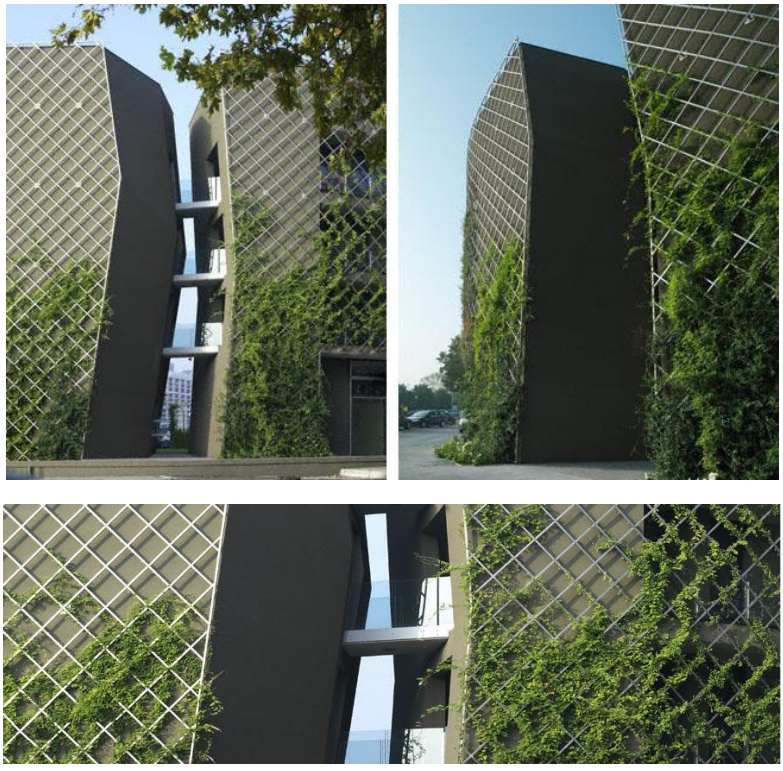

**Figure 4:** Metal fence system application - Centro Direzionale Forum, Rimini / Italy (Url-3).

## 2.3 Modular Systems

Modular vertical gardens are created by using planters of different sizes and shapes on building surfaces. The plants in these planters are arranged in various layouts to create visual compositions. The holes opened between the planters in the modular system allow vertical water flow, making the irrigation effective (İpekçi and Yüksel, 2012).

**Figure 5:** Modular system application - Seattle / USA (Url-2).

## 2.4 Cable-Supported Systems

Cable-supported systems have been developed for the use of climbing plant species in applications. In these systems, the surfaces that the plants can cling to are provided in a controlled manner, making it possible to create the desired shapes. The plant roots can be left at ground level or placed in planters or similar environments created in the voids on the building surfaces. Drip irrigation method is used in these systems. Metal cable and trellis are preferred for creating the surfaces that the plants can cling to (Örnek, 2011; Çelik et al., 2015).

**Figure 6:** Cable-supported system application - Maschinenfabrik Oerlikon Park, Zurich / Switzerland (Url-4).

## 3. PLANT SELECTION FOR VERTICAL GARDEN APPLICATIONS

The plant design studies carried out on building surfaces are significantly different from the plant arrangements in traditional landscape projects. Indeed, the ecological environments in which vertical garden systems are located are artificial and have challenging conditions that are not suitable for planting (Koç and Güneş 1998).

In studies on the plant design of building surfaces, a systematic evaluation process should be followed. First, the suitability of the building surface for growing plants must be carefully examined, and the capacity of these surfaces to withstand the loads from the planting should be determined. Then, it is essential to select the most suitable vertical garden system for the building surface. After determining the building surface and the application technique, suitable plant species should be selected, considering environmental conditions, the structural features of the building, and the materials used (Çelik et al., 2015).

The selection of plant species to be used in vertical garden applications varies depending on factors such as the aesthetic qualities of the plants, the living environment of the plants, the location of the building surface, the climate conditions of the region where the application will be made, the direction and intensity of sunlight (Akdeniz and Zencirkıran, 2013; Kanter 2013a; Ekren, 2016). When determining the plant species to be used in vertical gardens, a detailed analysis of regional climate data is important. In areas with low precipitation, the use of drought-resistant plant species is essential. For south-facing facades, plant selections tolerant to sunlight should be made, and for north-facing facades, plant selections adapted to cold and shade should be made (Seçkin, 2011; Erdoğan and Khabbazi 2013).

When selecting plants, the growth power, growth direction, and height characteristics of the plants must be considered. Since the systems are applied to building surfaces, it should not be forgotten that the plants should be able to grow in limited areas and their height should be limited to a certain level. In the selection of plant species, factors such as ecological adaptation, compatible living with other plants, non-spreading root system, non-aggressive growth, ability to cling to vertical surfaces, and low water demand should be considered. In vertical garden applications, it is important to prefer plant species that are

suitable for the ecological and morphological conditions of that environment. This way, while achieving high ecological compatibility, significant reductions in vertical garden installation and maintenance costs can also be obtained (Kanter, 2014; Çelik et al., 2015).

The selection of plant species should also be suitable for the purpose and goals of the vertical garden design. The design purpose of the vertical garden can be a functional purpose such as blocking noise, an ecological approach such as improving air quality, or an aesthetic approach such as masking a bad view or creating emphasis. The plant species used vary according to the determined purpose (Akdeniz and Zencirkıran, 2013; Ekren, 2016).

**Table 1:** Some plant species used in outdoor vertical garden systems (Gür and Kahraman, 2022).

| **Plant Species** | **Family** |
|---|---|
| *Aeschynanthus radicans* Jack | *Gesneriaceae* |
| *Aloe ciliaris* Haw. | *Asphodelaceae* |
| *Ampelopsis aconitifolia* Bunge | *Bignoniaceae* |
| *Anthurium crystallinum* Linden & Andre. | *Araceae* |
| *Asplenium nidus L.* | *Aspleniaceae* |
| *Asplenium adiantum- nigrum* L. | *Aspleniaceae* |
| *Asplenium thunbergi* Belangeri | *Aspleniaceae* |
| *Berberis thunbergii* var. atropurpurea nana Chenault | *Berberidaceae* |
| *Bougainvillea glabra* Choisy | *Nyctaginaceae* |
| *Campsis radicans* (L.) Bureau | *Bignoniaceae* |
| *Cardinal climber (Ipomoea quamoclit* L.*)* | *Convolvulaceae* |
| *Cardiospermum halicacabum* Linn. | *Sapindaceae* |
| *Carex morrowii* Boott. | *Cyperaceae* |
| *Carex oshimensis* Nakai | *Cyperaceae* |
| *Carex testacea* Sol. ex Boott | *Cyperaceae* |
| *Cercestis mirabilis* Bogner. | *Araceae* |
| *Chlorophytum bichetii* Backer. | *Asparagaceae* |
| *Chlorophytum comosum L.* | *Asparagaceae* |
| *Cineraria maritima* Linn. | *Asteraceae* |
| *Cissus antarctica* Vent. | *Vitaceae* |
| *Clytostoma callistegioides* Cham. | *Bignoniaceae* |
| *Cuphea hyssopifolia* Kunth. | *Lythraceae* |
| *Dianella tasmanica* var. variegata C. Pynaert | *Asphodelaceae* |
| *Distictis buccinatoria* A. H. Gentry | *Bignoniaceae* |
| *Dracaena surculosa* Lindl. | *Asparagaceae* |
| *Euonymus japonicus* Thunb. cv. 'Microphyllus' H.Jaeger | *Celastraceae* |
| *Festuca glauca* Vill. | *Poaceae* |

## 4. BENEFITS OF VERTICAL GARDENS

In urban areas, vertical gardens increase the presence of green spaces, enhancing biodiversity and strengthening ecological values. They also reduce the urban heat island effect, improve air quality, and increase indoor-outdoor comfort. Furthermore, by trapping dust particles, they contribute to the reduction of carbon dioxide emissions and have a positive impact on the psychological and social well-being of urban populations, thus improving their quality of life. With these multifaceted effects, vertical gardens are seen as an important tool for sustainable urban development (Yüksel, 2013; Dedei Dündar and Demir, 2021).

### 4.1 Reduction in Energy Consumption

The materials and plants used in vertical garden systems absorb heat. Therefore, the vertical gardens used on building surfaces provide direct thermal insulation to the surfaces they are applied to (Kalay and Sarıman Özen, 2021). In addition, vertical gardens offer passive air conditionining methods, reducing the energy consumption of buildings. The plants that provide shading and energy savings in the summer months allow the building to benefit from sunlight in the winter by shedding their leaves. Furthermore, vertical gardens contribute to the reduction of heat gains and losses due to air circulation on building surfaces (Loh, 2008).

### 4.2 Reduction of Noise Pollution

Noise pollution in urban areas is an increasingly important problem with adverse effects on human health. In areas with dense buildings around roads, traffic-related noise is further amplified by the reverberation effect. In open spaces, sound waves can easily reach distant locations. In this context, plants are seen as the most effective decorative barriers against noise. The plant materials, soil, and irrigation channels used in vertical gardens have sound-absorbing properties. Additionally, the plantings on building surfaces prevent sound waves from entering indoor spaces by breaking, reflecting, or dispersing them. Therefore, vertical gardens fulfill the function of reducing noise both inside the building and in the immediate vicinity (Tekin and Oğuz, 2011; Erdoğan and Khabbazi, 2012; Yazgan and Khabbazi, 2014).

### 4.3 Improving Air Quality

The solution to air pollution, one of the major environmental problems in cities, depends not only on careful land use decisions, but also on the expansion of green areas as much as possible. Increased plant density plays an important role in renewing the urban atmosphere, increasing oxygen production and carbon dioxide consumption. Even covering a single surface of a two-story building with plants can provide benefits equivalent to the oxygen production and carbon dioxide consumption of a large tree (Yazgan and Khabbazi, 2014).

The presence of plants plays a major role in improving air quality. Particles lifted by the wind from dry surfaces are transported without any obstacles. However, planting is the most important method to eliminate this negative effect. In addition to reducing wind speed, plants can trap dust particles through the moist environments they create with their roots and leaves. In this way, plants contribute to the elimination of harmful microorganisms through their own juices or secretions. In urban areas, the planting of building surfaces, which is one of the important obstacles to the wind, is critical for the realization of these positive effects (Kemaloğlu and Yılmaz, 1991).

### 4.4 Reduction of Urban Heat Island Effect

Impermeable hard surfaces contribute to the increasingly prevalent urban heat island effect in urban areas. Dry walls, roofs, and streets absorb a portion of the energy while exhibiting a reflective property and reflecting a portion of it. The temperature that can be absorbed by the hard surfaces throughout the day is released after sunset, leading to the formation of a dome-shaped urban heat island. This condition in cities results in the formation of hot spots in other, cooler rural areas (Yazgan and Khabbazi, 2014).

The use of vertical gardens on building surfaces and the effect of plants significantly reduce the urban heat island effect (Tekin and Oğuz, 2011). The evaporation and transpiration of plants release water vapor, which lowers the surrounding air temperature. Therefore, it can be said that regions with planted buildings within the city have a more comfortable and livable climate compared to unplanted areas (Örnek, 2011).

### 4.5 Supporting Biodiversity

Biodiversity is considered as the totality of genetic, species, ecosystem and ecological processes in a region (Işık, 1997; Uzun, 2004; Özçelik,2006). Although people have distanced themselves from nature, they can create a plant-based ecological environment by applying vertical garden systems. Vertical gardens applied on building surfaces create a natural atmosphere in cities, while also providing an important living environment for other living species that can coexist with plants. The plant species used in vertical garden designs contribute to biodiversity by creating their own ecological systems (Ekren, 2016; Kalay and Sarıman Özen, 2021).

The diversity and density of plant species in vertical gardens play an important role in supporting biodiversity in urban ecosystems by providing habitat for wildlife (Tohum, 2011; Ekren, 2016). Consequently, by ensuring the sustainability of habitat-like environments, a healthy urban ecosystem is contributed to. In this way, the opportunity is provided for city residents to benefit from the advantages of a healthy urban ecosystem (Tohum, 2011).

### 4.6 Improving the Quality of Life for People Living in Urban Areas

In ecological designs, in addition to factors such as the efficient use of renewable energy sources, the preference for environmentally friendly local materials, the reduction of pollution, and the protection of habitats, importance is also given to public health and aesthetic values. Vertical gardens, in addition to contributing to the improvement of urban ecology, provide important aesthetic contributions to urban areas with the design possibilities they offer (Yazgan and Khabbazi, 2014). Vertical gardens can soften the harsh appearance of buildings, giving cities an aesthetic look, while also hiding the unsightly features of buildings (Erdoğan, 2013).

Vertical gardens can undergo color and shape transformations in different seasons of the year, creating various appearances within urban areas. Vertical gardens, which give the building surfaces a natural form with their leaves and branches, can also partially compensate for the loss of open and green spaces resulting from urban developments (Aygencel, 2011).

Individuals living in dense urban areas are generally deprived of adequate green space opportunities (Çakar et al., 2020; İlhan et al., 2024b).

However, vertical gardens can increase the quality of life by giving these areas a refreshing and aesthetic appearance. Scientific studies have shown that green spaces have a calming and relaxing effect on people. Additionally, activities performed in green spaces have been found to lower blood pressure, accelerate the healing process of stress-related illnesses, and increase the productivity of employees (Çakar and Akat Saraçoğlu, 2023). From this perspective, it can be said that vertical gardens are structures that help improve people's physical and mental health by increasing their environmental value and making significant contributions to the quality of life (Erdoğan, 2013; Beyhan, 2014).

## 3. CONCLUSION

Vertical gardens have emerged as a green solution that enhances the sustainability of urban ecosystems and provides numerous ecological, aesthetic, and social benefits in the face of the increasingly pressing environmental challenges in urban areas. These applications integrate nature into urban living spaces, while increasing biodiversity, improving air quality, reducing noise pollution, and mitigating the urban heat island effect. Furthermore, the aesthetic contributions of vertical gardens elevate the quality of life, creating a peaceful and healthy living environment in urban areas.

Vertical gardens are an important tool for increasing natural habitats in urban areas. It is seen that the widespread adoption of these systems is of critical importance for both individual and social well-being. In this context, it is recommended to use vertical gardens more effectively in urban planning and design processes. Accordingly, it is recommended that urban planners and landscape architects consider the positive impacts of vertical gardens on urban ecosystems and integrate them into urban development. It is seen as important for local governments to develop policies that support vertical garden applications, prioritize vertical garden projects in public spaces, and encourage citizens in this regard for sustainable urban development. Additionally, it is thought that further research on the development of vertical garden technologies, plant selection, and maintenance will also contribute to increasing the effectiveness of vertical gardens.

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# CHAPTER 4

## LAND READJUSTMENT AS A ZONING PLAN IMPLEMENTATION METHOD

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## INTRODUCTION

Today, approximately 56% of the world's population lives in cities. The population in urban areas is expected to double its current state by 2050 (World Bank, 2023). Such a population increase reveals that urban settlements and infrastructures should be managed in the most rational way, especially in developing countries such as Türkiye. In this sense, since the speed and scale of urbanization will bring with it problems such as access to infrastructure and housing, central and local governments should keep their land management policies up-to-date.

Urban planning is the main key to a healthy, balanced and orderly development that ensures the establishment of human and social relations within the framework of administrative and legal foundations and the perception of environmental conditions, historical and cultural values as a whole (Keleş, Mengi, 2021; Meydan Yıldız et al., 2022). The basic principle that local government units are obliged to fulfill and implement within the city planning system; to enable residents to live in a healthy and balanced environment and to improve the environmental rights of individuals in accordance with the principle of public interest (Keleş, Mengi, 2024; Mengi, Meydan Yıldız, 2017). Urban planning is prepared with three different planning structures according to the area and purposes in which they are located. These are spatial strategy plans, landscaping plans and zoning plans (Meydan Yıldız et al., 2021).

Zoning plans, which have an important place in zoning law, serve many purposes for the solution of social, economic, physical and legal problems regarding the future of urbanization (Akdemir, 2021). Zoning plans achieve their main purpose as long as they can be associated with the existing ownership structure and applied to the land. For this reason, various zoning application methods are applied in our country and a property relationship is provided with zoning plans (Taşkaya, 2021).

In Türkiye, the implementation of the zoning plan to the land is provided by voluntary (optional) and mandatory applications. The practical implementation of procedures such as private subdivision, consolidation of land portions, and boundary exchanging, which are called voluntary implementation, is very limited. In addition, the use of these approaches brings with it many problems such as the inability to share the value increase fairly,

the restriction of the use of zoning parcels and the deterioration of the blessing-burden balance. On the other hand, expropriation, which is one of the practices defined as mandatory, provides land acquisition quickly for the performance of public services and is an effective method for small-scale projects. However, it is an expensive method, it has a structure that can cause land speculation, social problems such as migration and unemployment.

In this study, land readjustment (LR), which is a zoning plan implementation method that is frequently used by municipalities in our country, is discussed. The legal, administrative and practical dimensions of land regulation are examined. Its basic principles, application principles and contribution to urban development are examined. Land readjustment studies have an important place in zoning plan applications in terms of preventing unplanned development in our country. It is used as an effective tool to achieve a healthy and orderly urban infrastructure and planned residential areas. However, the fact that the application is area-based rather than value-based and does not offer an effective model to cover infrastructure costs reveals that the method needs to be improved.

## 1. ZONING PLANS AND IMPLEMENTATION METHODS

The first law envisaging the preparation of zoning plans in Türkiye was enacted in 1848 in order to determine the construction forms of the buildings in the areas that make up the center of Istanbul and some zoning rules. In our country, physical planning studies are carried out with the Zoning Law No. 3194, which entered into force in 1985. With this law, "settlements and constructions in these places; to ensure that the plan is created in accordance with science, health and environmental conditions". This legal legislation constitutes the main framework of physical planning in our country. Zoning plans at the lower scale are divided into two as master and application zoning plans. Land use decisions are detailed in 1/5000 scale master development plans. In these plans, plan decisions are more concrete and the implementation drives the zoning plans. Decisions regarding construction and implementation are regulated in 1/1000 scale application zoning plans.

The presence of urban, social and technical infrastructure areas in the planned area is a requirement of urbanism principles and planning principles. It is important that these areas are determined according to the population size

envisaged in the area to be planned and distributed evenly over the area.

Our zoning legislation envisages the construction of zoning parcel plans in order to ensure the implementation of the zoning plans and the realization of the zoning islands and zoning roads brought by the plan.

Local authorities in Türkiye use voluntary and mandatory approaches in order to implement zoning plans as a whole and to apply the functions envisaged in the plan decisions to the land in a disciplined manner (Uzun, 1992). If the request comes from the public, the applications are made ex officio. However, if the request comes from the owners of the real estate, the applications are made optionally (Figure 1).

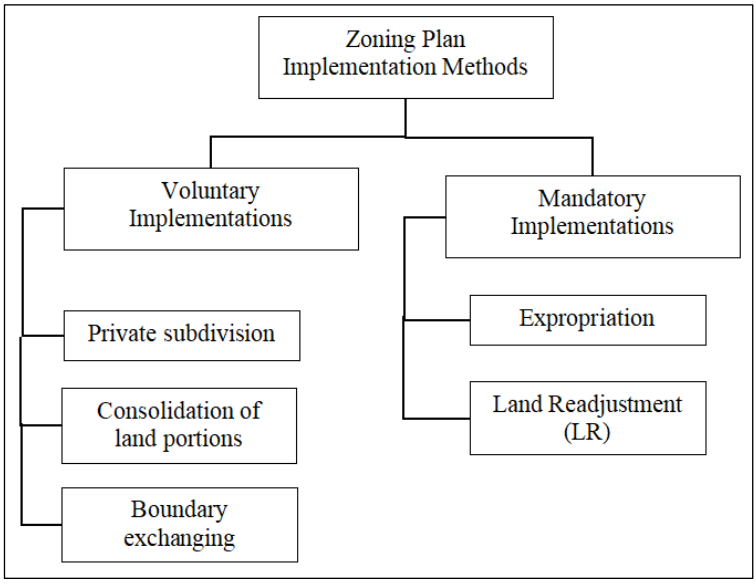


**Figure 1:** Development Plan Implementation Methods

### 1.1. Voluntary practices

*Private subdivision*: It is the creation of more than one parcel by dividing a parcel in accordance with the zoning legislation. It can be applied in planned and unplanned areas. In areas with a zoning plan, according to Articles 15th and 16th of the Zoning Law, the execution procedures can only be carried out in accordance with the implementation zoning plans with the consent of all parcel owners in areas where the parcel plan has been registered.

*Consolidation of land portions:* It is the merging of more than one

adjacent parcel in accordance with the zoning legislation. In areas with a zoning plan, according to Articles 15th and 16th of the Zoning Law, the deposit procedures can only be carried out in accordance with the implementation zoning plans with the consent of all parcel owners in areas where the parcel plan has been registered.

Zoning parcels in the following cases can be subject to foreclosure and deposit procedures:

* Zoning parcels where it is not possible to build according to the zoning legislation due to the surface area, façade, drawing distances and similar reasons of the parcel.

* Zoning parcels that cannot be granted a building permit due to the above situations despite meeting the construction conditions.

In this way, zoning parcels can be made in accordance with the zoning plan, zoning legislation and construction.

*Boundary exchanging:* Having a broken border between two parcels may cause some difficulties in using the real estate. For example, if it is an immovable land, there may be some difficulties in placing the building to be built on it. In such cases, the broken boundary can be corrected with the agreement of the two neighboring parcel owners. The main point in boundary correction is that the areas of the parcels do not change after the boundary correction of the two parcels is made.

The use of these approaches brings with it a number of problems:

* The balance of blessings and burdens brought by the zoning plan cannot be achieved.

*Some parcels may remain in the public domain in whole or in part. In this case, the increase in value that comes with the plan cannot be shared fairly.

*Parcels made in accordance with Articles 15th and 16th of the Zoning Law No. 3194 cause the parcels to not be used properly and structures in different forms such as low, high, narrow and wide emerge (Uzun, 1992).

### 1.2. Mandatory Applications

*Expropriation:* It is the acquisition of an immovable property from individuals, by public legal entities, by paying for it according to a certain fair criterion, in order to carry out an activity for the public benefit and transferring

it to public ownership (Dictionary of Urban Sciences, 1980). As a result of the responsibilities assigned to them by law, public institutions in Türkiye provide the immovable properties, resources and easements they need for the public services they are obliged to carry out; It can be expropriated by paying the costs in cash and in advance. The most basic principle of expropriation is that it is done on the grounds of public interest. This principle is ensured, for example, in places where there is a zoning plan, and a public interest decision must be taken for other transactions. Although expropriation deprives private property owners of their property, land acquisition by public institutions is provided quickly and is an effective method for small-scale projects (Uzun, 2009).

*Land Readjustment (LR):* LR, which aims to implement development plans as a whole, is a method used to obtain land reserved for public use through plan decisions. The basic principle in LR is that the existing cadastral parcels in a regulation area are combined into a single mass, arranged in the form of new development parcels in accordance with the zoning plan data, and returned to the owners. As a result of this practice, it is ensured that public areas are also offered to public service (Yomralıoğlu, 1992). It is the most effective plan implementation tool that has been used by municipalities, governorships and other public institutions for many years to meet the housing needs of the rapidly increasing population in Türkiye (Çelik Şimşek and Uzun, 2018).

## 2. PRINCIPLES OF LAND READJUSTMENT

When we look at the origin of LR, although there are different scenarios, it is accepted that it was implemented in Germany at the end of the 19th century (Karki 2004). However, the first significant city-scale application of LR took place in Frankfurt in 1902. Over the years, LR's influence in urban contexts has spread beyond Germany (Fermin, 2024). LR; It has also found application in many countries of the world such as Japan, Korea, India, Austria, Spain, China, Finland, and Lebanon (Uzun and Çelik Şimşek, 2018; De Souza, 2018).

Türkiye, on the other hand, has adopted this mechanism since 1930 in order to accelerate the reconstruction process in areas affected by earthquakes, fires, disasters and areas previously designed for urban development projects (Türk, 2005). However, legally, it has been used since 1985 in accordance with Article 18th of the Zoning Law. The success of LR depends on the strong legal and administrative structure of the countries and the effective land management

systems (such as real estate market, cadastre, valuation). In this respect, its success in developing countries is very limited (UN-Habitat, 2011). However, the interest of developing countries in LR, which is defined as a land regulation tool, is increasing (Fermin, 2024).

The definitions of LR vary widely and differ according to the contexts of the countries themselves. In this sense, it is possible to define LR in the following ways;

• LR is the modification of the shapes and uses of land to create public facility areas in planned areas and to make land useful (Hosono, 2018).

• It is an approach that can contribute to cities becoming more inclusive, safe, resilient and sustainable (Hosono, 2018).

• LR is a supportive tool for sustainable urban development for planned and manageable urban expansion (UN-Habitat, 2011).

• LR is an urban development tool designed to facilitate the transformation and development of urban areas over the years (Fermin, 2024).

• Land Regulation is a planning tool that transforms cadastral parcels with a problematic structure in terms of urban planning into a more economically usable structure (Uzun et al., 2022).

LR makes a significant contribution to the regulation of urban areas and the promotion of urban development. It is possible to list the advantages of LR as follows;

• LR increases the value of privately owned real estate together with its surroundings.

• The land required for public services is acquired without the need for expropriation or purchase costs. Thus, the cost of urbanization is reduced for local governments (UN-Habitat, 2011).

• With its win-win potential, it both increases the values of privately owned land and facilitates the financing of overvalued land needed for public services (De Souza, 2018).

• It offers a cost-effective alternative to expropriation practices. It offers an alternative financing mechanism for public infrastructure investments (Fermin, 2024).

In order to create a new residential area, first of all, the zoning plans of that region must be made by the local governments. With the decisions of the application zoning plans, the residential area; The need for housing, social and

technical infrastructure is determined. Accordingly, the area; Zoning islands are subdivided according to roads, parks, green spaces, schools, public facility areas and other uses. Article 18th of the Zoning Law must be operated in order for the zoning islands to be put into use within the planned order. According to the principles of LR;

1. The LR project boundary is determined to determine the cadastral parcels to be regulated.

2. The contribution rate (CR) rate to be used in obtaining the land required for the public service areas in the regulation area is calculated.

3. An equal amount of CR deduction is made from the cadastral parcels located in the area where the LR project will be carried out.

4. The new zoning parcels formed after the CR deduction are allocated to the building islands closest to their original location.

5. At the end of the application, the owners of the real estate have more valuable zoning parcels suitable for construction (Figure 2).

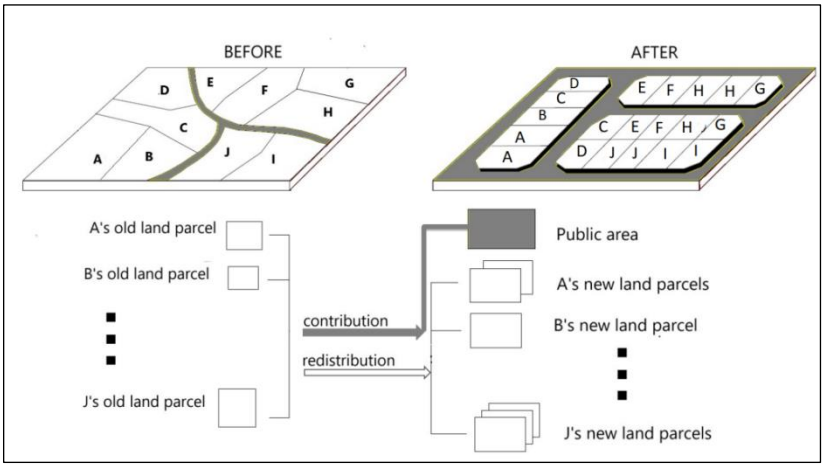


**Figure 2.** Mechanism of land readjustment (Adapted from Yomralıoğlu et al., 1996)

### 2.1. The legal aspect of LR

The Zoning Law provides municipalities; It assigns the task of preparing 5-year zoning programs to implement this plan within 3 months at the latest after the zoning plans come into force. In addition, municipalities or governorates; It must make and approve the subdivision plans within five years

from the date of finalization of the development plans. Municipalities or governorships are held responsible for all kinds of expropriation works and transactions that may arise due to their failure to make a parcel plan.

The legal basis of LR, which is one of the zoning plan implementation methods, is Article 18th of the Zoning Law No. 3194. Accordingly; The lands within the boundaries of the application zoning plan are divided into islands or parcels in accordance with the zoning plan, distributed and registered to the beneficiaries according to the principles of detached, shared or condominium. While carrying out these transactions, the consent of the owners of the real estate is not sought. The authority to implement is in the municipalities within the boundaries of the municipality, and in the governorships outside the municipality and the surrounding area.

In order to establish the public service areas necessary for the population in the regulation area to continue their urban activities, a sufficient amount of area is deducted from the cadastral parcels included in the regulation. This deduction is made in return for the increase in value due to the regulation. This deduction, which is defined as the Contribution Rate (CR), cannot exceed forty-five percent of the area of the regulated land and plots before the regulation. This rate varies according to the size of the areas and building islands (roads, green areas, parks, etc.) reserved for public use in the regulation area ($0 \leq CR \leq 45$). With the amendment made to the zoning law in 2019, the CR, which was previously 40 percent, was increased to 45 percent to meet the needs of the regulated places. Table 1 shows the areas to be covered from CR. As a rule, these areas, obtained by CR deduction, cannot be used except for service issues. According to the needs of the regulation region, if the CR rate exceeds 45 percent, it is ensured that the amount exceeding 45 percent is met from the public immovables or areas owned by the Treasury or completed by the municipality or governorship through expropriation.

**Table 1:** Proportion and type of deductions made in LR (by years) (Adapted from Uzun, 2009)

| Year | CR (%) | Scope of the Turkish LR Contribution Rate (CR) |
|---|---|---|
| 1864 | 25 | Road |
| 1882 | 25 | Road |
| 1930 | 15 | Road, public square |
| 1933 | 15 | Road, public square, green area |
| 1957 | 25 | Road, public square, green area, parking lot |
| 1972 | 25 | Road, public square, green area, parking lot, public garden, play garden |
| 1985 | 35 | Road, public square, green area, parking lot, public garden, play garden, mosque place and police station |
| 2003 | 40 | Road, public square, green area, parking lot, public garden, play garden, religious place, police station and primary education areas |
| 2019 | 45 | 1) Road, 2) public square, 3) green area, 4) parking lot, 5) public garden, 6) play garden, 7) religious place, 8) police station, 9) primary education areas, 10) market place, 11) neighborhood sports field, 12) area to be afforested, 13) road on which access control is applied, except for the highway, 14)waterway, 15) Flood Control Facility Areas, 16) Health Facility Areas Affiliated to the Ministry of Health, 17) Public Transportation Stations and Stops, 18) Official Institution Area, 19) Cemetery Area, 20) Municipal service area, 21) Social and cultural facility area, 22) Recreation area, 23) Promenade Fields |

## 2.2. Application Size of LR

In order to apply LR in a region, the cadastral studies of the project area must first be completed. There should be no disputes regarding the areas of cadastral plots. On the other hand, there must be an approved application zoning plan for the area. After these prerequisites, other technical studies are carried out by the responsible units. The main feature of an LR is that the space required for public services is provided from the cadastral plots that fall under the

regulation. The contribution rate to be received in return for the increase in value that will occur after the regulation is a maximum of 45 percent. Contribution rate ratio is the ratio of the amount of contribution rate determined in an arrangement area to the total area of cadastral or development parcels within this area. The amount of CR is calculated according to the following formula:

$$\mathrm{CR} = \frac{\sum \text{cadastral parcel area} - \sum \text{building block area}}{\sum \text{cadastral parcel area}}$$

The implementation of LR officially starts after the decision of the municipal council is taken. Once the regulation area has been identified, the regulation boundary is first drawn by the technical team responsible for LR. While determining this limit, the principles in Article 10 of the LR Implementing Regulation are taken into account.

Then, the title deed and cadastral information and documents of the immovables within the regulation area are collected from the relevant institution. These data are the list of parcels to be implemented, their coordinates, ownership map, surface area. After the technical procedures, the CR calculation is made and the amount of deduction to be made from the cadastral parcels for the public and public service areas in the relevant area is determined. In cases where the CR does not exceed 45 percent, action is taken in accordance with Article 15th of the LR regulation. The final stage is the construction and distribution of parcel plans. The following principles are taken into account in the creation and distribution of zoning parcels:

*The allocation of cadastral parcels is made from the place where the parcel was located before the arrangement as much as possible as a result of the application.

*Parcels cannot be created below the minimum parcel sizes specified in the zoning plan.

* It is ensured that the buildings coincide with a complete and share-free zoning parcel, provided that they provide the minimum parcel size. Zoning parcels are created by taking into account the existing constructions on the land.

* Shared lands remaining in the regulation area may become detached.

* Buildings and areas that need to be protected are left in a zoning parcel independently.

* In parcel plans and sheets; cadastral parcels shown by dashed lines, zoning islands and parcels, island/parcel numbers, regulation boundary, usage decisions in the zoning plan, road widths are shown.

## 3. CONCLUSION

In many countries, LR is seen as an important planning tool for rural and urban land transformation and an important economic instrument for implementing development plans. LR has been actively used in our country since 1985, enabling the production of zoned land and contributing to urban development and transformation. In addition, it is accepted as an important instrument for bringing urban rent to the public. As such, LR offers a variety of benefits to both applicators and property owners. Practitioners have the opportunity to implement zoning plans effectively and quickly. Parcels suitable for construction are produced for the housing-shelter needs of the increasing population. In this context, LR is an excellent tool for municipalities and governorates, providing land for urban development (Archer, 1988). Cadastral parcels of real estate owners, which are not suitable for zoning and construction, turn into zoning parcels. By meeting their social and technical infrastructure needs, they have healthier living spaces. After the LR project, land values have increased rapidly, providing a significant financial gain to property owners (Uzun, 2009; Çelik, 2013). LR provides significant benefits to both the parcel owners affected by the regulation and the local authorities. Real estate owners obtain more valuable and suitable parcels for construction in return for the decreasing amounts of their land. Municipalities, on the other hand, obtain public spaces free of charge.

On the other hand, land is an important resource for the realization of a public service. However, covering the construction costs of the relevant service is a significant problem for local government units experiencing financial difficulties. When we look at the examples in the world, in addition to the deduction made from CR to cover the construction costs of public services, an additional deduction is made under the name of reserve area. With this deduction, the construction cost of the infrastructures is covered. However, such an approach is not yet valid for Türkiye. The fact that LR applications are

made on an area-based basis and that real estate values are not taken into account in Türkiye is also one of the important problem areas and has been a subject of debate for a long time. However, it is possible to come across value-oriented practices in many countries. Although the legislation on LR Türkiye has changed over the years, the basic principles remain the same. However, the conditions of the urban ecosystem and real estate market, which are in constant development, need to be well analyzed and new approaches adapted to LR.

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# CHAPTER 5

## CHILDREN'S RIGHT TO PLAY AND CHILDREN'S PLAYGROUNDS IN THE CONTEXT OF CHILD-FRIENDLY CITIES

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## INTRODUCTION

***"Children are a kind of indicator species, if we can build a successful city for children, we will have a successful city for everyone." Enrique Peñalosa (Martin, 2019)***

Childhood is an important period in the formation and development of personality. During this period, play is of great importance in terms of physical, social and emotional development; children, with friends sharing, each other help don't, with the environment positive relationship building, taking responsibility and others to their rights respect hearing like basis rules They learn. Especially with the increase in population, children's right to play is being taken away from them as a result of increasing problems every year. Without ignoring children's right to play for healthy child development, these increasing problems can be prevented or reduced with the child-friendly cities approach in our country and around the world.

The aims of this study are; (1) To reveal the importance of play for children and the importance of children's playgrounds in the landscape, (2) To present the importance of children's right to play at national and international levels, (3) To examine the support for child-friendly city initiatives by evaluating children's playgrounds with landscape planning, landscape design and landscape management studies, (4) To make evaluations regarding the presentation of suggestions to local governments.

## 1. CHILD AND PLAY

Child and childhood different scientific in disciplines if defined in from each other independent however with each other connected aspect (Onur, 2008). Views on the concept of childhood have changed significantly throughout human history. In ancient times, despite insufficient knowledge about childhood, it was accepted as a period that included stages other than old age and infancy. In the Middle Ages, it is seen as a period when the concept of childhood was almost never defined and there was a lack of awareness about children. In the 16th and 17th centuries, the concept of child and childhood began to develop gradually in Western countries. However, during this period, the innocence and weakness of children were emphasized. Later in this process, with World War II, awareness of children in

European countries increased and they became more sensitive (Sağlam and Aral, 2016).

In addition, according to Huizinga (1995), play is a concept older than humans and culture. Culture is born in the form of play and is an activity that has existed since the beginning of human history. According to Huizinga (1995), play is a fundamental part of the development of civilization and provides the balance between the spiritual and material powers of society.

Play is one of the most important activities in children's lives. For children, play is a means of expressing their feelings, thoughts and experiences. Therefore, children's natural language is play and they do not communicate like adults, because children are not small adults. Play, as a natural language, allows children to express themselves, make sense of their thoughts and learn. In this context, as expressed by Frank, " Game play, children nobody them cannot teach things learning the phrase " is the form of " is quite meaningful (Landreth, 2011).

Play helps children develop their creativity, problem-solving skills, empathy, and social skills. It is also a tool that helps children discover the world, learn, and grow. Play has become an important factor in children's learning and development (Riley, 2012).

Mengütay (2005) stated that children find their true identities and values through play, and this is also of great importance. Play offers children the opportunity to discover their own preferences, talents and interests. These statements show that play is an activity that contributes significantly to the multifaceted development of children (Ginsburg, 2007).

Play has been recognized as an important element in children's lives, and children's play activities can change over time. This change can be emphasized differently in different environmental contexts depending on the attitudes of children and society towards play (Gill, 2021). Cultural, socio-economic and environmental factors can affect the nature of play and children's play experiences. Many researchers have drawn attention to different aspects and nature of play in different environmental settings (Webb and Associates, 1999; Cole-Hamilton, Harrop, and Street, 2002). Being physically active and playing are critical to children's development. These activities help children develop their cognitive, physical, emotional, and motor skills. In addition, physical activity and play offer important benefits for preventing chronic diseases such as obesity. Regular

physical activity helps children maintain healthy weight control and improves their overall health ( Milteer et al., 2012 ; Piercy et al., 2018 ; Powell et al., 2018 ).

This situation all Children for valid if not in healthy children, expected physically and engine with development They grow up. After infancy development each stage psychologically, physiologically and socially difference psychological and physiological development and changes in children occur very quickly. Your childhood life along this much important one role play because of this of the period sociology and of education focus point is it is clear. Experts just children normal to the development contributed found a lot factor not, same in time in children soul health to your problems from where possible various factors also they focus on. This for this reason children healthy and suitable development and growth to support aiming various in professions self-esteem, school life, parenthood and social oppression like topics big interest (Anonymous, 2023).

Growth is the state of showing physical development. Development; the individual development process in learning, maturation and growth is the process. These elements There is no development without learning and growth. Therefore development is a concept that encompasses all these elements. Maturation is the developmental stage of each child. For different at speeds learning is a biologically changing process in which growth, development and maturity to ensure is an important element of the concept of development. Learning is the individual's interaction with the environment. Interaction resulting from and often permanent behaviors to be gained. It is a process that provides a learning process executing person, new and complex as it matures to the results to reach for necessary the one which readiness concepts of to your life integrates (Senemoğlu, 2020).

Early intervention for childhood problems is crucial to minimizing long-term damage. Unresolved childhood problems negatively impact the learning of adult life skills, job performance, the ability to maintain friendships, and the ability to adapt to the demands of responsibility (Anonymous, 2023).

Play is a natural, enjoyable, optional, goalless and non-compulsory activity for children (Başoğul et al., 2017). It includes skills such as creativity, adaptability, risk-taking, curiosity, cooperation, problem-solving and "fluency" (VanFleet, Sywulak, and Sniscak, 2018). Playing with play elements of different shapes and sizes helps children learn to understand the meanings of colors, sizes and objects, to comprehend life and to distinguish between what is real and what is not. In addition, through play, they gain skills such as recognizing and defining objects,

understanding their functions, sorting and grouping, reasoning, establishing cause-effect relationships, making choices and developing strategies (Yavuzer, 2006).

Children are not as good at expressing their thoughts and feelings as adults. They are often unaware of their thoughts and feelings and cannot understand them. For this reason, it is very difficult for them to express themselves. Playing games for children is like talking for adults. Playing, children feelings expression he said and discovered, Relationships discovered, their experiences he conveyed, your desires expression he said And themselves satisfaction he said is the place. Toys are children's words, games are their meanings. At the same time, through games children are less risky for themselves opportunity to learn in an environment owner They become. Especially outdoor play allows children to feel more free both physically and psychologically (Öğretir, 2008). The importance of play for children is presented in Table 1.

**Table 1:** The importance of play for children

| The Importance Of Play For Children | Resource |
|---|---|
| Play encourages children to establish good relationships with their environment and to adapt to the society they live in. | (Arı et al., 2002) |
| Children game by same in time dimension, Ren, shape, size, weight, volume, dimensions, time, place, distance, and space like A lot **concepts** They learn. In addition to these, classification, arrangement, and analysis such as making, synthesizing, and problem solving mental they learn the activities. | (Akander, 2003). |
| Play is an environment that develops children's sensory perceptions. Through these games, children learn sensory concepts such as thin-thick, hot-cold, big-small, sweet-sour. In addition, games trigger children's curiosity and develop their reasoning skills. | (Akander, 2003) |
| According to Piaget (1857), having fun is adaptation. According to Gross (1896), play is practice . possible behaviors game by is won.Caillois (1958) according to game, real from life different is conscious performed, income your feelings in including, clear One frame inside straight And cheerful One in this way maintained voluntarily One is action. | (Gultat, 2015) |
| Play, especially when combined with activities that require physical strength such as jumping, running and climbing, supports the regular | (Akdere, 2006) |

| | |
|---|---|
| functioning of the child's body systems such as breathing, digestion and circulation. | |
| Playing games ensures that children's body systems work regularly. Functions related to growth, such as burning excess fat accumulated in the body, strengthening muscles and normal functioning of the endocrine glands, are carried out through games that require metabolism. | (Kocyigit et al., 2007) |
| Daily physical activity and movement have important effects on health. Adequate physical activity in the preschool period has many positive effects on health. These activities may reduce the risk of obesity and provide a protective effect against cardiovascular diseases. | (Dwyer et al., 2012) |
| It is reported that the use of toys and movement while playing effectively reduces anxiety in children. | (Ghabeli et al., 2014) |
| Through play, the child practices the experiences of adults, tries to understand them and thus discovers the world around him through play, arriving at seriousness under the guise of a form of entertainment. Play refreshes knowledge and contributes to the firm fixation of knowledge. | (Runcan et al., 2012) |
| While playing, the child learns to speak, listen, read the facial expressions and gestures of others. Over time, he learns that if he wants his friends to play, he must share, negotiate, obey or set rules, and that he must be patient, obedient and tolerant. | (Motataianu, 2014) |
| It shows that playing games can contribute to reducing crime and violence in children. | (Macdonald et al., 2021) |
| Playing outdoors has huge learning and developmental benefits for young children. When children play outside, they learn how to interact with others, express and resolve their emotions. Playing outdoors helps children explore their natural environment and develop a more positive attitude towards learning. | (McMillan, 2018) |

## 2. CHILDREN'S PLAY RIGHTS

The importance of play for children and the structure of society has been emphasized by many studies, and providing children with the right to play has also been emphasized (Table 1). Play is a fundamental right of children.

Games; 1977 in the year published The child's game to your right related Malta The Declaration states that nutrition, health, shelter and education are essential to the developmental potential of every child. vital importance owner is (Heseltine and Holborn,1987). National Game Area Security program (NPPS) focuses on idea is this: Every child has the right to play There are, children play to learn the values of play and life. Playing games has a positive effect on physical and personal development (Anonymous, 2023).

Two international establishment, UNICEF (United Nations Children's Fund ) and IPA (International Game Association), game and game areas in including to be as follows child with their rights "United Nations Human Rights Charter" related The “Declaration of the Rights of the Child” was published in 1959. In the 7th article of the said declaration, This expressions place is taking: “The child in education rights It should also be recognized in the agreement. Playing field; Society and the public institutions have this right to life to be passed for effort to show It is necessary. In the 31st article of the " Declaration of the Rights of the Child " renewed by the "United Nations Congress" , it is stated that "children rest, age-appropriate games and cultural events participation "right" It is emphasized (Giles-Corti et al., 2005).

Child rights about most detailed to the content owner the one which. And A lot country by approved, neglect said all child your rights back bringing and healthy one society formation accelerating Child Rights The Agreement (1989) all countries has signed The child's high the benefit of Approving and the child alive stay, development, name, citizenship, your thoughts expression don't like privacy rights in including to be as follows the child your well-being constituent actions defining child to your rights about It is included in the contract (Jones, 2005; Karakaş and Çevik, 2016; Örün and Tatlı, 2012; Unutkan, 2008; Washington, 2010).

Moreover above agreement within the framework of the state to children opposite have responsibilities. Parents non- children upbringing and care, disabled children your needs to be met, children their lives healthy One in this way to

continue and social from aid to benefit from providing in place (Akyüz, 2000; Fazlıoğlu, 2007; Karaman- Kepenekçi, 2010; Yıldırım Doğru, 2015).

Play is considered indispensable for children's emotional and physical development, health and general happiness (Clements, 2004; Lester, 2008; Janssen, 2015; Lambert et al., 2019). Children's ability to play is mentioned in Article 31 of the United Nations Convention on the Rights of the Child (UNCRC) and Article 12 of the African Charter on the Rights and Welfare of the Child (ACRWC). Both articles of these international conventions emphasize the right of every child to "Use their free time and rest, to take part in play and recreational activities appropriate to the child's age, and to participate freely in cultural and artistic life" (Raney et al., 2019*).*

The Convention on the Rights of the Child secures all areas of development of the child, thus forming the foundations of a conscious society. It is extremely important for children to know and internalize these rights. Children who know their rights in society respect the rights of other individuals and develop themselves to be harmonious individuals in society (Bilir and Cansever, 2017).

This to rights related awareness And learning It starts in the family children education institutions continue by doing more in development It is necessary (Baykara, 2010; Vigorous, 2015). Children's especially child cognition and society in its development fast with progress together right the concept of internalizing and your rights Understanding Individuals aspect their upbringing is important (Ayhan, 2017; Durualp, 2015; Fazlıoğlu, 2017).

Children's rights are a principle that every child has fundamental rights such as living, developing, being protected and participating in decisions, and that these rights apply to every child without discrimination. Every child has the right to live humanely in a safe and healthy environment, and respect for human rights begins with how society treats children. A child-centered approach requires understanding that children are individuals with their own independent rights and acting not only for them but also with them. In this context, it is important to recognize, understand and implement children's rights in order to improve their lives (Gökmen, 2013).

Children's playgrounds are spatial educational environments specifically designed to support children's emotional, social, physical and cognitive development and to provide education. These areas are of great importance as they support children to come together and socialize, interact with their environment and nature, have fun and rest. They are in a critical position within urban open-

green space systems by creating safe play environments by alleviating the rigid images caused by dense urban construction (Powell, 2005).

This is from ancient times the nature and value of the game. There are many different opinions on the subject advanced and sometimes this game perceptions are conflicting. Nowadays, adults play games attitudes towards it are changing. Some adults ignore games, some see games as a waste of time, some as a danger contains thinking games limits, some use games as a learning and socialization mechanism for children use to ensure for is using. United Nations Children's Rights About Article 31 of the convention to adults "Game luxury not "It is right" your message by giving to adults some responsibilities and responsibilities while loading, adults different but each other highlights the three roles involved. The first one children's right to play is the giving of the right to play. The importance of play in children's lives importance understanding the right to play is the first condition for respecting and supporting the right to play. Adults game to the right. The second role is to respect the right to play. Respecting the right to play requires understanding that play belongs to children and should not be organised by adults. At the same time, hospitals for children, schools should be done. Environment planning, urban planning, transport, industry children's right to play in areas such as determining their zones respect to hear, to respect the right to play it is the duty of adults to show the effect of play on children lightly not to take or ignore It is extremely important that the right to play is not a luxury but a basic need and should be emphasized and encouraged through various activities. The right to play should be supported and everyone should have this right. respect in this context, children's right to play about with people raising awareness by talking is necessary (Dereli and Uludağ, 2013).

UNICEF (United Nations Children's Fund) recognizes Türkiye as an upper and middle-income country with widespread public services and stable institutions. In the country Most of the children's families care under where he grew up, shelter, food and other basic needs and mainly public services such as education and health from their services they benefited from (Anonymous, 2015).

UNICEF, Türkiye children and children's rights related the main achievements and gains are as follows (Anonymous, 2023):

- Improvements in child health and well-being,
- 4 age above to children school pre- education by giving school pre- children to the development focus,

- Extending the compulsory education period to at least 12 years,
- Türkiye Big People In the Assembly Child Rights Lower The Commission, in the provinces whereas Child Rights Commissions created And 2012 in the year Child Rights Monitoring And Evaluation Board of Directors Activation
- 2005, the Child Protection Law come into force after entering very A lot child organizations Children from exploitation, from violence, to protect from abuse and neglect oriented applications (Anonymous, 2015). Listing Türkiye's achievements for children in 5 points, UNICEF states that limitations under the following headings: is expressed as:
- Child labor due to poverty, lack of equality in nutrition and participation in education,
- Being deprived of quality education and health opportunities,
- Problems of children who are married early and involved in crime,
- Personal and social development, entertainment, sport and informatics like in the fields opportunities absence,
- Children's thoughts desired to some extent expression unable to necessary environment cannot create

According to UNICEF in Türkiye children, especially of the population busy in the regions where annoyed game rights is located. This in the regions Children for sufficient game area does not exist and children movement field is restricted. Local And central governments insufficient urban planning And suitable non-reconstruction measures, children physically activities negative by influencing indirect aspect game your rights to be prevented path ( Erbeseler, 2014; Anonymous, 2015).

Türkiye signed the Convention on the Rights of the Child for the first time at the "World Summit for Children" held at the United Nations Headquarters on 29-30 September 1989, becoming the only state to have signed this convention at the presidential level. However, the necessary ratification process for the convention to enter into force was only completed on 9 December 1994. Thus, Children's Rights About The agreement was signed on 27 January 1995. And Türkiye national law numbered 4058 It has become a law (Polat, 2008). Since the signing of the Convention on the Rights of the Child and its entry into force in 1995, it has been observed that significant progress has been made in the promotion, dissemination, monitoring and implementation of children's rights in Türkiye. However, we are still

faced with a situation where much more progress needs to be made in terms of the general awareness and consciousness of the society and the focus of the public administration approach on children's rights. In Türkiye's public law, "children's right to be children and to live in a healthy environment" is emphasized under a special title regarding children's rights. However, there are no detailed regulations regarding children in the local administration law and the child's right to participation is not emphasized enough (Çakırer, 2015).

In Türkiye, the protection of children, their status within the family, their education, their working conditions and all their rights in general are secured by various legal regulations. In addition to the economic and social rights of children, one of the rights that is often overlooked and then examined, but is actually a priority for the physical and spiritual development of the child, is the right to play. Play is a basic need of every child. While some children can easily meet this need due to the favorable living conditions, others cannot sufficiently benefit from the right to play due to the limited opportunities of the country or region they live in. The ability of children to play is considered a cultural norm. Play is an important opportunity for children to understand their environment and society. Play helps children reflect both their personal characteristics and the cultural characteristics of the society they live in to the future durable with steps preparations for game by Happy One childhood spend basis One It was a necessity (Özdemir, 2006).

Violations of children's rights deprive children of basic needs and services (e.g. health, education, etc.). These violations lead to children being subjected to abuse, violence and neglect, and to their right to participate fully in society. Depriving children of their basic rights can have negative consequences. These consequences can increase the risk of children being exploited, neglected, abducted or abused (Anonymous, 2006).

There are three main factors among the main reasons why children do not benefit equally from the right to play around the world. These are universal poverty and the inability to meet basic needs due to this poverty, the change in cultural values due to the globalization process, and the existence of inadequate playgrounds. The change in cultural values can affect the way play is perceived; for example, the tendency to see play as a leisure activity only. In addition, children may prefer to watch television or play computer games under the influence of technological developments. The inadequacy of playgrounds is another problem that violates children's right to play. In settlement plans, playgrounds large enough and in

sufficient numbers to meet children's needs are not considered. In addition, the fact that schools focus on cognitive studies and apply intensive educational programs to students is another factor, as is not providing them with sufficient opportunities to play (Tuğrul and Metin, 2019).

The areas that municipalities that are sensitive to children's rights should regulate are as follows: (Özservet, 2015)

- Recognizing the right of children to participate in city-related decisions,
- Providing children with the opportunity to share their thoughts about how they want to live in their city.
- Removing obstacles that children face in family, community and social life.
- Ensuring children have access to basic needs, such as health and education.
- Ensuring access to clean water and healthy food.
- Protection of children against violence and ill-treatment.
- Creating areas where children can roam safely.
- Creating suitable spaces where they can meet and play with their friends.
- Ability to interact with plants and animals by providing access to natural environments.
- Respect for the right to live in a clean and healthy environment.
- Providing opportunities for children to participate in social and cultural activities

In our country, it is observed that children's rights are not sufficiently known and there is a need to raise awareness on this issue and that local administrators lack awareness on children's rights. This issue was organized on 17-18 November 2014 and especially "Child Your rights to be implemented Oriented Child Supervision at the “Symposium” was emphasized (Özservet, 2015).

## 3. CHILD FRIENDLY CITIES

### 3.1. What is a Child-Friendly City?

The child-friendly city approach aims to fully implement the Convention on the Rights of the Child. In this context, a child-friendly city should provide young citizens with the right to make decisions about the city they live in, to express their thoughts freely, to participate in society, family and social life, to access basic needs such as education, health and shelter, to drink clean water and have healthy living conditions, to be protected from exploitation, abuse, violence and mistreatment, to

walk the streets safely, to meet and play with friends, to have green areas and to live in a clean environment (Genç and Güner, 2016)

Focusing on raising healthy generations, the first examples of Child Friendly City initiatives emerged in Italy in the 1990s. This initiative started in the small town of Fano in Italy and spread throughout the country and became internationally recognized, with the leadership and participation of Rome. In this process, local governments took action to discover children, hear their voices and investigate their needs. In this way, children have the right to their own rights. reunion to the opportunity owner They are. Child Friendly Cities implemented in many cities in Italy program Environment Ministry of It is coordinated by (Karakuzu and Aksu, 2022).

The Child Friendly City (CFC) approach offers the opportunity to participate in social and cultural activities and to access all kinds of services as equal citizens of the cities without being subject to any discrimination such as ethnic origin, gender, different belief, economic income or disability status (Gökmen, 2013). The countries where the child friendly city initiative exists and does not exist are presented in Table 2.

**Table 2:** Countries in the world where the UNICEF Child Friendly City Initiative is and is not implemented (Anonymous, 2022).

| **The CFC Initiative Exists** | **CFC Initiative Does Not Exist** | **Countries with CDA Initiative in Design Process** |
|---|---|---|
| **Canada** | Denmark | Alaska |
| **Brazil** | Mexican | USA |
| **Colombia** | Bolivia | Norway |
| **Pelu** | Argentina | Chinese |
| **Costa Rica** | Chile | Svalbard Islands |
| **Belize** | Uruguay | |
| **Iceland** | Cuba | |
| **Senegal** | Paraguay | |
| **Guinea** | Russia | |
| **Mozambique** | Australia | |
| **Portugal** | Morocco | |
| **Spain** | Algeria | |
| **France** | Libya | |
| **United Kingdom** | Sweetcorn | |

| | |
|---|---|
| **Swedish** | Sudan |
| **Finland** | Financial |
| **Germany** | Niger |
| **Italy** | Nigeria |
| **Austria** | Tanzania |
| **Poland** | Angola |
| **Ukrainian** | South Africa |
| **Belarus** | Saudi Arabia |
| **Bulgaria** | India |
| **Türkiye** | Iranian |
| **Jordan** | Pakistan |
| **Kazakhstan** | Afghanistan |
| **Mongolia** | Thailand |
| **Kyrgyzstan** | Turkmenistan |
| **Indonesia** | Syria |
| **New Zealand** | Iraq |

The Emergence Process of the Child-Friendly City Concept in the World is presented in Table 3 (Aydoğan, 2020).

**Table 3:** The Emergence Process of the Child-Friendly City Concept in the World (Aydoğan, 2020)

| **CHILD-FRIENDLY CITY PROCESS IN THE WORLD** | |
|---|---|
| **HISTORY** | **WORKS CARRIED OUT IN THE PROCESS** |
| **1924** | Genera Declaration of the Rights of the Child |
| **1946** | UNICEF Organization |
| **1948** | United Nations Universal Declaration of Human Rights |
| **1949** | Establishment of the Bernard Van Leer Foundation |
| **1959** | The UN General Assembly adopts the Declaration of the Rights of the Child |
| **1971-1975** | Kevin Lynch's UNESCO's Supported Project "In the city Grow" |
| **1972** | Stockholm Conference (UN Conference on Humanity and Environment) |
| **1976** | UN Conference on Human Settlements (Habitat I)-Vancouver |
| **1979** | UN declares International Year of the Child |
| **1987** | Brundtland Report by the World Commission on Development and Environment |
| **1989** | UN Convention on the Rights of the Child |
| **1990** | UN World Children's Summit-UN New York |
| **1994** | Louis Chawla's "Growing up in Cities" project on the agenda |
| **1994** | The adoption of the UN Convention on the Rights of the Child by the Turkish Grand National Assembly |
| **1996** | Habitat II Conference-Istanbul |

| | |
|---|---|
| **1996** | Establishment of the UNICEF Child Friendly Cities Initiative (CFCI) |
| **1997** | Rio+5 Conference |
| **2000** | UN Millennium Summit-Millennium Development Goals |
| **2000** | Establishment of UNICEF Child Friendly Cities (CFC) Secretariat |
| **2001** | Istanbul+5 Conference |
| **2002** | Rio+10 Conference |
| **2008** | Child Friendly City Conference-Rotterdam |
| **2012** | Rio+20 Conference |
| **2015** | Agenda 2030: Adoption of the UN Sustainable Development Goals |
| **2016** | Habitat III Conference (New Urban Agenda)-Quito |
| **2018** | Child-sensitive urban planning book by Jens Aerts published by UNICEF |
| **2018** | Kit containing criteria for creating a CVC published by the Bernard Van Leer Foundation through its program called Kent95 |

The Emergence Process of the Child-Friendly City Concept in Türkiye is presented Table 4 (Aydoğan, 2020).

**Table 4:** Child-Friendly City Process in Türkiye (Aydoğan, 2020)

| **CHILD-FRIENDLY CITY PROCESS IN TÜRKİYE** | |
|---|---|
| **HISTORY** | **WORKS CARRIED OUT IN THE PROCESS** |
| **1868** | Reformatories |
| **1873** | Darüşşafaka |
| **1896** | Hospice Institution |
| **1915** | Darüleytamlar |
| **1919** | Industrial Gurbuzler School, Military Primary School |
| **1920** | Kindergarten |
| **1920** | Children's Town-Sarıkamış |
| **1921** | Himaye-i Eftal-Children's garden |
| **1921** | Children's Day |
| **1925** | First Kindergarten |
| **1927** | Declaring April 23 as Children's Day |
| **1929** | Children's Week announcement |
| **1963** | Turkish Declaration of Children's Rights |
| **1979** | The United Nations declared the International Year of the Child |
| **1994** | The adoption of the UN Convention on the Rights of the Child by the Turkish Grand National Assembly |
| **2010** | KENTGES Child Friendly City creation article (2010-2023) |
| **2014- 2015** | UNICEF Child Friendly Cities Country Program |
| **2016** | International Children's Center (ICC) "Child Friendly Tourism" Project |
| **2016-2020** | UNICEF Child Friendly Cities Country Program |

The "Framework of Action for Child-Friendly Cities" published by UNICEF (United Nations Children's Fund) in 2004 defines the necessary qualities of a child-friendly city. In this context, the most important indicator of whether a city is child-friendly is the decision-making of children about the city and its design. Taking whether they can participate in the processes or not. Children's right to participation was guaranteed by the "United Nations Declaration of the Rights of the Child" published in 1989. Isolating children from the design processes of their living environment and limiting their right to influence their own lives can lead to problems in terms of social inequality. The idea that they should only be raised for a "brighter future" means seeing child participation only as a preparation process for the future, while ignoring the effects of children on current structures (Kemp and Sutton, 2002).

Creating a child-friendly city also means implementing the Convention on the Rights of the Child by local governments and observes a number of important features that put children at the center. To create a child-friendly city, local governments should consider 9 building blocks (Anonymous,2004):

***Children's Participation*:** Children themselves concerning Topics active Participation to be directed their opinion And your thoughts listening, decision Don't give in the process This your views consideration to be taken,

***Child-Friendly Legal Framework*:** All children your rights protecting And developing rules, arrangements And legal procedures to determine,

***City-Scale Child Rights Implementation Strategy*:** To the contract based on aspect child friendly One city construction to do for detailed And comprehensive One strategy or program to develop,

***Child Rights Unit or Coordination Mechanism***: Local in administrations children your views priority aspect Consideration to be taken will provide permanent structures to create,

***Determination and Evaluation of the Impact on Children*:** Law, policy and applications APPLICATION pre, APPLICATION during And APPLICATION after Children on it the effect of to be determined oriented systematic the process existence,

***Regularly Published "City Children's Situation Report":*** Children's situation And your rights to the determination oriented researches And sufficient data collection of to be monitored,

***Ensuring Awareness of Children's Rights:*** Adults And children child rights about your information to develop,

***Independent Advocacy and Advocacy on Behalf of Children:*** Protecting children's rights oriented in their efforts non-governmental organizations and Ombudsman in this field or Child Commissioner's Office Independent human rights organisations such as install.

Considering these building blocks, local governments should focus on the following priority targets (Gökmen 2013):

- A safe and healthy environment,
- A friendly city to support children's development,
- A sustainable and fair environment,
- An environment where basic services are provided and can benefit everyone in the environment,
- Creating a friendly environment especially for children in difficult situations,
- It is also necessary to have primary goals in an environment that is anti-discriminatory and promotes solidarity.

These goals form the basis of a child-friendly city approach and provide a framework for protecting and promoting children's rights.

Game, diary to life Participation One is an example And children 's environmental with demands head to help them regulate their emotions, cope with stress Don't and self-defense skills qualities such as winning is a tool for gaining. Children usually reflect what they see in society in their games. For example, while playing, they think of going to the market or filling up his toy car with gas dream a child who does daily life experience wins and thus social to reality participates. Therefore, the right to play is directly linked to the right to participate is We can say that. In cases where the right to play is prevented, the right to participate is also seen. For example, the environments that some children have to live in may contain high levels of violence and fear. War, pollution, poverty, prisons, oppressive environments and bad environments, participation your right well the main reason for the denial of the right to play games of the reasons some of them. This situation open in the air game playing decrease and adult control increase path in opening, well Children are completely deprived of their right to play stay means (Dereli; Uludağ, 2013).

In addition to the economic and social rights of children, it is important to focus on the right to play, which is often overlooked and addressed later, but is actually a much more prioritized right in terms of the child's physical and spiritual development. Play is a basic need of all children. While some children can easily meet this need due to the favorable conditions in which they live, others cannot sufficiently benefit from the right to play due to the inadequacy of the conditions of the country or region in which they live (Küçükkali, 2015).

In our country with childhood a national policy on the subject The absence of this puts a great responsibility on local governments and society. Municipalities, borders inside people's and circles needs -most good understanding, livable environments for children creator and in many areas to the problem and are the organizations closest to a solution. Children Council Administrations by managed a significant part of the population in the regions Social service to the policy According to local governments to children and to families oriented support and in providing protection services. As in developed countries around the world, local governments need to play a critical role in terms of providing services more effectively at the local level, compared to the central government. For example, in countries such as Finland, which produces many projects for children, local governments have a great influence on children's education. Similarly, in small settlements such as Fano, where child-friendly initiatives are thought to have started in Italy, this responsibility is usually undertaken by a local government unit (Çakırer, 2014).

Children's Rights The Agreement within the body of and under the responsibility of local governments The Child Friendly Cities initiative is carried out by UNICEF . With the financial support of UNICEF Türkiye Office, UNICEF Türkiye National Committee and IKEA (Company), local child-friendly policies and programs of governments to develop and child friendly area supports the creation of . Moreover Interior Ministry of Local Administrations General Directorate, Türkiye Municipalities The Union, United Cities And Middle East And West Asia Local Administrations Area The organization And Local Administrations Academy local And spherical democracy national coordination In this project, children are considered active participants in the city administration and their ideas are taken into account by the city administration. In this way, city policies are shaped based on the opinions of children (Anonymous, 2023).

### 3.2. UNICEF Child Friendly City Projects, World

Child Friendly Cities The project, UNICEF by 2014-2015 years between Türkiye's 10 different of the city in their municipalities applied One project is, IKEA Türkiye And National Finance from support taking advantage of local in administrations with children child friendly policy And programs development of aims. UNICEF, Child Friendly City attempt in the scope of 45 in the country child friendly city projects (Aydoğan, 2020). Child-Friendly City Initiatives in the World are presented in Table 5.

**Table 5:** Child-Friendly City Initiatives in the World (Anonymous, 2023).

| **CHILD-FRIENDLY CITY INITIATIVES IN THE WORLD** | | |
|---|---|---|
| **COUNTRIES** | **INITIATIVES** | **YEAR** |
| **FRANCE** | "Child Friendly Cities The aim of the "VAE" program is to official of children's lives between Improvement about awareness is to create. This 12 cities participated in the initiative and many A rigorous application process was established. The agreement child friendly in commitment found to cities six - year recognition shaped is signed and if within six years This commitment in its place if they can't bring it the appointment may be cancelled. Today VAE approach 231 city and 9 the region covers. This initiative especially for children focuses on participation, non - discrimination and education ("UNICEF Children Friendly City"). | 2002 |
| **SPAIN** | This attempt, city their management taking into account the welfare of children areas, protects their rights , encourages their participation and makes cities more rewarding, more sustainable and more equitable in this way encourages the development of living public policies . One city/region child friendly to be recognized as a city, the following conditions welcome Need: A city- wide children's strategy, a local action plan And council Participation should be. Children and will follow this They need to establish a steering group ("UNICEF child friendly to cities related practical examples"). | 2002 |

**Table 5:** Child-Friendly City Initiatives in the World (Anonymous, 2023). (Continued).

| | | |
|---|---|---|
| **GERMANY** | This attempt to do two things aims to: 1) local governments, politicians and municipalities among children-related issues related awareness 2) Increasing the participation of children and young people in cities to the development of participation and having a say The project cycle lasts four years . At the beginning of the cycle , the CFCI coordination body takes into account the structure of the municipality and the situation of children's rights. conducts a comprehensive analysis of the . The results of the analysis will then be used to develop an action plan. "Towards Child- Friendly Cities related "UNICEF Application Example"). | **2012** |
| **JAPAN** | After the official presentation , five city, UNICEF testing its effectiveness decision The components of the Japanese CFC model are very close to the original UNICEF components . This model creates a common framework for action that complies with the principles of children's rights. cities construction The model will be evaluated by participating municipalities with the support of UNICEF . After the pilot phase , the model will be rolled out to all relevant municipalities in Japan. to use will be presented ("UNICEF child friendly to cities oriented APPLICATION examples"). | 2018 |

Examples of Child-Friendly City Initiatives around the World are presented in Figure 1 and Figure 2

**Figure 1:** Germany Schulberg Children's Playground (Anonymous, 2016).

UNICEF with Child Friendly City project supporting Germany's Wiesbaden of the city in your heart, landscape architects Annabau by designed, different

architectural to design owner attention attractive one game is the field. With natural elements designed for children's ages and according to their difficulty levels like they can have fun, climbing, jumping, rest and activities such as sliding areas It has become one of the unique children's playgrounds that combines has arrived (Anonymous, 2023).

France, which carries out the Child Friendly Cities project with UNICEF, is also an example of a children's playground designed with natural elements and water features.

**Figure 2:** Example of Children's Playground in France (Anonymous, 2016).

### 3.3. UNICEF Child Friendly City Projects, Türkiye

Child Friendly Cities The project, UNICEF by 2014-2015 years between Türkiye 's 10 different of the city in their municipalities applied One project is, IKEA Türkiye And National Finance from support taking advantage of local in administrations with children child friendly policy And programs development of aims. UNICEF Türkiye Committee. UNICEF, Child Friendly Cities attempt in the scope of 45 in the country child friendly city projects to life aimed to pass (Aydoğan, 2020).

Project activities were implemented in ten different cities in Türkiye. These cities are Manisa, Bornova/İzmir, Eyyubiye/Şanlıurfa, Mamak/Ankara, Mersin,

Yüreğir/Adana, Lüleburgaz/Kırklareli, İspir/Erzurum, Giresun and Bitlis (UNICEF). Child Friendly City Initiatives in Türkiye are presented in Table 6.

**Table 6:** Child-Friendly City Initiatives in Türkiye (Anonymous, 2023).

| CHILD-FRIENDLY CITY INITIATIVES IN TÜRKİYE | | |
|---|---|---|
| **CITIES** | **INITIATIVES** | **YEAR** |
| **ADANA / YUREGIR** | Yuregir Municipality this important with the project disabled to children suitable game areas by creating, children coordination mechanisms by applying, to parents physically, psychological And cognitive needs about education by giving, children game And development to their rights to reach helper will be activities is running. Advert Children's rights in society by using billboards and other visual communication tools about awareness to be increased oriented Advocacy activities will execute. | 2015 |
| **ANKARA / MAMAK** | Children's themselves oriented prepared in programs promise owner to be to ensure, programs planning to the process active their participation facilitate, opinion And your comments -most top at level to be taken to ensure for available Child The Council of Strengthening for effort will show. By creating a suitable playground for children with disabilities disabled children to access their rights to play and development helper will be. Mother father trainings will continue to give children's rights about awareness to be increased oriented Advocacy activities will execute. | 2015 |

**Table 6:** Child-Friendly City Initiatives in Türkiye (Anonymous, 2023), (Continued).

| | | |
|---|---|---|
| **BITLIS** | Children's themselves oriented prepared in programs promise owner to be to ensure, programs planning to the process active their participation facilitate, opinion And your comments -most top at level to be taken to ensure for available Child The Council of Strengthening for effort | **2015** |

| | | |
|---|---|---|
| | Advertisement Children's rights in society by using billboards and other visual communication tools about awareness to be increased oriented Advocacy activities will execute. Available capacity of personnel and systems by strengthening child coordination mechanism will be implemented . | |
| **ERZURUM / ISPIR** | Children themselves oriented prepared in programs representation, active participation in the planning of these programs to facilitate, opinions and comments organised will establish a Children's Council to ensure that it is received as a new Culture In the center ensuring active participation of children and youth; child- friendly One area by creating programs and projects will support the development to the parents physical, psychological and cognitive needs well Here are some better parenting methods: Education on acquiring will be given. | 2015 |
| **GIRESUN** | Children themselves oriented prepared in programs representation, active participation in the planning of these programs to facilitate, opinions and comments organised Giresun Municipality will review its budget from a child rights perspective and start the new budget period . appropriate budget changes will do. By creating a suitable playground for children with disabilities disabled children to access their rights to play and development helper will be. | 2014 |

**Table 6:** Child-Friendly City Initiatives in Türkiye (Anonymous, 2023), (Continued).

| | | |
|---|---|---|
| **IZMIR / BORNOVA** | Children themselves oriented to the programs their participation, active role in the planning of these programs to take them to facilitate, opinions and comments organised Children's Council will be established to ensure that children are taken as robotics, technology autonomy, control And Best practice opportunities and technical standards for using linear and | **2015** |

| | | |
|---|---|---|
| | non-linear automation systems to ensure Child-friendly equipment such as in including is will establish a Renewable Energy and Mechatronics Laboratory **.** | |
| **KIRKLARELI / LULEBURGAZ** | Child Safe, free and child-friendly environments for their activities (sports, cultural events, festivals, etc.) will create will design children's streets in a way that will ensure the active participation of children in every stage of the process. A child-friendly strategic plan will be developed; will ensure meaningful participation of children in the preparation and discussion of the plan. Advertisement Children's rights in society by using billboards and other visual communication tools about awareness to be increased oriented Advocacy activities will execute. Mother father trainings to give continue will. | 2015 |
| **MANISA** | Children themselves oriented prepared in programs representation, active participation in the planning of these programs to facilitate, opinions and comments organised will establish a Child Council to ensure that families are taken into custody. Children adopt better parenting practices within the framework of their physical, psychological and cognitive needs helper will be parents trainings will be given. Children for child friendly areas (libraries, cultural and artistic activities for children areas) creation of to support. | 2015 |

**Table 6:** Child-Friendly City Initiatives in Türkiye (Anonymous, 2023), (Continued).

| | | |
|---|---|---|
| **MERSIN** | Prepared for children themselves have a say in the programs to ensure, the existing Children's Council to facilitate their active participation in the programme planning process and to ensure that their views are regularly sought Strengthening will be aimed. Advert Children's rights in society by using billboards and other visual communication tools about awareness to be increased oriented Advocacy activities will execute. Available a Child Coordination | **2015** |

| | | |
|---|---|---|
| | Mechanism to strengthen the capacity of staff and systems will apply. | |
| **SANLIURFA / EYYUBIYE** | Child Safe, free and child-friendly environments for their activities (sports, cultural events, festivals, etc.) will create will design children's streets in a way that will ensure the active participation of children in every stage of the process. A child-friendly strategic plan will be developed; will ensure meaningful participation of children in the preparation and discussion of the plan . Advert Children's rights in society by using billboards and other visual communication tools about awareness to be increased oriented Advocacy activities will execute. Mother father trainings to give continue will. | 2015 |

Samples of Child-Friendly City Initiatives in Türkiye are presented in Figure 3, Figure 4 and Figure 5.

**Figure 3:** Mamak District of Ankara Province; Children's Playground Designed Within the Scope of Child-Friendly City (Anonymous, 2016).

Mamak Municipality, It is the only municipality among the capital municipalities that implements the Child Friendly City project with UNICEF.

Disabled playground specially designed for children has been opened. An area that is friendly to disabled children, safe and includes elements that comply with standards, where they can play together with other children under equal conditions has been designed. Along with accessibility, soft ground texture and play groups that comply with standards; attention has been paid to the park design that allows children with physical disabilities to play with other children. Within the scope of a child-friendly city, this is the most important issue that the Municipality should pay attention to in such children's playgrounds (Anonymous, 2016).


**Figure 4:** Kırklareli Province Lüleburgaz District; Children's Street Designed Within the Scope of Child-Friendly City (Anonymous, 2016).

The children's street was launched in Lüleburgaz in 2015 with the slogan "Lüleburgaz, a Child-Friendly City" in cooperation with UNICEF and IKEA. The street, which was closed to vehicle traffic, was turned into a street where children can play safely and freely. The aim of the designed children's street is to create an area where only children can spend time by closing it to vehicle traffic. Instead of play groups used in children's playgrounds, an area where various activities are held was created for children to socialize. The main purpose of the project is to establish streets belonging to children and to establish child-friendly spaces where they can both have fun and learn in line with their wishes and desires. The street includes a bicycle path, an area where children can play street games such as hopscotch, an area where they can play ball and draw (Anonymous, 2016).

**Figure 5:** Şanlıurfa Province Eyyubiye District; Children's Playground Designed Within the Scope of Child-Friendly City (Anonymous, 2021).

Eyyubiye Municipality, which carries out the Child Friendly Cities project with UNICEF, designed a forest-themed children's playground in order to instill a love of animals and nature in children and to increase their self-confidence. The play groups in this designed children's playground are expressed as forest-themed due to the fact that they are shaped with plant models. Plants are depicted in the play groups, but tree and bush species are not seen. The theme is reflected in the design only with the play element (Anonymous, 2021).

In addition, studies were carried out according to the results in a total of 12 provinces (Gaziantep, Bursa, Trabzon, Antalya, Sivas, Konya, Kırşehir, Kayseri, Tekirdağ, Karaman, Erzincan and Hizmetkar), 8 of which are main and 4 are reserve. ) Child-friendly advertisements should be developed within the framework of these criteria. However, after a short time, it was decided that it would be more appropriate to start these studies as 12 pilots in the province and to separate the main studies. Behind this first study, your decision was an event to be organized by the provincial staff together with locally elected administrators. Moreover, families and schools are not child-friendly in meetings (Topsümer et al., 2015). Child-Friendly City Criteria within the Scope of Children's Rights to Play are presented in Table 7.

**Table 7:** Child-Friendly City Criteria within the Scope of Children's Play Rights (Topsümer et al., 2015).

| CHILD-FRIENDLY CITY CRITERIA WITHIN THE SCOPE OF CHILDREN'S PLAY RIGHTS | |
|---|---|
| **A Healthy and Safe Environment** | Child And family health their structures ; from pollution, contagious from diseases And their lives And their health may affect other from negativities Protection is planned. |
| **A Friendly Environment for Children's Development** | Positive features owner house And environments While the importance of children's physical , social and psychological development is emphasized; social buildings suitable for children's interaction with their environment Providing all entertainment, education and social activities is intended. |
| **A Sustainable and Fair Environment** | Securing a sustainable future for children and their families under This future must be taken, Children environmental deterioration And natural disasters devastating from the effects of to fair economic and social conditions that protect must endure. |
| **Basic Services Are Provided and Care Is Provided to All** | Preventive services that provide information on hygiene and health, in emergencies and acute diseases first to help possibility by the centers providing Presentation is required. |
| **A Friendly Environment Especially for Children in Distress** | Local policies should address issues that particularly affect vulnerable children . to take These are the isolation overcome to come And what they experienced to society integrated to be for to help need are homeless , disabled and vulnerable children. |
| **An Environment That Does Not Discriminate and Encourages Solidarity** | Gender, economic, cultural, social And ethnic differences, person in honor of respectful And solidarity aiming One in the frame expression is being done. |
| **Children's Participation** | To the children information and value their opinions , as partners , individuals, equal and active members to act during the CDA study Consideration the most important foundation to be taken is one of the elements . |
| **Child Friendly Legal Infrastructure** | Local managers, controls under legal infrastructure child your rights protection And to support must provide And local administrations, own controls under non- laws in its implementation with children together child protector aspect duty should take. |
| **Child Rights Unit or Coordination Mechanism** | CDC's Establishment of children at the center of management It requires that this be done from their ways one is children's rights to establish a unit or coordination mechanism. Coordination mechanism the highest political body of the city must belong to . |
| **Child Budget** | the Rights of the Child, states must ensure the economic, social and cultural rights of children. assurance under to take for the widest resources available No state or city |

| | |
|---|---|
| | requires the use of detailed And TRUE One budget analysis How well can you perform this task without cannot determine whether it was brought . |
| **Making Children's Rights Known** | status of children as rights holders in CFC will be supported by all who work with and on their behalf Article 29 of the Convention on the Benefits of Education guarantees respect for human rights and other fundamental freedoms. to develop should aim. |
| **Report on the Situation of Children in the City** | CDAs, constantly monitoring the situation of children in their cities All children from birth to 18 years of age related statistics And systematic collection of information , child-centered urban of politics development is fundamental in terms of . |

## 3.4. Planning and Design Criteria for Children's Playgrounds within the Scope of Child-Friendly City

### *Children's Play Areas Planning Criteria (Anonymous, 2020)*

Spatial plans;land usage and reconstruction to their decisions information giving, physically, natural, date and cultural values to protect and to develop for prepared, protection and use balance providing, national, regional and city at the level of sustainable development supporting, healthy, quality of life high and trustworthy environments creator are documents.

Each type and in size reconstruction their plans preparation and examination with in these done change, adding and in changes; 14 June 2014 history and 29030 Numbered Official In the newspaper published "Land Use Planning Regulation" provisions of suitable should be.

This Regulation in the scope of prepared in all types and sizes land use plans, the planning principles set out below, principle, standard, presentation techniques and planning are applied in accordance with the relevant definitions.

These general principles and bases are as follows:

a) Plans are made for the public good.

b) Plans are a whole with representation, sheet, plan report and plan notes.

c) Project, lower level to the project guidance does however detail level of building requirements to the level, scale and purpose suitable to be should be provided.

d) Senior planning, low level to planning spatial goals determining, guidance and principlesproviding is planning.

e) Spatial strategic Implementation of plans, environmental plans and master development plans cannot be achieved by measuring.

f) Other in stages planning by expanding or contracting planning cannot be

achieved.

g) Historical, natural and cultural values protection and use between balances must be achieved.

h) Improving the quality of buildings and the environment necessary renovations for the purpose of related decisions is located in the plan.

i) Natural to disasters related data, to the project basic geological and natural data.

j) Existing traditional structures, if any, in the project must be protected.

k) National and regional strategic planning of large projects requiring decision-making at the level spatial planning or environmental planning It is essential to evaluate it within the scope of.

l) Planning process; Analysis stage research to do, problem emerge to put and data and information to collect contains; Your information collection, unification and your results evaluation synthesis stage of and plan relating to decision don't give stages of in the preparation of plans, surveys, public opinion polls are used to ensure participation according to the plan type.

m) Your plan in case of cancellation, analytical and synthetic studies more before organisation and from organizations taken opinions this regulations within the framework of the following in this way again will be evaluated: new plan development process of one piece.

n) Available surrounding or adjacent to planning according to planning is done. Protected areas the plans surrounding these areas are made taking into account the sensitivity of these areas.

*Location Selection in Planning:*

- Playground location while choosing areas away from heavy traffic for safety, noise and air pollution reasons priority should be given. This type of area for if planning is required plants and inanimate matter necessary precautions against to be taken is required.
- Children's playgrounds the child must be within walking distance of home or school.
- Dynamic areas with land, hiding, exploring, climbing and offers opportunities such as skating for flat areas It is more enjoyable than design. Therefore, from the natural height of the area in the process to benefit from suitable has been seen.

### *Children's Play Area Design Criteria (Polat, 2021)*

- Active play activities that require physical effort and passive play activities that do not require physical effort should be included in the playground.
- Areas that appeal to different age groups are separated by distance. be but also with each other connected be It is necessary. Due to the physical differences of children depending on their age, the play elements should appeal to different age groups. Therefore, they should be separate. In order for children of different age groups to socialize, they should be connected.
- Children's modeling their skills and imagination Natural materials such as sand and gravel are used to develop space should be reserved. However, it is also seen that sand poses a danger to children in younger age groups. For this reason, materials that meet certain standards and are appropriate for age groups should be used.
- In addition to the area reserved for play equipment, there is a space where children can move and run freely. can jump and also free space to roam must be found.
- Children's game to their fields hand, face washing, this drinking and playing sand purposeful This fountains should be placed.
- Protecting children from falling etc. for the protection of children game of the field Soft ground that provides less damage in case of accidents and natural materials should be used. The natural mulch used in recent years is more useful because it serves both purposes.
- In the playground are suitable for vehicles such as strollers, bicycles and wheelchairs. must be at least 1.5 m wide.
- Parents their children, especially also to be able to watch their young children and their ability to control for clear One to the distance seating elements should be placed. The seating area around sufficient in number rubbish box must be found.
- It is stated that the use of plants in children's playgrounds contributes significantly to the mental, emotional and physical development of children and also minimizes the accidents and injuries frequently seen in these places. Therefore, the use of plants in children's playgrounds should be increased. However, there are points to be considered when making plant design. Game

areas of around thorny, toxic, inedible fruits and allergen pollen including Plants should not be included.

- Children should benefit from sunlight, and at the same time, shaded areas should be created with trees or artificial materials to protect children from excessive sunlight. Medium-sized evergreen species should be selected. It should be ensured that the branches of the plants do not block the paths in the children's playground. For this, plants should be planted at standard intervals so as not to block the passage and regular maintenance and pruning should be done. Examples of plants that can be used in children's playgrounds are trees such as Acer campestre, Acer platanoides, Cercis siliquastrum, Purunus cerasifera (Erdem, 2003).
- Without ignoring the safety of the place, soft-textured plants placed in the green area and on the roadside will provide children with the opportunity to hide and wander around.

## 4. CONCLUSION

The first paragraph of article, 31 of the Convention on the Rights of the Child, which regulates the most fundamental vital rights of children, is as follows; "States Parties recognize the right of the child to rest, leisure, play and engage in entertainment (activities) appropriate to his or her age and to participate freely in cultural and artistic life."

The text of the article shows that children having playgrounds suitable for their ages is a fundamental right as much as the right to life. One of the biggest factors underlying a quality life is educated children. The primary way of education for children is also play. The human brain is an entity that develops as it thinks. For this reason, if states aim to raise intelligent, strong and conscientious societies, they should start with children. Children who are happy and manage to be happy achieve this with love and play. The muscle structures of people with increased mobility develop and the material and spiritual efforts of societies to combat obesity and this fight decrease.

One of the biggest problems of children today is the lack of socialization and communication. Lack of communication and loneliness also bring psychological problems. Children who do not know new people around them do not know how to establish communication skills with people they encounter in society. Outdoor

children's playgrounds are a socialization area for children and their families. Children whose lives are stuck between apartments need constant renewal of their horizons.

Children need open spaces to perform their physical activities and socialize.

The goal of municipalities to be child-friendly will be the most important service for children and values will be transferred to future generations. A good society depends on a good childhood.

With play, the child's inner world of intense emotions such as fear, anger, jealousy, disappointment, etc. And conflicts to the games in It is conveyed that children are in a safe place so that they can open their inner worlds easily. They have to believe in the game. The most important function here child unconditional accepting it as it is is to provide the necessary environment for growth and development. Borders and choices Self-awareness and autonomy develop through play and this helps children is the most important benefit it provides.

Psychological problems experienced by children; behavioral problems, relationship problems with family members or peers, adaptation problems in school or social environments, sibling jealousy, fear and anxiety, behaviors that are not appropriate for their age, etc. Problems such as these can be minimized through play. Children's ability to socialize more with other children in playgrounds will reduce such problems and strengthen their communication.

Play is an inseparable part of a child's life and the most important tool for their development, as well as their most natural learning environment. They are also the child's language and most effective means of expression. At this point, play will help the child discover their talents and develop their senses, while providing these, and at the same time, increase their physical and personal development.

With the increase in population today, this situation to urbanization also path is opening. However constructions increase causing the decrease of open spaces and other open green areas in the neighborhood has happened. Today children are mostly at home parents with ready-made toys or technological devices that can be provided they are playing. This for this reason active movement area annoyed the one which... child, energy exposed can't take it off And with peers relationship cannot establish. For this reason, the importance of children's playgrounds is increasing. As the child population increases, the amount of playgrounds per child decreases. In regions with intense urbanization, children's playgrounds are inadequate in terms of planning due to the lack of open spaces.

Playgrounds for children are not only a need that supports their development, but also a secured right. Article 31 of the Convention on the Rights of the Child, renewed by the United Nations Congress, states that children need to rest, play games appropriate to their age, and participate in cultural and artistic activities. This issue, which many people do not feel the need to think about, is regulated by a convention to which countries are parties, and shows once again how important it is.

The child-friendly approach in cities offers opportunities regarding the planning, design, implementation and management of children's playgrounds, which is one of the areas of work of landscape architects. Many studies conducted in the world and in Türkiye have emphasized the planning, design, implementation and management problems in children's playgrounds in cities. However, the search for solutions to these problems is insufficient.

The criteria for child-friendly cities; the target is to reach 170 municipalities with the Child-Friendly Cities program in the next two years, to influence decisions about their cities, To be able to express their ideas about what kind of city they want, Being able to walk freely on the streets, living in a clean environment, being able to benefit from all the services of the city equally with all the citizens regardless of religion, language, income, gender, ethnicity or disadvantage (Anonymous, 2022). Accessibility, when criteria such as natural and environmentally friendly solutions (Francis et al. 2006) are evaluated, new opportunities will be presented to solve the problems revealed by the research results.

One of the most important components of a city being child-friendly is that it has a child-friendly environment for every age group (*Article 1: If you are under 18, you are a child and you have rights", Convention on the Rights of the Child, 1989* ) is to provide equal playing rights in urban space. For this, it is recommended that local governments and decision-makers get support from the experiences of landscape architects in this regard.

Landscape architects are responsible for managing, planning and designing the work carried out within the scope of child-friendly city initiatives, and for giving children the right to play and positively influencing their physical and personal development. Negative problems that affect children in every way, such as inadequacy in terms of standard square meters, lack of children's play areas that

appeal to different age groups, socio-economic inequality, and space planning and design that ignores disabled children, need to be minimized.

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# CHAPTER 6

## THE INFLUENCE OF LARGE TREES ON THE IDENTITY OF SQUARES

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## INTRODUCTION

Urban squares have been the center of public life and cultural interactions throughout history. These squares play an important role in human life as places where social relations and social memory are shaped. There are many different elements that make up the identity of public space in urban areas. In addition to architectural elements such as buildings, monuments and open space design, natural elements, especially large trees, directly affect the character and function of these spaces. This study examines how large trees in squares shape place identity in physical, ecological and social terms.

Place identity is the name given to the overall impact of a place on its users with physical and symbolic meanings. Lynch (1960) emphasizes the importance of the visual perception of the environment in creating place identity and states that the elements that take place in people's minds increase the recognizability of the place. Large trees in squares become a fundamental part of this recognizability. In addition to being a visual focal point of the square, large trees create a sense of belonging in the space. Gehl (2010), with his concept of "cities on a human scale", draws attention to the importance of organizing urban spaces in accordance with human needs. In this context, trees help squares become meeting, resting and interaction points for people. The shaded areas created by large trees allow people to spend time in squares for a long time, thus creating spatial areas where social interactions intensify (Raskovic and Decker, 2015; Yazıcı and Gülgün 2017).

In this context, the visual and emotional effects of the large trees (*Platanus orientalis*) in the Kaynaklar village square on people and the effects of these trees on the identity of urban spaces were examined through questionnaires and face-to-face interviews.

### The Role of Trees in Urban Spaces in Historical Perspective

The role of trees in public spaces has played an important role in history, from ancient times to the present day. For example, in Ancient Greece, large trees in the squares of the Agora functioned as places where people gathered and held discussions. Trees in the Agora enhanced physical comfort by providing shade, while at the same time creating central points for social interaction. This is noteworthy in terms of the social functions of large trees in urban design.

During the Ottoman Empire, large plane trees in squares became an important part of social and cultural life. Places such as Sultanahmet Square, Topkapı Palace courtyard and Gülhane Park in Istanbul, surrounded by trees, became social meeting points of the Ottoman period. While large trees strengthened the symbolic value of public spaces in the Ottoman period, they also increased the livability of these spaces (Necipoğlu, 2005). In this period, large trees became an important part of urban identity as spaces that met the public's need for gathering, socializing and resting.

### Aesthetic and Psychological Effects of Trees

Trees are elements that increase the aesthetic value of squares and help users to establish a deeper connection with the space. Large trees create a natural focal point in public spaces and provide visual relief for users. As Lynch (1960) notes in his theory of the urban image, trees contribute to the memorialization of the square and give the space an identity. Large trees are among the elements that complement the visual composition of the square.

Psychologically, proximity to nature reduces people's stress levels and provides peace of mind. Large trees offer such psychological benefits in dense urban environments, allowing people to connect with nature. Squares with trees are seen as spaces that fulfill people's need for rest and relaxation. The natural shade and feeling of spaciousness provided by trees in these spaces strengthen the emotional connection of users with the space (APA, 2020; Yazıcı, 2017, Gülgün et al, 2017).

### The Effects of Trees on Social Interaction and Creating a Social Meeting Space

Large trees in squares provide important meeting points for social interactions. Trees allow squares to be used intensively, especially during the summer months. People meet, rest and interact socially in the shaded areas. Jacobs (1961) states that people naturally prefer meeting points in urban spaces and that these points shape social life. Squares with large trees create these natural meeting places.

Large trees also create a sense of belonging among communities. In these spaces, people not only fulfill their individual needs, but also come together in community. For example, places like “Gülhane Park” in Istanbul become social

meeting places thanks to large trees. People gathering around the trees have the opportunity to both get away from the stress of daily life and improve their social relations.

### The Impact of Trees on Urban Identity

Urban squares are places that reflect the identity of a city and have an important place in the collective memory of the society. Large trees play an important role in the formation and sustainability of this identity (Eraslan and Çavdarlı, 2022). The long-lasting nature of trees symbolizes the historical continuity of squares. For example, trees in large city parks such as the Luxembourg Gardens in Paris or New York's Central Park have become not only visual but also historical and cultural symbols of these places. Similarly, large trees in historic squares such as “Sultanahmet Square” in Istanbul add historical depth and meaning to the place.

Cloke et al. (2002) argue that the large trees in Victoria Square in Bristol, England dominate the architectural logic of the square. The square was characterized as a place of trees. It was emphasized that residents still remember and talk about the old beech tree in the square, which lost a large branch in the 1950s and had to be cut down. Such memories inspire public support for efforts to “support” the old trees in the square. The old trees in the square are central to the identity of the square. Local residents, pedestrians and users of the square perceive it as a place with trees and experience it in various ways.

In this context, the preservation and transmission of large trees to future generations is critical to ensuring the continuity of urban identity. The loss of large trees is not only a physical loss, but also a weakening of social memory and cultural idntity.

## 1. MATERIALS and METHODS

Buca Kaynaklar village square; which is the subject of the research; is located in the center of Kaynaklar village in Buca district of Izmir. Kaynaklar is located on a plateau 9 km southeast of Izmir. It is 4 km away from Buca, located on the foothills of Nif Mountain (Figure 1). It stands out as a rural settlement with its general structure (Ünal Ankaya, 2007).

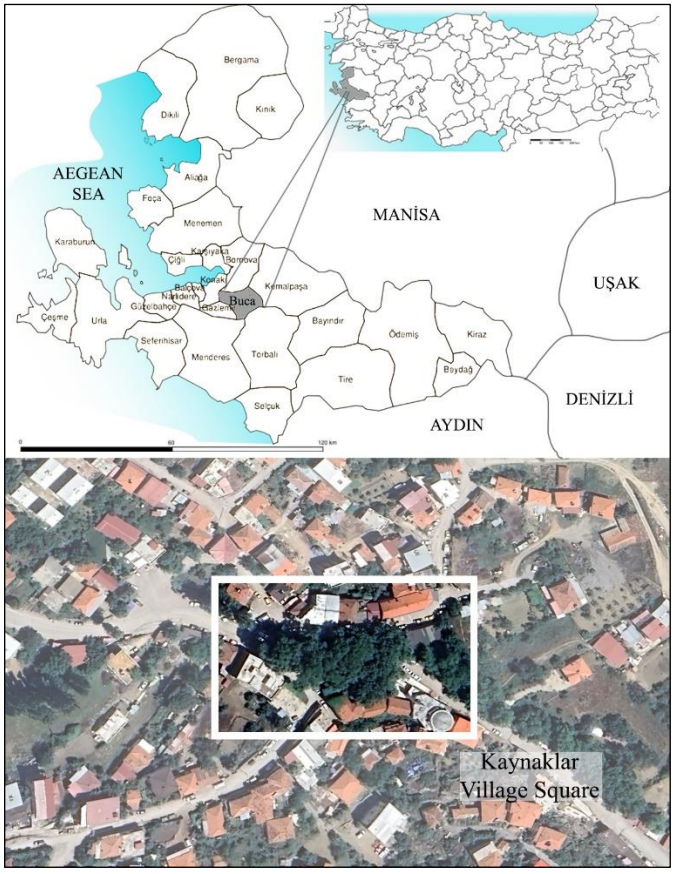


**Figure 1:** Location of the study area.

Kaynaklar is known as the oldest village of Buca (URL-1). Although the history of Kaynaklar village is unknown, it is thought to have a history of approximately 200 years (URL-2). According to 2023 data, its population is 1703. There are abundant water resources in the region where Kaynaklar village is located. Gürlek stream, which flows through the center of the village square and joins Tahtalı stream, has been turned into a water channel. For this reason, the water that used to flow abundantly has now decreased considerably. The water of the stream starts to flow in November-December and ends in May. Especially in summer, the water does not flow (URL-1).

While the village square, which is the subject of the research, was used as a gathering area where weddings, festivals and entertainments were held in the past, it has almost lost this feature now. Today it has become a tourism

center (URL-1). Today, it is a place used intensively by official institutions, food places, coffee houses and tourists (Figure 2) (Barboros, 2019).

Kaynaklar village has a dense green area. There is a rich vegetation around it. For this reason, the village's clean air, natural products and the opportunity to do nature sports make it a frequent destination for daily tourists from the city center (Barboros, 2019). The village of Kaynaklar, which has the Whole City Law of Buca Municipality, has more than 200 rock climbing routes (URL-2).

**Figure 2:** General view of Kaynaklar Village square

Kaynaklar village has an essential richness in terms of monumental trees. There are 7 monumental plane trees *(Platanus orientalis)*, one of which is registered in Kaynaklar village square. The most important of these is the Kunduracı Plane, which has existed for more than 1000 years. The Kunduracı plane tree was determined to be 1025 years old by the Protection of Naturel Assets Board in 1994 and was registered with a height of 30 meters and a diameter of 15 meters (Güngör, 2017). There are coffee houses and eating and drinking places under the plane tree covering the entire square. Over time, it has become a center of attraction for tourists. Especially for those who are interested in mountain and hiking sports use the square where the plane tree is located as a way to climb Nif Mountain from the shores of Gurlek Waterfall. In order to reach the waterfall, it is possible to see people camping in the forest by

following the water's edge and those who use the shores as a recreation area (Boyacı, 2023).

Based on these characteristics of the region, the visual and emotional effects of the large trees (*Platanus orientalis*) in Kaynaklar village square on people and the effects of these trees on the identity of urban spaces were analyzed through questionnaires and face-to-face interviews.

Within the scope of the research, a face-to-face survey was conducted with 60 respondents in Kaynaklar village square. The surveys were conducted on September 19 (Thursday) and September 21 (Saturday), one day on weekdays and one day on weekends. During the preparation of the questionnaire forms for the people using the square, the studies on the subject by Cihangir (2013), Heimlich et al. (2008), Schroeder et al. (2006) were taken as reference in the creation of the form. In addition, the small number of studies on the subject reveals the originality of the study. The survey conducted within the scope of the research consists of 4 main sections. Survey respondents;

- Questions about defining the respondent profile (demographic data)
- Questions to reveal the uses and activities enabled by the research area (activity)
- Questions on the salient features and problems of the research area (space)
- Questions to reveal the identity and image perception of the research area (meaning)

The questions consisted of 16 multiple-choice and graded questions.

The following formula was used to determine the number of people to be surveyed (Baş, 2005) and the calculation was based on 95% probability and 10% margin of error.

$$n = Nt^2pq / d^2(N-1) + t^2pq$$

*N: Number of individuals in the target group, n: Number of individuals to be sampled, p: Frequency of occurrence of the event under investigation, q: Frequency of non-occurrence of the examined event, t: The theoretical value found according to the t-table at a certain significance level, d: ± sampling error accepted according to the frequency of occurrence of the event (p: 0.5, q: 0.5)*

In calculating the number of individuals to be surveyed, the population of Kaynaklar village was taken as 1703 (male population, 868 and female

population, 835) according to the 2023 census (TUİK, 2023). It was used as "Number of Households in the Main Population (N)" and as a result of the calculations, the number of people to be surveyed was determined as 60.

Random sampling method, one of the probability sampling methods, was used to select the respondents. In line with the purpose of the study, the questionnaires were conducted on individuals using the Kaynaklar village square. SPSS 29.0 software was used in the statistical analysis of the survey studies.

In line with the data obtained through the questionnaire study, how the large trees *(Platanus orientalis),* in Kaynaklar village square shape the identity of the space in physical, ecological and social terms, the meaning that plane trees add to the square and its surroundings, the problems and prominent features of the square were evaluated.

## 2. FINDINGS and DISCUSSION

The surveys conducted with the respondents within the scope of the study were examined under 4 main sections. In the first part of the survey, 5 questions were asked to define the profiles of the respondents. Accordingly, when the distribution of the answers given to the questions according to gender was analyzed, it was determined that 53.3% of the respondents were male (Table 1).

**Table 1:** Distribution of respondents according to gender

| ***Gender*** | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *Female* | 28 | 46.7 | 46.7 | 46.7 |
| *Male* | 32 | 53.3 | 53.3 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

Considering the age of the individuals who responded to the survey, it was determined that the highest rate of participation was over the age of 65 with a rate of 25%, and the lowest rate of participation was 1.7% in the 18-24 age range. It is thought that the reason for the highest proportion of respondents over the age of 65 is due to the fact that the surveys were conducted in a square that is a village square / coffee shop / bazaar (Table 2).

**Table 2.**:Distribution of respondents according to age ranges

| *Age (Years)* | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|
| *18-24* | 1 | 1.7 | 1.7 | 1.7 |
| *25-34* | 14 | 23.3 | 23.3 | 25.0 |
| *35-44* | 13 | 21.7 | 21.7 | 46.7 |
| *45-54* | 8 | 13.3 | 13.3 | 60.0 |
| *55-64* | 9 | 15.0 | 15.0 | 75.0 |
| *65+* | 15 | 25.0 | 25.0 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

When the educational status of the respondents is analyzed, it is shown that most of the respondents are university students/graduates with 38.3%, while the lowest percentage is non-literate with 1.7% (Table 3).

**Table 3:** Distribution of respondents according to their education level

| *Level of Education* | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|
| *Primary school graduate* | 14 | 23.3 | 23.3 | 23.3 |
| *Secondary school graduate* | 7 | 11.7 | 11.7 | 35.0 |
| *High school graduate* | 15 | 25.0 | 25.0 | 60.0 |
| *University student/graduate* | 23 | 38.3 | 38.3 | 98.3 |
| *Illiterate* | 1 | 1.7 | 1.7 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

When the marital status rates of the respondents are analyzed, it is shown that 70% of the respondents are married, and 30% are single (Table 4).

**Table 4:** Distribution of respondents according to their marital status

| *Status* | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|
| *Married* | 42 | 70.0 | 70.0 | 43.3 |
| *Single* | 18 | 30.0 | 30.0 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

Regarding whether the respondents live in Kaynaklar village or not, 43.3% of the respondents live in Kaynaklar village, and 56.7% are tourists in

the square. The high rate of tourists is attributed to the fact that Kaynaklar village being close to Izmir city center, and the region offers a wide range of recreational activities with its natural beauties (Table 5).

**Table 5:** Distribution of respondents according to whether they live in Kaynaklar village or not

| ***Do you live in Kaynaklar?*** | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *Yes* | 26 | 43.3 | 43.3 | 43.3 |
| *No* | 34 | 56.7 | 56.7 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

In the second part of the survey, the respondents were asked questions about who they use the village square with, for what purposes they use it, and how often they visit it. In this context, when the purpose of the respondents' use of the square is analyzed, “chatting” has the highest percentage with 45%, while “eating and drinking” has the lowest percentage with 8.3% (Table 6).

**Table 6:** Distribution of respondents' purpose of using the square according to percentages

| | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *Rest* | 26 | 43.3 | 43.3 | 26.0 |
| *Chatting* | 27 | 45.0 | 45.0 | 27.0 |
| *Getting together with friends* | 23 | 38.3 | 38.3 | 23.0 |
| *Eating and drinking* | 5 | 8.3 | 8.3 | 5.0 |
| *For business* | 7 | 11.7 | 11.7 | 7.0 |
| *Tourist/day visit* | 12 | 20.0 | 20.0 | 12.0 |

When asked with whom the respondents use the square, “with friends” has the highest percentage with 63.3%. The option “alone” with 11.7% means that the respondents do not want to spend time alone while using the square (Table 7).

**Table 7:** Distribution of respondents according to the percentages of who they use the square with

| | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *With friends* | 38 | 63.3 | 63.3 | 54.2 |
| *With relatives* | 25 | 41.7 | 41.7 | 35.8 |
| *Alone* | 7 | 11.7 | 11.7 | 10.0 |

When the frequency of the respondents' visits to the square is analyzed, the option “every day” has the highest percentage with 36.7%, while the option “several times a week” has the lowest percentage with 13.3% (Table 8).

**Table 8:** Distribution of the frequency of respondents' use of the square according to percentages

| | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *Every day* | 22 | 36.7 | 36.7 | 36.7 |
| *Several times a week* | 8 | 13.3 | 13.3 | 50.0 |
| *Rarely* | 18 | 30.0 | 30.0 | 80.0 |
| *Touristic* | 12 | 20.0 | 20.0 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

In the third part of the survey, the sources were asked questions about the prominent features and problems of the village square. In this context, firstly, the prominent features of the square were listed in a chart, and the respondents were asked to indicate the degree to which these features affected them. When the answers to the question were analyzed, 93.3% of the respondents stated that “trees are the most important element of the square” and 88.3% stated that “the square is always shaded in summer” as the most prominent features of the square (Table 9). In addition, the prominent features of the square were also evaluated based on whether the respondents live there or not. Accordingly, 85.5% of the residents think that both “trees are the most important elements of the square” and “there is always shade in summer”. On the other hand, 97.1% of tourists chose the option “trees are the most important elements of the

square". In addition, 50% of the tourists think that seeing familiar faces does not give a sense of belonging. In terms of crowdedness, 50% of the residents were not satisfied with this situation, while 52.9% of the tourists were satisfied with the highest percentage.

**Table 9:** Impact level of the prominent features of the square

| ***Prominent features of the square (%)*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
|---|---|---|---|---|---|
| *Trees are the most important elements of the square* | 0 | 1.7 | 3.3 | 1.7 | 93.3 |
| *The stream is an important element for the square* | 11.7 | 5.0 | 15.0 | 8.3 | 60.0 |
| *The fact that there is always shade in summer makes it attractive* | 3.3 | 1.7 | 3.3 | 3.3 | 88.3 |
| *Seeing familiar faces gives a sense of belonging* | 35.0 | 13.3 | 3.3 | 5.0 | 43.3 |
| *The crowd give the familiar peace of mind* | 28.3 | 6.7 | 20.0 | 6.7 | 38.3 |

***1:*** *Strongly disagree* ***2:*** *Disagree* ***3:*** *Undecided* ***4:*** *Agree* ***5:*** *Strongly agree*

In another question about the square, a table consisting of 6 items was used to measure the rate of respondents' being affected by the problems they see in the square. Accordingly, the most important problems of the square are "dried up stream water" with a rate of 96.7% and "poor maintenance of the stream" with a rate of 88.3% (Table 10). When the problems of the square are evaluated according to whether the respondents live in Kaynaklar village or not, the majority of those living in the village (42.3%) think that there is a maintenance problem of the trees, but tourists (35.3%) do not think that there is a maintenance problem of the trees. The biggest problem is considered to be "the lack of maintenance of the stream" and "the need for the stream water to be active again" by both sides. In addition, when the problems are analyzed by educational level, high school graduates (66.7%) and university graduates (47.8%) think that the increase in the number of tourists does not affect the square badly. On the contrary, primary school graduates (57.1%) and non-literate people (100%) think that the square is badly affected. In terms of frequency of visits, the majority of the respondents think that "the increase in the number of tourists does not have a bad impact on the square". On the other hand, those who visit every day (50%) think that the trees have maintenance

problems, while those who visit rarely (44.4%) and tourists (50%) do not think that the trees have maintenance problems.

**Table 10:** Impact level of the problems encountered in the square

| ***Problems of the square (%)*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
|---|---|---|---|---|---|
| *I think that the increase in the number of tourists has badly affected the square* | 43.3 | 1.7 | 11.7 | 15.0 | 28.3 |
| *I think that trees have maintenance problems (annoying insects, allergens, neglected branches, etc.)* | 30.0 | 8.3 | 28.3 | 6.7 | 31.7 |
| *I think that the stream is neglected* | 0 | 6.7 | 1.7 | 3.3 | 88.3 |
| *I think that the stream should be active again* | 0 | 3.3 | 0 | 0 | 96.7 |
| *I think that there are too many sellers* | 61.7 | 3.3 | 13.3 | 6.7 | 15.0 |
| *I think that there are insufficient social facilities in the square (seating areas, commercial areas, fountain, etc.)* | 18.3 | 3.3 | 23.3 | 15.0 | 40.0 |

***1:*** *Strongly disagree* ***2:*** *Disagree* ***3:*** *Undecided* ***4:*** *Agree* ***5:*** *Strongly agree*

In the fourth and final part of the survey, the respondents were asked questions to reveal their perception of the identity and image of the area. In this context, it is seen that 66.7% of the respondents know the age of the Kunduracı plane, the largest and oldest tree in the square. The protection status of the plane tree is also known by a high percentage (60%). The history of the plane tree (70%) and the follow-up of the maintenance work (55%) were not known at a high rate (Table 11). In addition, the knowledge levels of respondents living in the Kaynaklar village and tourists about plane trees were compared. According to these evaluations; the majority of both people living in the Kaynaklar village and tourists know the age and protection status of the Kunduracı plane tree. Finally, while 76.9% of the people living in the village followed the maintenance work on the Kunduracı plane, the majority of the tourists (76.9%) did not.

**Table 11:** Respondents' knowledge about the Kunduracı plane tree

| | ***Yes (%)*** | ***No (%)*** |
|---|---|---|
| *Do you know the age of the Kunduracı plane tree?* | 66.7 | 33.3 |
| *Do you know the history of the Kunduracı plane tree?* | 30.0 | 70.0 |
| *Do you know the conservation status of the Kunduracı plane tree?* | 60.0 | 40.0 |
| *Have you ever followed the maintenance work on the Kunduracı plane tree?* | 45.0 | 55.0 |

The impact level of the meaning attributed to the plane trees by the respondents in the research area was measured in a 6-item chart. In this context, it is seen that the highest percentages are "representing history" with 93.3% and "representing green and nature" with 93.7% (Table 12). When the meaning attributed to the plane trees was evaluated in terms of gender, it was determined that for women (96.4%) they "represent green and nature" and for men (93.8%) they represent "history" and "roots and ancestors". However, when the meaning attributed to the plane trees is evaluated according to whether the respondents live in Kaynaklar village or not, the majority of the residents (69.2%) responded that "the plane trees remind me of my childhood", while the majority of the tourists (50%) did not think the same way.

**Table 12:** Impact level of the meaning attributed to plane trees in the research area

| ***Meaning attributed to plane trees (%)*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
|---|---|---|---|---|---|
| *Representing history* | 0 | 1.7 | 3.3 | 1.7 | 93.3 |
| *It represents roots, ancestors* | 3.3 | 1.7 | 0 | 3.3 | 91.7 |
| *Reminds me of my childhood* | 36.7 | 5.0 | 5.0 | 1.7 | 51.7 |
| *Reminds of the past* | 18.3 | 5.0 | 6.7 | 3.3 | 66.7 |
| *Representing green and nature* | 0 | 0 | 0 | 6.7 | 93.7 |
| *Makes you feel a sense of belonging* | 10.0 | 1.7 | 1.7 | 5.0 | 81.7 |

***1:*** *Strongly disagree* ***2:*** *Disagree* ***3:*** *Undecided* ***4:*** *Agree* ***5:*** *Strongly agree*

Finally, in the context of the relationship between the square and the plane trees, when the respondents were asked the question “would the square function the same without the plane trees and would it make you feel the same emotions?”, it is seen that the majority of the respondents (78.3%) chose the option “plane trees are the symbols of this village. Without them this square would have not had the same function” (Table 13).

**Table 13:** Distribution of the respondents' opinions on the integrity of the square and plane trees according to percentages

| | ***Frequency*** | ***Percent*** | ***Valid Percent*** | ***Cumulative Percent*** |
|---|---|---|---|---|
| *The square would still have been treated the same way without the plane trees* | 1 | 1.7 | 1.7 | 1.7 |
| *Without the plane trees, the square would have been used but it would have not had the same spirit.* | 12 | 20.0 | 20.0 | 21.7 |
| *Plane trees are the symbols of this village. Without them this square would have not had the same function* | 47 | 78.3 | 78.3 | 100.0 |
| ***Total*** | **60** | **100.0** | **100.0** | |

When the question on the relationship between the plane trees and the square was evaluated according to whether the respondents live in Kaynaklar village or not, it was determined that the majority of both residents (96.2%) and tourists (64.7%) chose the option “plane trees are the symbols of this village.

Without them this square would have not had the same function” (Table 14).

**Table 14:** Percentage distribution of the views on the relationship between plane trees and the square according to whether the respondents live in Kaynaklar village or not

| | ***Do you live in the village of Kaynaklar? (Yes %)*** | ***Do you live in the village of Kaynaklar? (No %)*** |
|---|---|---|

| | | |
|---|---|---|
| *The square would still have been treated the same way without the plane trees* | 3.8 | 0 |
| *Without the plane trees, the square would have been used but it would have not had the same spirit.* | 0 | 35.3 |
| *Plane trees are the symbols of this village. Without them this square would have not had the same function* | 96.2 | 64.7 |

It is thought that the reason why the residents of Kaynaklar village have a significantly higher rate of perception of the plane trees as the symbol of the square than the tourists may be due to the fact that the residents have established stronger ties with the place and the plane trees.

## 3. CONCLUSION and SUGGESTIONS

Large trees in squares are among the basic elements that form the identity of urban spaces. These trees, which contribute to the identity of squares in terms of aesthetic, ecological, historical and social aspects, are an indispensable part of urban design. In this context, the visual and emotional effects of the large trees (*Platanus orientalis*) in Kaynaklar village square on people and the effects of these trees on the identity of urban spaces were examined through questionnaires and face-to-face interviews.

The findings obtained from the surveys conducted within the scope of the research were analyzed under the titles of “activity”, “space” and “meaning”.

When the research area is evaluated in terms of activities, it is determined that the respondents generally use the square for “chatting” and “resting”. The square is generally used with relatives and friends, but it is not preferred for lonely use. This shows that the square is an important socialization and meeting point for the respondents.

When the research area is evaluated in terms of spatial features, the trees in the square are seen as one of the most prominent features of the square by the majority of the respondents. In addition, the shade provided by the trees was also identified as one of the most important elements in the square. However,

it has been determined that the answers of those who live in the village of Kaynaklar and those who are tourists have significant differences especially to the questions about the perception of the place. For example, for those living in Kaynaklar village, seeing familiar faces in the square makes them feel a sense of belonging, while tourists do not feel the same.

When the problems of the square are evaluated in terms of the frequency of visits, it is understood that there are differences in the perception of the problems according to the frequency of use of the place. In this case, respondents who use the square every day are more sensitive in perceiving the problems. For example, while those who use the square every day think that the trees have a maintenance problem, most of the tourists do not think so. It is thought that the reason for this is that those who rarely visit the square and tourists cannot notice problems such as pruning, fungus, branch breakage, etc. due to their short visits.

Finally, the research area was evaluated in terms of the meaning attributed to the plane trees by the respondents. In this respect, the plane trees are generally symbolic of "history, ancestors and roots" for both residents and tourists. At the same time, the size of the trees and the effect they create together remind the participants of greenery and nature at a high level. In terms of the relationship between the square and the plane trees, the idea that "the square would not function the same without the plane trees" is actually an indication of the impact of these large and mighty trees on individuals.

As a result, trees are an important part of habitats and nature. Monumental trees, on the other hand, are rare trees with historical, cultural and ecological value. Especially in squares, monumental trees are seen as elements that emphasize the identity and cultural values of the place. The visual and emotional effects they leave on people make squares more livable and meaningful, while creating spaces where social interactions intensify. The protection, maintenance and development of these areas where nature and people come together are important for the continuity of cities and their transmission to future generations. In this context, protecting large trees and integrating them into urban design processes will be an important step towards creating sustainable cities.

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# CHAPTER 7

## AESTHETIC MANIFESTO IN PUBLIC LANDSCAPE THE JOURNEY OF STREET ART FROM VANDALISM TO PUBLIC ART AND ITS PLACE IN LANDSCAPE

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## 1. INTRODUCTION

Public space is defined by Habermas as "an arena where people come together to generate thought, discourse, and action about common issues, engaging in mutual interaction" (Habermas 1995). When considered as a public space, it consists of areas where individuals living in the city communicate and carry out various activities; these spaces can be viewed as extensions of indoor environments, where urban and social life unfolds. It is defined as open spaces such as parks, gardens, roads, squares, and courtyards that are accessible to all members of society without distinction (Bayram 2007; Özer et. al. 2010). Based on these definitions, public space can be expressed as physical and social environments and various landscapes in which each individual continues to live by producing, consuming, and expressing themselves in any way.

Public art is an important phenomenon where the artist achieves the highest level of interaction and collaboration with society, thereby enhancing the quality of public space. Public art and street art contribute to urban life by increasing individuals' engagement with public spaces and allowing them to enjoy these experiences. In this sense, public art plays a supportive role in the design of public spaces (Sönmez and Erdoğan 2019;Özgeriş and Özer 2022).

With the 20th century, there have been significant changes in art and perceptions of art. In this context, many artists have begun to use outdoor spaces and thus public areas as a stage for their art, driven by the desire to reach all members of society. Urban or rural areas commonly used by the community create opportunities for artistic activities. These areas can include streets, pedestrian zones, squares, parks, open and green spaces, public buildings, and common-use courtyards and gardens, as well as the facades of these buildings. Beyond their use for transportation, streets have become an essential part of the city's and neighborhood's culture. Through spatial arrangements and implementations in the streets, there is a meeting point for artists aiming to convey aesthetic and artistic messages to the public and community. Although street art, starting with graffiti, initially emerged as an illegal practice, it has now gained recognition from art circles and society for its ability to provide a unique visual identity and convey messages through the streets. Street art has become one of the important methods of communication and interaction with all urban dwellers and social groups (Sönmez and Erdoğan 2019). In this sense, street art is designed to appeal to a broad audience and is created for the

community. In street art, the artist is in constant communication with society, offering entertaining experiences while also incorporating memorable and educational elements. The messages are presented in a simple, easily understandable, and often humorous manner. While surprising people with its unexpected aspects, street art enhances social communication by differentiating the relationship between space and individuals, thereby contributing to the development of the city (Lacy 1995, Knight 2008, Dinç 2018).

According to Chang'e (2008), public art is the artistic expression of the artist and the community that can be placed in public space, either permanently or temporarily, through various forms, materials, and processes. Unlike traditional art, public art is created for society; its target audience is the entire community. Not all individuals in society may have access to galleries or museums to engage with art, nor may they feel the need to do so. However, encountering art in public spaces, where daily life unfolds, provides cultural awareness and benefits. Additionally, public art plays a supportive role in the design of public spaces (Sönmez and Erdoğan 2019). Street art is a genre that can be considered under the umbrella of public art. The lack of a specific definition for street art stems from its nature and the way it emerged. Initially appearing as an illegal activity, it has rapidly spread, developed various forms, and begun to be accepted by authorities.

Street art, characterized by its oppositional expression, critiques authority and the management errors and injustices it perceives, as well as societal problems like hunger and war, environmental destruction, and ecological issues (Dinç 2018). Graffiti, a typical art form of the hip-hop subculture, represents the expressions of groups that are closed and anonymous to the majority of society. Despite strong connections, these groups are often transient and usually disband after the completion of specific projects. Other forms of street art are typically created by individual artists seeking to develop a unique style. Open global networks formed by curious individuals, activists, and organizations use platforms like the internet and social media to maintain connections between artists and audiences. Some street artists (e.g., JR or Swoon) are particularly sensitive to social issues and contribute to the formation and sustainability of communities, including those to which they do not belong, through their creations. A specific form of street art is community murals commissioned to enhance the identity and cohesion of a community.

Therefore, despite their informal and temporary nature, street art and graffiti have the ability to create communities at various levels (Gralinska-Toborek 2024).

Graffiti, considered the birth of street art, is thought to have begun in the 1920s and 1930s with tags created by gangs on city walls or subway trains. The first form of graffiti, also recognized as an activist action, is known as "tagging," where the artist writes their name or nickname in detail. After World War II, it began to emerge at an increasing pace in major cities as an anti-war visual action, becoming a sign of existence and a means of self-expression. The slogan "Kilroy was here," which emerged during the war, can be considered one of the earliest examples of graffiti in the known sense. Accompanied by a caricature of a man peering over a wall, "Kilroy was here" became a popular graffiti visual drawn by American troops during the war, serving as a universal sign that American soldiers had passed through a region (Figure 1) (URL.1).


**Figure 1**: Early examples of tagging-style graffiti (World War II Memorial in Washington D.C. Photo; Bob Strauss 2019, Kilroy was here. Photo; Richard Cohrs/Unsplash).

By the 1960s and 1970s, the first examples of street art emerged as a form of self-expression through writing or drawing, motivated by feelings of alienation and oppression, a response to authority, disregard for rules, and a desire for recognition.

In the following years, starting in the 1980s, a wave of migration from rural to urban areas began, leading to changes in urban structures. Newcomers faced identity definitions emphasizing their differences, being labeled as immigrants, minorities, or invaders by urban residents and city administrations. This led to the creation of a hybrid culture between the cities they arrived in and the rural cultures they brought with them (Havası and Canduran 2022).

Street art continued to evolve quickly and protestingly, prioritizing the message over classical artistic aesthetics, often without revealing the identities of the street artists (Gökova, 2020).

Street art cannot be limited to specific art forms or activities like graffiti, nor are there restrictions on the materials artists can use. Spray paints, candles, sound effects, sculptures, strings, and various objects encountered in daily life can all serve as materials for the artist. In visual street art, various techniques such as spray paint, stickers, stencils, printing, and posters are commonly used to create wall writings and paintings, with graffiti being the most frequently encountered form of street art. Massive paintings on building facades in suitable spaces are referred to as murals. The practice of covering public furniture and objects with yarn to draw attention to a specific topic is called yarn bombing. The "lock-on" technique refers to objects, sculptures, and installations attached to public furniture. Recently, a type of graffiti using moss (moss graffiti) has gained attention. In addition to these, street performances including pantomime, juggling, illusion arts, poi, theater, live statue performances, street installations, and street music also belong to the realm of street art (Figure 2). Today, there are many renowned street artists known by their signature styles and names in their works (URL.2).

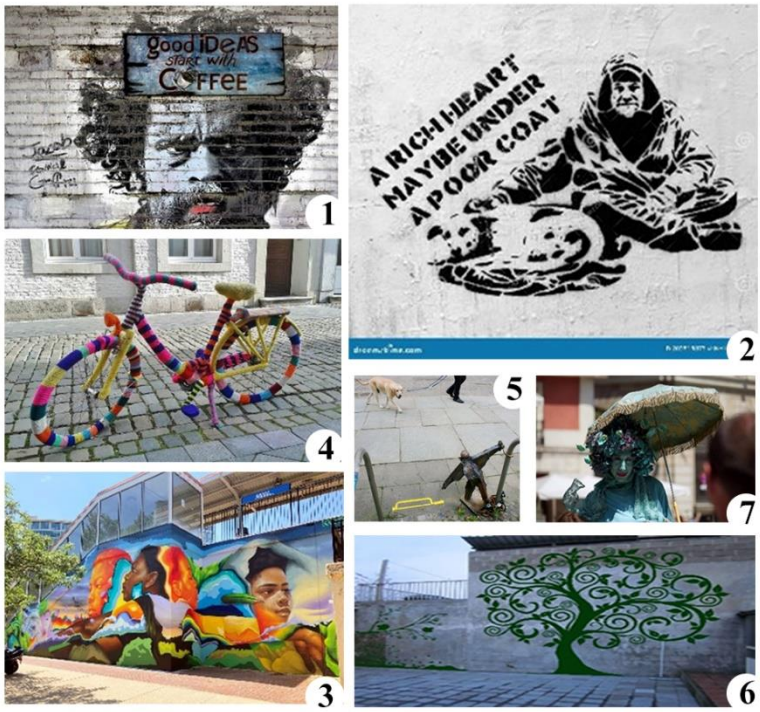


**Figure 2**: Examples of street art; 1. Graffiti, 2. Stencil, 3. Mural, 4. Yarn bombing, 5. Lock on, 6. Moss graffiti, 7. Living statue

The pioneers of street art in the 1960s include Cornbread, Cool Earl, and Kool Klepto Kid. In the 1970s, artists like TAKI183, Julio204, Lady Pink, MICO, and C.A.T. 87 became some of the most famous figures in the streets. The late 1970s and the 1980s are known as the golden age of graffiti, marking a period of revolution in the art form. Futura 2000, Zephyr, Ja, Revolt, Revs, Kaves, BG 183, Lee, Bio, Sane/Smith, Comet, Dondi, Slave, Jon156, Seen, Daze, Keith Haring, and many others are considered legends of the New York streets.

Towards the end of the 1980s, graffiti spread to Europe, with Blek Le Rat becoming a well-known artist in the streets of Paris. He not only gained fame but also inspired the now-iconic and still mysterious Banksy. Blek Le Rat is one of the pioneers of the stencil technique. One notable example of street art from this era is the famous Charging Bull sculpture, created in 1989 by sculptor Arturo di Modica.

Keith Haring, known for his work rather than his name, was an American painter, graffiti artist, and social activist who reflected the street culture of New York in the 1980s. His street art career began with drawings he made with chalk on the subway walls. His frequently drawn "The Radiant Baby" (crawling baby symbol) became his trademark. His works have been exhibited in galleries around the world, and he first visited Australia in 1984, starting to create murals in Melbourne with his unique style. Haring's easily recognizable works have been used on all kinds of commercial products and continue to be utilized (URL.3).

Shepard Fairey is perhaps best known for his "Hope" poster featuring Barack Obama. On September 2, 1989, an anti-racism protest took place in Cape Town, where thousands marched towards the South African Parliament. During the protest, police sprayed protesters with purple paint, which led to their identification and arrest. In 2014, Fairey referenced this protest by creating a work that painted Nelson Mandela in purple on the 25th anniversary of the protest. This piece, ten stories high and covering an area of over 2,000 square meters, looks out over the Nelson Mandela Bridge. The Nelson Mandela mural is Fairey's first work in Africa (URL.34). Fairey rose to prominence with his poster design for Obama during the presidential campaign, and after appearing on the cover of Time magazine with the same design, he also created a poster of Atatürk, among his famous works (Figure 3) (URL.3).

**Figure 3:** Examples of the most well-known works by famous street artists: 1. Charging Bull sculpture by Arturo di Modica in front of the New York Stock Exchange, 2. Keith Haring's Radiant Baby, 3,4. Shepard Fairey's Mandela Mural and Atatürk Poster

Initially creating graffiti on the streets, JR discovered a camera in the Paris metro one day and began recording and photographing himself and his friends while they made graffiti. At just 17 years old, he started pasting copies of these photographs on the city's walls. Born in 1983, JR remains somewhat

of a mystery regarding his identity and defines the streets as the world's largest art gallery. In 2011, he received the prestigious TED Prize, awarded to only one person each year.

After winning the award, he launched the "Inside Out" project, where participants from anywhere in the world can share an idea, project, movement, or experience by sending in portrait photographs. JR and his team print these photos in black and white at a size suitable for wall installation and send them back to the participants, who are free to display the work on any wall they choose. Since March 2011, the project has seen over 170,000 posters installed in 108 countries, along with other similar initiatives (Figure 4) (URL.3).

**Figure 4:** Street artist JR's "Inside Out" (2011) and "Face to Face" (2007) Projects

The street artist known as 'p183,' for whom it is difficult to find sources not in Russian, has maintained his mystery even in death. Though said to have died in 2013 under undisclosed circumstances, it is known that he began his work before Banksy, despite claims that he imitated Banksy in Russia. One of p183's early works that brought him fame is the piece where he integrated a street lamp with the frame of a pair of glasses, as seen in the image above (URL.3).

**Figure 5:** Examples of works by street artist p183 (URL.4)

Banksy, who is at the top of the list of the most famous street artists of all time and continues to conceal his true identity in order to "avoid fame," has made a name for himself over the past decade with his wall paintings in various places around the world, particularly in England. His works convey anti-war, environmental, animal rights, and anti-consumerism messages. He has created nine graffiti pieces on the Israeli-Palestinian wall, which he describes as the world's largest open-air prison. Most recently, Banksy has controversially sold his works for millions at the Andipa Gallery in London, raising discussions about his sacrifice to popular culture. He has also secretly exhibited his pieces in renowned galleries like the Louvre, Tate Modern, and the Metropolitan Museum of Art. He has gained fame for his stencil and graffiti works that contain simple yet profound social messages delivered with a subtle sense of humor (Figure 6).

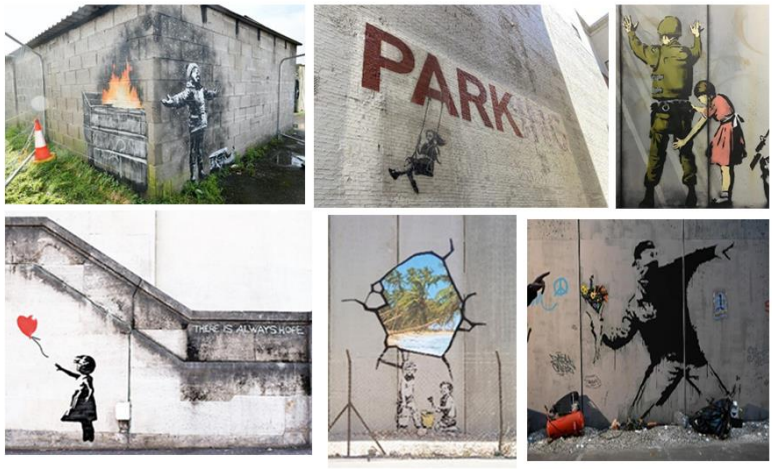


**Figure 6:** Some works by Banksy (URL.5, URL.6, URL.7, URL.8, URL.9, URL.10)

The Spanish street artist known as Pejac creates designs with social messages in various European cities. He is said to have started drawing on walls as a reaction to his teacher's views on art. Emphasizing that he brings his art to the streets for those who do not or cannot go to museums, Pejac aims to provoke thought in people, believing that this is how his art can fulfill its purpose. His artworks can be found in cities like Moscow, London, Istanbul, and Paris. In

October 2015, Pejac left his mark on the streets of Üsküdar with three-dimensional paintings. The three works titled “Lock, Poster, and Shutters,” which adorn closely situated walls, showcase the artist's commentary on windows (Figure 7) (URL.11).

**Figure 7:** Street artist Pejac’s work titled “Lock, Poster, and Shutters” (Istanbul 2014)

The Belgian street artist Roa is known for his large animal figures painted on abandoned buildings. Today, Roa has works in many cities, from New York to Paris and from Berlin to Warsaw. He emphasizes that working in the "street" liberates both himself and his creativity (Figure 8) (URL.3, URL.12, URL.13).

**Figure 8:** Examples of Roa's Works

The Canadian street artist Peter Gibson has created many works in the streets of Montreal. He began his work in 2001, advocating for more bike lanes in the city, and received substantial support from the public. Peter Gibson's distinctive artistic feature is that he works directly on crosswalks, highway lines, and essentially in places where everyone passes by and must see. Although he primarily continues his work in his hometown of St. Etienne, he has also created pieces in other cities during his travels (Figure 9) (URL.3, URL.14, URL.15, URL.16).

**Figure 9.** Examples of the works of street artist Peter Gibson.

Oak Oak, who has no formal training in painting, is actually a full-time office worker. The artist incorporates shapes he notices in his surroundings into his art, creating new and humorous interpretations on existing surfaces and materials (Figure 10). (URL.3, URL.17, URL.18).

**Figure 10.** Examples of Oak Oak's works.

Jan Vorman reflects the LEGO craze that has taken over the world in street art by filling in broken and damaged spots on streets and walls with his LEGO creations. Gaia, who grew up in New York, brings figures from nature to the city in her unique style, proving her stage name derived from the mother goddess in mythology. Many of the street art pieces of this artist, whose works have been published in various famous galleries, have also been compiled into a book (Figure 11). (URL.3, URL.19).

**Figure 11**. Examples of Jan Vorman's works.

Vinie is a French street artist originally from Toulouse. She began doing graffiti with the “AH Team” in high school. Soon after, she started diversifying her work by incorporating scenes and characters inspired by themed murals. In 2007, she moved to Paris and created her signature feminine character with an iconic afro hairstyle, depicting her in harmony with nature and her surroundings (Figure 12). (URL.20).

**Figure 12:** Examples of street artist Vinnie's works.

Bordalo II is a well-known street artist recognized for his "Trash Animals." This talented Portuguese artist creates, combines, and develops ideas using discarded materials, linking his art to sustainability, ecological, and social awareness. Starting from graffiti, he aims to convey his message in a more contemporary and different manner (Figure 13). (URL.21, URL.22, URL.23, URL.24).

**Figure 13**: Examples of artist Bordalo II's works.

Brazilian artist Fábio Gomes Trindade uses trees and other natural elements as complementary elements in his artwork. He is known for his murals that depict detailed portraits of women and children, incorporating the branches of trees and shrubs as 'hair' in his designs (Figure 14). (URL.25).

**Figure 14**: Examples of artist Fábio Gomes Trindade's works.

Mona is known for her multi-layered murals depicting wildflowers and plants, celebrated for her unique perspectives. Originally from San Francisco, California, she began her career as a muralist. Currently, this Swiss artist creates murals in public spaces and collaborates with activists (Figure 15). (URL.26).

**Figure 15**: Examples of artist Mona's works.

MTO is a French street artist known for the high quality of his portraits. His works, which express social messages, are primarily divided into two categories: "Site-Specific Muralism" and the "Label Media Series." With a concealed identity, MTO has become a highly respected artist in the global graffiti and street art scene, and his works can be found in many places around the world, including Berlin, France, Portugal, Estonia, Italy, Latvia, Mexico, Northern Ireland, Malta, and the USA (Figure 16). (URL.27).

**Figure 16**: Examples of MTO's works.

The street artist Alexandre Farto, known by the pseudonym Vihls, has a unique street style that does not use spray paint or paste but rather employs the actual walls and their history. He is recognized for his relief portraits carved into layers of plaster and brick found worldwide. By using acid etching, bleach, pneumatic drills, and other improvised tools to reveal the layers of a wall, he creates realistic portraits of people (Figure 17). (URL.28).

**Figure 17:** Examples of street artist Vihls's unique technique

Another form of street art that has recently become popular is known as 3D Street Art. The pioneers of this art form have developed incredible chalk drawing skills to trick passersby into seeing three-dimensional landscapes and objects on completely flat asphalt. Works created through a projection technique called "anamorphosis" create a three-dimensional artistic illusion when viewed from the correct angle, taking sidewalk art into the third dimension. Some of the most recognized names in this art include Edgar Müller, Julian Beever, Kurt Wenner, Manfred Stader, and Eduardo Relero.

Edgar Müller, born on July 10, 1968, in Mülheim/Ruhr, grew up in the rural town of Straelen in western Germany. His fascination with painting began in childhood with images of Straelen's landscapes, and by the age of 25, he decided to dedicate himself entirely to street painting, traveling all over Europe to make a living through his temporary art.

Eduardo R. Relero is an Argentine artist currently living in Rosario, Spain, who creates anamorphic drawings with themes of social critique and satire. Julian Beever is a British artist based in Belgium, known for his "Trompe-l'oeil" chalk drawings on sidewalk surfaces since the mid-1990s, and he is considered one of the most famous 3D street artists on the internet.

Manfred Stader began street painting and sidewalk art during his art education at the renowned Städel Art School in Frankfurt in the early 1980s, becoming one of the master street painters by 1985. Kurt Wenner, who lived in Ann Arbor, Michigan, is recognized as the inventor of three-dimensional pastel drawings. He created his first commissioned mural at the age of sixteen and started making a living as a graphic artist at seventeen, having attended both the Rhode Island School of Design and Art Center College of Design. His art often references elements of classical Italian painting and architecture (Figure 18). (URL.29).

**Figure 18:** Examples from 3D street art artists: 1; Edgar Müller, 2; Kurt Wenner, 3; Manfred Stader, 4; Julian Beever, 5; Leon Keer, 6; Eduardo R. Relero, 7; Mr. Hou**.**

"Yarn Bombing," the art of covering objects with colorful yarn using your imagination, emerged as a street art form in the Netherlands in 2004 and quickly gained global popularity. This movement is known as a type of graffiti art that does not use spray paint or any kind of paint. In Turkish, it is referred

to as "örgü bombardımanı," where various objects such as trees, poles, benches, bridges, and bicycles are covered in knitting instead of walls (Figure 19).

This movement, where many different objects are adorned with knitted pieces, has spread rapidly, and Yarn Bombing exhibitions are being held in many parts of the world. Although still relatively new in the realm of street art, Yarn Bombing adds warmth, comfort, and a cozy image to spaces by bringing color to objects, especially in cold cities. The first instances of Yarn Bombing were seen in May 2004 in the Netherlands, and in 2005, individuals in Texas contributed to this street art movement with their own knitting (URL.30, URL.31).

**Figure 19:** Examples of Yarn Bombing street art.

Moss graffiti, also known as eco-graffiti or green graffiti, is a type of street art that uses live moss to write on the walls of public spaces. In this form of graffiti, moss replaces the paints typically used. Moss walls, like traditional graffiti, allow artists to express their emotions and thoughts. The materials used do not damage the surfaces of buildings and grow and develop over time. Moss graffiti artists do not release toxic chemicals through spray paint; instead, they use biodegradable materials.

The birthplace of moss graffiti is the UK, and the first known artist of this art form is Anna Garforth, who has numerous works created in England. As a graffiti artist, Anna Garforth has experimented with various materials and concepts, resulting in many moss graffiti pieces that now adorn the walls of England (Figure 20). (URL.32).


**Figure 20**: Examples of moss graffiti.

In Turkey, graffiti began to emerge in the mid-1980s and gained popularity with the Hip Hop culture of the 1990s. New forms of street art that surged in the 2000s only started to show their influence in Turkey around 2010. In this sense, graffiti and street art in Turkey are still in a developmental phase compared to the global scene. However, Turkish graffiti and street artists showcase high performance and style evolution. Additionally, the Mural Istanbul Festival has brought renowned artists known in the street art and graffiti scene from abroad to Turkey, allowing Turkish artists to experience these works and personalities firsthand, gaining valuable insights for developing their own styles.

Through such festivals, this art movement is also evolving in Turkey. Street art, which began to gain popularity in Turkey in the 1990s, became quite popular in the 2000s, experiencing a significant explosion after the 2013 Gezi protests. Today, nearly every street in metropolitan areas features successful examples of street art. In Istanbul, vibrant examples can be found in central districts such as Taksim, Beşiktaş, Kadıköy, and Şişli; in Ankara, Kızılay and Tunalı Hilmi; and in İzmir, Alsancak and Bornova.

This art form has become so popular that the Pera Museum in Istanbul held an exhibition titled "The Language of Walls" in 2014, showcasing works by 20 world-renowned artists from the USA, Germany, France, Japan, and Turkey. Recent events include the Mural Istanbul Festival organized by the Kadıköy Municipality, the Istanbul Comics and Art Festival (ICAF) held since 2016 at the restored "Museum Gazhane" by the Istanbul Metropolitan Municipality, and the Kendine Has MURAL Fest organized by the Sinop Municipality in 2019.

Notable Turkish artists include Eskreyn, Nuka, Cins, Wicx, Leo Lunatic, Hure, Omeria, No More Lies, Gamze Yalçın, Rakun, Hero, Mert Tugen, Alpha Rising, Canavar, Urbangeode, and Kien (Figure 21). (URL.33).

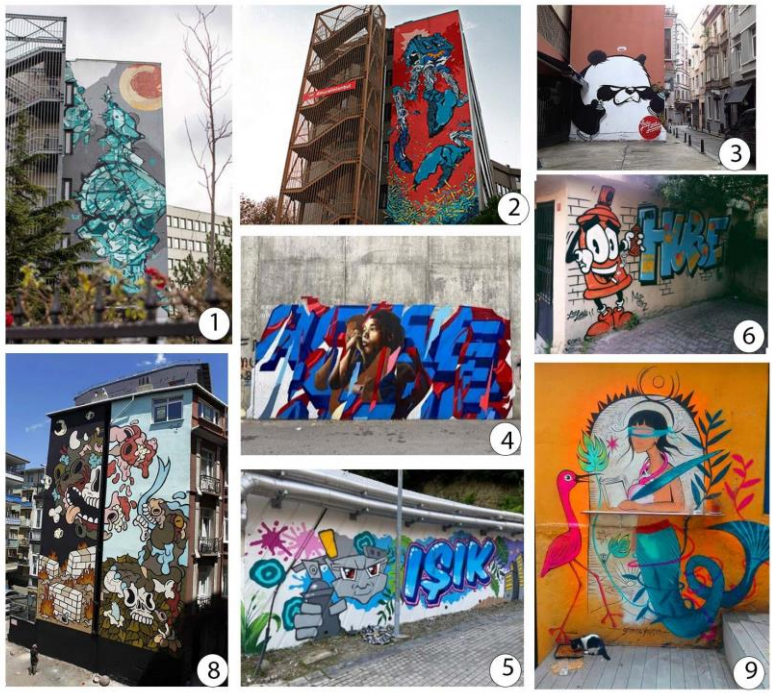


**Figure 21:** Examples of the works of street artists in Turkey: 1; EskReyn, 2; Nuka, 3; LeoLunatic, 4; Reach Geblo, 5; Turbo, 6; Mr Hure, 7; Gamze Yalçın, 8; Cins

## 2. VANDALISM AND STREET ART IN LANDSCAPE:

Vandalism is generally defined by Van Vliet as "the intentional damage or destruction of property belonging to others" (Van Vliet 1992). Graffiti is defined as the act of drawing or painting words or images on various surfaces, usually walls and windows. Vandalism can involve writing or drawing on surfaces, as well as actions such as cutting seats, breaking glass, and etching glass. Graffiti encompasses marking public property and ranges from general tagging to complex stencil art that often utilizes colors and three-dimensional effects based on socio-political commentary. While graffiti can be seen as a specific type of vandalism and even considered a more literate form of

intentional damage from a linguistic and artistic perspective, there is no evidence to suggest that those who create graffiti engage in common vandalism acts. Wilson and Healy (1987) found no statistically significant relationship between graffiti and potential or actual violence within the NSW State Rail network in Australia. It is also particularly emphasized that the uncertainty regarding what differentiates a graffiti artist from a vandal and under what conditions this distinction is made remains (Halsey and Young, 2002). Similarly, the value-laden structures of graffiti have become intertwined with the physical environment and location (Cresswell, 1992). Therefore, graffiti is a complex phenomenon that must be understood within a socio-technical and environmental context. While graffiti can be understood as a form of vandalism, the two are not necessarily related. After graffiti emerged on the streets of New York City in the 1970s, it began to grow into an increasingly significant street movement and later started to be displayed in art galleries (Rabinow, 1986). During this development, psychologists and sociologists began to take an interest in the motivations and explanations behind such vandalism and graffiti behavior. Ward (1973) outlined the most commonly used typology of vandalism by defining it based on the motivations that create them.

Ward (1973) and Thompson et al. (2012) have categorized types of vandalism as follows:

- **Acquisition-oriented vandalism**: Damage inflicted for the purpose of obtaining property or money.
- **Tactical Vandalism**: Using vandalism to achieve other goals, such as sabotaging a machine to force a long break at work.
- **Ideological Vandalism**: Vandalism committed to express a social, political, or other 'cause.'
- **Vindictive Vandalism**: Damage inflicted as revenge for a perceived injustice from an authority figure (e.g., a school principal).
- **Playful Vandalism**: Vandalism carried out in the context of 'play,' such as seeing who can hit a streetlight the hardest.
- **Malicious Vandalism**: Damage inflicted to express anger or frustration, often directed at property perceived as 'middle class.'

According to Aslan (2018), vandalism is a social issue that threatens urban aesthetics and community peace wherever it exists. To achieve the goals of landscape architecture, designs must be made in such a way that they are least affected by vandalism, and criteria aimed at reducing it should be adopted.

However, visual street arts have emerged as expressions of the inner voice of the community, reinforcing the sense of belonging in public spaces and granting the city a new identity. Street art, which has evolved over the past 50 years, cannot be ignored or suppressed when considered a form of social action. On the contrary, it has continued to flourish in cities by transforming itself, discovering new forms of expression, addressing contemporary social wounds, and proving to be a socio-political force.

As seen, street art, which is closely related to vandalism, also allows every segment of society to express itself artistically, using the streets as their canvas and stage. Considered an alternative form of art-making, street art is evaluated within the context of Lefebvre's "right to the city" theory (Yerli 2024).

Landscape architecture is a discipline that, as much as it relates to art, also addresses the physical and psychological needs of society, striving to provide access to art and artworks in outdoor spaces. Landscape architects must make decisions about the variety, location, message, or cultural content of public art while designing public spaces, considering the physical and psychological requirements of society, and keeping aesthetic principles in mind (Demir et al. 2011). Additionally, during the design phases, they should collaborate with artists and involve the landscape architect as the guiding authority in projects that include public art (Dinç 2018).

Although street art often takes place in public areas, artists have different spatial preferences, allowing them to reach diverse audiences. Furthermore, it is understood that artists use public spaces as limitless exhibition areas, resulting in their works integrating with their surroundings and offering viewers unconventional spatial experiences (Gencer 2023).

Evaluating the witty language of street art in landscape architecture will provide numerous benefits. It should be regarded as a unifying element for social relationships and as a tool for creating pleasant spaces for enjoyable experiences. This will contribute to individuals developing a sense of belonging to the city they live in and foster urbanization (Demircioglu et al. 2011).

Additionally, it will promote respect for freedom of expression, listening to others, and raising sensitivity and awareness toward art. The increase in the visual and cultural richness of the city through the integration of street art into landscape design will help soften the cold atmosphere of the concrete city and contribute to the city's tourism potential and economy (Dinç 2018).

At this point, the landscape architect should play a guiding, idea-generating, and unifying role in the final design by incorporating street art while involving artists and the public. While designing balanced areas for ecology and society, the landscape architect should create landscapes that soften the cold structures of cities, which are concrete-dominated and devoid of greenery, enabling individuals to reduce stress and enjoy their time. Especially in crowded, concrete-intensive streets or areas experiencing visual pollution due to urbanization, the aim should be to make the streets more livable by utilizing the witty language of public art, creating safe and peaceful spaces where people can share, enjoy, express themselves, increase their social communication, and relate to one another (Dinç 2018).

Street art can completely transform the visual aesthetics of an area. A city filled with high concrete gray buildings can gain vibrancy and identity through color and light, reducing dull and dirty environments. People walking in the city can feel inspired and revitalized instead of gloomy or indifferent. Moreover, it encourages people to pay attention to the world around them, helping to engage the public and foster connections with their surroundings rather than isolating them from society. With the addition of art to our physical environment, the places where we work, learn, and relax become enriched, and our minds open to new possibilities. By adding character and complexity to spaces that might otherwise be boring, street art can imbue a sense of life into the environment. Especially when artists collaborate with civil society and business leaders, large-scale projects can emerge that completely reframe a space. Furthermore, research examining the power of art has shown that public art can create a sense of place and identity within a community. Street art can personalize cities and towns and break the monotony. It can bring color and vibrancy to otherwise dull or neglected areas, helping to foster a sense of pride and ownership among community members and improve overall quality of life. Street art can also attract tourists and bring economic development to a community. People may travel from other areas to see murals and other street

artworks that can generate income for local businesses. Additionally, street art can serve as a platform for social commentary and awareness, drawing attention to important issues and igniting conversations within the community. It can encourage community engagement and integration, fostering a sense of ownership and pride when artists involve community members in the creation of street art.

As the true artists of outdoor spaces, landscape architects should incorporate public art projects accepted by the community into their designs while creating areas where the public or street artists can leave their mark and express themselves freely. This will contribute to the community's shared living spaces and help them embrace these areas. In this regard, designers should include elements such as painted walls, floors, installation areas, performance spaces, squares, street amphitheaters, etc., in their projects to create successful areas that enhance social communication and interaction (Dinç 2018).

Examples of such initiatives can be found in many parts of the world. In the Nord-Holland district of Kassel, Germany, democratic processes were experimented with in the public space planning process (Reibel 2019). A public workshop, social gatherings, and temporary public art installations were conducted to provide expression opportunities for groups wishing to unite the diverse elements of the community and make their voices heard. The emotional map produced from the community workshop laid the foundation for a candlelight installation that engaged the public on issues that both destabilized and empowered the community. Addressing landscape challenges through a local art installation provided stakeholders with tangible interaction on abstract topics. The importance of presenting an interdisciplinary approach to spatial planning and deepening stakeholder participation in fair, transparent, and inclusive processes of participatory design was emphasized among the results obtained (Reibel 2019).

In general, it is noteworthy that the practices of young graffiti and street art producers, previously seen as a resistance and confrontation against institutional and political intolerance, now play an extraordinary creative role that significantly contributes to cultural, social, and economic progress. This undoubtedly affects paradigm shifts, transforming what is considered marginal and illegal into consensual communications in urban public spaces. Factors such as technology and the internet, which transcend geographical boundaries,

along with academic studies, significantly contribute to the dissemination of knowledge about graffiti and street art culture. The themes emphasized in street art culture need to be contextualized according to the social, economic, and political characteristics and interests of each society. Despite legal prohibitions, graffiti and street art interventions are being utilized by local governments in many urban centers worldwide (Silva 2021). It seems reasonable to assume that new planning policies are being adopted that combine urban renewal focused on graffiti and street art culture with inclusivity measures for social revitalization. While the city of Lisbon captures a beautiful blend of street art with history, local heritage, and public participation, Toronto is attempting to prevent vandalism through the implementation of street art murals and support for local artists. In addition to beautifying urban renewal and dilapidated, unsafe areas, cultural and creative productions enhance socioeconomic development, social cohesion, and community empowerment, thus providing a better quality of life for citizens. Communities are gaining new ways not just to see a space, but to be part of it. New synergies associated with graffiti and street art culture guide the development of project management skills, regardless of whether they yield financial or social benefits, due to the contribution of initiatives like the StreetArtCEI project in providing resources for information and entrepreneurial activities. Moreover, it has been shown that the production of graffiti and street art murals is increasingly recognized as a product of cultural tourism and has become significant for economic development. Importantly, innovation and creativity are creating various local economic activities that add value to communities, turning them into tourist attractions. It can be said that a social consensus has been reached regarding the implementation of graffiti and street art culture, reflecting the dynamics of globalization and characteristic of a new century where changes occur rapidly. Based on a holistic vision, it should be emphasized that graffiti and street art culture has always been an integral part of social movements, but today occupies a 'reconciling' position in the advancement of democracy and the development of society (Silva 2021).

From the mysterious cave paintings of prehistoric communities to the exciting street scenes of today’s urban areas; from revered religious frescoes adorning some places of worship to hidden artistic tags in back alleys; and from the corridors of schools, libraries, and museums to outdoor public gathering spaces, murals are ubiquitous and used for countless motivations. Conceptually

simple, murals are large paintings made on walls, ceilings, or other permanent structures, and given their simplicity, they often serve as a versatile form of public street art and participation. One of the most prominent and important benefits of muralism, the art of mural painting, is its democratic and accessible nature. Murals bring art directly to people in public spaces, accelerating the dissemination of the benefits gained from experiencing art, often in communities that lack access to such artistic resources or inspirations. Nowadays, an increasing number of city governments and organizations are establishing mural initiatives and creating extensive mural collections with these benefits in mind (Stupp 2022).

In recent years, street art and graffiti have been framed as elements of cultural heritage. However, there has yet to be a clear consensus on defining or conceptualizing street art as heritage. A study argues that street art and graffiti do not represent a dichotomy between tangible and intangible heritage or between people and objects; instead, they represent an inseparable relationship between the two (Nomeikaite 2017). According to Shariatpanah et al. (2021), graffiti contains linguistic symbols worth exploring. Studying and interpreting wall writings is essential for solving societal issues and understanding people's desires, motivations, and wishes. Examining wall writings is also important in the macro planning of governmental social and cultural issues. It is a highly reliable way to learn about people’s political, cultural, social, economic, and religious aspirations and desires.

Street art and its close relative, graffiti, have increasingly been recognized as cultural heritage elements in various parts of the world, showcasing a dramatic visual aesthetic while also being acknowledged for their political power. However, these artworks are often susceptible to damage from weather conditions, removal by public authorities, vandalism, and destruction. Artists frequently view their works as ephemeral, investing little effort into their preservation, which underscores the fragility of street art.

The MementoArtem project, launched in 2021, aims to document and archive not only the physical works of street artists but also the diverse background information that contributes to their creations by exploring various human-centered technologies and emerging standards. This initiative envisions the digital preservation of street art, akin to other cultural heritage artifacts, for future generations.

The question of whether street art can be considered tangible or intangible cultural heritage has sparked various approaches and discussions among art circles and authorities. Institutions like UNESCO have begun to view street art as heritage elements, with discussions about their inclusion in official heritage frameworks (McInerney et al. 2023).

Traditionally, responses to street art have been closely tied to vandalism, often characterized as a legal issue best handled through punitive or property laws. However, many street artists do not perceive this framing as a problem, as their works increasingly acquire commercial value, improve urban landscapes, create new local art markets, attract tourists, and contribute to the gentrification of impoverished areas. Consequently, traditional ways of understanding street art are beginning to pose new challenges to concepts of crime and property.

An observational study in London proposed a new theory regarding the sensory experience of encountering street art in urban settings, emphasizing that street art should be viewed more as a performance rather than a mere object (Flessas and Mulchany 2018).

In contemporary cities, street art engages with societal issues through its unique style and forms of expression, warranting its evaluation within the framework of linguistic landscapes. The linguistic landscape theory examines the linguistic environment of contemporary cities, its multilingualism, and the reasons behind it. According to Landry and Bourhis (1997), the language of public signs, billboards, street names, place names, commercial shop signs, and public signs in government buildings coalesce to create the linguistic landscape of a particular area and city. Shohamy and Waksman (2012) noted the fluid nature of linguistic landscapes, describing public space as a dynamic and fluid realm that is constantly constructed, deconstructed, and reconstructed.

In many cities worldwide, graffiti is simultaneously viewed as an illegal act and as a component of the linguistic landscape. Padang, the capital of West Sumatra in Indonesia, has received the 'Adipura' award for its success in cleaning and managing urban environments 17 times. In response, city management has begun to combat graffiti and enforce penalties. However, new graffiti continually emerges in place of what has been removed, with the government emphasizing that graffiti undermines the city's beauty (Yendra et al. 2020). Reeve (2017) concluded that graffiti in Padang is an urban culture

and art movement influenced by global culture, considering graffiti a global act occurring everywhere. Other perspectives argue that graffiti in Padang is part of the public space's linguistic landscape, symbolically constructed by various linguistic signs (Artawa and Sartini, 2019; Gorter, 2018; Hernández et al., 2017; Landry and Bourhis, 1997; Thongtong, 2016; Yendra et al. 2020).

Similarly, regarding the social aspect of linguistic landscapes, many examples of graffiti in Tbilisi demonstrate street artists' engagement in socially significant discussions addressing both local and state issues. The exhibition of Tbilisi's graffiti illustrates the fluidity of such narratives in the linguistic landscape, as older graffiti are often cleaned or covered by official or commercial signs, only to be replaced by new works. Events like the ArtAttack Festival (2015), which highlight international collaborations among street artists, have contributed to the broader recognition of graffiti as an art form, reinforcing its status as more than just an act of vandalism (Radaviciute 2017).

## 3. CONCLUSION

Graffiti plays a significant role in establishing a relationship between society and space in contemporary urban life, which has distanced itself from the streets over time. Both graffiti and street art reflect the cultural values and social sensitivities of society in public spaces, personalizing characterless urban areas and creating culturally specific landscapes. This process significantly contributes to cultural landscapes as factors that influence urban identity and collective memory.

In the context of contemporary time and space consumption, graffiti enhances the sense of belonging to places, extending the time people spend in public areas and thus facilitating cultural mixing. However, graffiti has historically been labeled as vandalism by many authorities, who have attempted to erase it from urban landscapes despite its cultural benefits. Nowadays, initiatives like graffiti parks are being designed to encourage graffiti production.

Nonetheless, legalizing graffiti can contradict its nature, potentially diminishing its impact on urban communication and interaction. Therefore, while efforts that are deemed beneficial to society and culture persist, contrary initiatives will likely fade away over time. Ultimately, graffiti and street art will

continue to hold a lasting place within societal dynamics, but the direction of that place will be determined by societal acceptance and legal regulations.

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# CHAPTER 8

## MACHINE LEARNING APPLICATIONS IN LANDSCAPING

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## INTRODUCTION

Among the main dynamics of the current century; natural disasters, global urbanisation, natural climate change, all include landscape architecture issues. These issues are interrelated and are handled with a holistic approach. Today's landscape studies; ecological services system, urban applications (ecological-cultural-social), urbanism and landscape design, sustainability and nature conservation. Artificial intelligence, landscape architecture "is a professional field that deals with the planning, design, management and sustainable development of natural and artificial environments" (Kızılaslan, 2023), in today's technologies, intelligence simulation is carried out with these machines programmed with the aim of predicting human intelligence and imitating human actions. Thanks to this feature, machine learning algorithms, which are used in many fields, have been effectively applied in landscaping studies in recent years.

Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without being explicitly programmed. These algorithms are used for various purposes such as image processing, data mining, predictive analytics, etc. The main advantage of using ML is that when an algorithm learns what to do with data, it can do its job automatically (Mahesh, 2020).

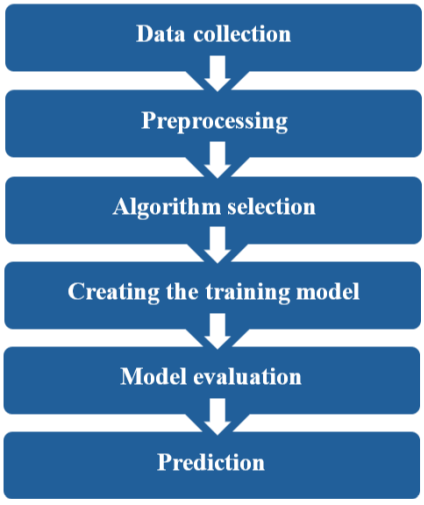


**Figure 1:** Flow process of machine learning methods

ML algorithms can be defined as 'universal predictors'. Thus, they can learn the main behaviours of a system under investigation from a training data set and make general predictions. Another feature of ML-based methods is that they do not require any prior information about the nature of relationships between data. The usage area of ML applications can be summarised under three main headings.

(1) A deterministic modelling of the system has a heavy computational process and ML can serve as a code accelerator tool.

(2) There is no one deterministic model, but an ML-based empirical model can be constructed using the available data.

(3) It can effectively produce solutions for classification problems.

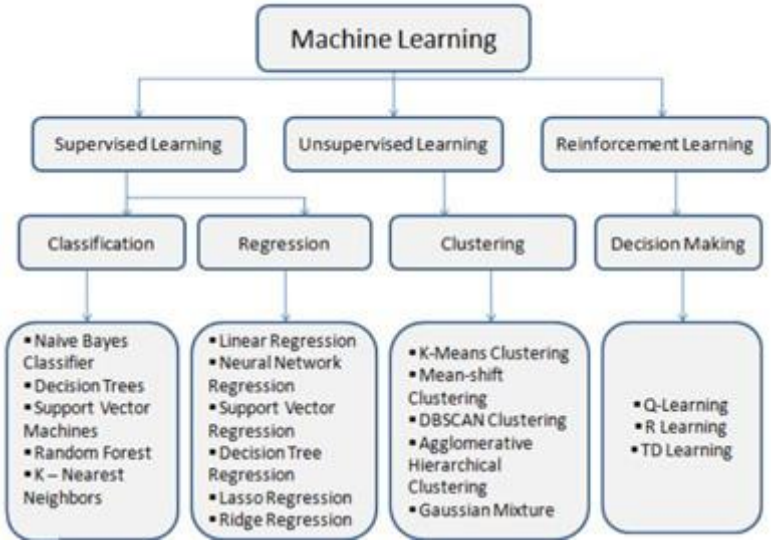


**Figure 2:** ML algorithms (URL1).

ML applications are used in many areas to increase efficiency and create new opportunities. ML algorithms can be implemented in design and planning processes of landscape studies, prediction modelling and classification studies. With this review, the applications of ML algorithms used in landscape studies have been evaluated by examining the existing domestic and foreign literature. In the studies to be carried out in this field, it is tried to be explained by giving

examples about how ML algorithms are used for what purpose. It provides an idea for future studies to resolve selection confusion in algorithms.

ML models are categorised under three main headings according to their functions; classification, clustering and regression (association) rules. In the classification task, a model is built using the training data and this model assigns the new incoming data to one of the predefined classes. The success of this model developed by the algorithms is evaluated using test data. In the regression task, classification algorithms are used, but instead of predefined classes, there is a continuous range of values. In the clustering task, the model consisting of input parameters is formed according to the values of the input data without predefined classes. The most widely used approaches among ML methods are supervised learning approaches. In this method, the classification process is based on sampling identified pixels to classify unidentified pixels. Not all ML techniques can always produce a highly accurate land use/land cover map because good results depend on the ML model setup, training examples and the input parametres (Talukdar et al., 2020). In general, the classification process in supervised learning consists of three steps:

1. Training phase, identification of a representative training field and definition of the spectral characteristics of each land cover type in the scene, known as the numerical training set or training fields;

2. Classification phase, categorisation of every pixel in the image dataset into land cover class.

3. Output phase: Thematic maps etc. In supervised learning, if the user correctly identifies the classes, the results of supervised classifications are more accurate and precise than unsupervised learning. Therefore, we can say that the user has a great job in supervised learning and the process is user controlled (Dokuz et al., 2020). Supervised learning has a wide range of algorithms. The most commonly used ML algorithms in the literature are logistic regression,support vector machines, logistic regression, naive bayes, K-nearest neighbour, decision tree and random forest algorithms.

# 1. MACHINE LEARNINGS AND THEIR IMPLEMENTATION IN LANDSCAPE STUDIES

## 1.1. Random Forest (RF) Classifier

The RF algorithm, a nonparametric supervised approach, generates a series of decision trees and performs classification and regression. Each tree is grown on a random subset of the dataset containing the dependent landform type and its independent variables (curvature, slope) through a processor called sampling or bagging and provides a prediction for the dependent variables ( Breiman and Cutler, 2011; Breiman et al., 1984 ). The RF algorithm is generally more accurate than the single decision tree algorithm. The main input parameters for RF are the count of trees to be developed and the count of variables in each split. However, there is no absolute correlation between having too many trees and classification accuracy.

Uses in landscape: More recently, it has also been applied to the mapping of landforms and related surface changes such as soil, erosion, landslides and plant resource properties ( Harris and Grunsky, 2015; Taalab et al., 2018 ), measuring small and diverse wildflowers distributed in a heterogeneous landscape (Tabor et al, 2024), measuring the importance and non-linear effects of landscape patterns on ecological resilience (Ma. et al., 2023).

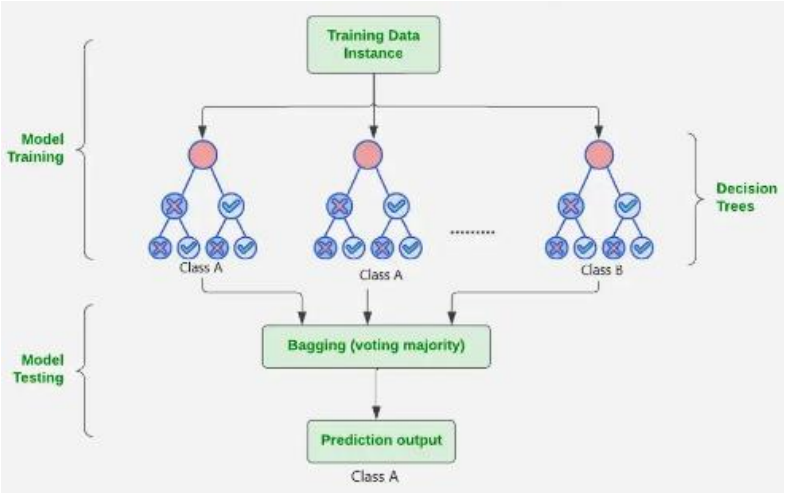


**Figure 3:** Random Forest in machine learning (URL2).

### 1.2. Support Vector Machines (SVM) Classifier

SVM is one of the learning methods developed by Vapnik (1995) for solving classification problems in the field of statistical learning theory, which tries to minimise structural risk (Kavzoglu and Colkesen, 2009). When a situation occurs where the data cannot be separated linearly, this gap with a linear definition can be filled with non-linear definitions (Akşehirli et al.,2013). SVM is a supervisory learning algorithm used to separate different classes and maximize the margin. SVM is a set of related supervisory learning methods that are used for both classification and regression. Given a set of training examples, each labeled as falling into one of two categories, the algorithm builds a model that estimates whether a new example will fall into one categorization or the other. This model reduces the classification error on invisible data to a minimum, without a priori assumptions about the likelihood distribution of the data.

Uses in landscapes: Accurate land use/land cover (LUC) maps derived from remote sensing data have been applied to quantify and monitor temporal-spatial patterns of LUC change, to assess classification performance ( Lu et al., 2004, Carreiras et al., 2006, Paneque-Gálvez, et al., 2013), to analyse complex rural-urban landscape change and patterns.

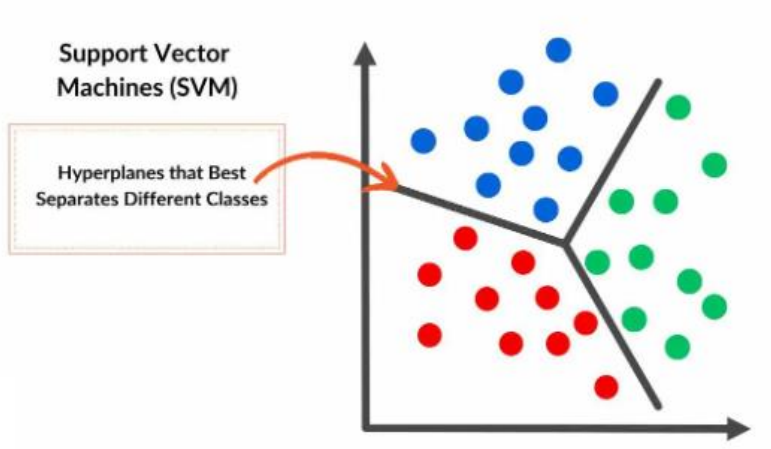


**Figure 4:** Support Vector in machine learning (URL3).

### 1.3. Classification and Regression Tree (CART) Classifier

CART is a decision tree algorithm that is frequently preferred in solving various problems in many other fields such as health, engineering, agriculture as well as remote sensing applications. The main purpose of the tree structure created with CARTis to classify the data into appropriate classes accurately and quickly with the logic of 'what if' (Breiman et al., 1984). The CART algorithm divides the tree into two sub-branches starting from each decision node with binary branches and performs the decision making process by transforming a complex problem into simpler sub-problems. It provides nonparametric approaches and easy interpretability in classification problems, areas with complex effects (Kavzoğlu et al., 2012).The disadvantages of the CART model include overfitting and instability (Ishwaran., 2007).

Uses in landscapes: Both ecoregionalisations should be used as a spatial framework for the analysis of current meteorological and phenological data to reveal climate change induced impacts (Pesch et al., 2011), to identify and map flora (Zhang and Yang, 2020), landscape indices and classification studies to estimate spatial land cover (sharma et all, 2024).

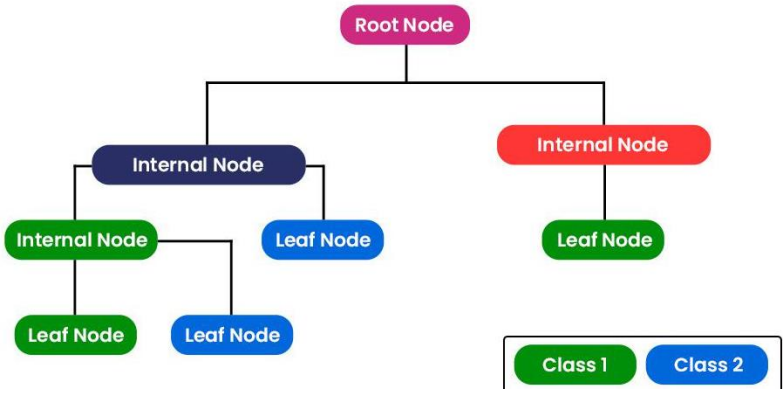


**Figure 5:** CART in machine learning (URL4).

### 1.4. Decision Tree(DT) Classifier

Decision Trees (DT) is an algorithm that defines the relationship between data with a classification and regression method, which has recently been widely used in the literature (Kavzoğlu and Çölkesen, 2010).The DT algorithm is one of the inductive algorithms and is used in both regression and classification problems. DT are used for data mining tasks such as clustering and classification. The working principle of the decision tree is based on a divide-and-conquer strategy, which is easy to implement and requires little prior knowledge. With the decision tree, data sets of any size with a large number of attribute values can be generated. Successful partitioning of the training sample set continues until a single class instance remains in the sub-sample sets (Farid et al., 2013). Advantages of using DT; It is easy to create a decision tree. Numerical and categorical data can be processed. It can be used in large data sets. Disadvantages; Very complex trees can be produced. Memorisation (over fitting) may occur. Low success in predicting continuous variables. Low success in model building if there are few samples in the data set and the number of classes is high (Sezer,2008).

Uses in landscape: Predictions are made by training data affecting soil erosion. ML algorithms can function as a valuable analytical tool in design research. In the chaotic world of landscape architecture, human perception and artificial intelligence is used to understand and predict human behavioural responses to alternative environmental designs (Raman and Naderi, 2006; D. Han et al., 2023).

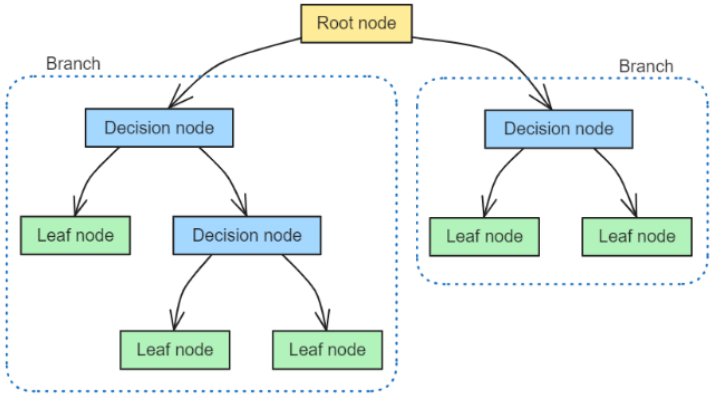


**Figure 6:** Decision tree in machine learning (URL5).

### 1.5. XGBoost Classifier

Extreme Gradient Boosting is a very effective and well-known ML technique. Combining a number of numerical prediction models into a single robust model. The algorithm has been recognized for its speed, portability, and capability to deal with high-dimensional datasets (Georganos et al., 2018).

Uses in landscape: Increase in slope of landscape areas, 2D/3D landscape pattern measurements and their land surface temperature (LST) changes, the relationship between urban thermal pattern and urban landscape structure ( Weng et al., 2007), used to analyze the relationship between the analysis of landscape metrics and impacts on LST (Yu et al., 2020).

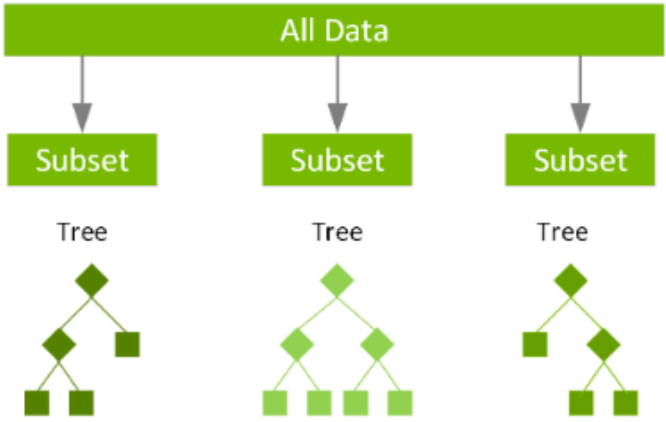


**Figure 7:** XGBoost in machine learning (URL6)

### 1.6. k-Nearest Neighbour (k-NN) Classifier

The k-NN algorithm is an approach that performs regression and classification tasks based on lazy learning. k-NN algorithm considers k class centres determined in the training phase and performs the classification process according to the distance of the test values to these class centres. Various distance measures such as Manhattan, Euclidean and Minkowski distances are used as similarity measures to the class centres. The algorithm starts by determining k class centres randomly and classifies the training data according to their proximity to these class centres.

Uses in landscape: Erosion susceptibility classification (F. Abbas et al. all,2024), heterogeneous land cover classification (G. Ashiagbor, et al., 2023), plant species estimation after forest fires (Affleck and Gaines, 2023).

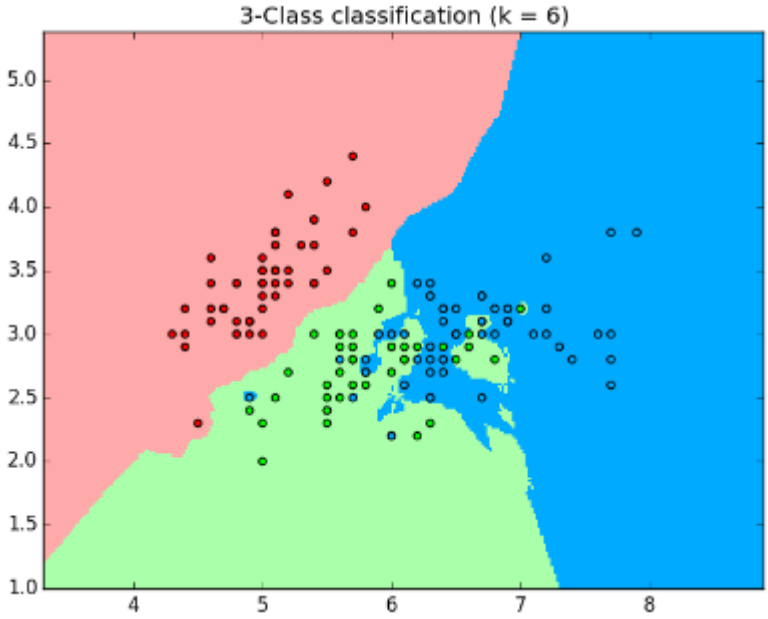


**Figure 8:** Example of green wall and green roof (URL2, 3)

### 1.7. Naive Bayes (NB) Classifier

It is a family of algorithms based on Bayes' Theorem. These classifiers are commonly used in machine learning due to their simplicity and efficiency. The advantage of using NB is its speed. It is fast and easy to make predictions with high dimensional data. The NB classifier is a widely researched classification model, used in many cases as a benchmark for comparison with new methods. The elegance and apparent accuracy of NB (Domingos and Pazzani, 1997) even when the independence requirement is violated, continues the interest in the model (Hoare ,2008).

Uses in landscape: GIS-based soil mapping (Yudhana et al., 2021), plant species recognition and classification studies, higher results were obtained compared to other classification modes (Pearline and Kumar, 2021 ;Danacıoğlu,2023).

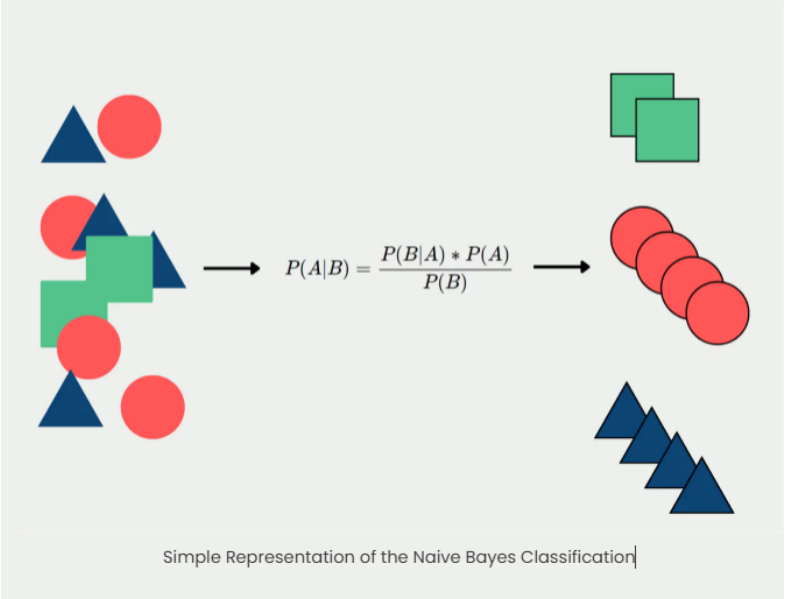


**Figure 9:** Naive Bayes in machine learning(URL8).

## 2. CONCLUSIONS AND SUGGESTIONS

ML shows a continuous progress due to the proliferation of its usage areas and the increase in the number of studies. In this study, the innovative perspective brought by machine learning to landscape architecture studies helps to draw a path by making use of the literature in determining the methods and variables to increase the level of accuracy in design, planning, prediction and classification. Within the scope of the study, firstly, information about the definition of ML algorithms, modelling and classification forms and their relationship with landscape architecture is given. Then, landscape studies carried out in recent years have been examined and analysed within the framework of the literature. Information on what these studies are and which algorithms are used to solve problems related to which application areas are given. Within the framework of the study, the issues to be considered in ML algorithms according to the literature can be summarised as follows:

- There are many models and algorithms that can be used for machine learning, and it is very important to choose the right algorithm for the success of the study.

- Each algorithm has its own advantages and disadvantages. While the RF algorithm is less affected by parameter changes, SVM is more sensitive to parameters (Chang et al., 2019).
- Factors such as size, nature, distribution of the data set; selected parameters, kernel functions; quality of the training and test data set are directly related to classification accuracy (Ibrahim, 2023; Li et al., 2019). In this context, the most appropriate method is expressed as the least sensitive, most complex and fastest (Congalton and Green, 2019).
- It helps to eliminate the difficulties in mapping cultural ecosystem services, which are considered within the scope of landscape studies (Brown and Fagerholm, 2015).
- It has played an effective role in saving time in modelling areas that provide cultural ecosystem services on land cover (Arslan and Örücü, 2020)
- With 3D modelling and visualisation studies, it provides great advantages to the designer and user by analysing the relationship of land (such as land surface temperature, slope) changes, including ecological studies.
- According to the method of the study to be carried out, according to the content and parameters of the data set, different ML models are evaluated together and the results are obtained.

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# CHAPTER 9

## THE SIGNIFICANCE OF SOCIAL INFRASTRUCTURE IN URBAN QUALITY OF LIFE: A CASE STUDY OF YERKÖY DISTRICT (YOZGAT)

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## INTRODUCTION

The emergence of cities throughout history has brought with it numerous challenges and, consequently, the development of policies to address them. Rapid population growth in cities, particularly with the advancement of industrialization, has fueled illegal construction, leading to unplanned urbanization (Keleş, Mengi, 2021). This unplanned growth has resulted in the unhealthy and irregular development of cities, negatively impacting urban life. The lack of holistic urban planning has hindered the formation of a distinct city identity (Mengi, 2007). Thinkers seeking solutions to economic, social, and environmental issues are developing various urban and citizen models, striving to resolve the dialectical relationship between these concepts.

Studies on the concept of quality of life emphasize the importance of socio-cultural, environmental, and economic norms within the urban context (Keleş, Mengi, 2024). These studies advocate for the holistic planning of cities, ensuring that every citizen has equal access to all services (Mengi, Meydan Yıldız, 2017). Cities should be approached holistically, not regionally, ensuring equitable access to rights recognized by local communities. Ultimately, legal frameworks should be designed and implemented to enhance urban quality of life.

Urban quality of life is directly related to social infrastructure, a relationship crucial for enhancing the overall well-being of urban dwellers. Social infrastructures are facilities and spaces that meet the social, cultural, and educational needs of the community. These spaces provide urban planners with essential insights for both harmonizing with the physical environment and effectively serving the community (Mengi, Meydan Yıldız, 2019; Mengi, Algan, 2003). This approach enables the creation of more livable, sustainable, and functional urban areas.

This study aims to examine the extent to which quality of life criteria are applied within the boundaries of Yerköy district, Yozgat province, in line with social infrastructure standards. Taking into account the district's existing social infrastructure and current population structure, the study correlates these factors with the minimum per capita area sizes specified in the standards and determines the adequacy of these areas.

## 1. THE CONCEPT OF URBAN QUALITY OF LIFE

The concept of urban quality of life, according to the consensus among various scholars, is defined as the interplay of social, health, economic, and physical environmental conditions that influence individual and societal development (Shookner, 1997). This concept is often used in conjunction with livability, sustainability, smart growth, and resilience (Tekeli, 2010). Sustainability and livability are mutually supportive concepts, with sustainability gaining meaning within the framework of livability. Livability is defined as the success criteria for a settlement to be deemed favorable and is indexed to the social sphere. In other words, it entails settlements incorporating indicators of people's quality of life and adopting a human-centered approach (XI. Development Plan, 2018).

According to Veenhoven (1996), the term quality of life has two interpretations: the existence of conditions necessary for living a good life and, alongside these conditions, the ability to experience a good life. Both interpretations can be applied in personal evaluations. When making such assessments, considering both the externally perceived circumstances and the individually assumed situation of someone believed to be living a quality life is crucial for accurate evaluation. Veenhoven (2000), elucidated the four-dimensional nature of life through the opportunities and outcomes generated by inner and outer quality. The ultimate summary indicator of quality of life is how long and happily a person lives.

**Table 1:** Four Qualities of Life (Veenhoven, 2000).

| | external qualities | intrinsic qualities |
|---|---|---|
| Life opportunities | livability of the environment | Life skills (capabilities) of the individual |
| Life Results | Value of life (utility) | Knowing the value of life |

Harvey Perloff, one of the first scholars to examine the impact of the urban environment on quality of life, stated in 1969 that the quality of life for individuals gathered around an urban settlement is determined by the interplay of the natural and human-made environments (Tekeli et al., 2010). In this sense, quality of life pertains to both natural and built environment characteristics. Unlike quality focused on sustainability, which centers on the

preservation of natural resources, climate, ecology, etc., this concept also encompasses urban amenities and comfort elements (Şeker, 2011).

With the realization that rapid and distorted urbanization diminishes the quality of life, the concepts of "city" and "quality of life" have begun to be considered in conjunction. When articulated within a general framework, quality of life is often explained as the ratio between the supply and demand of services and all conditions required by urban dwellers, encompassing a complex array of indicators: 1) Indoor and outdoor environmental standards (such as environmental pollution, natural environmental attributes, and green space utilization); 2) Citizen well-being (income level, unemployment rate, crime rates); 3) Service diversity and quality (education, entertainment, public health, public transportation, municipal services, good governance) (Turgut Yıldız, 2007).

Consequently, in terms of social, economic and spatial elements, it can also be defined as the situation where the urban infrastructure, social facilities, communication, transportation and housing facilities are above the previously determined standards; and the individuals living in the city benefit equally from these facilities and opportunities offered by the city (Geray, 1998; Üçer, 2009).

## 2. URBAN QUALITY OF LIFE MEASUREMENT CRITERIA

As is well known, the fact that individuals within a society have a high individual standard of living does not necessarily indicate a high urban quality of life. This is because urban problems arising independently of individuals pose a significant obstacle to achieving urban quality of life. Within urban structures, it is crucial to establish a direct relationship between the individual and the space. In this sense, urban quality of life can also be defined as a concept that encompasses measurable spatial, social, and physical elements that constitute its framework, as well as how urban residents perceive these elements (Van Kamp et al., 2003).

While conceptually defining quality of life is straightforward, evaluating it is not as simple as defining it. Consequently, it possesses numerous distinct characteristics with both objective and subjective dimensions. In this vein, determining indicators for assessing quality of life

within an urban area to ascertain its level emerges as a crucial consideration. Indicators found in research can be categorized into two primary groups: The first group consists of objective values related to the urban environment, necessitating quantifiable indicators and statistical data consideration. Thus, this group allows for the categorization of information that remains consistent across individuals (Karaağaç, 2019).

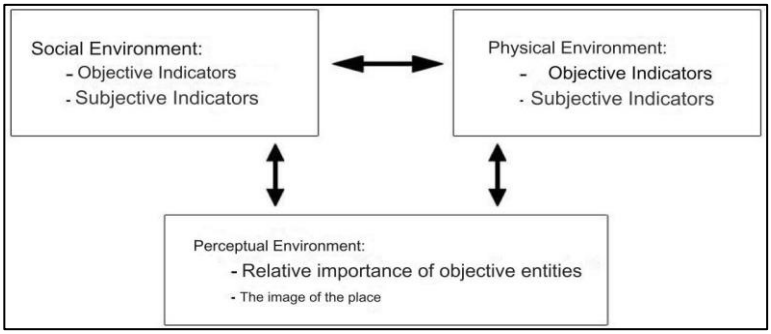


**Figure 1:** The components of life model (Cutter, 1985; Topçu, 2003:14).

The first group, encompassing objectively defined indicators, examines the environment inhabited by people. In this context, indicators need to be quantifiable, taking into account statistical data. Therefore, it is feasible to classify information within this group that does not vary from person to person (Karaağaç, 2019). It should be noted that urban quality of life indicators within the study area are significantly influenced by highly subjective factors such as culture and traditions prevalent in the geographical context of the research (Eva et al., 2011).

Although there is no single, universally agreed-upon model for measuring urban quality of life in the existing literature, it can be argued that the most prevalent and accepted approach involves the use of "indicators." It is noteworthy that studies on urban quality of life initially emerged within the Social Indicators Movement in the 1960s. Social indicators, in their simplest form, represent concise, comprehensive, and balanced judgments about the state of a society's fundamental aspects (Stimson and Marans, 2011).

In addition to studies focusing on measuring quality of life by considering the conditions individuals experience, research aiming to gauge individual perceptions and experiences has also come to the forefront. To

facilitate this measurement, evaluation criteria have been employed across domains such as family and marital life, education, health, governance, work and employment, housing and neighborhood, religion and beliefs, financial status, and investments (Campbell, Converse, and Rodgers, 1976).

Over time, the focus has shifted towards determining the level of urban quality of life measurement and identifying relevant indicators, revealing a prevailing trend of employing a combination of subjective and objective indicators that can vary across city, district, and neighborhood scales. Objective indicators assess the equitable and balanced access of individuals residing in a city to the services and amenities it provides. In other words, objective indicators attempt to measure the overall quality level offered by the city to all its residents.

The equitable, healthy, and systematic access to and utilization of urban services by city dwellers are also considered fundamental rights (Keleş, Mengi, 2024). This right, known as the right to access urban services, is ensured by providing services such as housing, drinking water supply, solid waste and wastewater disposal, transportation, and electricity equally, fairly, and adequately to everyone in settlements. Affordable rent and infrastructure services, housing that respects human dignity, accessible and reachable urban services, and easy communication facilities are the fundamental metrics of access to urban services (Ertan and Ertan, 2013).

Objective indicators of the physical environment are directly related to social facilities, and this relationship is crucial for enhancing the quality of urban life. Standards set for social facilities pertain to amenities that cater to the social, cultural, and educational needs of the community, assessed on a population scale. As objective indicators of the physical environment, social facility areas provide crucial information for urban planners to ensure both environmental integrity and equitable, accessible living conditions for the community. This approach aims to foster the development of more livable, sustainable, and functional urban areas.

## 2.1 The Concept of Social Facilities

According to Keleş (1990), social facility areas encompass "all public uses necessary for a settlement to fulfill its functions." Therefore, social facilities can be summarized as the organized arrangement of activities that

determine the level of livability in a city, in the form of functions that individuals require.

Administrative facilities constructed to carry out administrative services in the city, green spaces and sports fields where individuals can engage in recreational activities, educational facilities to meet educational needs, healthcare facilities for accessing healthcare services, and public and semi-public spaces, including both open and closed areas, are considered social facilities that enable socio-cultural activities.

Article 3 of the Regulation on the Principles of Plan Making defines social facilities under the heading of social infrastructure as "the name given to educational, health, religious, cultural, and administrative buildings, as well as green spaces such as parks and children's gardens, that need to be constructed to create a healthy environment" (Official Gazette, 1985). Based on this regulation, certain standards have been established in our country for social facility areas to enhance the quality of cities. These standards determine the minimum amount of facility areas required based on the city's population and guide urban planning.

### 2.2 Standards Developed for Social Facilities

In a general sense, cities should be evaluated with the understanding that social facilities are among the most fundamental and vital elements within public spaces. This significance stems from the role of social facilities in ensuring the functionality and sustainability of built-up areas. Social facilities can also be termed as urban infrastructure elements that enhance the quality of life in cities and provide services that city residents require in their daily lives.

In Turkey, public spaces and the standards to be adhered to within these areas are reflected in planning literature and legal frameworks as urban and social facility areas. Venues that host social and cultural activities, such as administrative facilities providing administrative services in cities, green spaces promoting physical and mental well-being, sports facilities, healthcare institutions, and education centers, constitute a part of social facilities as public or semi-public spaces. These social facilities are defined by the "Regulation on the Preparation of Spatial Plans" standards, which are determined through spatial planning processes. This regulation establishes

minimum per capita square meters and minimum standards for social facilities, considering both current and future needs. Article 16 of the Regulation on the Principles of Plan Making states, "In the preparation and modification of development plans at every scale, the minimum standards specified in the table for social and technical facility areas shall be complied with, taking into account the conditions of the planned settlement and region and future requirements." The table below provides information on the social facility standards introduced by the regulation on the preparation of spatial plans (Table 2).

**Table 2:** Social Facility Standards (Regulation on the Preparation of Spatial Plans, 2014).

| ANNEX-2 TABLE | | TABLE OF STANDARDS AND MINIMUM AREA SIZES FOR MINIMUM SOCIAL AND TECHNICAL INFRASTRUCTURE AREAS IN DIFFERENT POPULATION GROUPS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| INFRASTRUCTURE AREAS / POPULATION GROUPS | | 0-75,000 | | 75,001-150,000 | | 150,001-500,000 | | 501,000+ | |
| | | m²/person | Minimum Unit Area (m²) | m²/person | Minimum Unit Area (m²) | m²/person | Minimum Unit Area (m²) | Makishi | Minimum Unit Area (m²) |
| EDUCATIONAL FACILITIES AREA | Kindergarten | 0.50 | 1,500-3,000 | 0.50 | 1,500-3,000 | 0.60 | 1,500-3,000 | 0.60 | 2,000-4,000 |
| | Primary school | 2.00 | 5,000-8,000 | 2.00 | 5,000-8,000 | 2.00 | 5,000-8,000 | 2.00 | 5,000-8,000 |
| | Middle school | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 |
| | Day,High School | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 | 2.00 | 6,000-10,000 |
| | Boarding High School | | 10,000-15,000 | | 10,000-15,000 | | 10,000-15,000 | | 10,000-15,000 |
| | Industrial Vocational High School, Multi-Program High School | | 10,000-25,000 | | 10,000-25,000 | | 10,000-25,000 | | 10,000-25,000 |
| | Special Education, Rehabilitation and Guidance Centers | | 2,000-4,000 | | 2,000-4,000 | | 2,000-4,000 | | 2,000-4,000 |
| | Adult Education Center Maturation Institute | | 3,000-5,000 | | 3,000-5,000 | | 3,000-5,000 | | 3,000-5,000 |
| OPEN AND GREEN AREAS | Children's Garden | 10.00 | | 10.00 | | 10.00 | | 10.00 | |
| | Park | | | | | | | | |
| | Square | | | | | | | | |
| DISTRICT BOUNDARIES MADE INTERNALLY IN PLANNING | District Spcr Area | | | | | | | | |
| | Botanical Park | | | | | | | | |
| | Picnic Area | | | | | | | | |
| | Recreation | | | | | | | | |
| PROVINCE BORDERS IN ALL IN THE PLANNING MADE | Zoo | 5.00 | | 5.00 | | 5.00 | | 5.00 | |
| | Urban Forest | | | | | | | | |
| | Area to be Afforested | | | | | | | | |
| | Fair, Fair and Festival Area | | | | | | | | |
| | Hippodrome | | | | | | | | |
| HEALTH FACILITIES AREA | Family Health Center | 1.50 | 750-2,000 | 1.50 | 750-2,000 | 1.50 | 750-2,000 | 1.60 | 750-2,000 |
| | Primary Health Care Facilities | | 3,000 | | 3,000 | | 3,000 | | 3,000 |
| | Oral and Dental Health Center | | (110) m² per unit | | per unit | | (110) m² per unit | | (110) m² per unit |
| | Maternity and Child Care Homes | | (130) m² per bed | | 1.50 per bed (130) m² | | (130) m² per bed | | per bed (130) m² |
| | State Hospitals | | | | | | | | |
| | Specialized/Training and Research Hospitals | | | | | | | | |
| | Physical Therapy and Rehabilitation Hospitals | | | | | | | | |
| | Health Campuses | | (220) m² per bed | | (220) m² per bed | | (220) m² per bed | | per bed (220) m² |
| SOCIAL AND CULTURAL FACILITIES AREA | | 0.75 | | 1.00 | | 1.25 | | 1.50 | |
| PLACE OF WORSHIP | Small place of worship | 0.50 | 1,000 | 0.50 | 1,000 | 0,75 | 1,000 | 0,75 | 1,000 |
| | Central place of worship | | 2,500 | | 2,500 | | 2,500 | | 2,500 |
| | Large place of worship and complex | | 10,000 | | 10,000 | | 15,000 | | 15,000 |
| TECHNICAL INFRASTRUCTURE (Excluding Roads and Parking Lots) | | 1.00 | | 1.25 | | 1.50 | | 2.00 | |

These standards aim to ensure the proper inclusion of social facilities in the planning and development processes of cities and to enhance the quality of life for urban residents. Today, development plans at different scales, prepared within the framework of urban planning hierarchy, should be made in line with the standards listed in the table above. The basic criterion considered when applying these standards is the population of the area being planned. These standards should be implemented in plans where a high quality of life and human comfort are set as primary goals.

## 3. ADEQUACY OF SOCIAL FACILITIES IN MEASURING URBAN QUALITY OF LIFE IN YERKÖY DISTRICT OF YOZGAT PROVINCE

The study area is Yerköy district, located in the southwest of Yozgat province, bordering Kırşehir, Kırıkkale, and Çorum and 39 km away from the city center. The district has a surface area of 1,245 km² and consists of 14 neighborhoods and 60 villages. A large part of the district, which experiences a terrestrial climate, is steppe. The banks of the streams are generally forested. Yerköy, a small village during the Ottoman Period, began to develop after the Ankara-Kars railway was put into service during the Republican Period and became a sub-district in 1935 and a district of Yozgat in 1945.

This study examines the adequacy of social facilities in the region in question in accordance with the standards of the Regulation on the Preparation of Spatial Plans. Yerköy district has a total population of 38,925. Calculations were carried out on this population according to the $m^2$ / population formula.

### 3.1 Educational Areas

Kindergarten, primary school, secondary school, and high school areas were examined under the heading of educational areas. There are a total of 36 educational areas within the boundaries of Yerköy district. Of these areas, 2 are kindergartens, 10 are primary schools, 9 are secondary schools and 15 are high schools.

*Kindergarten Areas*

According to the Regulation on the Preparation of Spatial Plans, kindergartens require an area of 0.50 $m^2$ per capita, while in 0.22 hectares of

kindergarten areas, only 0.06 $m^2$ per capita is allocated. Therefore, kindergarten areas are insufficient throughout the district in line with the standards.

*Primary and Secondary School Areas*

The Regulation on the Preparation of Spatial Plans states that 1.50 $m^2$ of area per capita should be allocated for each of the primary and secondary school areas. When the entire district is considered, primary school areas per capita in the 2.68-hectare area are determined as 0.80, and secondary school areas per capita in the 5.80 hectare area are determined as 1.48 $m^2$, and these areas are insufficient throughout the city compared to the standards.

*High School Areas*

The high school area should be 1.75 $m^2$ per capita, according to the standards. The total high school area of 15.96 hectares in Yerköy district has 4.10 $m^2$ of area per capita and is considered sufficient for the city.

**Table 3:** Adequacy Status of Educational Areas (prepared by the authors).

| Area | Existing Area (Hectare) | Per Capita $m^2$ | Required $m^2$ | Sufficiency Status |
|---|---|---|---|---|
| Kindergarten | 0.22 | 0.06 | 0.50 | **Insufficient** |
| Primary School | 2.68 | 0.80 | 1.50 | **Insufficient** |
| Secondary School | 5.80 | 1.48 | 1.50 | **Insufficient** |
| High School | 15.96 | 4.10 | 1.75 | **Sufficient** |

As a result of the values indicated in the table above, educational areas other than high school areas are insufficient throughout the district.

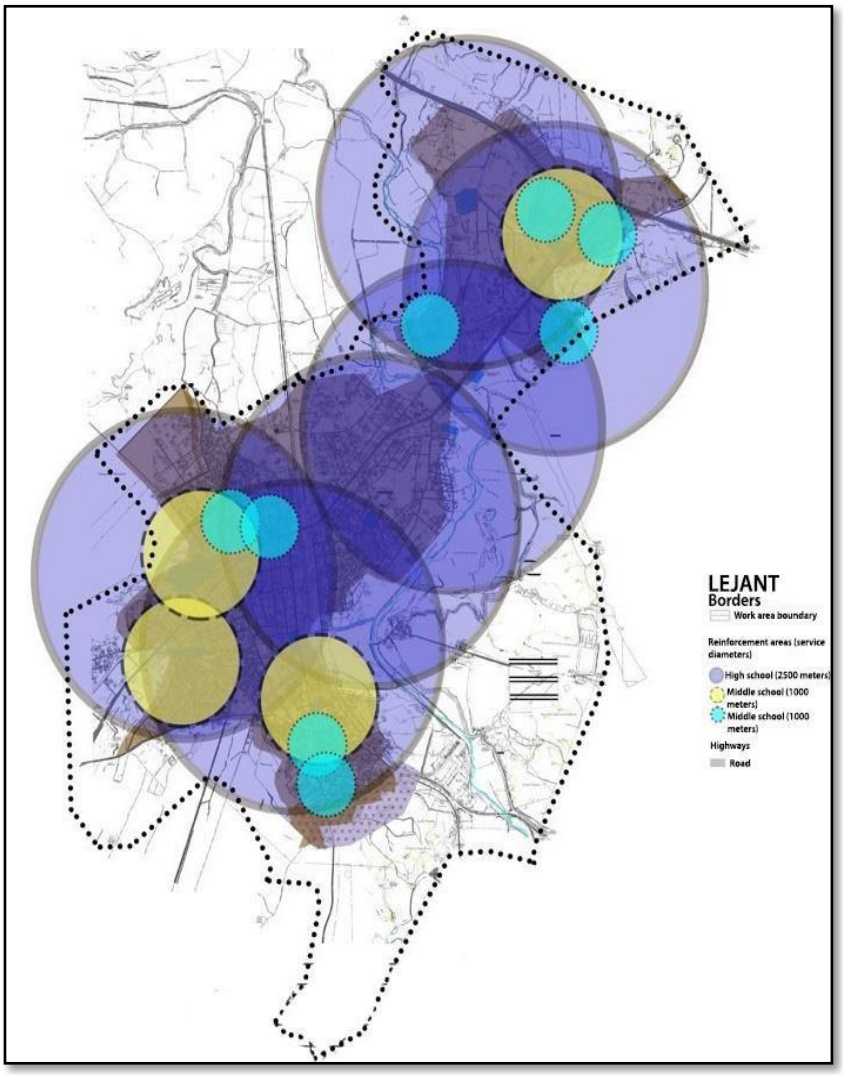


**Figure 2:** Impact Area of Educational Areas (prepared by the authors).

## 3.2 Health Areas

There are 5 healthcare facilities in the study area. These healthcare facilities cover an area of 1.77 hectares. The standards specified for healthcare areas require 1.50 $m^2$ of area per capita, but the 0.45 $m^2$ of healthcare area per capita throughout the district is insufficient.

**Table 4:** Adequacy Status of Health Areas (prepared by the authors).

| Area | Existing Area (Hectare) | Per Capita $m^2$ | Required $m^2$ | Sufficiency Status |
|---|---|---|---|---|
| Health | 1.77 | 0.45 | 1.50 | **Insufficient** |

### 3.3 Places of Worship

There are 12 places of worship within the study area, covering a total of 4.56 hectares. According to the standards, there is 1.20 $m^2$ of area per capita, and since the required area per capita is 0.50 $m^2$, it is sufficient.

**Table 5:** Adequacy Status of Places of Worship (prepared by the authors).

| Area | Existing Area (Hectare) | Per Capita $m^2$ | Required $m^2$ | Sufficiency Status |
|---|---|---|---|---|
| Worship | 4.56 | 1.20 | 0.50 | **Sufficient** |

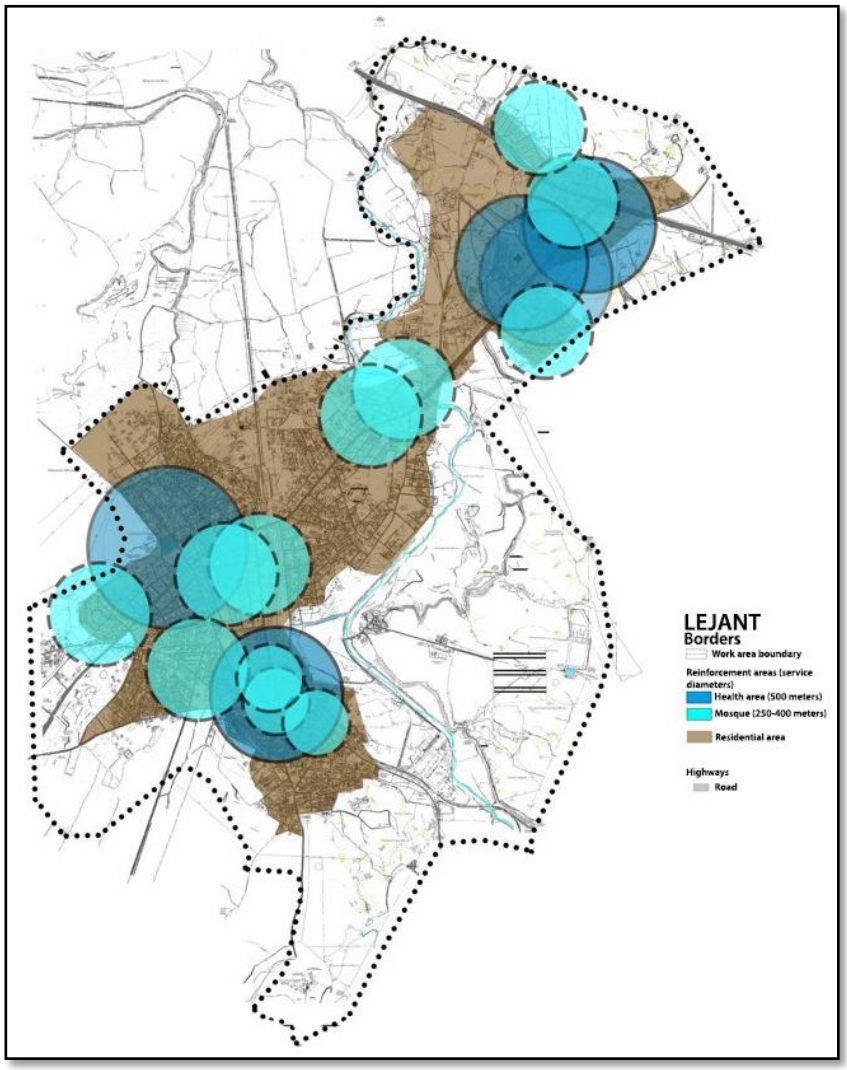


**Figure 3:** The Impact Area of Places of Worship and Health Areas (prepared by the authors).

### 3.4 Green Areas

Under the heading of green areas, parks and green areas, passive green areas, and cemeteries were examined. There are 8 parks and green areas within the study area. Green areas can be described as the most important public space in determining the sustainability and quality of life of the city. According to the standards for green areas, there should be at least 10 $m^2$ of area per capita. Green areas within the city have a total area of 1.77 hectares

and 0.45 $m^2$ of area falls per capita. There are 2 passive green areas throughout the city. It has a total area of 0.6 hectares. There are 4 cemeteries within the boundaries of the study area. It is located in a total of 3.2 hectares. Cemeteries have chosen locations towards the periphery of the study area.

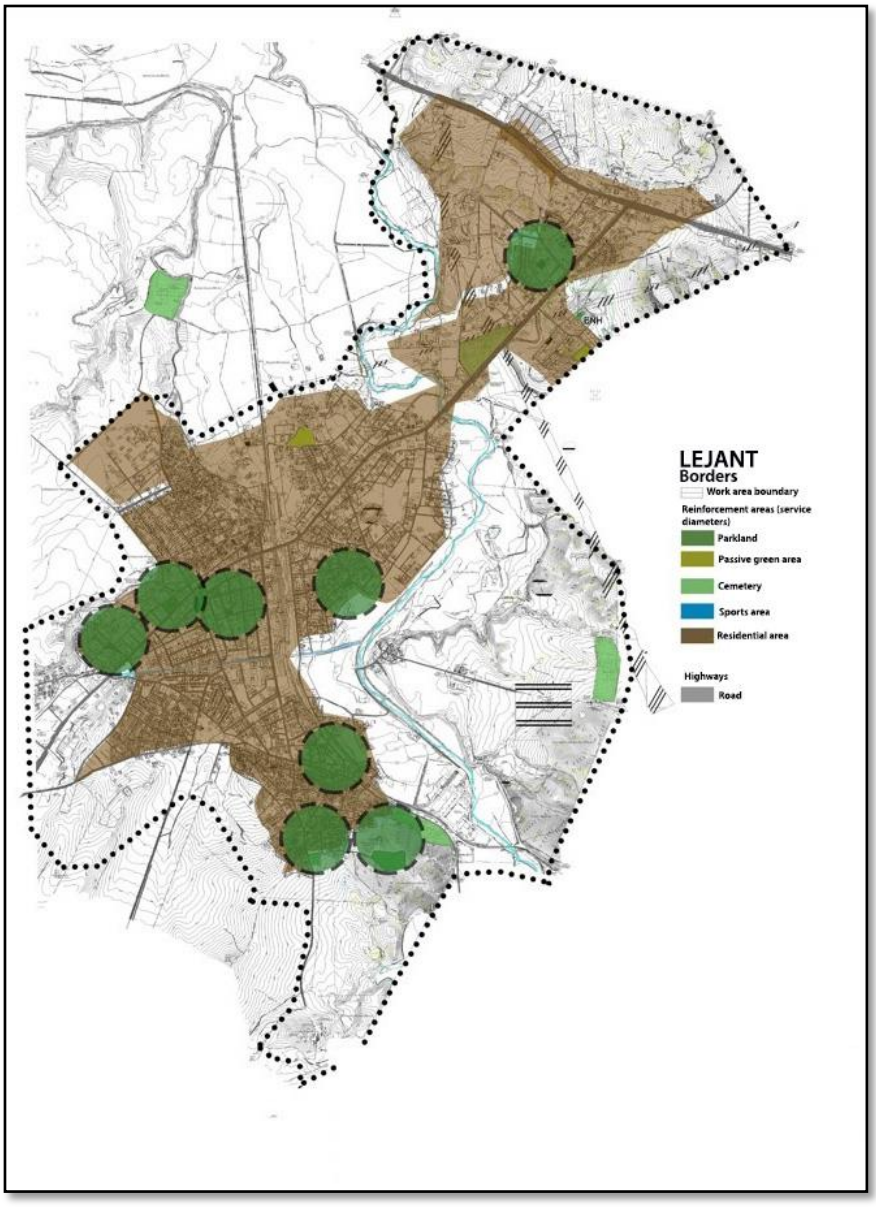


**Figure 4:** Impact Area of Light Green Spaces (prepared by the authors).

### 3.5 Social Infrastructure Areas

Social infrastructure areas within the study area cover a total of 8.60 hectares. There is 1 sports area in the city. These sports areas have a total area of 6.38 hectares. According to the standards, social infrastructure areas offer 2.20 $m^2$ of space per capita for this city, which is considered sufficient.

**Table 6:** Adequacy Status of Green Spaces and Social Infrastructure Areas (prepared by the authors).

| Area | Existing Area (Hectare) | Per Capita $m^2$ | Required $m^2$ | Sufficiency Status |
|---|---|---|---|---|
| Park | 1.77 | 0.51 | 10 | Insufficient |
| Children's Park | 0.31 | 0.09 | 10 | Insufficient |
| Social Infrastructure | 8.20 | 2.20 | 0.50 | Sufficient |

## 4. CONCLUSION

Urban quality of life is the common language of many concepts. The point reached as a result of this language is that quality of life is a multifaceted phenomenon that develops depending on mental and physical variables on the individual's life. The phenomenon that brings together the concepts of social facilities and urban quality of life is the spatial dimension that requires the evaluation of quality of life on physical space.

A study was conducted on the adequacy of social facility standards in the evaluation of urban quality of life in Yozgat province, Yerköy district. Analyses were carried out in line with the quality of life criteria by focusing on the location selections and adequacy of the existing social facility areas in the field. The Regulation on the Preparation of Spatial Plans and Social Facility Standards were used in this study to determine the adequacy of facilities. As a result of the evaluations made regarding the field, the numerical data of the distribution of the facilities within the field were taken into consideration and compared with the regulation standards. As a result of this comparison, the urban quality of life in the area was examined.

In this study, the effects of social facilities such as education, health, worship, and green spaces within the boundaries of Yerköy district on urban quality of life were evaluated. When the educational areas are examined, it is seen that the kindergarten, primary school and secondary school areas are insufficient according to the standards of the regulation on the preparation of spatial plans. While kindergartens need an area of 0.50 m² per capita, they only offer 0.06 m² in the current situation. Similarly, in primary and secondary school areas, the areas per capita are 0.80 m² and 1.48 m², respectively, which are below the standards. This situation indicates that children and young people in Yerköy district may be adversely affected due to lack of space in their education processes. As a suggestion, it is necessary to expand the educational areas and build new educational facilities.

Considering high school areas, it is observed that the existing areas are above the standards (1.75 m²) with 4.10 m² per capita. This shows that there is enough space for high school education and that no additional investment is needed in this area. However, the efficiency and quality of the current use of high school areas should be evaluated. Health areas are far behind the standards (1.50 m²) with 0.45 m² per capita. Insufficient health facilities can negatively affect people's access to health services. For this reason, the establishment of new health facilities and the expansion of the existing health infrastructure should be a priority.

Places of worship are adequate, offering 1.20 m² of space per capita, above the standards. The current use and accessibility of these areas should be emphasized, and improvements should be made if necessary. Green spaces are considered an important component of urban quality of life. The green space per capita in Yerköy district is 0.45 m², which is well below the standards (10 m²). Lack of green spaces can negatively affect the physical and mental health of city dwellers. Increasing green spaces, expanding parks and recreation areas will significantly increase the quality of urban life.

In conclusion, when the social facilities in Yerköy district are evaluated in general, it is seen that they fall behind the standards in many areas. There are deficiencies in basic need areas such as education and health facilities, and there is no balanced distribution of social facilities throughout the city. The lack of green spaces negatively affects the quality of urban life. In this context, it is recommended to increase social facility areas and ensure the

efficient use of existing areas in urban planning processes. It is necessary to determine new social facility areas and improve existing ones. Ultimately, it is suggested that Yerköy district can become a more livable, sustainable and high quality of life city in this way.

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# CHAPTER 10

## ALTERNATIVE PARK SPACES IN URBAN ECOSYSTEMS: SCULPTURE PARKS

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## INTRODUCTION

Cities are an open ecosystem with the living and non-living elements they contain. Recently, more than half of the world's population lives in cities. (Cepeliauskaite and Stasiskiene,2020). The rapid increase in the urban population in cities has also brought about the need for open and green spaces for the people living there. Open and green spaces refer to areas covered with vegetation, such as parks, gardens, and green roofs. These areas play a vital role in improving the quality of life for urban residents and provide a range of environmental, social, and economic benefits (Pal and Sharma, 2023).

Open green spaces provide many benefits for urban ecosystems and urban dwellers. These areas play an important role in meeting the recreational needs of urban residents. The term recreation is defined as outdoor excursions and activities either individually or in groups during leisure time (Shi et al., 2023).

One of the most important areas where people living in cities carry out recreational activities is city parks. Over the years, cities have undergone transformations in line with the preferences and needs of the people living in them and this transformation has also been reflected in urban parks. One of the park concepts that emerged with the changing understanding of parks is sculpture parks. The term sculpture park is defined as facilitates the convergence of sculptures, nature and visitors by combining art with open air (Porter, 2024).

This study on sculpture parks aims to investigate the history of sculpture parks, emergence of sculpture parks and to introduce them through examples from around the world and to emphasizing the importance of sculpture parks.

## 1. URBAN ECOSYSTEMS and OPEN GREEN SPACES

Cities are unique ecosystems that intricately connect nature, economy and society (Wang et al., 2020; Meng et al., 2024). An urban ecosystem refers to any ecological system within a city or another densely populated area or in a broader sense as it is a larger ecological system that constitutes an entire metropolitan area (Pickett, 2024).

Urban ecosystems are characterized by extremely heterogeneous habitat patches and mosaics. which is based on multiple spatial scales, ranging from

individual patches to entire urban mosaics. emphasizes approaches (Swan et al., 2021).

However, during the recent years, increasing migration activities in cities have led to the frequent transformation and changes of urban landscapes into urban land uses, resulting in the fragmentation of large green areas and the emergence of new urban ecosystems (Dattilo and MacGregor-Fors, 2021). As many green spaces are replaced by concrete blocks, the availability of open green areas in urban environments is becoming increasingly difficult (Dewi et al., 2018).

While Conedera et al., (2015) and Hadavi et al., (2015) defined urban green spaces as publicly accessible urban and peri-urban open spaces that are partially or completely covered with large amounts of vegetation, Ding et al. (2022) defines open and green spaces as areas with vegetation, such as parks, gardens, and green roofs.

Open green spaces have a significant role for cities and their residents such as increasing the livability of cities, ensuring the healthy functioning of urban ecosystems, improving air quality in urban areas, supporting urban biodiversity (Kattwinkel et al., 2011), providing noise control (Pathak et al., 2011), trapping carbon dioxide (Liu and Li, 2012; Madureira et al., 2015), producing oxygen (Jo, 2002), and regulating microclimates (Shin and Lee, 2005; La Rosa, 2014). Additionally, they benefit public health due to their role in protecting environmental conditions (Willdan et al., 2023).

## 2. URBAN RECREATIONAL AREAS

The term urban recreation area is defined as open spaces, structures and facilities with recreational functions such as rest, communication, exercise, travel and tourism, which are accessible to people who will engage in recreational activities (Xue et al., 2022). Generally, these areas are defined as areas or space designed for the organization of recreation and leisure activities for public (Dorozhkina, 2019).

Urban recreational areas directly or indirectly contribute to human or social well-being. (Konijnendijk et al., 2013). In addition, urban recreational areas are provide many benefits, also they provide many benefits such as ecological, social etc.

A group of authors composed of various researchers has listed the potential benefits of urban recreational areas as follows (Konijnendijk et al., 2013).

- **Effects on Health:** Positive effects on human health (both mental and physical) and well-being through direct or indirect effects such as recreation and leisure activities.
- **Tourism:** Tourism is gaining attention because of its potential to improve the health and well-being of visitors, as well as its benefits to the local economy.
- **Increasing the Value of Real Estate:** Having a recreational area around it reflects positively on the value of real estate.
- **Biodiversity:** The role of some urban recreational areas in accommodating and supporting biodiversity, and particularly species diversity. Biodiversity is directly linked to human well-being, but also provides an important basis for ecosystem functioning and hence for a range of ecosystem services (Hooper et al., 2005).
- **Air Quality and Carbon Sequestration**: Positive effects of green areas on reducing air pollutant levels and carbon sequestration.
- **Water Management:** Benefits of parks to rainwater/runoff regulation.

Recreational areas also provide many benefits to society in terms of mental health (Bernat et al., 2022). Urban recreational areas appear in various forms according to the needs of people living in cities. Examples of urban recreational areas include stadiums, green belt systems, sports facilities, children's playgrounds, parks, home gardens, and playgrounds (Stanley et al., 2012).

## 3. URBAN PARKS

The simplest definition of a urban park was made by Kevin Lynch in 1965. Lynch defined parks as land parcels shown in green on planners' maps (Sadeghian and Vardanyan, 2015).

Parks are defined as large parcels of land designed to meet the recreational needs of people living in urban or rural areas, with a specific volume-spatial system which balance of the elements and structures that constitute the landscape in its design. They can be 5-15 hectares or more in size, multifunctional, single-functional or with a specific purpose of use (children,

sports, walking, exhibition, ethnographic, zoological, etc.) (Sydorenko, 2018).

Parks are landscapes designed as a result of the reflection of human creativity in time and space in the environment, combining nature and art in a harmonious way (Athanasiadou, 2019).

### 3.1 History of Urban Parks

According to Oldham (1980), the concept of a urban park was first observed in the prehistoric civilizations of Australia. It is concluded from the statements of the white settlers who adopted Western Australia as their homeland that when they first encountered the Australian region, there was an appearance that was reminiscent of a park structure in the country and that the natives living in the region burned the forests in a planned manner to obtain this appearance (Oğuz, 1998).

There are many urban parks that were built during the reign of Alexander the Great. It is known that one-fourth of the city of Alexandria in Egypt during this period consisted of parks and gardens (Al-Qudah, 2006).

In the Middle Ages, landscapes were categorized into three groups: the gardens immediately surrounding the house, castle or institution; the area beyond which a larger space could be developed; and the parks some distance from the main house (Historic England Gardens: Scheduling Selection Guide, 2018).

In terms of urban parks, successful examples can be found in Europe, especially in England. Most of the park areas were developed from former noble hunting forests or private gardens (Al Qudah, 2006).

By the end of the 17th century, these areas had ceased to be used solely for hunting and had turned into fruit and flower gardens representing wealth and social status. During this period, other segments of the urban population, especially the working class, were unable to benefit from the parks. (Güneş, 2019).

The idea of opening urban parks to the public in England dates back to 1635. In 1635, Hyde Park was opened to the public by Charles I. St. James Park, Green Park and Kensington Gardens, which are still among the notable parks of the city of London today, likewise became public spaces in the last second half of the 18th century with special permission (Al Qudah, 2006).

The Victorian writer John Ruskin, who lived in the 19th century, made

the following observation: *"The measure of every great civilization is its cities, and the measure of the greatness of a city lies in the quality of its public spaces, parks and squares"* (Hinds, 1979). As this statement indicates that parks are areas that have consistently maintained their importance in every period.

### 3.2 Park Identities

The term "park" is defined by Olmsted and Kimball (1973) as " a type of open green space that is always covered with trees and grass" (Polat, 2001).

On the other hand, Gold (1980) defined parks as " public or private areas reserved for aesthetic, educational, recreational and cultural use" (Al-Qudah, 2006; Oğuz 1998).

Parks, which have undeniable benefits for people in terms of improving the environment they live in, economically, health-wise and in enhancing well-being and mental health aspects, also play a major role in the processes of supporting and ensuring the continuity of life on Earth (Seely, 2022).

According to Ummeh and Toshio (2017), parks are generally classified in three ways:

a) According to their characters

b) According to their purposes

c) According to their sizes

The most commonly used classification among these is the size-based classification. However, this classification defines the physical size of the parks and their detailed characteristics making it easier to determine the service level of these areas (Ummeh and Toshio, 2017).

Various researchers have classified parks in various ways according to their size, function, population of the settlements where they are located and distance to users (Polat 2001). One of the classifications is as follows:

1. Mini Parks
2. Roadside Parks
3. Neighborhood Parks
4. District Parks
5. City Parks
6. Regional Parks

Currently, there are few studies in the literature regarding park identities (Quintal et al., 2019). The limited number of studies on park identities indicates

need for the development of park identity scales across different park types and countries (Kim and Stepchenkova, 2017).

The classification of parks also varies from country to country. For example, according to Korean law, parks are divided into four main categories: neighborhood parks, walking parks, regional area parks, and metropolitan area parks (Nam and Kim, 2018).

### 3.3 Alternative Parks

The historical evolution of the concept of urban parks can be exemplified by the classificaiton made by Cranz (1982). Cranz (1982) who categorized parks into four different types: Pleasure Garden (1850–1900), Reform Park (1900–1930), Recreation Facility (1930–1965) and Open Space System (1965–?) (Cranz and Boland, 2004)

Over the centuries various changes have occurred in the development and formation processes of parks. These changes have been based on cultural, social and economic developments, as well as new technological developments and techniques. The desire and search for continuous new solutions have been associated with trends, experiences and ideas in the fields of architecture and urban planning, as well as nature, philosophy, economics and many other fields of study (Pancewicz, 2018).

Park systems have an internal hierarchy and identity within themselves within the planning scale. This hierarchy of parks serves a basis for the within themselves identity of the urban landscape. Polat (2021) categorized the park types and the studies conducted on these parks in Table 1:

**Table 1:** Classification of park types and related studies on parks (Polat, 2021).

| Park Hierarchy and Identity | Researchers | Research Topic |
|---|---|---|
| **Public Park (Regional Parks)** | (Chandrasiria and Arifwidodob, 2017) | The research examines the usage characteristics of Benjakitti Park in Bangkok, Thailand. |
| **Adjacent Parks** | (Kaczynski et al., 2010) | The study investigated whether parks were used more intensively for physical activity. analyzes whether it is used or not |
| **Agro- Industry Parks** | (Nuhoff-Isakhanyan, 2017) | Examines research networks in agricultural industrial parks |
| **Amusement Parks** | (Wang et al., 2017) | Focused on research related to amusement parks |
| **Coastal Parks** | (Hipp and Ogunseitan, 2011) | The research focused on psychological restorativeness in coastal parks |
| **Community Park** | (Tang et al., 2017) | Resarch focused on Community Park |
| **Country Parks** | (Qi et al., 2017) | The study serve a landscape quality evaluation model for the country parks |
| **Culture Parks** | (Hunter, W.C., 2014) | The research focused on the Taiwan Indigenous People Culture Park located in Pingtung City in Southern Taiwan |
| **Historical Urban Park** | (Gasiorek, et al., 2017) | The research focused on the historical Planty Park, which is also its on the UNESCO World Heritage List and historical urban parks |

**Table 1:** Classification of park types and related studies on parks (Polat, 2021) (Continued)

| | | |
|---|---|---|
| **Historical Park** | (Nayan et al., 2016) | The research focused on a historical park which is reintroducing the Sydney Lake Garden as the historical park |
| **Irrigated Parks** | (Halper et al., 2015) | The research focused on irrigated parks which can contribute to water demand management and urban sustainability |
| **Line Park** | (Jung et al., 2016) | The research focused on Gyeongui Line Park, an urban park |
| **Local Park** | (Plane and Klodawsky, 2013) | The research focused on neighborhood spaces as a local park |
| **Municipal Parks** | (Ye et al., 2012) | The research focused on plant species diversity in municipal parks |
| **Regional Parks** | (Rocchi et al., 2017) | The research focused on the Trasimeno Regional Park (Region of Umbria) |
| **Neighborhood Parks** | (Cohen et al., 2016) | The research focused on neighborhood parks and their role in physical activity |
| **Neighborhood Park** | (Schultz et al., 2017) | The research focused on park-based physical activities |
| **Urban Neighborhoods** | (Han et al., 2018) | The study focused on crime rates and use of local parks |
| **Pocket Parks** | (Nordh and Østby, 2013) | The research focused on small urban public parks |

**Table 1:** Classification of park types and related studies on parks (Polat, 2021). (Continued)

| | | |
|---|---|---|
| **Provincial Parks** | (Eagles et al., 2014) | The research focused on management plans of Ontario Provincial Parks |
| **Provincial Park** | (Ro-Young et al., 2014) | The research focused on the of 800 taxa are distributed Chilgapsan State Park |
| **Public Parks** | (Kellison et al., 2017) | The research focused on public parks. |
| **Public Small Parks** | (Mutiara and Isami, 2012) | The research focused on public small parks in Jakarta City |
| **River Park** | (Hutcheson et al., 2018) | The research focused on the economic value of the Hudson River Park |
| **Rural Parks** | (Lõhmus and Liira, 2013) | The research focused on Historic old parks and rural parks |
| **Safari Park** | (Finnegan et al., 2018) | The research focused on the UK safari in Merseyside, England,which opened in 1971 |
| **Dog Park** | (Howsea et al., 2018) | The research focused on dog park |
| **Safari Park** | (Flack,2016) | The research focused on English safari park first appeared in the grounds of Longleat House in Wiltshire's Rolling countryside in the spring of 1966. |
| **Snow Park** | (Carúsa and Escorihuelab, 2016) | The research focused on snow park injuries |

**Table 1:** Classification of park types and related studies on parks (Polat, 2021). (Continued)

| | | |
|---|---|---|
| **State Park** | (Joshia et al., 2017) | For the study public lands such as state parks provide numerous environmental, economic and cultural benefits |
| **State Parks** | (Whiting et al., 2017) | The research focused on Geogia state park visitors. |
| **Suburban Parks** | (López-Mosquera and Sánchez, 2012) | The resarch focused on the Theory of Planned Behavior and Value-Belief- Norm Theory in a suburban park |
| **Theme Park** | (Milman and Tasci, 2018) | This study attempts to identify the drivers of satisfaction and loyalty in the context of theme parks. |
| **Thematic Parks** | (Nururrohmaha and Suhirmana, 2016) | The research focused on Thematic Park in smart livable-sustainable city of Bandung |
| **Urban Parks** | (Almeida et al., 2018) | The research focused on ecosystem services in urban parks |
| **Urban Parks** | (Doughlas et al., 2018) | The research focused on the System for Observing Play and Recreation in Communities (SOPARC) to document the age, gender, ethnicity, and physical activity levels of urban park users |
| **Urban Forest Park** | (Chena and Qib, 2018) | The research focused on urban forest parks such as Fuzhou National Forest Park (FNFP). |
| **Water Park** | (Anonymous, 2016) | The research focused on water parks. |
| **Zoological Park** | (Hernández et al., 2018) | The research focused on zoological park |

Sculptures located in the city have great meaning for cities, both with the social messages they convey and the aesthetic features they add. In addition, sculpture parks, where sculptures are exhibited and provide spatial affiliation to them, are very important in terms of space being an element of art (Reynolds, 2011).

## 4. SCULPTURE PARKS

### 4.1 History of Sculpture Parks

The close interaction between art and landscape is associated with outdoor art in the mid-20th century (Reynolds, 2011). British artist Henry Moore emphasized that sculptures should be exhibited outdoors and that sculpture is a work that should interact with their environment, rather than merely serve as decorative object intended solely to embellish the surroundings (Shin and Pae, 2019).

In this context, the idea of a sculpture park emerged. Sculpture parks are defined as artistic places where large-scale sculptures are exhibited in open areas (Polat, 2023).

After World War II, many sculpture collections began to include parks specifically created for institutions. An example of this is the MoMA Sculpture Garden, established in New York City in 1939 (Shin and Pae, 2019). In 1977, a new concept of parks emerged in England. The Yorkshire Sculpture Park, located in the 18th century Bretton Hall grounds (Kochetkova, 2018).

The integration of sculptures into green spaces became very common in the 1980s. This widespread use of sculptures in green spaces also led to increased criticism (Shin and Pae, 2019).

### 4.2 Design of Sculpture Parks

When examined from an artistic perspective, there are various factors to consider such as the sculptures must adapt to the space and ensure harmony between the park and the outdoor sculpture (Despot and Sandeva, 2013).

In sculpture parks, designers often use sculptures as a focal point. The quality of the texture and surface material used is an important aesthetic dimension of both the park design and the sculpture. The textures of sculptures may vary depending on the materials and tools they are made of (Farooq and Kamal, 2021).

Some specific features that sculptures designed for parks must meet are listed as follows:

- Sculpture, as an art form, must be in a reciprocal relationship with the park design, this is a basic principle to be considered when designing a sculpture park.
- The size of the preferred sculpture should be compatible with the environment and the plants used in the area, and its location within the park should be determined correctly depending on its size.
- The location of the sculpture used in relation to natural or artificial light sources, shape, theme and the selection of the material used in the construction of the sculpture should be considered.
- The distance required for a complete visual perception of a sculpture or sculptural composition is the most important element to be considered in visualization.
- Color and material are of great importance in the artistic effect of the sculpture in the space and in the sculptor's idea of creating the sculpture.
- The sculpture should be in harmony with the whole park and should also be in harmony with the dimensions of the plants that make up the park composition (Despot and Sandeva, 2013).

### 4.3 Examples of Sculpture Parks from Around the World

Sculpture parks are works of art that offer visitors different experiences, they offer visitors the opportunity to experience the landscape physically, that is, aesthetically. In this context, there are many sculpture parks in the world today. Examples of sculpture parks from the past to the present and images of these parks are presented as follows (Table 2):

**Table 2.** Sculpture parks in the world from past to present

| Park Name/Opening Year/Country | Images of the Park |
|---|---|
| •Kröller-Müller Museum<br>• 1938<br>• Netherlands/Otterlo (Anonymous, 2022) |  |
| •Middelheim Open Air Sculpture Museum<br>• 1950<br>• Belgium / Antwerp (Anonymous, 2016) |  |
| • Buddha Park<br>• 1958<br>• Laos/ Vientiane (Anonymous, 2018) |  |

**Table 2.** Sculpture parks in the world from past to present (Continued)

| | |
|---|---|
| • Forma Viva Sculpture Park<br>• 1961<br>• Slovenia/ Portoroz<br>(Anonymous, 2024a) |  |
| •Storm King Art Center<br>• 1967<br>• USA<br>(Yılmaz, 2011) |  |
| • Hakone Open Air Museum<br>• 1969<br>• Japan / Tokyo<br>(Anonymous,2011) |  |

**Table 2.** Sculpture parks in the world from past to present (Continued)

| | |
|---|---|
| • Chapungu Sculpture Park<br>• 1970<br>• Zimbabwe/ Harare<br>(Anonymous, 2024b) |  |
| • Laumeier Sculpture Park<br>• 1975<br>• USA/Missouri<br>(Anonymous,2024c) |  |
| • Yorkshire Sculpture Park<br>• 1977<br>• England/ Wakefield<br>(Yılmaz, 2011) |  |

**Table 2.** Sculpture parks in the world from past to present (Continued)

| | |
|---|---|
| • Austria Sculpture Park<br>• 1981<br>• Austria/Graz<br>(Anonymous,2024d) |  |
| • The Sculpture Park at Waitakaruru Arboretum<br>• 1991<br>• New Zeland/ Tauwhare<br>(Anonymous,2024e) |  |
| • Goodwood<br>• 1994<br>• England/ London<br>(Anonymous, 2014) |  |

**Table 2.** Sculpture parks in the world from past to present (Continued)

| | |
|---|---|
| • Skulpturen Park Cologne<br>• 1997<br>• Germany/Cologne (Seelbach, 2024) |  |
| • Sengkang Sculpture Park<br>• 2001<br>• Singapore/ Sengkang New Town<br>(Chen, 2020) |  |
| • Frederik Meijer Sculpture Park<br>• 2002<br>• USA/ Michigan (Anonymous,2024f) |  |

**Table 2.** Sculpture parks in the world from past to present (Continued)

| | |
|---|---|
| • Glenorchy Art and Sculpture Park<br>• 2008<br>• Australia/ Glenorchy (Coxall, 2017) |  |
| • Pappajohn Sculpture Park<br>• 2009<br>• USA/ Lowas (Anonymous, 2024g) |  |
| • Ekeberg Sculpture Park<br>• 2013<br>• Norway/ Oslo (Anonymous, 2024h) |  |
| • Minqin/Suwu Desert Sculpture Park<br>• 2018<br>• China / Minqin (Yardımcı, 2022) |  |

## 4.4 Sculpture Parks in Türkiye

### 4.4.1 Değirmendere Fine Arts Park

In 1993, the sculpture symposiums held as a result of the joint efforts of Mimar Sinan Fine Arts University and Değirmendere Municipality provided Değirmendere with a collection that could form a modern art museum. (Akyürek, 2013). A sculpture park was designed as a result of the works created in the Zühtü Müridoğlu Wooden Sculpture Symposium in the region, but the area was damaged as a result of the 1999 earthquake. (Yılmaz, 2011).

**Figure 1:** Değirmendere Fine Arts Park before the earthquake (Yılmaz, 2011)

### 4.4.2 Loft Art Sculptville

The Sculpt Ville open-air sculpture park, which opened on July 19, 2021, in Bodrum features 28 works by fifteen artists from Türkiye and the world (Anonymous, 2021).

**Figure 2:** Loft Art Sculptville (Kadı, 2021)

## 5. CONCLUSION

Sculpture parks, which are at least as old as the concept of art itself, are now widespread around the world today and have been accepted in by all societies. These parks hold significant value particularly for those who interact with them with their magnificence, serene images, artistic assets and their representation of many socio-political and economic issues (Nasidi and Samuel, 2023).

When considered in terms of their educational contributions, sculpture parks provide support for educational activities by providing guided tours, workshops and educational programs to emphasize the historical and cultural importance of the sculptures exhibited in the park area. In this way, the new generation of young artists are inspired and the way is opened for the appreciation of art. In addition, sculpture parks also serve as a meeting point for people in the society they are located in. They also enable the development of a sense of belonging and togetherness with events such as concerts, festivals, worship, open-air shows, etc. organized in the area where the parks are located (Nasidi and Samuel, 2023).

Sculpture parks which have been established and valued worldwide for many years, unfortunately still lack the necessary recognition and valued presence in Türkiye and are not widely seen. These parks hold significant

potential to benefit for Türkiye numerous way, such as conveying our rich historical, cultural heritage, as well as our understanding of art to visitors, younger generations and people interest in sculpture art and sculpture artists. Sculpture parks also offer a platform to introduce our skilled sculpture artists and facilitate cultural exchange through collaborative art Project with international artists.

In line this benefits, sculpture parks should be made more widespread and included in design and planning decisions. Additionally, persons passionate about this art form, including sculpture artists, landscape architects and other professionals should be encouraged to participate in sculpture park projects. Promoting multidisciplinary studies in Türkiye would further support the development of sculpture park designs across the country.

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# CHAPTER 11

## EXAMINATION OF HARIKALAR DIYARI PARK IN TERMS OF XERISCAPE

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## INTRODUCTION

With the recent increase in urbanization and industrialization, there has been degradation in the ecosystem. As a result of these deteriorations, cities planned with policies that do not consider ecological aspects have led to global warming over time, which has resulted in climate change. Due to the rapid increase in the population of urban areas, taking precautions against climate changes is effective in improving the quality of life of many people in the world. Because cities are places where individuals may be vulnerable to health problems due to climate change (Temiz Topsakal and Erduran Nemutlu, 2023). The negative effects caused by global warming are; erosion, drought, desertification, increase in temperature, excessive rainfall, decrease in biodiversity, disruptions in the water cycle, insufficient rainfall, destruction of forests and decrease in soil fertility (Atıl et al., 2005). Landscape architecture ecosystem studies play an important role in solving these problems. Because it includes many important functions that provide many services to society. Climate improvement is among the main ecosystem services (Çetinkaya Çiftçioğlu, Uzun and Erduran Nemutlu, 2016). Since Türkiye is located in the Mediterranean Basin, which is a sensitive region in terms of global climate change, it is faced with the risk of being affected by these negativities.

Water is a highly productive factor that cannot be produced by humans and is a basic need for human survival mayan ve insanın yaşaması için temel ihtiyaç olan bir faktördür (Çorbacı et al., 2011). Plants need water just like people do, and that's why regular irrigation is necessary in urban landscapes. Cities' water resources are used to irrigate urban landscapes. However, as the risks of drought and drought, as well as the amount of water used in irrigation activities, have increased to serious levels, the issue of effective use of water has emerged and ecologically based design approaches have been developed by planners and researchers (Yazgan et al., 2014, Kısakürek et al., 2020). These are concepts such as “Water-Efficient Landscaping”, “Low-Water”, “Rational Use of Water” (Water-Wise, Water-Smart) and “Natural Landscaping” (Çöp and Akat, 2021; Çorbacı and Erken, 2022). Although there are differences in the application of these concepts, their basic principles are the same. With the coming together of all these concepts and understandings, the concept of "Xeriscape" "Xeriscape Landscape Arrangements" has emerged. According to Ünal Çilek, M. (2023); although zero water consumption is not possible in

landscape arrangements, 30-85% water savings can be achieved with xeriscaping design.

The concept of "xeriscaping", which is the subject of this study, first emerged in the United States in 1978. The concept of xeriscape is defined as landscape applications where water is used at a minimum level and water resources and the environment are protected when there are no accessible fresh water resources or when access to water for irrigation is not available (Wade et al., 2002).

There are 7 basic principles of xeriscape landscaping. These are;

- Planning and Projecting
- Soil Preparation
- Appropriate Plant Selection
- Effective Irrigation
- Use of Mulch
- Proper Maintenance
- Creating Easy-to-Maintain Grass Areas

Planning and Projecting: Planning and projecting are important stages of xeriscape. It is important to look at the climate conditions of the area where the project will be carried out, to examine its topography, to have information about the existing vegetation and the current use of the area in order to implement a more accurate and sustainable landscape application (Bayramoğlu, 2016).

Soil Preparation: In soil preparation, the pH value, water holding capacity, drainage structure, fertilizer requirement and nutritional value of the soil are very important for healthy plant development. Therefore, certain analyses should be made on the soil where the plant will be planted and as a result of the analysis, the soil should be made suitable for the plant.

Appropriate Plant Selection: The plants to be used should be natural species and drought-resistant species rather than exotic plants. Plant density affects water saving, such that in xeriscape applications, sparsely vegetated areas consume 0.04 $m^3$ of water per m2, medium density areas consume 0.12 $m^3$ and densely vegetated areas consume 0.21 $m^3$ of water. In addition, grass areas consume 1.43 $m^3$ of water per m2 (Ünal Çilek, M. (2023).

Effective Irrigation: Water usage should be kept to a minimum while meeting the water needs of the plants. In this discipline, zoning should be done

according to the water needs of the plants, and the plan and time of the irrigation system should be shaped according to the needs of the plants.

Use of Mulch: By covering the top of the soil with dried leaves, dolomite stone, tree bark and organic materials, water retention is ensured later and the water retention capacity is increased.

Proper Maintenance: Maintenance is required at regular intervals for the continuity of all designs and applications.

Creating Easy-to-Maintain Grass Areas: Within the concept of xeriscape design, grass areas should be used as little as possible or a grass mixture consisting of drought-resistant species should be used.

In order to prevent the plants, which are the living materials of landscape arrangements, from being affected by drought and water shortage, which are one of the biggest environmental problems today, to prevent water usage from increasing to serious levels, and to protect ecological balances, it is necessary to make design and planning by taking into account the criteria of xeriscape. In this context, this study aims to examine Harikalar Diyarı Park in Ankara in terms of xeriscape criteria and to make suggestions for the negative results.

## 2. MATERIAL AND METHOD

### 2.1. Material

The study area is the Harikalar Diyarı Park located in Sincan district of Ankara province. The area is 1,300,000 m2 and is one of the largest parks in Europe. The park was put into operation on October 5, 2004. The project and implementation of the park were carried out by the Ankara Metropolitan Municipality Environmental Protection and Control Department and it is still under its control today.

According to the measurement made on Google Maps, the distance from the city center (from Kızılay) to this area is 27.1 km. The area is accessible by private vehicle, metro, minibus, bus and by walking from the surrounding settlements. The area is entered through 15 different gates. The area includes picnic areas, greenhouses, sports areas, skating rink, go-kart area, amphitheater, fairy tale island, wedding halls, amusement park, ladies' tavern, Sincan cultural center, children's playgrounds, personnel service building, lawn games and intellectual games, waterfall tea garden, country coffee house, rose garden, parking lot, vehicle and walking paths, buffets, bird garden, nomad house,

administration building, toilet, boats and education center. There are seating benches, lighting elements, garbage cans, fountain, gazebo, flower pots, children's play elements, fitness equipment, fairy tale island cartoon character statues and information signs in the area. Visuals from the study area are given in Figure 1.

*(a)* *(b)*

*(c)* *(d)*

**Figure 1:** The study area (a), the view from the study area (b), the nearest metro station to the area (c) and the fairy tale island (d) (Original, 2022)

The plant species found in Harikalar Diyarı Park and examined in terms of the xeriscape design concept are as follows: *Acer platanoides, Acer pseudoplatanus, Aesculus hippocastanum, Ailanthus altissima, Ampelopsis quinquefolia, Berberis thunbergii, Betula alba pendula, Buddleja davidii, Buxus sempervirens, Catalpa bignonioides, Cedrus deodora, Cerastium tomentosum, Cornus mas, Cotoneaster dammeri, Cupressus arizonica glauca, Eleagnus angustifolia, Euonymus fortunei, Euonymus japonicus, Forsythia x intermedia, Fraxinus excelsior, Hedera helix, Juniperus horizantalis,*

*Koelreuteria paniculata, Ligustrum vulgare, Lonicera caprifolium, Mahonia aquigolium, Morus alba pendula, Picea pungens, Pinus nigra, Platanus orientalis, Pyrancantha coccinea, Prunus cerasifera, Prunus serrulata "Kanzan", Robinia pseudoacacia, Salix babylonica, Sambucus nigra, Sophora japonica, Spiraea vanhouttei, Symphoricarpos albus, Syringa vulgaris, Tamarix tetrandra, Taxus baccata, Thuja orientalis, Tilia tomentosa, Viburnum opulus, Vinca minor, Yucca filamentosa.*

### 2.2.Method

This study was conducted in 3 stages. In order to evaluate whether the study area was suitable for xeriscape landscape design, the evaluation table compiled by Ünsal and Çelik Çanga (2023) was used (Table 1). Then, the study area, Harikalar Diyarı Park, was examined within the framework of the 'Xeriscape Design Criteria' table and the current situation was analyzed. A plant list was created with the information received from the field authorities. The existing plants in the area were examined in terms of their families, origins (naturalness/exoticity), ecological requirements, ecological tolerances, and drought resistance, and evaluations were made in line with the purpose, conclusions were drawn, and suggestions were developed.

## 3. FINDINGS

The study area was examined in terms of xeriscape criteria by taking into account 7 principles and a total of 45 criteria. Each criterion was evaluated in line with the on-site examinations and information received from the authorities and is given in Table 1.

**Table 1:** Harikalar Diyarı Park xeriscape design criteria evaluation table

| **Name of the Park**: Harikalar Diyarı | **City/District/Neighborhood**: Ankara/Sincan/Yunus Emre | | |
|---|---|---|---|
| **Size of the Park (m²)**:1.300.000 m² | **City/District/Neighborhood Park**: City park | | |
| **Temel lkeler** | **The criteria** | Y | P | N |
| **Planning and Projecting** | The general landscape character of the area has been preserved. | + | | |
| | There are trees in the park that will provide shade. | + | | + |
| | The slope of the area is suitable for natural drainage. | | | + |
| | Terracing has been done to prevent water loss. | | | + |
| | Drainage of structural areas is suitable for collecting rainwater. | | + | |
| | Special areas have been made for the collection of rainwater. | | | + |
| | There is a building mass or vegetative element that borders the park. | + | | |
| | Hard surfaces have permeable properties. | | + | |
| | Sufficient amount of green space has been used. | | | |
| | Plants are divided into zones according to their water requirements (Zone I, Zone II, Zone III). | + | | |
| **Soil Preparation** | Vegetable soil has been laid. | + | | |
| | Soil analysis was carried out before the project. | | | + |
| | In this area, fill soil was used. | | | + |
| | The soil is sufficiently permeable. | + | | |
| **Appropriate Plant Selection** | Plants are selected from species suitable for ecology. | + | | |
| | Plants that consume less water were used. | + | | |
| | Plants tolerant to extreme conditions were used. | | + | |
| | Plants adapt to fluctuations in soil moisture. | + | | |
| | The root structure of the plants is suitable for xeriscape. | + | | |
| | The above-ground structure of the plants is suitable for xeriscape (spiny, gray, hairy, fleshy, etc.). | + | | |
| | Plants were selected from natural cover species. | + | | + |
| | The size and form of the plants are suitable for xeriscape . | + | | |
| | Natural plants have been preserved in the area. | + | | |
| **Creating Easy-to-Maintain Grass Areas** | Grass was not used in sloping areas. | | | + |
| | There are large grass areas | + | | |
| | Grass areas are applied as one piece or interconnected. | + | | |
| | Grass types are suitable for the climatic conditions of the city where they are located. | + | | |
| | Grass areas is resistant to drought conditions. | + | | |
| | Artificial grass was used in this area. | | | + |
| | The grass area is resistant to pressure and wear. | + | | |
| | Applications have been made to reduce grass areas. | | + | |
| **Effective Irrigation** | Drip irrigation system was used. | | + | + |
| | Grass areas are irrigated with a low pressure sprinkler irrigation system. | + | | |
| | The irrigation system is connected to an automation. | + | | |
| | Irrigation times are done after sunset or early in the morning. | + | | |
| | Irrigation heads are positioned to save water. | + | | |
| | Water resources were used effectively. (Rain water, natural water sources, etc.) | + | + | |
| | Irrigation water is obtained from waste water. | + | | |
| | The sprinklers of the irrigation system are placed considering the prevailing wind direction. | | | + |
| **Use of Mulch** | Organic mulch has been applied (plant bark, leaves, etc.). | | | + |
| | Inorganic mulching has been applied (stone, rock, gravel, plastic sheet, etc.). | + | | |
| **Proper Maintenance** | Correct pruning has been done. | + | | |
| | Regular weed control is carried out. | | + | |
| | Fertilization is done regularly. | | + | |
| | Disease and pest control is carried out. | + | | |
| **Abbreviations:** **Y:** Yes, **P:** Partially, **N:** No | | | | |

According to Table 1, out of 45 criteria determined for the xeriscape design principles of the Harikalar Diyarı Park, 28 criteria were evaluated as "yes", 6 criteria were evaluated as "partially" and 11 criteria were evaluated as "no". Thus, 62.22% were evaluated as positive, 24.44% as negative and 13.34% as both partially and positive.

In this study, plants were first examined in terms of family information (Table 2).

**Table 2:** Family information of plants in Harikalar Diyarı Park (URL1-URL24)

| Family | Latin name of the plant | Family | Latin name of the plant |
|---|---|---|---|
| *Acereceae* | *Acer platanoides* | *Hippocastanaceae* | *Aesculus hippocastanum* |
| | *Acer pseudoplatanus* | *Moraceae* | *Morus nigra* |
| *Agavaceae* | *Yucca flamentosa* | *Oleaceae* | *Forsythia x intermedia* |
| *Apocynaceae* | *Vinca minor* | | *Syringa vulgaris* |
| *Araliaceae* | *Hedera helix* | | *Ligustrum vulgare* |
| *Berberidaceae* | *Berberis thunbergii* | | *Fraxinus excelsior* |
| | *Mahonia aquigolium* | *Pinaceae* | *Picea pungens* |
| *Betulaceae* | *Betula alba pendula* | | *Pinus nigra* |
| *Bignoniaceae* | *Catalpa bignonioides* | | *Cedrus deodora* |
| *Buxaceae* | *Buxus sempervirens* | *Platanaceae* | *Platanus orientalis* |
| *Caprifoliaceae* | *Sambuxus nigra* | *Rosaceae* | *Pyracantha coccinea* |
| | *Symphoricarpos albus* | | *Prunus cerasifera* |
| | *Viburnum opulus* | | *Prunus serrulata 'Kanzan'* |
| | *Lonicera caprifolium* | | *Spiraea vanhouttei* |
| *Caryophyllacea e* | *Cerastium tomentosum* | | *Cotoneaster dammeri* |
| *Celastraceae* | *Euonymus fortunei* | *Salicaceae* | *Salix babylonica* |
| | *Euonymus japonicus* | *Sapindaceae* | *Koelreuteria paniculata* |
| *Cornaceae* | *Cornus mas* | *Scrophulariaceae* | *Buddleja davidii* |
| *Cupressaceae* | *Cupressus arizonica glauca* | *Simaroubaceae* | *Ailanthus altissima* |
| | *Thuja orientalis* | *Tamaicaceae* | *Tamarix tetrandra* |
| | *Juniperus horizantalis* | *Taxaceae* | *Taxus baccata* |
| *Elaeagnaceae* | *Eleagnus angustifolia* | *Tiliaceae* | *Tilia tomentosa* |
| *Fabaceae* | *Robinia pseudoacacia* | *Vitaceae* | *Ampelopsis quinquefolia* |
| | *Sophora japonica* | | |

According to Table 2, 4.25% of the plants in the study area are *Acereceae*, 2.12% are *Agavaceae*, 2.12% are *Apocynaceae*, 2.12% are *Araliaceae*, 4.25% are *Berberidaece*, 2.12% are *Betulaceae*, 2.12% are *Bignoniaceae*, 2.12% *Buxaceae*, 8.51% *Caprifoliaceae*, 2.12% *Caryophyllaceae*, 4.25% *Caleastraceae*, 2.12% *Cornaceae*, 6.38% *Cupressaceae*, 2.12% *Eleagnaceae*, 2.12% *Fabaceae*, % 2.12% *Hippocastanaceae*, 2.12% *Moraceae*, 8.51% *Oleaceae*, 6.38% *Pinaceae*, 2.12% *Platanaceae*, 10.63% *Rosaceae*, 2.12% *Salicaceae*, 2.12% *Sapındaceae*,

2.12% *Scrophulariaceae*, 2.12% *Simaroubaceae*, 2.12% *Tamaicaceae*, 2.12% *Taxaceae*, 2.12% *Tiliaceae* and % 2.12 of them consist of species from the *Vitaceae* family.

In the xeriscape design approach, it is very important to use natural plants instead of exotic species. Because the more natural the plant is in the region it is located in, the easier it adapts. For this reason, choosing natural species for plants to be used in xeriscape is always the primary preference (Bayramoğlu, 2016). The plants in the study area were also evaluated in this respect and the relevant information is given in Table 3.

**Table 3:** Endemic and natural status of plants in Harikalar Diyarı Park (URL1-URL24)

| **Latin name of the plant** | **Natural Exotic** | **Endemic situation** | **Latin name of the plant** | **Natural Exotic** | **Endemic situation** |
|---|---|---|---|---|---|
| *Acer platanoides* | E | NE | *Lonicera caprifolium* | E | NE |
| *Acer pseudoplatanus* | E | NE | *Mahonia aquigolium* | E | NE |
| *Aesculus hippocastanum* | E | NE | *Morus alba pendula* | E | NE |
| *Ailanthus altissima* | E | NE | *Picea pungens* | N | NE |
| *Ampelopsis quinquefolia* | E | NE | *Pinus nigra* | N | NE |
| *Berberis thunbergii* | E | NE | *Platanus orientalis* | N | NE |
| *Betula alba pendula* | E | NE | *Pyracantha coccinea* | E | NE |
| *Buddleja davidii* | E | NE | *Prunus cerasifera pisardii nigra* | E | NE |
| *Buxus sempervirens* | N | NE | *Prunus serrulata 'Kanzan'* | E | NE |
| *Catalpa bignonoides* | E | NE | *Robinia pseudoacacia* | E | NE |
| *Cedrus deodora* | E | NE | *Salix babylonica* | E | NE |
| *Cerastium tomentosum* | E | NE | *Sambucus nigra* | E | NE |
| *Cornus mas* | E | NE | *Sophora japonica* | E | NE |
| *Cotoneaster dammeri* | E | NE | *Spiraea vanhouttei* | E | NE |
| *Cupressus arizonica glauca* | E | NE | *Symphoricarpos albus* | E | NE |
| *Eleagnus angustifolia* | N | NE | *Syringa vulgaris* | N | NE |
| *Euonymus fortunei* | E | NE | *Tamarix tetrandra* | E | NE |
| *Euonymus japonicus* | E | NE | *Taxus baccata* | N | NE |
| *Forsythia x intermedia* | E | NE | *Thuja orientalis* | E | NE |
| *Fraxinus excelsior* | E | NE | *Tilia tomentosa* | E | NE |
| *Hedera helix* | E | NE | *Viburnum opulus* | E | NE |
| *Juniperus horizantalis* | E | NE | *Vinca minor* | N | NE |
| *Koelreuteria paniculata* | E | NE | *Yucca filamentosa* | E | NE |
| *Ligustrum vulgare* | N | NE | | | |

N: Natural, E: Exotic, NE: Not Endemic, E: Endemic

According to Table 3, the majority of plants in Harikalar Diyarı Park (80.85%) are exotic species, while only 19.15% are natural species. However,

in the xeriscape design concept, natural species should be used instead of exotic species.

Thus, since the plant's water consumption is low, its resistance to drought will be high and the plant life will not be shortened in periods when water is low. Since the main subject of the study is drought, the drought resistance of the plants in Harikalar Diyarı Park and their current status in terms of their water requirements were discussed and the information obtained is given in Table 4.

**Table 4:** Drought resistance and water requirements of plants in Harikalar Diyarı Park (URL1-URL24)

| **Latin name of the plant** | **DR-WR** | **Latin name of the plant** | **DR-WR** |
|---|---|---|---|
| *Acer platanoides* | 1-2 | *Lonicera caprifolium* | 2-2 |
| *Acer pseudoplatanus* | 1-1 | *Mahonia aquigolium* | 1-2 |
| *Aesculus hippocastanum* | 1-2 | *Morus alba pendula* | 2-1 |
| *Ailanthus altissima* | 1-2 | *Picea pungens* | 2-2 |
| *Ampelopsis quinquefolia* | 2-2 | *Pinus nigra* | 1-2 |
| *Berberis thunbergii* | 1-2 | *Platanus orientalis* | 1-2 |
| *Betula alba pendula* | 1-1 | *Pyracantha coccinea* | 1-1 |
| *Buddleja davidii* | 1-3 | *Prunus cerasifera pisardii nigra* | 2-2 |
| *Buxus sempervirens* | 1-2 | *Prunus serrulata 'Kanzan'* | 2-2 |
| *Catalpa bignonoides* | 1-1 | *Robinia pseudoacacia* | 1-2 |
| *Cedrus deodora* | 2-2 | *Salix babylonica* | 2-1 |
| *Cerastium tomentosum* | 1-3 | *Sambucus nigra* | 1-2 |
| *Cornus mas* | 2-3 | *Sophora japonica* | 1-3 |
| *Cotoneaster dammeri* | 1-3 | *Spiraea vanhouttei* | 1-3 |
| *Cupressus arizonica glauca* | 1-3 | *Symphoricarpos albus* | 1-3 |
| *Eleagnus angustifolia* | 1-3 | *Syringa vulgaris* | 1-2 |
| *Euonymus fortunei* | 1-2 | *Tamarix tetrandra* | 1-3 |
| *Euonymus japonicus* | 1-2 | *Taxus baccata* | 1-3 |
| *Forsythia x intermedia* | 1-2 | *Thuja orientalis* | 1-2 |
| *Fraxinus excelsior* | 1-3 | *Tilia tomentosa* | 2-1 |
| *Hedera helix* | 1-3 | *Viburnum opulus* | 2-2 |
| *Juniperus horizantalis* | 1-2 | *Vinca minor* | 1-2 |
| *Koelreuteria paniculata* | 1-2 | *Yucca filamentosa* | 1-2 |
| *Ligustrum vulgare* | 1-3 | | |

Drought Resistance (DR): 1:Tolerant, 2:Not Tolerant Water Requirement(WR): 1:High, 2:Medium, 3:Low

Water conservation and evaluation, elimination of problems caused by global warming, and use of drought-resistant species in plant design to prevent

plants from being affected by drought are also among the priority issues (Ertop, 2009; Bayramoğlu, 2016). For this reason, methods that will save water in planning, projecting and applications in the field of landscape architecture have been developed (Bayramoğlu et al. 2013). In the xeriscape landscape design approach, species that consume less water should be preferred instead of species that consume a lot of water.

According to Table 4, 76.59% of the plants in the study area are drought-resistant, while 26.41% are not drought-resistant species. In addition, it is seen that 15.21% of the plants in the area have "High" water requirements, 56.51% are "Medium" and 30.43% are "Low".

The environmental conditions that the plants in Harikalar Diyarı Park can tolerate in terms of urban and ecological conditions were examined and the conditions that the species can tolerate were determined on a plant basis (Table 5).

**Table 5:** Tolerances of plants found in Harikalar Diyarı Park (URL1-URL24)

| Latin name of the plant | Ecological tolerances | Latin name of the plant | Ecological tolerances |
|---|---|---|---|
| *Acer platanoides* | 3,5,6,8,10,19 | *Lonicera caprifolium* | 8,14 |
| *Acer pseudoplatanus* | 1,5, | *Mahonia aquigolium* | 11,12 |
| *Aesculus hippocastanum* | 1,3,5,6,9,10,18,19 | *Morus alba pendula* | 13,8 |
| *Ailanthus altissima* | 3,14,15 | *Picea pungens* | 3,5,14 |
| *Ampelopsis quinquefolia* | 8,9,14,15,17 | *Pinus nigra* | 3,5,6,8,9,11,15 |
| *Berberis thunbergii* | 3,5,8,14 | *Platanus orientalis* | 1,3,5,9 |
| *Betula alba pendula* | 1,3,5,8,14 | *Pyracantha coccinea* | 3,6,10,12 |
| *Buddleja davidii* | 2,3,9,18 | *Prunus cerasifera pisardii nigra* | 5,8,12 |
| *Buxus sempervirens* | 11,12,14 | *Prunus serrulata 'Kanzan'* | 3 |
| *Catalpa bignonoides* | 10,12,14 | *Robinia pseudoacacia* | 1,3,8,15 |
| *Cedrus deodora* | 3,6,17 | *Salix babylonica* | 3,8,9,12,13,14 |
| *Cerastium tomentosum* | 3,8,9,14 | *Sambucus nigra* | 14 |
| *Cornus mas* | 5,6,14,18 | *Sophora japonica* | 2,3,5,10,12 |
| *Cotoneaster dammeri* | 3,6,8,14,15,17 | *Spiraea vanhouttei* | 3,5,14 |
| *Cupressus arizonica glauca* | 3,8,14,15 | *Symphoricarpos albus* | 3,8,10,14,15,17,18 |
| *Eleagnus angustifolia* | 9,13,15,18 | *Syringa vulgaris* | 9,11,14 |
| *Euonymus fortunei* | 3,10,12 | *Tamarix tetrandra* | 2,3,6,10,12 |
| *Euonymus japonicus* | 3,10,12 | *Taxus baccata* | 3,8,9,11,14 |
| *Forsythia x intermedia* | 8,9,14,15,17 | *Thuja orientalis* | 1,5,8,14,15 |
| *Fraxinus excelsior* | 6,14 | *Tilia tomentosa* | 3,10,12 |
| *Hedera helix* | 3,10,14,18 | *Viburnum opulus* | 8,9 |
| *Juniperus horizantalis* | 3,8,9,14,15,18 | *Vinca minor* | 3,15,18 |
| *Koelreuteria paniculata* | 3,9,13 | *Yucca filamentosa* | 1,3,4,9,13,18,19 |
| *Ligustrum vulgare* | 3,8,9 | | |

1: Dust, 2: Salinity, 3: Drought, 4: Excessive Rainfall, 5: Air Pollution-Smoke, 6: Wind 7: Radioactive Pollution, 8: Cold, 9: Extreme Cold (Air), 10: Extreme Heat (Air), 11: Dark Shade, 12: Extreme Humidity, 13: Light, 14: Full Sunlight, 15: Infertile Soil, 16: Diseases, 17: Alkaline and Acidic Soil, 18: Inadequate Maintenance, 19: Pests

According to Table 5, 14.89% of the plants in Harikalar Diyarı Park are tolerant to dust, 6.38% to salinity, 65.95% to drought, 2.12% to excessive rainfall, 25.53% to air pollution/smog, 19.14% to wind, 42.55% to cold, 34.04% to extreme cold (air), 23.40% to extreme heat (air), 8.51% to dark shade, 23.40% to extra humidity, 10.63% to light, 48.93% to full sunlight, 25.53% to infertile soil, 10.63% to alkaline and acidic soil, 19.14% to inadequate care and 6.38% to pests.

In light of all these findings and the principles of xeriscape design, the evaluations made regarding the area are listed below;

Evaluation in Terms of Planning and Projecting: Planning and projecting is the most important stage of the xeriscape. It is important to look at the climate conditions of the area where the project will be carried out in advance, to examine its topography, to have information about the existing vegetation and the current use of the area in order to make a more accurate and sustainable landscape application (Bayramoğlu, 2016). When the study area was evaluated in terms of this principle, the following results were reached;

By holding meetings with authorized persons in the Ankara Metropolitan Municipality Environmental Protection and Control Department, the landscape project of the area was obtained and it was learned that the landscape project of the area was made by expert landscape architects and that the project was designed by taking into account the climate, topography and vegetation of the area.

The sizes of the soft and hard floors in the area were made by considering the balance. In hard floors, importance was given to the absorption of water by leaving spaces between the joints. At the same time, the surface flow of the hard floors was planned and attention was paid to the water draining and returning to the soil. EPDM rubber coated floor was applied in children's playgrounds.

Evaluation in Terms of Soil Preparation: Before the landscaping project, the soil structure of the area should be evaluated and the plant should be selected according to the structure of the existing soil. In addition, after the landscaping application, care should be taken to ensure that the soil structure has a high water holding capacity, pH values and unique texture are suitable for the plant in order for the plant to continue its life.

According to the information received from the officers in the study area, no special soil analysis was performed. It was observed that there was clayey, impermeable soil in some parts of the area. However, topsoil was applied to ensure that plants grow in a suitable environment.

Evaluation in Terms of Appropriate Plant Selection: The plant to be used should be in accordance with the concept of xeriscape criteria and should have a low water requirement and be of a type suitable for the natural and climate of the region in which it is located in order to protect and evaluate water and prevent global warming (Ertop, 2009; Bayramoğlu, 2016). When the study area was evaluated in terms of this principle, the following results were reached;

It was determined that 76.59% of the plants in the area were drought-resistant and 30.43% were species with low water requirements. It was also observed that the plants around the area were in a form that limited and screened the area, thus creating a screening effect in terms of reducing wind. This application increases the water retention capacity of the plants. However, only 19.15% of the plants used in the area were natural species. According to the information obtained from the officers working in the area, the plants were selected and zoning was done by considering the climatic conditions of the area, the soil and water requirements of the plants.

Evaluation in Terms of Creating Easy-to-Maintain Grass Areas: Grass surfaces are very important aesthetically and functionally in landscaping applications. Grass areas are frequently used to create spaces in open areas or to contribute to the aesthetic values of the spaces created. However, the water requirement of grass surfaces increases in direct proportion to the area they cover. Therefore, grass areas should be preferred as little as possible in xeriscape applications.

The grass areas in Harikalar Diyarı Park were created as a whole. Care was taken to ensure that it was not in pieces, and the grass species used in the grass area were 30% Lollium perenne, 20% Festuca rubra rubra, 25% Festuca rubra cummutate, 20% Poa pratensis, 5% Agrostis tenuis. Grass areas were also used in roof garden applications. However, grass areas in some regions do not have a natural drainage slope of approximately 1-2%. There are grass areas with very high slopes and terracing was not done in the grass areas.

Evaluation in Terms of Effective Irrigation: A project should be made according to the water demand of the plant to be used in the area and the

irrigation period and frequency should be adjusted. Sprinkler irrigation should be used in large areas and drip irrigation should be used in narrow areas. Irrigation should be connected to an automatic irrigation system so that the plants are watered regularly and at certain times.

The area has an automatic irrigation system. The sprinklers in the system are designed at 10-15m intervals. Irrigation is done at night. However, in some areas, manual irrigation is applied. In some areas where there are ground cover plants, drip irrigation is used. Irrigation water for the park is provided by water stored from Çubuk Stream, located near the area.

Evaluation in Terms of Mulch Use: The mulch used in this area was provided from inorganic materials instead of organic materials. Instead of tree bark, leaves etc., stone, rock, gravel etc. materials were preferred.

Evaluation in Terms of Proper Maintenance: Appropriate care is generally provided in the area, but incorrect pruning was done to the trees in some areas, causing deterioration in the form of the trees. At the same time, weed control has not been provided in some areas. But when you look at the area in general, it can be seen that maintenance such as pruning, weed control, etc. is being carried out. In addition, the effects of vandalism can be seen occasionally on plants as well as on equipment elements in open and green areas.

## CONCLUSION AND RECOMMENDATIONS

The evaluation of Harikalar Diyarı Park in terms of xeriscape concept was made by on-site observations and interviews with authorized persons within the framework of 7 principles and 45 criteria. As a result of the evaluations, 40% of the planning and projecting criteria were positive, 30% were negative and 20% were partially positive. In order to improve the 30% negative situation, the drainage slope of the grass areas in the area should be adjusted to 1-2% and terracing should be done, and rainwater should be stored for reuse.

While making an evaluation in terms of soil preparation, no soil preparation was made that fully complied with the criteria within the xeriscape design criteria before the project, but the soil was processed and vegetal soil was laid. Thus, the soil preparation criterion was concluded as 50% positive and 50% negative.

In the criterion of limiting the grass to suitable and functional areas, 62.5% were concluded as positive, 25% as negative and 12.5% as both positive and negative. The grass surfaces in this area are quite large and it would be more appropriate to reduce the grass area surface and use ground cover plants instead of grass plants in terms of the xeriscape design concept. Care should be taken to have whole and single lawn areas instead of small and piecemeal lawn areas.

In the effective irrigation criterion, 62.5% were concluded as positive, 12.5% as negative and 25% as both positive and negative. When performing sprinkler irrigation in the area, the dominant wind direction should be taken into account and irrigation should not be done against the direction of the wind.

In this area, which is completely incompatible with the concept in terms of mulch use, organic mulching should be used instead of inorganic mulching. In order to ensure the continuity of the plants in the area and to ensure the sustainability of the design in terms of aesthetics, their maintenance should be done in a regular manner and in accordance with the plant species.

A very small part of the plants (19.15%) consists of natural plants, the rest consists of exotic plants. This situation has been evaluated as a negative in terms of ecological and economic aspects in the area. Therefore, more space should be given to natural species in the area because the use of natural species contributes greatly to both the country and the ecosystem of the area.

Although the majority of plants in this area are plants with moderate water requirements, for a better xeriscape design, plants with low water requirements should be in the majority, or even all of them should be preferred this way.

Since the area is in a central location, it is under the influence of environmental negativities. For example, Ayaş-Ankara Yolu Boulevard, Gazi Mustafa Kemal Boulevard, Menderes Street passing through the immediate vicinity cause air pollution and dust in the area. In this case, the plants in the area are affected by intense dust. However, only 14.89% of the plants in the area consist of dust-resistant species. Although there are tall buildings around the park, the park receives full wind and sun. Considering that only 19.14% of the plants here are wind-resistant, it has been determined that environmental pressures are not sufficiently taken into account in the selection of plant species

in this park. Environmental pressures must definitely be taken into account in new planting designs.

As a result; Harikalar Diyarı Park has been evaluated positively in terms of 4 out of 7 principles of the xeriscape concept (planning and projecting, limiting the grass to suitable and functional areas, effective irrigation, appropriate maintenance). The other 3 principles (appropriate plant species selection due to not using natural species, use of mulch, soil preparation) have been evaluated negatively. The fact that even one of the principles has been evaluated negatively means that the plants in the park will not be able to survive on days when water crises are/will be experienced or will not be able to fully fulfill the functions expected from them. It is possible to transform the park in terms of the principles evaluated negatively, and it is necessary to make designs that will implement all the principles of the xeriscape concept in the new parks to be built throughout the city and to implement them without compromising the principles.

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# CHAPTER 12

## MISSISSIPPI SCENIC ROUTES AND THE ARCHITECTURAL FEATURES OF SOME STRUCTURES ALONG THESE ROUTES

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## INTRODUCTION

Scenic routes are defined as roads planned in areas of significant landscape value, designed to be safe and aesthetically pleasing while maintaining controlled traffic conditions (Seçkin, 1985). These routes are typically one or two lanes and serve the purpose of visual enjoyment, planned using various methods depending on their intended use.

Although scenic routes may have a commercial aspect, their primary purpose is recreational use. They are designed to facilitate access to areas rich in natural and cultural beauty, thereby supporting ecotourism activities (Sezen, 2018).

Scenic routes can be classified into "primary" and "secondary" scenic routes. Primary scenic routes are generally two lanes and possess high aesthetic and cultural value. These routes allow for visually focused journeys lasting between two to four hours. On the other hand, secondary scenic routes are mostly single-lane, though they may also be two-lane, and are defined as routes branching off from primary roads to provide access to secluded landscapes. However, for a route to be considered a secondary scenic route, it must be connected to primary roads (Seçkin, 1985; Sezen, 2018).

Globally, the majority of notable highways are among those with high scenic quality. Key elements that enhance the visual appeal of a highway include the presence of water bodies such as seas, oceans, rivers, and streams. Furthermore, the diversity and richness of the surrounding natural vegetation significantly contribute to the quality and attractiveness of scenic routes.

In Turkey, the first study in the context of scenic routes was conducted for the coastal road between Foça and Yeni Foça. This project linked the concept of scenic routes with tourism and was planned by the Provincial Bank Urban Planning Department. It was implemented by the General Directorate of Highways with financial support from the Ministry of Tourism (Başal, 1979; Karahan, 2003).

When planning scenic routes, certain criteria should be considered. These include:

- The planned scenic route should be constructed at the same elevation as the landscape or at a higher level.

▪ Scenic routes should be designed to pass along the edges of terrain or forests, minimising damage to landscape values

▪ When planning scenic routes, all characteristics of the terrain should be assessed. During this assessment, cultural and natural structures should be studied, and scenic viewpoints identified.

▪ While planning scenic routes, the types of activities offered and the facilities available to users should be clearly defined.

▪ Connectivity and accessibility of cultural and natural recreational opportunities to the main road should be studied.

▪ The safety and design of planned scenic routes should be harmonised (Seçkin, 1985).

The aim of this study is to examine the architectural features and aesthetic approaches of recreational facilities located along the routes of Mississippi scenic roads.

## 1. MISSISSIPPI SCENIC ROUTES

Mississippi scenic routes encompass the state's natural beauty and historically significant landmarks, transforming them into major tourist attractions. This contributes significantly to the state's economy (Anonymous, 2024a). The development of scenic routes involves a complex interplay between cultural narratives of local communities, the sustainable management of natural resources, and the representation of historical heritage through tourism and infrastructure. These interconnections reinforce the importance of scenic routes in achieving regional development goals.

The Mississippi River holds historical significance for the discovery, colonisation, and economic development of the United States. Fremling's (1987) study emphasises the vital role the river has played in commercial freight transport over the past 150 years. However, human interventions to develop waterways have had profound ecological impacts. In particular, Louisiana’s sensitive wetlands and barrier islands have suffered adverse effects. The river's length and expansive drainage basin further highlight its ecological importance.

Mississippi’s cultural heritage is a key element in enhancing the state’s tourism potential, with the blues music culture standing out

prominently in this regard. Gulyas (2008) focused on the cultural significance of blues music in Jackson, Mississippi, with a particular emphasis on North Farish Street. Efforts to rebrand Farish Street as a modern equivalent to Beale Street underscore the importance of constructing cultural authenticity and its strategic use in attracting tourism. Efforts to preserve the blues community's heritage play a crucial role in shaping the identity of the scenic highways and the surrounding communities.

Mississippi scenic routes are not merely tourist attractions but also tools for preserving and sustainably developing the state's cultural and environmental values. Gollnick (2010) highlights the impact of human activities on habitats and community structures, focusing on environmental transformations along the Mississippi River. Gollnick's study examines the historical context of river management practices, such as the construction of locks and dams, and their role in transforming the river from a dynamic, free-flowing system to a more controlled environment. These changes have altered floodplain relationships and significantly affected the recreational and restorative functions of the landscape, profoundly impacting the lifestyles of communities along the river (Gollnick, 2010).

Cheetham (2015) explored the visual representations of Mississippi scenic routes and their influence on visitors' perceptions. Routes like the Natchez Trace Parkway shape cultural identity through the experiences and preferences of visitors. Analysing these visual representations helps to understand the value of scenic routes and positively shapes visitor perceptions.

Mississippi boasts a rich variety of scenic routes, including one national scenic route, 11 state scenic routes, and 13 natural scenic routes (Figure 1) (Anonymous, 2024a). These routes showcase unique features

that reflect the region's natural and cultural heritage. Some of the most notable scenic routes are detailed below


**Figure 1:** Mississippi Scenic Routes Map (Anonymous, 2024b)

### 1.1 Beach Boulevard Scenic Byway

The Beach Boulevard Scenic Byway is an 11.8-mile-long scenic route that stretches along the Hancock County coastline, starting from the Cedar Point boat launch in the north and ending at the Cadet Bayou Harbour in the south (Figure 2). This route features numerous significant buildings and sites that represent both national and state historical and cultural

landmarks. Beginning at the northern end of St. Louis, the route continues through the Bay St. Louis National Historic District and concludes in Bayou Cadet, one of Mississippi's notable fishing villages.

Along the route, visitors can explore natural and cultural sites such as the Felicity Street Marshes, the Mississippi Gulf Coast Birding Trail, and Dunbar Pier. Additionally, the route offers recreational amenities like cycling trails (Anonymous, 2024c).


**Figure 2:** A view of the Beach Boulevard Scenic Byway map (Anonymous, 2024 d)

### 1.2. Brice's Crossroads Battlefield-Chief Tishomingo Scenic Byway

This scenic route is located in the Lee and Prentiss regions and showcases the area's historical heritage and Native American culture. The route includes significant cultural and historical landmarks such as Brice's Crossroads Battlefield, the Chief Tishomingo Scenic Route, and the home of Chickasaw Chief Tishomingo (Figure 3). Additionally, the route features historic cemeteries that reflect the region's cultural heritage, offering visitors an opportunity to closely experience traces of the past.

The scenic route also hosts visitor and interpretation centres as well as areas displaying archaeological artefacts, providing an experience deeply intertwined with history and culture (Anonymous, 2024e).

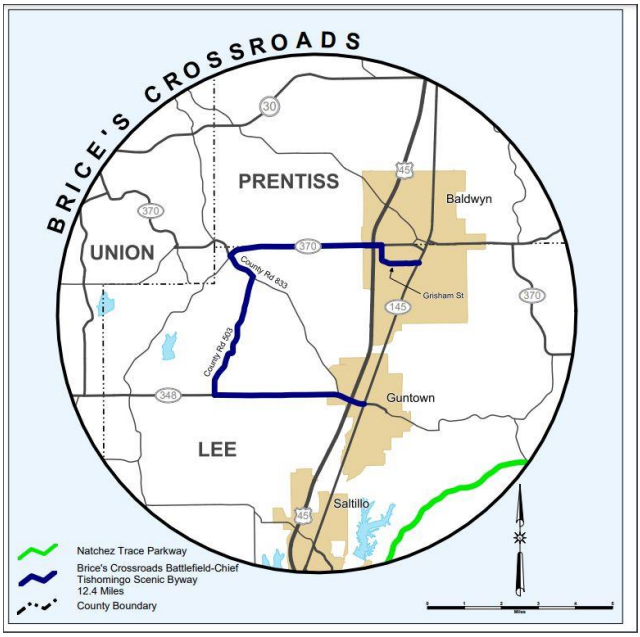


**Figure 3:** Brice's Crossroads Battlefield-Chief Tishomingo Scenic Byway Map

### 1.3. Great River Road – Mississippi

This journey along the Great River Road begins south of Memphis and continues through the Mississippi Delta (Figure 4). Often referred to as "Highway 61" or the "Blues Highway," this scenic route is renowned for the fertile agricultural lands formed over centuries by the flooding of the Mississippi River. Throughout the year, cotton, rice, and soybeans are cultivated and harvested along this route.

Notable landmarks along the route include the Windsor Ruins near the town of Gibson, recognised as Mississippi's largest antebellum mansion, and Vicksburg National Park, which encompasses 1,800 acres of historic terrain featuring hills, trenches, and rocky landscapes.

The lifestyle of communities in the Mississippi Delta is reflected in the region's unique Blues music culture. The Delta Blues Museum serves as a major attraction, introducing visitors to the area's rich musical heritage.

This route follows the Mississippi River for approximately 3,000 miles across 10 states, earning its designation as a "Great American Road" (Anonymous, 2024f).

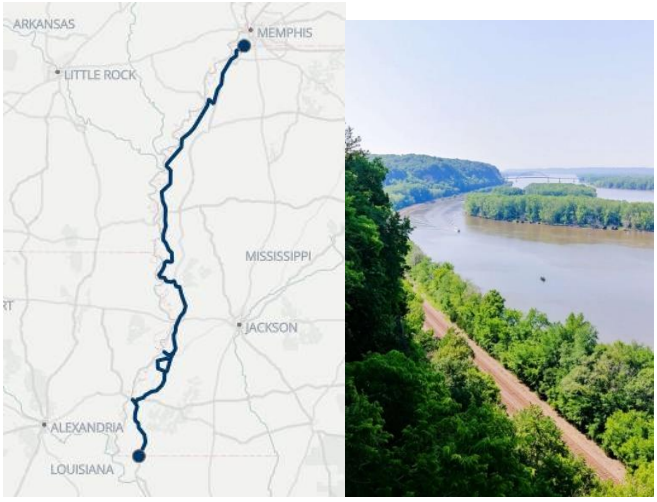


**Figure 4:** Great River Road Map and a View

### 1.4. Lower Mississippi Historic Scenic Byway

This scenic route, stretching over 100 miles, holds significant importance in American history. Beginning in Warren County, the route follows US Highway 61 and ends at the Louisiana state border (Figure 5). Meeting almost all criteria for secondary scenic routes, this path runs along the Mississippi River and connects four historic settlements (Anonymous, 2024g)


**Figure 5:** Lower Mississippi Historic Scenic Byway Map

### 1.5. NASA Scenic Byway to Space

This scenic route, spanning over 30 miles (Figure 6), features a variety of natural and cultural attractions, including tree-lined road networks, state parks, birdwatching shelters, historic cemeteries, and hiking trails. Designated by NASA as a must-see destination, the route is notable for its magnificent canopy of ancient oak trees. At its northern end lies the John C. Stennis Space Center, the largest rocket engine test facility in the

United States. The centre is also surrounded by various government agencies and private companies (Anonymous, 2024h).


**Figure 6:** NASA Scenic Byway to Space Map

## 2. ARCHITECTURAL STRUCTURES OF RECREATIONAL FACILITIES

The impact of daily life has led to a gradual decrease in open and green spaces within urban areas, weakening the relationship between humans and nature and exacerbating urban problems. These issues reveal that modern urban areas have developed without providing solutions that address human needs (Korkut et al., 2017; Şengül and Altay, 2024). Planning decisions regarding urban spaces are increasingly being taken within the framework of landscape planning strategies that prioritise the balanced use of natural and cultural resources and consider the needs of urban residents (Arslan et al., 2005; Ayhan, 2007; Şengül and Altay, 2024).

As a result of rapid urbanisation, individuals often struggle to meet their basic needs within urban areas. In this context, recreational areas hold a significant position in landscape planning strategies to address these needs (Özkan, 2002).

During the planning and implementation of recreational areas, the balance between conservation and utilisation should be maintained, and the sustainable use of resources should be prioritised (Koçan, 2012).

The fundamental features that a well-designed recreational area should possess are as follows:

- **Green Spaces and Landscape Elements:** The area should feature rich vegetation and include high-quality visual and scenic elements.
- **Activity Opportunities:** Facilities should accommodate sporting, cultural, and social activities.
- **Functional and High-Quality Spaces:** The area should provide well-designed and functional spaces where individuals can enjoy their leisure time
- **Harmonised Design and Management:** The functions and management of the spaces should be designed to complement one another (Eğlen, 2015).

## 2.1. Types of Recreational Facilities

Özer and Thompson (2009) argue that building systems in urban environments should be integrated with natural systems to promote sustainability. The authors emphasise that collaboration between architects and landscape architects can lead to innovative strategies that improve the relationship between the built environment and nature, ultimately fostering ecological resilience.

Sharma (2010) evaluates greenways as multifunctional landscapes that address both socio-cultural and ecological concerns, approaching the concept from a broader perspective. Sharma's analysis highlights the necessity of design typologies that can adapt to the challenges of sustainable development, advocating for integrated network designs that harmonise urban and natural systems. This study underscores the importance of connectivity in landscape architecture, aligning with subsequent research findings.

Carroll (2013), in a case study focusing on Baltimore, examines the potential of urban parks and vacant lots to serve as ecological corridors. The author proposes a theoretical strategy to enhance ecological landscapes by

prioritising community involvement. Criticising existing theories of landscape urbanism and ecological urbanism for neglecting public participation, Carroll advocates for a more inclusive approach that integrates urban parks with surrounding neighbourhoods. This perspective strengthens the idea that scenic routes should not only serve aesthetic purposes but also facilitate social interaction and ecological connectivity.

Some architectural spaces significant to scenic routes are outlined below.

### 2.1.1. Entry Area

The first impression upon entering a location is highly significant for the user experience. In this context, the entry points of scenic routes should be designed to make visitors feel they are entering a special area. Entry signs should reflect the character and identity of the highways they belong to, providing visitors with information and guidance about the route. Entry signs for national parks are often among the most critical elements in defining the identity of scenic routes. Proper planning, implementation, and use of these signs enhance the importance and value of the highways (Figure 7).

Entry areas are essential points that typically welcome visitors, define the identity of the areas they serve, and provide guidance and information about facilities and the characteristics of the region along the route. These areas also establish the architectural features and identity of the highways, leaving a strong first impression on visitors.


**Figure 7:** Entrances to Some Scenic Routes

Entry areas are essential points that typically welcome visitors, define the identity of the areas they serve, and provide guidance and information about facilities and the characteristics of the region along the route. These areas also establish the architectural features and identity of the highways, leaving a strong first impression on visitors.

### 2.1.2. Visitor Centers and Visitor Communication Stations

Visitor centres are critical areas for reflecting the identity and story of a scenic route, providing information to visitors, and guiding them (Figure 8). When determining the location of these centres, factors such as the usability of the land, ease of access to public services, transportation facilities for visitors arriving from highways, and the harmony of the landscape with the surrounding environment should be carefully considered.

In the design of visitor centres, the architecture of the buildings and the arrangement of the surrounding areas should enhance the identity of the highway and be planned in harmony with the region's characteristic features. Sustainable solutions should be adopted during the design process, and the long-term operational and maintenance requirements of the facility should be considered.


**Figure 8:** Views from Selected Visitor Centres

### 2.1.3. Wayfinding and Informational Signage

Strategically well-designed and positioned informational signage enables visitors to navigate scenic routes and access key recreational points, such as visitor centres, observation decks, and picnic areas (Figure 9). The surface design and overall architecture of the signs should be in harmony with the highways and planned to ensure consistency. For this purpose, various architectural and design elements can be utilised.

Developing a specific signage theme for the area and applying it consistently along the route helps to avoid confusion and visual fatigue caused by excessive signage. Adding the scenic route's logo or the name of the area to these signs provides visitors with reassurance that they are on the correct route and enhances their overall experience.


**Figure 9:** Views of Wayfinding and Informational Signage

### 2.1.4. Overlooks, Viewpoints and Turnouts

Observation decks are among the best areas for enjoying scenic views and also serve as rest areas. These locations provide visitors with the opportunity to observe and interpret the geological and cultural characteristics, wildlife, historical events, or panoramic landscapes of the area (Figure 10). Observation decks are typically positioned to be easily accessible from highways. Amenities such as benches, terraces, telescopes, and informational signage are provided for visitor use. These facilities support the observation decks and ensure sufficient access for visitors.

The physical arrangement of observation decks and viewing points should offer ample space to accommodate a certain number of visitors, allowing them to enjoy the scenery comfortably. To ensure visitor safety and preserve the natural features of the area, boundary elements such as fences or walls may be utilised. Furthermore, accessibility for all users,

including individuals with disabilities, should be a fundamental principle of the design.


**Figure 1:** Views from Scenic Observation Decks

### 2.1.5. Rest Areas for Breaks and Relaxation

Rest areas are strategically positioned along scenic routes to provide visitors with a place to take breaks and meet basic needs, such as using restrooms (Figure 11). These areas are typically located at the ends of roads or within the view of scenic routes. When planning rest areas, factors such as travel duration and the distance between two rest stops should be taken into consideration.

Rest areas generally offer facilities such as shops, restrooms, and parking spaces. These amenities should be designed to ensure safe and convenient access for both large and standard vehicles. Additionally, picnic tables and seating areas are provided to enhance visitor comfort.

These areas can be enriched with features like shaded spaces or enclosed shelters to ensure usability in varying weather conditions, making them suitable for use throughout different seasons.


**Figure 11:** Views from rest areas

### 2.1.6. Picnic Areas

One of the most popular recreational spaces along scenic routes is picnic areas (Figure 12). When planning scenic routes, picnic areas must be incorporated into the plan. These areas should be located in regions with easy access to scenic viewpoints and water. Additionally, proximity to geological features, historical sites, or hiking trails should be considered.

In designing picnic areas, priority should be given to safety measures between vehicle access points and pedestrian circulation. While ensuring visitor safety, the overall design should also be user-friendly. Moreover, the design of picnic areas should align with the architectural style of the scenic routes and other nearby recreational

facilities. This alignment ensures that the areas offer both aesthetic appeal and functional coherence.

**Figure 2:** A View from a Picnic Area

## 3. CASE STUDIES: SELECTED FACILITIES ALONG MISSISSIPPI SCENIC ROUTES

### 3.1. Natchez Trace Parkway Visitor Center

This natural parkway connects Natchez and Nashville, spanning the states of Mississippi, Alabama, and Tennessee (Figure 13). Designated as a national scenic route and an "All-American Road," this route is recognised as one of the top 10 cycling paths in the United States.

The park is open year-round to visitors, cyclists, and drivers, offering opportunities to enjoy its natural beauty and relax (Anonymous, 2024i).

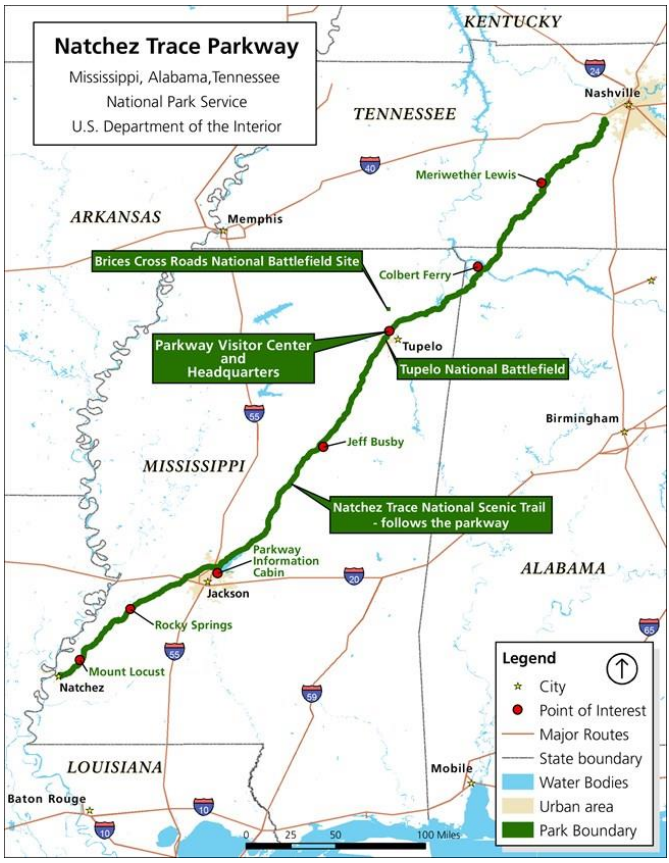


**Figure 3:** Natchez Trace Parkaway Map

Many national parks in the United States began construction as government projects during the Great Depression in the 1930s. The economic collapse and the increasing number of automobiles in the country encouraged the development of national parkways. In this context, the Natchez Trace Parkway (Figure 14) was combined with the Blue Ridge Parkway as an extension of Skyline Drive, which passes through Shenandoah National Park, to meet the nation's recreational needs (Anonymous, 2024j).

The Natchez Trace Parkway has a history spanning approximately 10,000 years and stretches across three states, covering a total length of 444 miles. Historically, this route consisted of a network of trails. Today, the park features over 350 archaeological sites, including Emerald Mound, the second-largest mound in the United States. This park corridor, spanning

five degrees of latitude, includes diverse landscapes such as forests, wetlands, grasslands, rivers, and meadows. Additionally, the park encompasses approximately 52,000 acres of natural, cultural, and historical resources (Anonymous, 2024k).

**Figure 14:** Various views from Natchez Trace Parkway

The Natchez Trace Parkway stands out as a versatile destination offering visitors a variety of recreational activities. Within this park, visitors can hike along the Trail of Tears, explore nearby waterfalls, visit the Meriwether Lewis Monument, and engage in nature-focused activities such as birdwatching. Additionally, walking and cycling trails, tent camping areas, and picnic spots provide a range of options for outdoor activities (Anonymous, 2024l).

### 3.2. Tishomingo State Park Campgrounds

Tishomingo State Park is located two miles southeast of Tishomingo County in Mississippi, just off Highway 25, and spans 1,200 acres (Figure 15). As one of Mississippi's ten state parks, Tishomingo ranks fifth and was constructed by the Mississippi Civilian Conservation Corps (CCC) beginning in April 1935. The park was opened to visitors in May 1939.

All structures within the park were designed in the Rustic Architectural style, commonly used in government-built parks, to harmonise with the natural environment. This design approach creates both aesthetic and functional unity between the buildings and the natural

landscape, ensuring the park's overall appearance aligns with its surroundings.

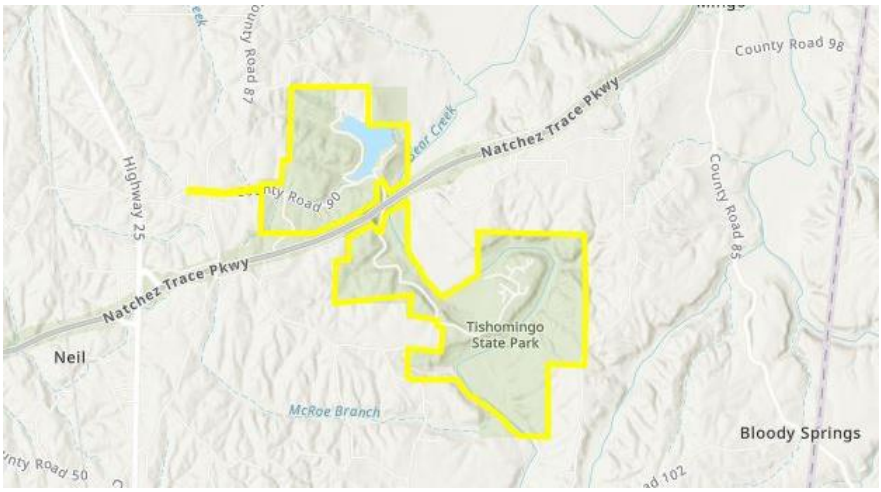


**Figure 4:** Map of Tishomingo State Park

Tishomingo State Park is a public recreation area located in Tishomingo County, Mississippi, at the foothills of the Appalachian Mountains. The park features striking natural attractions, including rock formations, waterfalls, and pedestrian bridges over Bear Creek (Figure 16)

This state park offers visitors a variety of activities such as canoeing, fishing, hiking, golfing, and camping. Additionally, the park includes 15 primitive camping sites, 2 primitive scout camps, 62 advanced RV camping sites, and 7 furnished cabins. This variety ensures a recreational and accommodation experience that caters to visitors with diverse preferences and needs.

**Figure 16:** Images from various recreational areas of Tishomingo State Park

The structures in the picnic areas are designed as single buildings with gable roofs and stone floors. These buildings are open on three sides and feature wooden beams and hand-carved support elements, which add to their distinctiveness (Figure 17). A stone fireplace and chimney are positioned at the centre of the eastern wall. The fireplace projection is topped with a saddle roof, completing the design.

This architectural style aligns aesthetically and functionally with the regional architectural character, offering both visual appeal and practicality.

**Figure 17:** A view from the Tishomingo State Park pavilion

## 4. DISCUSSION AND CONCLUSION

Bilgiç and Evren (2010) highlight the lack of an official method for evaluating transportation investments in Turkey. The study emphasises that evaluations based on insufficient data are unreliable and proposes the development of a simple, participatory, and transparent evaluation method in line with European Union practices. The applicability of a multi-criteria evaluation method to different types of investments is underscored as a significant step towards advancing Turkey's transportation policies.

Transportation infrastructure is a critical component underpinning economic activities. Investments in infrastructure have positive effects not only on industrial production but also indirectly on the service sector and social development. In this context, infrastructure plays a crucial role in achieving fundamental growth objectives such as urbanisation, industrialisation, and sustainable economic growth (Akgüngör and Kuştepeli, 2010). Alongside infrastructure investments, scenic routes also contribute to regional development by transforming their surroundings into social and cultural attractions, thereby providing economic benefits.

Scenic routes can be considered frameworks that enrich the environment and add symbolic layers of value connected to literary heritage. They also serve as tools for sustainable social and economic development by creating cultural routes and highlighting the values of cultural heritage (Sezen and Yılmaz, 2010; Karahan et al., 2024).

Kryeziu and Jaeger Klein (2019) examine the potential of historic trade routes in Kosovo and Albania to enhance rural tourism. Their study shows that these routes offer enriched experiences combining natural and cultural potentials, providing authentic experiences that cater to diverse tourist preferences. The study also explores how such routes could be developed through international collaborations.

Mississippi scenic routes demonstrate how historical elements and natural heritage can be planned in harmony with the environment while preserving their originality. These routes offer accessible recreational areas for visitors. Particularly, parks designed with materials and architecture compatible with nature by the National Park Service stand out. Rustic architecture dominates these recreational areas, creating unity with the natural landscape. Furthermore, the variety of recreational activities

provided ensures their appeal to visitors of all ages and expectations, contributing both economically and socially to the state.

Scenic routes should be designed within a sustainable framework to preserve historical, cultural, and natural resources while supporting economic development. For developing countries, such routes can be strategic tools for diversifying tourism and accelerating regional development. In Turkey, the development of a scenic route system can directly contribute to national development goals as well as strategies for combating and adapting to climate change.

The modernisation of transportation infrastructure is a fundamental priority for economic growth and social development in developing countries. In countries like Turkey, environmentally friendly and sustainable approaches should be adopted in the planning of transportation infrastructure. The Climate Change Adaptation Strategy and Action Plan (2024–2030) underscores the need to reduce the environmental impacts of the transportation sector and enhance its capacity for adaptation. Scenic routes can support these goals by contributing to the reduction of carbon emissions and providing a platform for integrating innovative transportation models.

The Twelfth Development Plan (2024–2028) identifies the development of sustainable tourism and environmentally friendly transportation systems as priorities. Turkey's geography, rich in historical and natural beauty, offers a strong foundation for scenic routes. Existing road networks in Turkey can be enriched with multifunctional corridors connecting cultural heritage routes and natural areas. Furthermore, the design of scenic routes should incorporate renewable energy-based technologies in line with the European Union's Green Deal policies on green transportation and carbon neutrality.

The economic contributions of scenic routes are particularly evident in rural areas through job creation and tourism diversification. As Kryeziu and Jaeger Klein's (2019) study shows, routes like historic trade paths contribute to rural development by offering authentic experiences. Developing similar routes in Turkey could strengthen tourism infrastructure in rural areas and help reduce regional inequalities

Scenic routes are significant not only for economic development but also for environmental sustainability. Turkey's Climate Change Mitigation

Strategy (2024–2030) emphasises the goals of increasing green spaces and environmental conservation. In this context, scenic routes can serve as strategic tools for preserving natural landscapes and supporting sustainable development.

In the process of developing scenic route projects in Turkey, the following elements should be considered:

- **Regional Planning and Coordination:** Planning scenic routes in alignment with regional development goals.
- **Green Transportation Models:** Establishing infrastructure for bicycle paths and electric vehicles.
- **Preservation of Cultural and Natural Heritage:** Encouraging sustainable tourism activities in these areas.
- **Community Engagement:** Involving local communities in projects and ensuring they derive economic benefits.

By implementing these recommendations, the development of scenic routes can contribute to both Turkey's development objectives and international climate change policies.

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# CHAPTER 13

## THE RELATIONSHIP BETWEEN PUBLIC ART AND LANDSCAPE ARCHITECTURE IN THE DIGITAL AGE; ANALYZING THE EXAMPLE OF IZMIR PROVINCE

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## INTRODUCTION

Today, as urban transformation accelerates, public spaces have become dynamic spaces that reflect the identities of societies and are at the centre of social interactions. Especially the impact of art and architecture disciplines on this transformation has become even more important with the introduction of digital technologies into our lives. The digital age can be defined as a period shaped by rapid advances in information and communication technologies, leading to radical changes in social, cultural and economic structures (Güleç and Savaşır, 2022; Gülgün et al., 2017).

The digital age has enabled art to find a wide place in public spaces, rather than being limited to closed spaces such as museums or galleries. Innovative methods such as digital screens, augmented reality (AR) applications, interactive art installations and projection mapping increase the visibility of art in the public spaces of cities. For example, interactive light shows organized in an urban square or information and culture sharing projects supported by digital screens strengthen individuals' connections to these spaces. Such practices allow public spaces to be redesigned as more accessible, participatory and multifaceted spaces. These possibilities brought about by the digital age have radically changed the presence and function of art in public space, offering the potential to transform it from static designs to dynamic experiences. Izmir stands out as one of the cities in Turkey where we can best observe this transformation. It is especially noteworthy for its historical texture, geographical location and cultural richness, while at the same time hosting contemporary art practices, innovative and flexible landscape designs (Image 1). In fact, the aim of this study is to examine the relationship between public art and landscape architecture in the digital age and to reveal the effects of this relationship on the urban fabric, social interaction and cultural identity by setting Izmir as a reference (Güleç and Savaşır, 2022; Gülgün et al., 2014; Akça and Ankaya, 2020).

**Figure 1:** Digital Installation in Urban Design (Alıcı and Bozkurt, 2023).

## 1.MATERIAL AND METHOD

The study first presents an overview of the development of digital technologies in the field of public art and landscape architecture, followed by a detailed examination of case studies in Izmir. Within the scope of this examination, the design of the selected projects, the technologies used, and their relationship with the urban fabric are emphasized. Furthermore, the evaluation of these applications in Izmir and their role in the formation of cultural identities of cities are discussed. The results of this study are intended to be an important resource for urban planners, architects, artists and municipal administrators and to inspire future public art projects. In the case of Izmir, this research aims to examine the relationship between public art and landscape architecture in the digital age and the role of public spaces in social interaction (Gülgün et al., 2018). Within the scope of the study, the spatial characteristics of artworks in certain public spaces of Izmir and their impact on users are analysed. In this section, the research area used in the process of conducting the research and the analysis process are detailed (Original, 2024).

**Figure 2:** Kordon Alsancak, Izmir (Original, 2024).

### 1.1. Research Area

Izmir is one of the most important cities in Turkey with its cultural richness, historical depth and innovative public art practices. In this context, the Konak- Alsancak Kordon areas of Izmir were selected as the research area (Image 2). These areas constitute an important place in the daily life of the people with their intense public use and socio-cultural diversity. These areas stand out as public spaces that reflect Izmir's urban identity, are used by local and international visitors, and have high social interactions (Güleç and Savaşır, 2022). The study analysed the contribution of various art forms, especially sculptures, monuments and digital art installations (Image 4), to the use value of these spaces. The Refik Anadol, "Earth Dreams: The Anatolia" exhibition is one of the most appropriate examples of this. It built a bridge between the past and the future of technology (Image 3).

**Figure 3:** Artificial intelligence hallucination and Refik Anadol Exhibition, İzmir. (Özer,2024).

### 1.2. Data Collection Methods

The research is based on qualitative data collection methods and uses observation, photography and field survey techniques to evaluate the effects of public art and landscape elements in Izmir on space and user experience. Public spaces were evaluated in terms of functionality, accessibility, spatial organization, aesthetics and user experiences (Orhan, 2021). In addition, the effects of public artworks such as encouraging social interactions, providing visual contribution to the space and increasing the duration of use were also discussed.

**Figure 4:** Izmir International Fair, as part of the 2021th Culture Summit, artist Refik Anadol's unique work Bosphorus (URL-2).

### 1.3. Analysis Process

The collected data was subjected to a detailed analysis process in order to understand the impact of public spaces in Izmir on user experiences. In this process, the interaction of artistic elements in public spaces with the space and their impact on user experiences were analysed. In the analysis process, physical and social factors that contribute to spatial quality were discussed, and concrete (sculptures, monuments) and abstract (digital art installations) art forms were evaluated in terms of social perception and spatial contribution. Through questionnaires and focus group discussions, especially for the young age group, the contribution of artworks to urban life and their aesthetic perceptions were investigated (Parlakkalay, 2020).

As a result, the contributions of public artworks in public spaces in Izmir to urban aesthetics, social interactions and user experience have been analysed. Original conclusions have been made about how Izmir's spaces equipped with public art respond to the needs of the digital age and how the relationship between landscape architecture and public art has evolved with the digitalization process. This study offers an academic perspective on how the relationship between public art and landscape architecture in İzmir redefines the social and aesthetic values of urban spaces in the digital age. The limitations of the study are that it focuses on a specific geographical region and is based on a literature review. The scope of the research may be limited depending on the keywords and databases selected. The flow diagram of the study is given in Figure-Image 5.

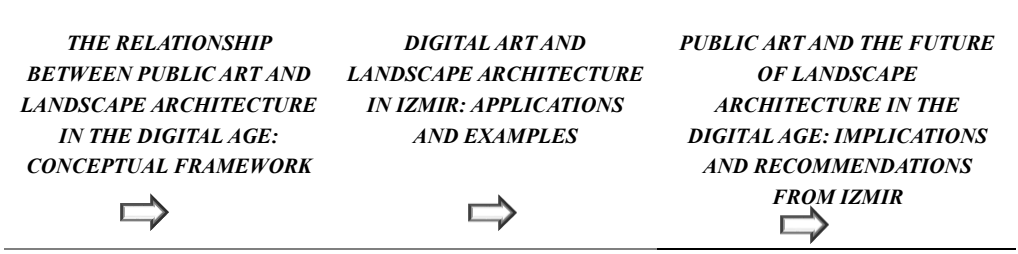


**Figure 5:** Flow diagram of the study (Original, 2024).

## 2. FINDINGS

### 2.1. Public Art and Landscape Architecture in the Digital Age: Conceptual Framework

The relationship between public art and landscape architecture in the digital age has deepened with the integration of technology into the daily lives of individuals by integrating art and space. While public art was limited to fixed sculptures and monuments in the past, with the development of digital technologies, it has transformed into interactive, participatory and innovative artworks that enrich spatial experiences. This transformation contributes to the redefinition of public spaces with a user-centred approach (Parlakkalay, 2020). For example, artworks equipped with digital projections, augmented reality and motion-sensing systems transcend the boundaries of space, allowing users to directly participate in the artworks and establish a stronger connection with the space. In the digital age, it is observed that art and architecture have gained a functionality that focuses not only on aesthetics but also on user experiences and social interaction. Thus, public artworks equipped with digital technologies blend with landscape architecture to transform urban spaces into meaningful and engaging spaces for individuals that encourage social interaction (Ada, Ceyhan, and Okun, 2022).

**Figure 6:** The Clock Tower in Izmir, illuminated with the digital artwork 'The Mastery of Time', 2024 (URL-1)

In this context, Izmir draws attention to digital art applications in its public spaces and landscape architecture workspaces (Image 6). While the

urban fabric and landscape architecture in Izmir are being reshaped in line with the innovative approaches brought by the digital age, the social functionality of these spaces is also increasing. In the digital age, the relationship between public art and landscape architecture has taken on a holistic design approach that allows individuals to become a part of the space, not just a visual experience. In this context, art applications supported by digital technologies in Izmir's public spaces provide important examples for the reinterpretation of urban identity through digital art (Çınar, Yirmibeşoğlu and Erdoğan 2024).

**Figure 7:** Izmir Kordon Digital Installation with Artificial Intelligence-ChatGPT (Original, 2024).

### 2.2. Digital Art and Landscape Architecture in Izmir: Applications and Examples

Digital art practices in the field of public art and landscape architecture in Izmir contribute to the spatial and social structure of the city by effectively utilizing the possibilities offered by the digital age. In particular, the widespread use of digital installations in İzmir's Konak Square has made this area one of the symbols of the city. The light plays and digital projection shows in Konak Square give the area a different atmosphere both day and night, enhancing the spatial aesthetics of the area and enriching the user experience. Such digital artworks provide an attractive experience for both locals and tourists, while contributing to the cultural identity of the city. Similarly, interactive sculptures located along the promenade give the area a unique visual character, especially

in the evening hours, and allow users to actively participate in the works (Uzun and Diktaş 2022). Especially on official/special occasions such as October 29, May 19, September 9 and November 10, these digital artworks were used more actively (Image 8). In this way, public spaces are becoming more than just aesthetic objects; they are becoming scenes of interaction that encourage the emotional and physical participation of users. In the Alsancak district, digital projection techniques and augmented reality applications offer the opportunity to experience art in a spatial dimension in public spaces and make an aesthetic contribution to the urban landscape (Original, 2024).

**Figure 8**: Izmir Clock Tower Special Digital Entelation for October 29th (Original, 2024).

İzmir Kültürpark is an important example for evaluating the multifaceted functionality of public spaces. In terms of functionality, it responds to the various needs of users by incorporating areas and activities that appeal to different age groups (Image 9). In terms of accessibility, its proximity to the city center and the arranged pedestrian paths ensure that users can easily reach the park. In terms of aesthetics, the park's historical texture and natural structure provide an important visual value that contributes to the urban fabric (Image 10). In terms of user experiences, various public artworks and landscape elements enhance the quality of time spent in the space and strengthen visitors' attachment to the space (Uzun and Diktaş, 2022).


**Figure 9:** Kültürpark Art Gallery (Izmir Art Website, 2024).

Digital art applications and contemporary public elements in Kültürpark add aesthetic and functional richness to the park. Technological elements such as digital screens, interactive light installations and projection systems give the space a different atmosphere, especially in the evening hours, extending the duration of the park's use. These digital elements not only create visual richness, but also encourage social interaction between users, strengthening the bond with the installation. By blending traditional landscape elements with advanced approaches of the digital age, Kültürpark offers a comprehensive model in terms of functionality, accessibility, aesthetics and user reviews. In this context, the digital art and general elements in the space have made Kültürpark an exemplary example of public space design and management (Original, 2024).

**Figure 10:** Izmir Kültürpark pool environment (IBB website, 2023).

### 2.3. Public Art in the Digital Age and the Future of Landscape Architecture: Implications and Suggestions from Izmir

This research, conducted in Izmir, shows that public art and landscape architecture in the digital age have an important role in reshaping social and aesthetic values in urban spaces. The integration of digital technologies into public art increases the interest of young age groups and visitors in art and creates an environment that encourages social interaction in urban spaces. In this context, the visual dynamism and participatory features provided by digital art reveal the functionality of art in Izmir's public spaces and its potential to strengthen the city's identity (Orhan, 2021).

In the future, with the increasing technological possibilities provided by the digital age, it is recommended that digital art and landscape architecture in Izmir be considered in an integrated approach to urban space design (Image 7). In this direction, it is important to use public artworks not only as aesthetic objects, but also as tools that increase interaction in public spaces and encourage people to think and explore. By giving more space to digital art in public space designs that reflect Izmir's cultural and artistic identity, these works can become an integral part of the urban landscape. In addition, the aspects of digital art that encourage social participation allow users to be more involved in artistic processes (Original, 2024).

Another suggestion for local governments and urban planners is to plan digital art projects in a way that supports sustainability in public spaces. Along with these projects, supporting projects that enhance spatial aesthetics in public spaces but are also compatible with the ecological values of the city can contribute to the sustainable development of Izmir's artistic identity in the digital age. These implications for Izmir provide guidelines for the relationship between public art and landscape architecture in the digital age and reveal that an innovative and user-oriented perspective should be adopted in future public space projects (Düzenli, Alpak and Tarakçı Eren, 2017).

## 3. DISCUSS

This research examines the relationship between public art and landscape architecture in the digital age and its contributions to urban aesthetics and social interaction in the case of Izmir. The findings show that with the integration of digital technologies into public art, public spaces in cities like Izmir have become more interactive and user centred. In this context, digital art applications in public spaces in Izmir offer a platform where individuals not only watch art, but also experience and interact with it (Bingölbali, 2023).

Digital projections and interactive sculptures observed in areas such as Konak, Kordon and Alsancak in Izmir contribute to the reshaping of public spaces as a social meeting point. By enabling individuals to interact directly with works of art, such practices allow public spaces to assume a role that encourages social interaction rather than simply providing aesthetic value. Furthermore, user observations and surveys conducted within the scope of the research revealed that such digital art installations attract more interest, especially from the young population. It has been observed that young users' interest in art is further enhanced by such digital artifacts. This shows that digital technologies enable the young age group to establish a closer relationship with art and deepen the user experience in public spaces. On the other hand, it can be said that the possibilities of the digital age have eroded the traditional boundaries between public art and landscape architecture, creating a new ground for interdisciplinary interaction. The examples of digital art in Izmir can be considered as successful reflections of this interaction. The contribution of digital art to the space is not only on an aesthetic level, but also enables people to connect with the space. Elements such as sculptures equipped

with digital projections offer the opportunity to experience the urban landscape from different angles and encourage the active participation of users. This allows landscape architecture to be reinterpreted not only as a physical arrangement but also as a tool that facilitates social interaction (Güleç and Savaşır, 2022). However, the sustainability and safety of digital art in public spaces also require attention. For example, the environmental impact of digital projections and the maintenance requirements of these artworks create additional responsibilities for local governments. In order to ensure the sustainability of such digital projects in Izmir, artworks in public spaces should aim to be ecologically and socially long-lasting. In this context, local governments should develop strategies to increase the sustainability of digital art in public spaces (Original, 2024).

Finally, the findings obtained in the case of İzmir show that the innovations brought by the digital age to public art and landscape architecture can also be examined in international cities. The strong relationship between digital art and landscape architecture observed in Izmir raises the question of how similar practices can be adapted in other cities. Izmir's public spaces, which have adapted to the requirements of the digital age, can serve as a model for other cities. Therefore, the results of this study are expected to provide guidance for landscape architects and public art designers in other cities (Orhan, 2021).

## 4. RESULTS

This research analyses the interaction between public art and landscape architecture in the digital age through the case of Izmir and reveals the transformative effects of digital technologies on the functionality and aesthetics of public spaces. It is concluded that artworks supported by digital technologies not only enrich urban aesthetics but also enhance social interaction and user experience. Digital projections, interactive sculptures and other digital installations in important public spaces such as Konak Centre, Kordon/Alsancak in Izmir enable individuals to establish a more intense connection to art and space and turn public spaces into living, dynamic spaces (Original, 2024).

The findings of the study show that the possibilities provided by the digital age eliminate the traditional boundaries between public art and

landscape architecture and offer a more participatory and experience-oriented space. Digital art practices in Izmir allow users to experience the space as an active participant rather than a mere spectator, contributing to the transformation of public spaces into attractive and meaningful spaces that strengthen social bonds. However, issues of sustainability and security of digital art are important to ensure the continuity of such projects in public spaces. In the case of Izmir, it is recommended to develop sustainable approaches, taking into account the maintenance requirements of digital artworks and their potential impact on the environment. Local governments should develop strategies to ensure that digital art projects are long-lasting and environmentally friendly, which will contribute to the sustainable preservation of the city's cultural and artistic identity in the future (Bingölbali, 2023).

In conclusion, this new understanding of art, shaped by the possibilities offered by the digital age, has reached a dimension that can be evaluated under the title of circulation in urban design processes. In this context, digital art practices not only offer an aesthetic contribution, but also assume a function that expands the boundaries of the landscape architecture discipline. It has the potential to reinterpret existing designs and produce new designs, especially by integrating periodic or year-round static designs into its own dynamic structure. This paves the way for innovative approaches and interdisciplinary interactions in the field of landscape architecture, making the contribution of the digital age to the spatial and cultural transformation of cities more visible.

These conclusions from the case of Izmir provide an important national and international model for how public art and landscape architecture can work together in harmony in the digital age. In this context, successful digital art practices in Izmir can serve as a guide for other cities. The study offers new perspectives on public art and landscape architecture in the digital age and presents innovative approaches for urban planners, architects, artists and local governments to consider in public art projects supported by digital technologies (Ada, Ceyhan, and Okun, 2022).

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# CHAPTER 14

## THE POTENTIAL OF SCENİC BYWAYS AS A REGIONAL DEVELOPMENT TOOL: THE CASE OF COLORADO SCENIC BYWAYS

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## INTRODUCTION

One of the important factors that form rural and urban landscapes is transportation lines. Highways are the engineering structures that have the most impact on the whole of nature in the desire of people to make urban and rural areas compatible with their own benefits and lifestyles. Highways, which provide the formation of a system on their own throughout the world, should be both a planning element that divides the landscape in which it is located and provide a structure that integrates with the landscape. With the ever-changing conditions of urban life, especially in the last half century, the increase in automobile ownership and innovations in road techniques have led to increased mobility (Öztürk, 2002).

Roads are among the most important landscape elements that provide the relationship between nature and people. People have the ability to see and recognize nature and nature gains value within the scope of human access. However, highways have the most unfavorable effect among man-made structures (Bilican, 1995). While highways and highways with their current changing structure continue their traditional role of providing transportation between people on the one hand, on the other hand, they are evolving within the framework of both functional and aesthetic concerns within the scope of science and technology that are developing day by day. In the first planning and implementation of highways in the traditional sense, it was aimed to provide transportation function only for the users, and the natural, historical and cultural environmental values that it passes over or through were ignored. With a more analytical approach, it could not be predicted that human beings would be isolated from this lost world of values (Karahan, 2003).

Road networks have interacted intensively with rural areas throughout history. In the process, road systems have altered the flow systems of rivers, fragmented habitats, restricted wildlife movement, and changed landscape characteristics by dispersing large numbers of exotic plant species over large areas. Nevertheless, some highway-rural landscape interactions have also had positive effects on the enjoyable perception and observation of the landscape (Karahan, 2003). Worldwide, studies on highway landscape planning emerged in the 1930s. The aim of the emergence of the subject was to ensure the relationship between the highway and the environment. The relationship between the environment and the highway was expressed as the view of the

highway from the neighboring landscape area, and over time, the studies started to cover the view of the landscape areas from the highway.

Landscapes that embody diversity and harmony have great potential for strong landscape values. The existing landscape character of a region can be related to the aesthetic image of the landscape in which it is located. Landscape attractiveness is important for landscape integrity. The assessment of the landscape attractiveness of a landscape area is determined by the vegetation condition, water elements and existing land topography. Natural elements and environmental factors reveal landscape attractiveness (Caf and Yılmaz, 2024). The fact that people's long-distance highway journeys are more pleasant and peaceful is directly proportional to how high the visual quality of the highway they use and the landscape around it is. Land topography, landscape elements, vegetation structure, presence of water elements and socio-cultural structure significantly affect the landscape on and around highways (Sezen, 2018).

In order for a highway to be considered as a scenic road, there must be surprises that can impress people traveling along the road. Geological formations with different structures, sudden elevation differences in topography, cliff edges and rocky areas, canyons and natural waterfalls, plains and plains, a wide range of vegetation with a collage of colors, gloomy forested areas, peaceful water surfaces, rural landscapes, streams running parallel to the road bends and natural areas with remarkable beauty should be encountered along the road (Sezen, 2018). In the evaluation of highway landscape features; criteria such as natural and cultural characteristics of the routes, vegetation structure, historical values, land use status, geographical structure, socio-economic structure, comfortable and pleasant driving for users, presence of interesting signage elements, concealment of bad views on the road, tourism and recreation potential, traffic safety, visual diversity, land topography and landscape harmony are taken into consideration (Sezen and Yılmaz, 2010).

Effective landscape design approaches for scenic highways are those that enhance positive scenic values and reduce negative scenic values. These values are often determined through surveys involving highway users, local residents and visual resource planners. Positive landscape values are defined as vegetation, landscape value, road features, topography, water bodies,

cultural and man-made structures. Negative landscape values are defined as landscape scars and blotches, unkempt development, conflicting land uses, inappropriate signage, and fragmented buildings (Bywoys, 1990).

The aim of this study is to examine the physical, social and economic importance of scenic roads and to reveal the potential for utilization within the scope of regional development. The scope of the study conceptually includes the principles of scenic roads, the role of scenic roads in regional development, and the use of scenic roads as a regional development tool. In this context, the scope of the study consists of scenic roads in the state of Colorado.

## 1. THE CONCEPT OF LANDSCAPE PATHS

Scenic roads are a safe, aesthetically pleasing and traffic-limited type of road planned or constructed in a landscape of unique natural beauty. It is a one- or two-lane road that is largely used for pleasure purposes and accommodates a small amount of commercial or transit traffic, and is usually built to different standards depending on the topography, type and intensity of traffic, and design speed (Seçkin, 1997).

Scenic roads should have high aesthetic value and cultural value. They should continue across the landscape and offer pleasant strolls and scenic views for passengers in vehicles. On the other hand, they should provide opportunities for users to relax with options such as viewing areas and vistas on the roadside and provide access to areas on the sides of the road corridors for recreational activities such as camping and picnics. Side roads should connect to these roads from main highways or other transportation facilities. Depending on the unique beauty potential of the natural structure, these roads can be traveled in different durations and distances, and a travel time of 2-4 hours is considered sufficient (Karahan, 2003).

While the main purpose of planning scenic roads is recreation, it is not possible to completely block them for commercial transportation. However, there are road standards and laws that include the rules to be applied in the location, design and use of arrangements such as gas stations, entertainment areas, accommodation facilities and recreation areas along the road, and the location of signs and boards and the determination of the areas they will cover (Başal, 1979).

The pleasure and confidence of driving and viewing scenic roads depends on the road as a whole, without sudden and dangerous curves. The road should allow the driver to recognize changes ahead. A sudden change in harmony disrupts the rhythm. This inner harmony or rhythm is expressed by continuity or three-dimensional coordination and the composition of landscapes that follow one another in motion (Karahan, 2003).

The concept of a tourism route or scenic road is not a new phenomenon. It was initiated in the early years of the twentieth century with the growth of pleasure motorized vehicles and car-based tourism (Denstadli and Jacobsen, 2011). Since the beginning of the 1900s, when the United States switched to motorized transportation, the importance and number of scenic roads and parkways has increased in the country. The first scenic roads were not the result of any plan, project, or organized coordinated program. In this sense, with few exceptions, no organized action plan for scenic roads was adopted in the first half of this century. Instead, these travel corridors were developed in a piecemeal manner. It was not until the 1960s that a coordinated national scenic program effort began to develop.

It cannot be said that any state or region was the first to provide a scenic road or causeway. In the early part of this century, many important projects were designed and built almost simultaneously, drawing on experience, experimentation and various technologies. The need for scenic byway planning has been expressed for a number of reasons, including the fact that driving for recreational and pleasure purposes is one of America's most popular outdoor recreation activities; the rapidly growing number of families who own automobiles and have a desire to see and enjoy America's natural beauty; rapid urban growth and development increasing the need for open space resources for outdoor recreation; the significant economic benefits that attractive roads and parkways generate through tourism and sightseeing; and the large potential gains in aesthetic and recreational benefits known to be associated with future road planning, design, and construction activities (URL-4).

In the USA, with the “Highway Beautification Act” in 1965 and the “Parkway and Scenic Byways Program” in 1966, aesthetic structure became important in addition to commercial and economic criteria in determining the highway corridor. Within this process, the understanding that highways

should be evaluated in terms of recreation and tourism in addition to their transportation function has been on the agenda (Anonymous, 1979; Caf and Yılmaz, 2024).

In Turkey, the first approach to the relationship between scenic road or scenic corridor and tourism was the planning of the coastal road between Foça and Yeni Foça. This study was carried out with the planning approach of Iller Bank's Zoning Planning Department, the financial support of the Ministry of Tourism and the sanctions of the General Directorate of Highways (Başal, 1979; Karahan, 2003).

The Scenic Byway is an important public investment that affects land use and land value and determines the economic structure of the population within its coverage area. The cost of acquiring land and creating a scenic opportunity is significant, but it is only part of the overall land decision. For a scenic route, the corridor that generates the most social benefits at the lowest cost is usually the most realistic option (Karahan, 2003). The location, design and construction of roads have a significant impact on the quality of the landscape as well as the safety of the roads. For roads with views at the edge, good design practices can make the difference between a road being quite ordinary and having a high scenic value (Bywoys, 1990).

Scenically important landscapes do not only benefit the individual who experiences them. They make an important contribution to the overall desirability of an area and can therefore be associated with wider economic benefits for a region (Zube, 1980; Clay and Daniel, 2000). Some observers say that the world's best hope for securing sustainability in travel and tourism is 'destination tourism'. The term refers to an attempt to bring together a variety of activities and attractions under a unified theme, thereby stimulating entrepreneurial opportunity through the development of ancillary products and services. Route tourism is therefore a market-oriented approach to tourism destination development. In essence, route tourism means linking a series of points of interest to promote local tourism by encouraging visitors to travel from one place to another. Routes vary considerably in length and scale (local, regional or international) and attract different types and numbers of tourists. Routes offer opportunities to create local development partnerships (Lourens, 2007).

## 2. THE CONCEPT OF REGIONAL DEVELOPMENT AND THE EFFECTS OF SCENIC BYWAYS

The development power and development levels of the regions also support the development of the national economy. Organizing development policies and making them applicable is the most important condition for ensuring development. In order to ensure regional development, different regional policies are targeted within the potential of each region. The main principles of regional policy are to ensure equal and efficient use of economic resources, to consume state resources in a correct and systematic manner, to minimize the differences in regional development levels and unequal conditions (İzgi, 2007).

By bringing a social dimension to outdoor recreation, scenic byway planning is becoming increasingly popular in planning and design disciplines. Linehan et al. (1995) theorize that scenic byway planning provides a theoretical framework that protects and promotes biodiversity values in a regional context (Karahan, 2003).

Although protecting environmental and natural values while promoting economic development may seem like an unattainable dilemma, they should in fact be mutual and supportive. Scenic byways should be protected and enhanced not only for their natural values but also for their potential for tourism, one of the country's largest growth industries (Bywoys, 1990).

For many people, being on the move can be considered a promise of happiness or happiness itself. “Traveling with hope is better than arriving” is the attitude of seeing travel as movement. Moreover, it has been shown that transportation facilities can both support the operation and development of attractions and also serve as attractions in their own right, such as scenic roads (Jacobsen, 1999).

Tourism routes and especially scenic routes are vital for tourism-related trade. This is true not only in the surrounding regions where most of these routes are located, but also nationally, as quality routes are assumed to be important attractions for international and out-of-region visitors as well as regional travelers (Denstadli and Jacobsen, 2011). Scenic routes are routes that combine natural and cultural values and have historical and aesthetic significance. These roads are used not only for transportation purposes but also for historical, cultural and commercial purposes.

Scenic roads constitute an important basis for the protection and development of cultural heritage with their features of being areas that host cultural landscape and natural richness, have aesthetic value, contribute to sustainable tourism, reflect the regional and cultural structure of the place where they are located, and contribute to establishing a connection with the historical past.

## 3. EXAMPLE OF COLORADO SCENIC BYWAYS

Colorado is the highest-altitude state in the United States and is located in the mid-western region. It is the eighth largest state in the United States, bordering much of the Southern Rock Mountains, much of the Colorado Plateau and the western part of the Great Plains Plain. Due to its interesting geography, Colorado is a state with microclimates in many parts. In the state, which also witnesses extreme weather conditions from time to time, the highest temperature seen so far has been 48 degrees and the lowest temperature has been -52 degrees (URL-1).

Numerous National Forests and parts of the Rocky Mountains are located in the state. It has 2 famous ski resorts, Apsen and Vail, which have winter tourism potential and offer nature excursions in the summer. The state has a wide range of tourism potential with its mountainous areas, valleys, forests and open spaces and offers many accommodation opportunities (URL-2).

Automobile travel has been a popular leisure activity in the US since the introduction of the automobile at the turn of the century. The development and designation of scenic roads that enrich the experience has a similarly long history. But the US lacks a comprehensive federal scenic byway program. This has resulted in a mishmash of federal, state, local and private scenic byway designations. Historically, the designation of scenic roads has been based on rules set by engineering and design professionals. Only recently has tourism become an important element of scenic road design (Lew, 1991).

The first officially designated scenic byways in America were created in Massachusetts in 1910. Ten years later, Arkansas and Mississippi joined the movement. More recently, California, Colorado, New York, Washington and Wisconsin have recognized their own special scenic roads. The 1965 Act

was passed to improve the appearance of all highways in America (Forbes, 2021).

In Colorado, beautiful scenery is inevitable; it's the history that makes the byways unique, and that's why the routes are officially called Scenic and Historic Byways. But there's much more behind the scenic byway designation than just the name. The Colorado Scenic and Historic Byways Program, one of the oldest official programs in the country, was established in March 1989. The program provides the people of Colorado and visitors with the naming, interpretation and preservation, infrastructure development and promotion of an outstanding tour system. It is also a grassroots program. Routes are designated by local communities and approved by a commission appointed by the governor, but managed at the local level. There are currently 25 designated Scenic and Historic Byways in the state, totaling 2,524 miles. Ten of these byways are also part of a collection known as America's Byways, designated by the U.S. Department of Transportation as All American Roads or National Scenic Byways. The routes range from paved two-lane state highways to gravel county roads to four-wheel drive-only dirt roads. All of Colorado's designated scenic byways are marked with prominent signs depicting clematis (the state flower) to identify and commemorate the special status of the route. Nationally designated byways also feature the America's Byways logo on their signage. Colorado's scenic byways are marked with distinctive signs to indicate and commemorate the road's special status (Pearce, 2007). Colorado is home to 26 scenic byways, including 13 national scenic byways and 13 state scenic byways (Figure 1; Figure 2).

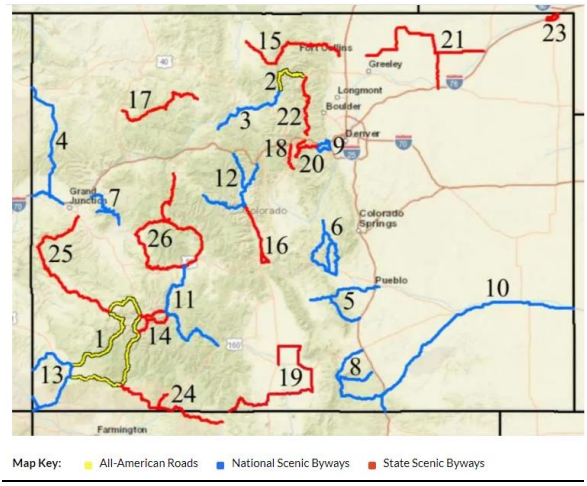


**Figure 1:** Colorado Scenic Byways (URL-5)


**Figure 2:** Upper Colorado River Scenic Byway (U-128) Satellite Image (Google Earth)

Utah State Route 128 (U-128) is a 44.6-mile (71.7 km) long state highway north of Moab. The entire length of the highway is designated as the Upper Colorado River Scenic Byway as part of the Utah Scenic Byways program (Figure 3; Figure 4). It is also part of the Dinosaur Diamond Prehistoric Highway, a National Scenic Byway.

This route along the Colorado River gorge begins at the Colorado River Bridge at the northern end of Moab. The route features the sixth longest natural rock span in the United States, world-famous movie locations, beautiful picnic and rock climbing areas, the Film Heritage Museum, a wide variety of hiking trails including a trail to Fisher Towers, points of historical

interest, guided horseback riding opportunities, outdoor dining and a ghost town.

**Figure 3:** Some views from the Upper Colorado River Scenic Byway (U-128) (URL-6)


**Figure 4:** Map of the Upper Colorado River Scenic Byway route (U-128) (URL-7)

The highway was originally built to connect rural towns in eastern Utah with the region's largest city, Grand Junction in Colorado. Part of the highway was incorporated into the Utah state highway system in 1931, while the rest was taken over by the state. Today the highway is used as a scenic route for visitors to the region.

The highway crosses the Colorado River at the site of the Dewey Bridge, which is listed on the National Register of Historic Places. This bridge was Utah's longest suspension bridge until it was destroyed in a fire in April 2008 (URL-3).

Colorado's scenic byways offer a combination of the region's historical and natural richness. Historic towns, old mining sites, indigenous cultural landscapes and natural landscapes along the trails provide an opportunity to recognize the cultural past of the region. Scenic Byways also contribute to Colorado's sustainable tourism potential. The tourism value chain generated in the areas traveled along the scenic byways contributes to the local economy.

## 4. CONTRIBUTION OF COLORADO SCENIC BYWAYS TO REGIONAL DEVELOPMENT

The travel industry directly impacts 171,000 Colorado jobs and $6.3 billion in wages. Grants from the Colorado National Scenic Byways Program from 1991 to 2012 totaled $17,945,194. A 2016 economic analysis of the state's economy found that from 2009 to 2014, cumulative visitor spending traveling on the byways totaled approximately $4.8 billion. These economic impacts show that byways are an extremely popular tourist attraction and contribute to regional and state economic development (URL-5).

According to National Travel Center research, the economic impact of Colorado's scenic byways is $314,000 per mile per year (Forbes, 2021).

Scenic routes enable local people to benefit from tourism and cultural activities. Small businesses, souvenir shops and handicraft vendors along the route contribute to the economic gain of local people. Events and festivals organized on these routes at different times not only engage local people but also make the route more interesting for tourists. Scenic routes bring together different communities in the region and encourage social inclusion. Guided tours, ecotourism activities and nature walks provide opportunities to learn about regional natural resources and ecosystems. This has also contributed to

raising cultural awareness. By taking part in these activities, local people can support sustainability and the protection of cultural heritage.

Created in 1991 by Congress, the National Scenic Byways Program recognizes historically, scenically and culturally significant byways, all of which promote economic development and tourism in communities around the United States. There are more than 1,200 byways in all 50 states. All scenic byways meet one or more of six criteria: scenic, historic, recreational, cultural, archaeological or natural.

For a road to be designated as a national scenic byway, it must first be designated as a state, tribal or federal agency scenic byway. After achieving this, a road can apply for national scenic byway designation, but its intrinsic quality must be of regional significance. Scenic byways in the United States are the best of the national scenic byways, demonstrating at least two key qualities of national significance.

Colorado byways provide access to some of the state's most spectacular public lands, including four national parks, 36 state parks, 13 national recreational trails, eight national forests and eight national monuments (URL-5).

## 5. CONCLUSION AND SUGGESTIONS

In addition to their social and environmental benefits, Colorado Scenic Byways also contribute to the economy of the region. Scenic byways create job opportunities for local people and offer visitors the opportunity to explore the natural and cultural heritage of the region. This contributes to sustainable regional development.

Scenic routes in Colorado have the potential to provide access to areas of tourist and natural beauty. This encourages tourists to visit the region. This in turn generates economic benefits from the tourism value chain. It provides employment opportunities for the local workforce. It offers an environmentally friendly tourism model by taking measures to protect natural areas. It offers the opportunity to promote and protect the cultural heritage of the region.

Scenic roads are routes with high aesthetic value, natural beauties, local cultures and historical monuments. These roads are an important attraction center for both local people and tourists. Scenic routes provide economic

potential by contributing to the tourism value chain as well as physical function and social value to the region.

Natural beauty, natural elements such as mountains, valleys, lakes, forests and topography should be taken into account when determining the route of the scenic route. Cultural heritage, local traditions and historical buildings are also important factors that enrich the route. For this reason, the protection and sustainability of the cultural heritage on the route is important. Planning should be done in harmony with local fauna and flora, and roads that do not destroy the environment and do not harm biodiversity should be preferred. In addition, scenic roads should be safe, comfortable and sustainable. Factors such as road width, curves, slopes, pedestrian paths and parking areas should be taken into consideration. Scenic routes should be accessible to all individuals, and design and planning should take into account the needs of people with disabilities. There should be information signs, directional signs and boards at some points of the scenic routes. When planning scenic routes, emphasis should be placed on the use of environmentally friendly materials and the natural environment should not be degraded. Appropriate vegetation should be planted to prevent erosion and landslides on scenic roads in mountainous areas. Landscape elements such as garbage bins, lighting elements, seating and resting areas should be included on the roadsides.

Scenic routes should be designed to attract both local people and tourists. In this way, sustainable tourism can be promoted and regional and economic development can be achieved. The active involvement of local people along the scenic route can provide new employment opportunities and economic opportunities for local residents. Sales of local products along the route can both promote the region and the income earned from sales has the potential to provide economic benefits for regional development. Preserving and incorporating local culture, traditions and lifestyles is both important for local people and attractive to tourists.

Scenic byway planning requires an interdisciplinary approach that includes not only aesthetic but also environmental, cultural and economic factors. As different geographical regions of Turkey have diverse climates, vegetation and cultural backgrounds, it is important to develop solutions specific to each region.

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# CHAPTER 15

## COMPUTER-AIDED PROGRAMMING MODELS USED IN PLANT DESIGN

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## INTRODUCTION

Plant design (PD) in landscape architecture plays a role in balancing aesthetic, ecological and functional elements. The use of plants not only supports aesthetic function but also brings ecological functions such as environmental sustainability, biodiversity and microclimate management. As a result of environmental analyses, the selection and strategic placement of appropriate plant species provides many environmental benefits such as preventing soil erosion in sloping areas, water management, improving air quality and carbon absorption (Kaçmaz, 2021). PD is a creative process that requires creativity and experience and is an important element that determines the identity of the space (Yazici et al., 2018; Duran and Güneş Gölbey, 2022; Tokmak et al., 2019); it directly affects the character of the public open space, residential garden or urban areas and the quality of the experience it offers to users (Kirkpatrick, 1992). The compatibility of the formal and functional characteristics of plants with topography and their relationship with seasonal changes should not be ignored (Gülgün et al., 2013). In this context, it is essential to understand the genetic basis of plant characteristics and to group plants for spatial improvement (Gülgün Aslan and Yazici, 2016; Ak and Güneş Gölbey, 2021).

**Figure 1:** Piet Oudolf's Rotterdam paradise, Walter Herfst (Stathaki, 2022)

Following the planning and design processes, it also meets the aesthetic and psychological needs of users by supporting ecological balances by selecting

plant species suitable for local climate and ecosystem conditions. At the same time, PD allows urbanites to re-establish their connections with nature with the increasing concretisation in cities today (Fig.2). Therefore, PD in landscape architecture discipline is a versatile discipline that both protects nature and offers aesthetic and functional areas (Gülgün et al., 2014).

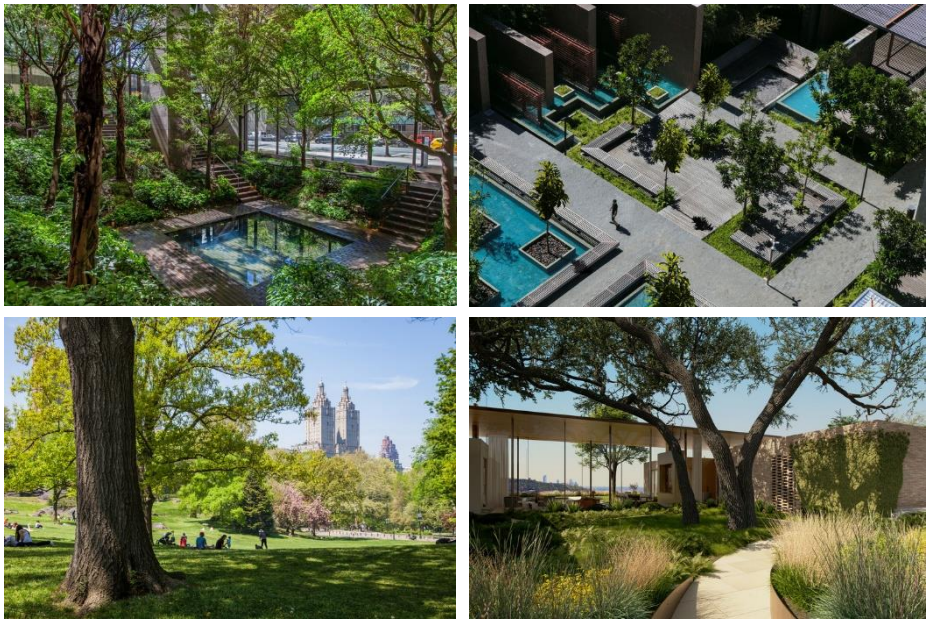

**Figure 2:** Examples of PD in modern gardens and urban green areas (URL1)

PD is an important building block that shapes the relationship between natural and artificial environment. The importance of PD in contemporary design processes is increasing and becoming increasingly complex (Yazici and Gülgün Aslan, 2017).

In this process, designers need to support aesthetic and ecological balance. For this reason, PD is not only limited to the selection of plant species, but also many factors such as topography, water management, microclimate The design of a plant is a complex process that also involves the designer. In recent years, computer-based modelling techniques have gained great importance in order to manage this complexity, and the software used in

different stages of PD accelerates the processes and provides more flexibility to the designer.

## 1. PLANT DESIGN

The role of landscape architecture in the planning, design and management of physical spaces including natural and built environments is critical for the creation of environmental quality (Birişçi et al., 2012; Anthony et al., 2019). In this context, certain basic concepts should be emphasised as a conceptual framework in the PD process**.**

It is one of the issues on the agenda to give more space to green areas that integrate nature and urban areas at every opportunity by integrating the evaluation and protection of natural resources (Gülgün et al., 2015). Today, rapidly progressing urbanisation makes daily life more and more difficult with its destructive effects and puts the built environment under pressure for people to survive (Atıl et al., 2005). Within the framework of PD, green area, facade, surface alternatives, ecological and aesthetic green tissue alternatives produced recently offer the herbal design alternatives we need in cities.

PD is the process of arranging plants in natural and built environments in an aesthetic, functional and ecological integrity (Yazıcı, 2017). Elements such as the organisation of open spaces in cities, green roofs, vertical gardens, indoor plants are the intersection points of architecture and PD (Kaylı and Güneş Gölbey, 2020) (Fig. 3). Today, recreation, developed in conjunction with plant design, provides spaces for urban dwellers living fast and busy lives, and short-term opportunities for citizens living in the dynamics of urban life to regain their physical and psychological health (Altuğ Turan et al., 2023). In other words, designs that follow the concepts we integrate plant design into our daily lives help users improve their quality of life (Karcı Demirkol and Kalaycı Önaç, 2024).

**Figure 3:** Example of green wall and green roof (URL2, 3)

Urban air temperature is higher than the surrounding rural landscape in the formation of urban heat island, the magnitude of temperature differences; local weather conditions, location and urban characteristics vary in temporal and spatial context (Kaçmaz Adıgüzel and Küçükerbaş, 2018). Studies on national – regional – urban and micro scale to reduce the effect of this heat island are reported with clearer and more concrete results with digitalisation.

Plants provide an aesthetic experience to the users of the space, while also providing functional benefits such as climate control (shading, temperature regulation), improving air quality and water management (Aşur and Yazıcı, 2018). In addition, plants used in the facade designs of buildings soften the harsh and artificial appearance of the buildings, creating a more harmonious image with the natural environment (Altuğ and Malkoç True, 2021).

## 2. COMPUTER AIDED DESIGN IN LANDSCAPE ARCHITECTURE: SOFTWARE AND APPLICATIONS

Software and programmes, which are included in every aspect of our daily lives, also play an important role in the professional discipline of landscape architecture. The rapid development of digital technologies has changed traditional design and presentation methods, making computer-aided drawing, planning and design more widespread (Bingöl et al., 2020). Three-dimensional modelling, animation and photorealistic presentations with digital

technologies add visual richness to projects and make presentations more impressive and understandable.

**Table 1:** Benefits of computer aided design programmes (Updated from Bingöl et al., 2020)

| | |
|---|---|
| -Possibility of precise operation,<br>-Time saving,<br>-To produce different designs,<br>-Different colours, fast printout with scale,<br>-Ease of analysis,<br>-To be able to model,<br>-Photorealistic image taking,<br>-To be able to make animations,<br>-Providing material diversity and light effect,<br>-To be able to calculate cost<br>-Virtual reality,<br>-Ease of revision,<br>-To be able to share in digital environment,<br>-Easy transport and archiving of data,<br>-Low cost,<br>-To be able to work independently,<br>-To be able to produce with 3D printers,<br>-Fast and accurate drawing,<br>-Drawings can be easily updated,<br>-Possibility of three-dimensional modelling,<br>-Improving the quality of presentation,<br>-Create interactive simulations, | -Detailed visualisation of designs,<br>-Fast switching at different scales,<br>-Easy sharing of designs,<br>-Reducing the probability of making mistakes,<br>-Rapid generation of different design alternatives,<br>-Animation of projects with renderings and animations,<br>-Technical drawings are made in accordance with the standards,<br>-Ease of data storage in digital environment,<br>Facilitate co-operation in complex projects,<br>-Ability to obtain high resolution visual outputs,<br>-Saving time in the design process,<br>-Easy archiving and organisation of drawings,<br>-Ease of integration into the production and application process,<br>-Facilitating the learning of the design process. |

### 3.1. Virtual Augmented Reality

Virtual and augmented reality technologies offer innovations in herbal design, making design processes more interactive and efficient. At the same time, animation and 3D computer design programs are the basic tools of modern cinema technologies, which change the way visual aesthetics appear and tell stories more understandable with augmented reality (Kabadayı, 2018).

Virtual reality allows users to experience plant growth in a fully digital world and experience the space before applying it in landscape designs, while augmented reality integrates digital information into the physical world, supporting real-time visualisation of how plants will be placed and grow in existing spaces (Song and Huang, 2017) (Fig. 4).

**Figure 4:** Augmented reality application for landscape designers (URL4)

These advances in technology enable landscape architects to better test their designs and to anticipate the future growth stages of plants and their effects on the site (Lammeren et al., 2002). For example, virtual environments can be created to simulate how plants will respond to topography, light and water conditions, so that more informed and sustainable decisions can be made during the design process. In addition, data such as plant species, growth rates, seasonal changes and maintenance requirements can be visually presented and dynamically monitored through these technologies. Using this data, designers develop realistic and scientifically based solutions in landscape designs (Uzun and Gül, 2017). Thanks to augmented reality, users can see how plants will be integrated into their real environment through their phones or tablets, and experience different plant placements by walking around the space (Hill et al., 2019). It provides a more participatory and effective process for both designers and customers. As a result, virtual and augmented reality technologies stand out

as innovative tools that advance visualisation, interaction and decision-making processes in PD

### 3.2. 2D and 3D Visualisation Programs

3D modelling programmes used in architecture and landscape architecture play an important role in various stages of the design process (Aydoğan, 2006). These software are used for visualisation, simulation and analysis of projects (Kotnik, 2010; Topçu, 2012).

#### 3.2.1. Autodesk AutoCAD

It is one of the most widely used software in architecture and landscape architecture. It offers tools for creating 2D and 3D designs (Silver, 2006) (Fig. 5).


**Figure 5:** Plan and section examples on PD in AutoCAD (URL5, 6)

Detailed drawings are also used to create CAD-based projects, manage large data files, and detail landscape projects such as plant layouts, irrigation systems and topographic arrangements (More et al., 2023).

#### 3.2.2. SketchUp

With its simple and understandable interface, it is an ideal modelling program for both architects and landscape architects. It is popular for quick concept designs and preliminary visualisations. It is a flexible tool that is quite suitable for beginners in 3D modelling (Lallawmzuali, 2023). In PD , it is used for rapid modelling of spaces and structures and for visualisations that can be presented (Fig.6).

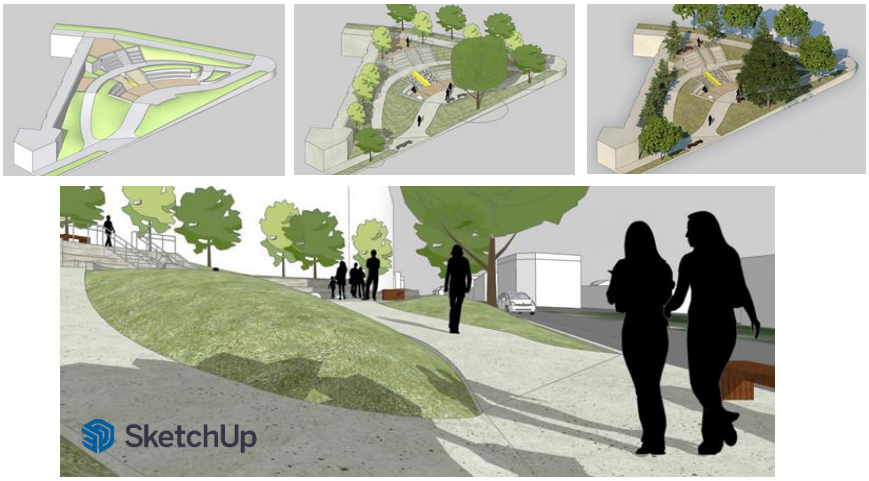


**Figure 6:** Example of 3D modelling on PD in SketchUp (URL7)

### 3.2.3. Lumion

It is used for fast visualisation and rendering. It is suitable for animations and real-time presentations of projects in architecture and landscape architecture (Cardoso, 2014). It enriches your designs with realistic textures, lighting and environmental effects (Fig. 7). It visualises designs by presenting plant , water effects and other landscape elements in a realistic way.


**Figure 7:** Example of 3D modelling on PD in Lumion (URL8)

### 3.2.4. V-Ray (Render)

It allows users to create photorealistic renderings using programmes such as 3Ds Max. It is used for detailed and realistic visualisations in architecture and landscape projects (Song and Huang, 2018). By realistically simulating lighting, material and environmental interactions, it provides a natural and realistic appearance of the designs (Fig. 8).

**Figure 8:** Example of 3D modelling on PD in V-Ray (URL9)

### 3.2.5. Blender

It is used for 3D modelling, animation and visualisation. It is a powerful tool for creating detailed models and presentations in landscape and architectural projects (Nijhuis and Stelingwerff, 2011). It stands out with its high-resolution modelling, rendering and animation capabilities. It is an ideal choice for creating realistic visuals of plants and landscape elements (Fig. 9).


**Figure 9:** Example of 3D modelling on PD in Blender (URL10)

### 3.2.6. Adobe Photoshop

In architectural projects, it is used to reflect the atmosphere of the space and PD by adding landscape elements and lighting effects (Manovich, 2013). Photoshop programme is an image editor where we can shape the rendering results (Olgun and Yılmaz, 2014).

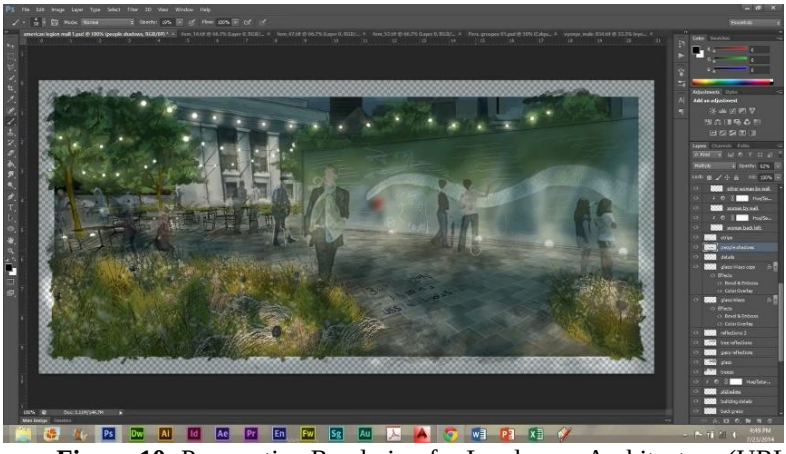

**Figure 10:** Perspective Rendering for Landscape Architecture (URL11)

In landscape designs, it is possible to obtain the desired results by editing the render results obtained from three-dimensional software in

photoshop, a pixel-based software (Özdemir, 2022). In addition, architects can make their designs look user-friendly, vivid and realistic by adding human figures, nature elements and various textures to the project areas (Fig.10). Thanks to the programme's layer structure and wide range of brush options, details can be enriched by going over the drawings, renderings can be improved and project-specific textures can be easily added.

### 3.2.7. Vectorworks Landmark

2D and 3D drawing programme for landscape architecture projects. Plant placement and environmental analysis can be done in landscape designs. In addition, it offers special solutions for landscape projects with plant database, irrigation systems and terrain modelling tools.

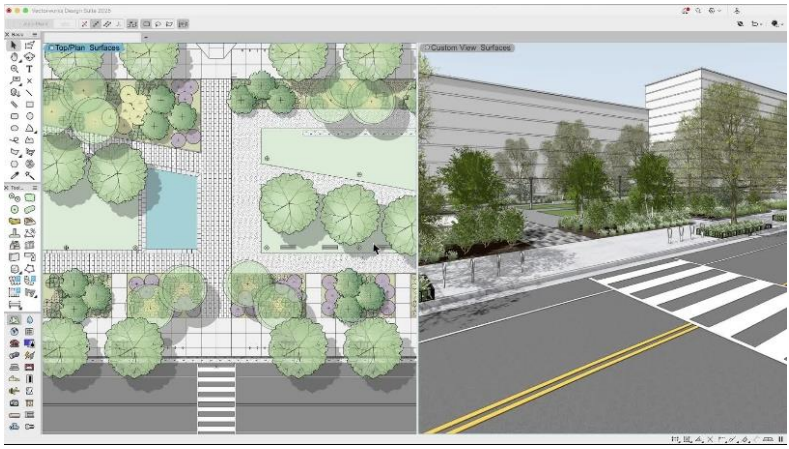


**Figure 11:** 3D Landscape Design Software Vectorworks Design Suite (URL12)

### 3.2.8. Rhinoceros 3D

It is used for complex surface modelling and the creation of organic shapes. In landscape architecture, it is especially suitable for creating unique form, construction and detail projects. Rhino is a powerful tool for simulating complex landscape designs and natural forms with its parametric modelling capabilities and extensive plug-in support (Ashari et al, 2022). It is especially used in topographic analyses of the landscape.

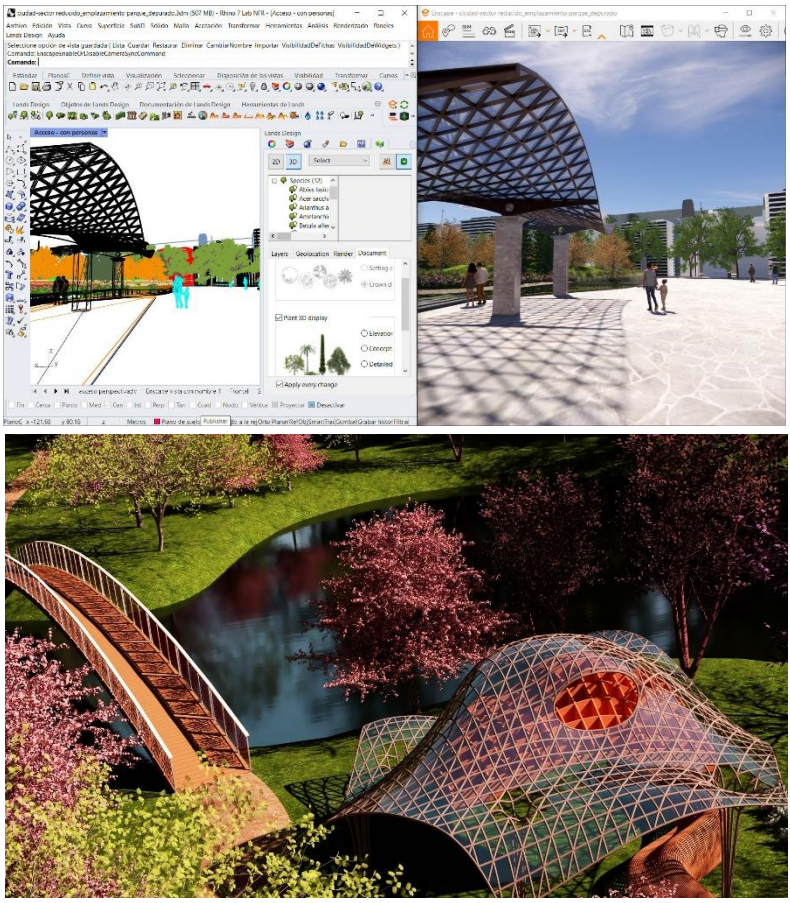

**Figure 12:** Rhino for Landscape Design (URL13)

### 3.2.9. Autodesk 3Ds Max

It offers advanced features in 3D modelling and animation. It is preferred for creating high quality visualisations and animations in architectural projects. Thanks to this programme, high quality renderings, architectural elements and landscape arrangements can be presented in detail. It is often preferred for presentations of large projects (Jiang and Zhang, 2019).

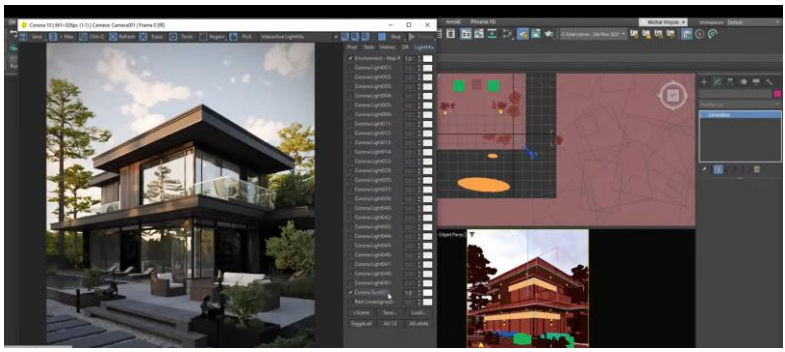

**Figure 13:** Autodesk 3Ds Max Landscape Design with Corona10 (URL14)

All these programs are used in architecture and landscape architecture to increase the efficiency of the design process, to provide simulations of PD modelling, and to provide more detailed and realistic visualisation of projects (Kurt, et al., 2019). Each of them carries the design process forward with specific features needed at different stages of the projects.

## 4. CONCLUSION AND EVALUATION

Landscape architecture is an important professional discipline in terms of planning, designing and managing natural and built environments in a sustainable and functional way. In the modern world, rapidly increasing urbanisation, environmental changes and the need for sustainable living spaces have increased the importance of landscape architecture. In this process, PD offers environmentally sensitive solutions by supporting many ecosystem services such as soil stabilisation, creating cities that adapt to the effects of climate change, water management, biodiversity conservation and carbon emission reduction.

Nowadays, computer programming and digital technologies have become important tools for the success of landscape architecture projects. Virtual and augmented reality helps users/customers to better understand the designs by visualising spatial arrangements in landscape projects, while 3D modelling programs provide simulation of landscape projects by detailing them. Software such as Autodesk AutoCAD, SketchUp, Lumion make the entire design process from large-scale projects to detailed vegetative

arrangements more practical and efficient. Through these programmes, it is possible to create virtual environments in landscape design and simulate factors such as the growth of living material plants in the fourth dimension of time, which is an important factor in projects.

Computer programming and digital technologies are enabling a more data-driven approach to landscape architecture. Technologies such as geographic information systems (GIS), virtual simulations and parametric design tools make landscape projects more sustainable, adaptable and functional. In particular, while providing solutions to important problems of our age such as climate change, depletion of natural resources and rapid urbanisation, significant gains are achieved by working with the principles of efficiency, accuracy and sustainability.

In conclusion, the use of computer technologies in the discipline of landscape architecture is an important step towards the protection of the natural environment and the creation of user-friendly, environmentally compatible spaces. In this context, computer programming stands out as an important tool that increases the functionality and creativity of landscape architects to contribute to an environmentally sensitive future.

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