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Chapter 1

DETERMINING THE PLANT DENSITY IN PARKS BY REMOTE SENSING TECHNIQUES: THE CASE OF FETHIYE CITY CENTER

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1. Introduction

Cities are constantly changing socio-culturally, socio-economically, ecologically and physically due to population growth and migration in the world (Mensah, 2014; Aida et al., 2016; Chan and Vu, 2017; Olgun et al., 2022) This change in cities affects cities positively or negatively depending on the objectives, strategies and activities implemented in the plans (Bhatta, 2010; Rostami et al., 2013; Menteşe, 2019; Olgun and Yılmaz, 2019a). In Turkey, there are legal regulations for the planning of cities that were published and entered into force in different periods (Olgun and Yılmaz, 2017a). However, cities have different settlement forms depending on their geography, topographic, hydrological, climatic and socio-economic and demographic characteristics. For this reason, it is not possible to provide only a settlement order or create a green area system in line with the legal legislation (Aksoy and Ergun, 2009; Rostami et al., 2013; Olgun and Yılmaz, 2017b; Olgun and Yılmaz, 2019b).

Urban green spaces are one of the important components of the city for the city and its dwellers (Demir et al., 2015; Selim et al., 2021). Because urban green spaces has many different functions and benefits such as; ecological and environmental functions (contribution to urban infrastructure, pollution control, biodiversity and nature protection, etc.), economic and aesthetic functions (energy saving, property value, etc.), social psychological functions, human health, recreation and welfare (Çınar, 2008; Quintas and Curado, 2009; Haq, 2011; Vlad and Brătăşanu, 2011; Yılmaz et al., 2016; Bogenç et al., 2018; Çoban and Yücel, 2018; Olgun, 2019).

Parks, which are an important component of urban green areas, are located in all neighborhoods in the city (Mutlu et al, 2018). Parks improve the quality of urban life of people living in cities, as they are environments that allow individual or collective social and cultural activities to be held in open areas in cities with dense building mass. Especially during the pandemic period (Covid-19), the importance of urban green spaces in sustainable modern urbanization has been understood once again (Moreno et al., 2021). In this context, parks are one of the elements that should be considered as a priority in the planning of cities and their balanced distribution throughout the city due to the functions they have and the benefits they provide to the city (Olgun and Yılmaz, 2019c; Vural, 2020; Olgun and Selim, 2021; Öztürk, 2021; Uygur and Özkan, 2022).

Remote sensing and geographic information systems are used in the green areas of the cities, as in the classification of the land cover/land use of the cities. Monitoring and evaluation of cities using satellite images through remote sensing and geographic information systems is among the

most frequently used methods in recent times, with its convenience and accuracy (Bhatta, 2010; Benliay et al., 2020).

There are different methods for observing and evaluating the current status of plants that have an ecologically important place. Today, one of the most preferred methods is remote sensing technologies (Akkamış and Çalışkan, 2020). Satellites, one of the remote sensing technologies, collect information about the earth through their sensors, according to the response of electromagnetic waves they send to the earth, and process this information into different bands in satellite images. With the first earth observation satellite Landsat-1, changes in vegetation can be observed using satellite images without going to the land since 1972 (Doğan et al., 2014; Bozkurt et al., 2018; Gülci et al., 2019; Özçalık et al., 2020: Taysun and Taysun, 2020; Atak and Tonyaloğlu, 2020; Karaali, 2020; Balambar et al., 2021; Aydın-Kandemir and Sarptaş, 2022). GIS softwares are used as an effective tool in the interpretation, analysis and use of the data obtained as a result of the analysis of satellite images in planning studies (Ardahanlıoğlu et al., 2020; Olgun, 2020; Çınar et al.,2021).

Bands in satellite images can be converted to better highlight certain features and patterns. Image band transformations have become common practice for generating new images from two or more image bands for information extraction (Xue and Su, 2017). The NDVI index is formed as a result of the analysis made by using combinations of NIR and Red bands for the observation and evaluation of vegetation (Rouse et al., 1973). NDVI is a widely used index for vegetation assessment due to its simple and readily available multispectral bands (Huang et al., 2021).

NDVI (Normalized Difference Vegetation Index) is an index that analyzes the density of vegetation in any area, whether it is healthy or unhealthy. With this feature, NDVI has become one of the most preferred methods for monitoring the status of vegetation in remote sensing. NDVI analysis has been widely used in many different ecological studies around the world, generally in studies such as monitoring vegetation change, estimating agricultural productivity, detecting whether plants are disease, monitoring drought, and determining vegetation destruction in fire zones. The number of NDVI articles in the Web of Science Core Collection increased from 795 in the 1990s to 3361 in the 2000s. (Huang et al., 2021). While it increased to 12,618 in the 2010s (Huang et al., 2021), the number of NDVI articles increased to 23,434 in the query conducted in December 2022 (Figure 1) (WOS, 2022).
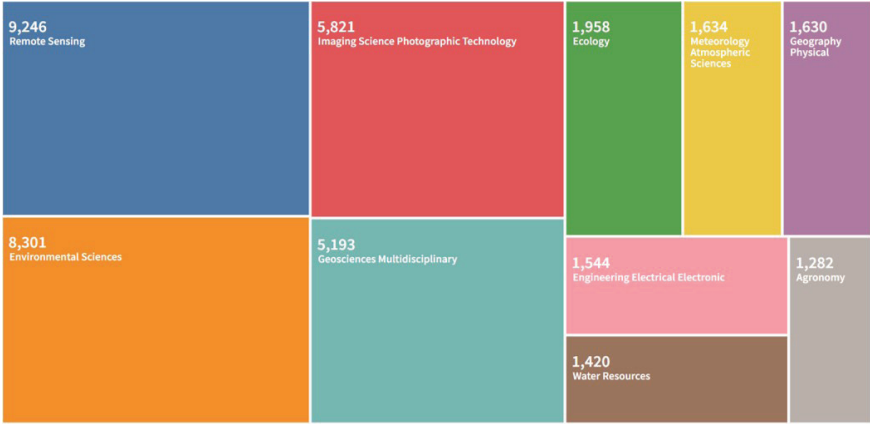
Figure 1: *NDVI article category published in Web of Science Core Collection in 2022 (WOS, 2022)*

The plant density in the park is as important as the location and size of the parks, which have an important place in terms of urban ecology. However, in order to ensure the sustainability of the parks, which allow the creation of large green areas in the city, after they are designed and implemented, it is necessary to periodically maintain the plants in the park and monitor their development of the plants. Today, remote sensing technologies are used effectively in the monitoring and evaluation of plant densities. In this study, the plant densities of the parks located in Fethiye city center were aimed to determine using remote sensing techniques and NDVI analysis.

2. Study area

As the study area, the parks in the city center of Fethiye district, which is within the Mediterranean region of the line separating the Mediterranean region and the Aegean region, were chosen. Fethiye, one of the 13 districts of Muğla province, is a typical coastal city in the Mediterranean region. In the south of Fethiye, there are Çayağzı and Kaş districts, where Eşen Stream empties into the Mediterranean. Kapidag Peninsula and Dalaman district are located in the west. There is Seydikemer district in the east. There are Gölhisar and Çameli Districts in the north (Karakuş et al., 2017; Ardahanlıoğlu Bozhüyük et al., 2018). Fethiye district has an area of 1135 km² and has a population of 170379 (TUİK, 2022). Fethiye city is in a sheltered plain structure surrounded by high mountains due to its geomorphological features. The limitedness of the plain areas around the plain caused the urbanization to spread on the plain floor and on the slopes. The number of neighborhoods in Fethiye district has become 38

with the Law No. 6360, which was published in the Official Gazette dated 06.12.2012 and numbered 28489. However, 15 of these neighborhoods are located in the city center (Karakuş et al., 2014; Selim et al., 2014; Çınar et al., 2015). The study was carried out in 15 neighborhoods in the city center of Fethiye (Figure 2).
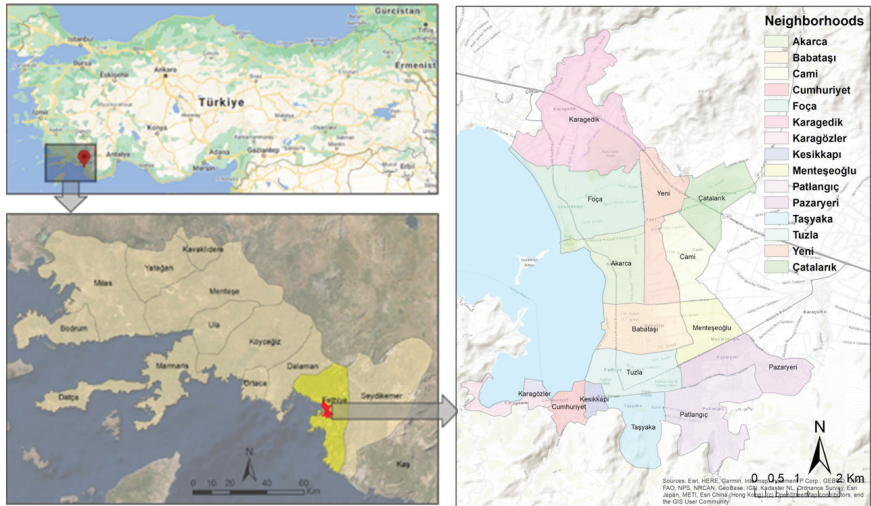
Figure 2. *Study area and neighborhoods in Fethiye city center*

3. Datasets

In order to obtain plant density in the study, the most suitable cloudless Sentinel 2 satellite image dated 14.05.2022 was downloaded free of charge from the website of Copernicus Open Access Hub website. The Sentinel-2 satellite provides 13 spectral bands with its Multispectral Imager (MSI) sensor. These spectral bands have a resolution ranging from 10 to 60 meters. The bands of the Sentinel 2 satellite image used in the study are given in Table 1. With these features, Sentinel-2 satellite images provide a detailed perspective for monitoring vegetation and earth (ESA, 2022). In the study, the 4th band and 8th band of the Sentinel 2 satellite were used to obtain the plant density (Figure 3).

Table 1. *Sentinel-2 Spectral Bands used in the study (ESA, 2022)*

Band	Resolution	Central Wavelength	Description
B4	10 m	665 nm	Red
B8	10 m	842 nm	Visible and Near Infrared (VNIR)
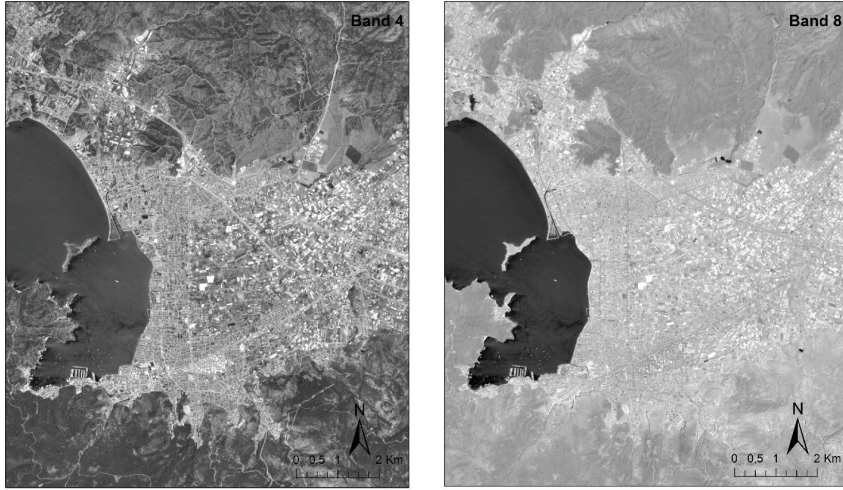
Figure 3: *Sentinel 2 bands (Band 4 and Band 8)*

Another dataset in the study is the parks in Fethiye city center. In previous studies on parks in Fethiye city center, Fethiye city center includes 15 neighborhoods (Karakuş et al., 2014; Selim et al., 2014; Çınar et al., 2015). The park data of 15 neighborhoods in the city center were used in the study (Figure 4) (Table 2).

Table 2. *Neighborhood parks and areas in Fethiye City Center*

Neighborhood	Parks area (da)	Neighborhood	Parks area (da)
Akarca	57,08	Kesikkapı	1,78
Babataşı	80,45	Menteşeoğlu	7,26
Cami	3,29	Patlangıç	123,57
Cumhuriyet	48,69	Pazaryeri	13,91
Çatalarık	3,53	Taşyaka	41,27
Foça	91,88	Tuzla	107,9
Karagedik	1,65	Yeni	18
Karagözler	48,25		
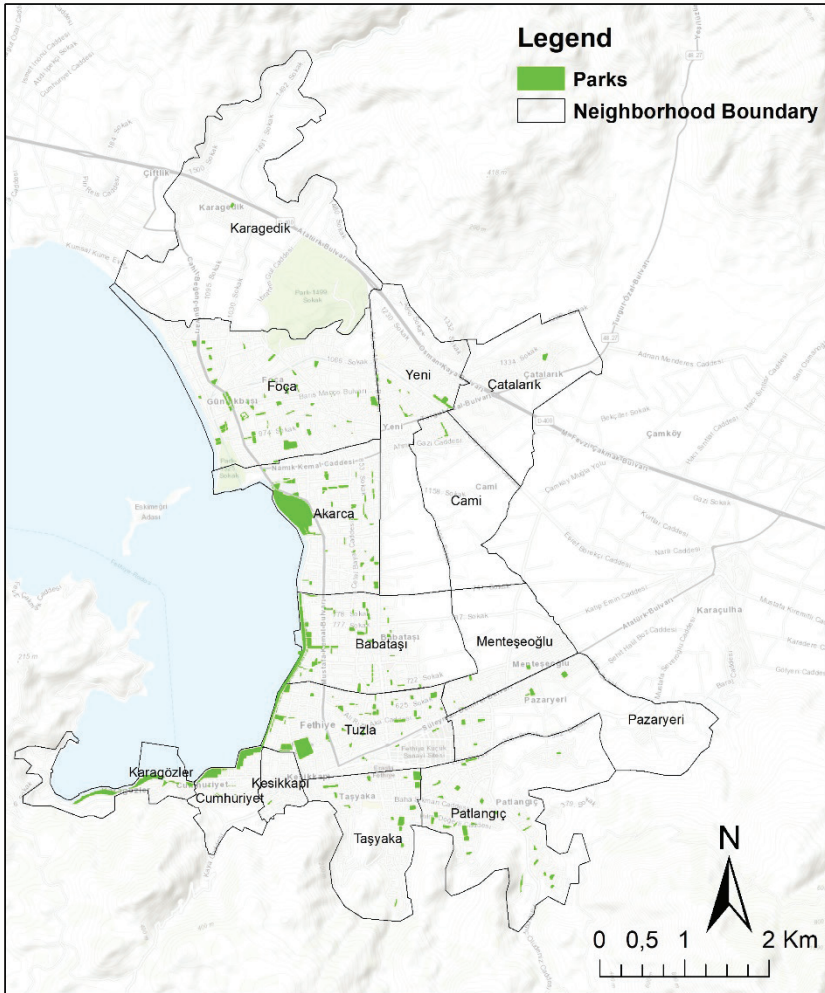
Figure 4: *Distribution of parks by neighborhoods in Fethiye City Center*

4. Extraction of Plant density Density in Parks from Satellite Image

The Normalized Difference Vegetation Index (NDVI), which has been used for many years in many ecological studies, has been used to determine the plant density in parks. The general purpose of using NDVI is to obtain information about vegetation with remotely sensed data (Pettorelli et al., 2005; Huang et al., 2021). NDVI is a widely used index for vegetation assessment due to its long history, simplicity, and dependence

on easily obtainable multispectral bands (Huang et al., 2021). By using Red (Band 4) and Near-Infrared (Band 8) bands, Normalized difference vegetation index (NDVI) image was produced with equation (1) (Rouse et al., 1973).

$$NDVI = \rho NIR - \rho R / \rho NIR + \rho R \qquad (1)$$

This formula, used in NDVI analysis, is based on the mesophyll structure in plants that scatter NIR, whereas chlorophyll absorbs red (Running, 1990; Myneni et al., 1995). The NDVI index calculated by using the reflectance values of the red and near-infrared bands takes values between -1 and +1 (Running, 1990; Myneni et al., 1995; Pettorelli et al., 2005; Benliay et al, 2020; Coşlu et al., 2021). Negative values in NDVI correspond to an absence of vegetation and positive values indicate vegetated land (Myneni et al., 1995; Jin et al., 2016; Zhang et al., 2017; Li et al., 2021). In general, negative values in the NDVI analysis indicate water bodies, values close to zero indicate concrete, sand and rock surfaces, and positive values indicate green areas such as forests and bushes (Jones and Vaughan, 2010; Aydemir et al., 2022). In another study, the land surface represents rock and soil when the NDVI value is below 0.2. In contrast, between 0.2 and 0.5, it represents a mixture of rock and vegetation. If it is above 0.5, it indicates that the land surface is covered with vegetation (Akyürek, 2020; Mercan, 2020; Polat, 2020; Çoşlu at al., 2021). The map showing the NDVI is given in Figure 5.
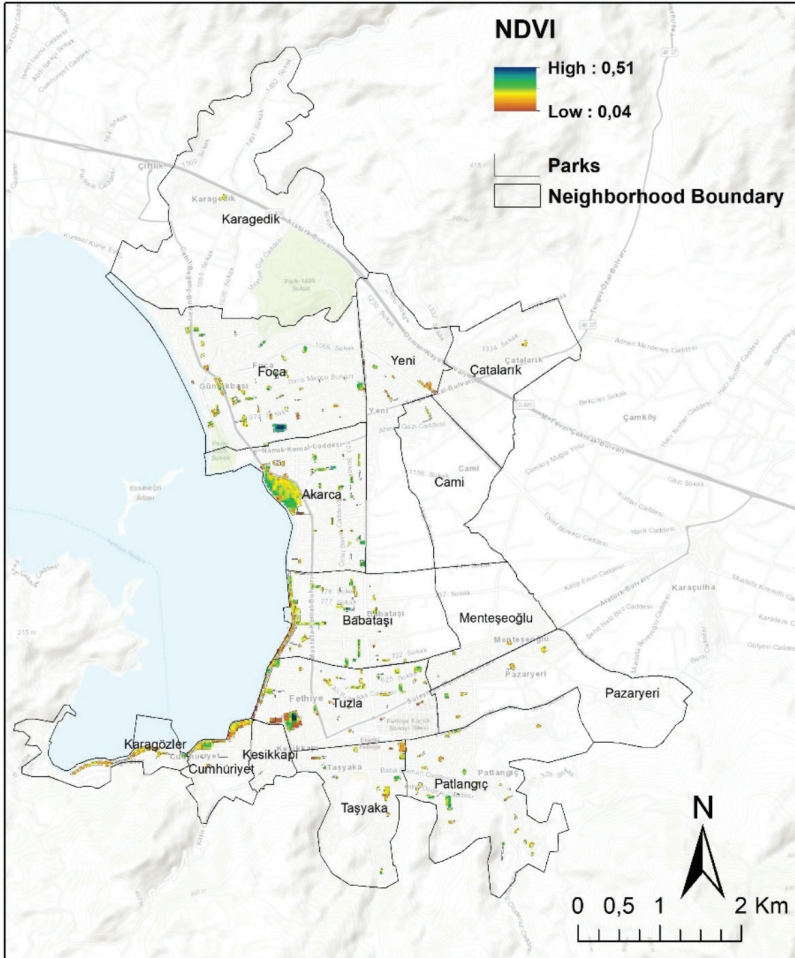
Figure 5: *Plant density in parks (NDVI)*

5. Evaluation of Plant density in parks

In the study, two bands of the image of Sentinel 2 satellite dated 14.05.2022 were used. Green area density (NDVI) in parks map was obtained by means of these bands (Figure 5). NDVI images showed that the minumum plant density Fethiye city center parks was 0.04 in the Tuzla neighborhood parks, while the highest plant density was 0.51 in the Tuzla neighborhood parks. In addition to these, the average plant density of the Fethiye city center parks was determined as 0.20 (Figure 6) (Table 3).
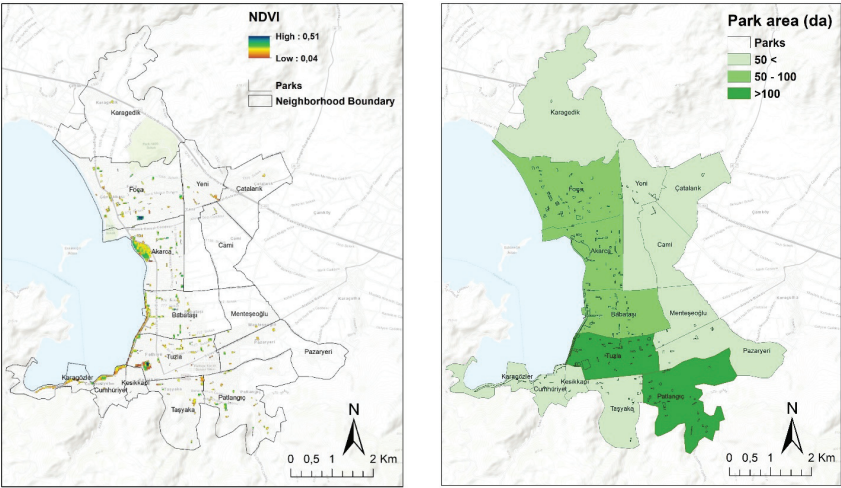
Figure 6: *Plant density in parks (left) and classification of park areas (right)*

Table 3: *Plant density and park area by neighborhoods*

Neighborhood	Plant Density (NDVI)			Parks area (da)
	Min	Max	Mean	
Akarca	0,05	0,35	0,23	57,08
Babataşı	0,06	0,40	0,21	80,45
Cami	0,16	0,23	0,19	3,29
Cumhuriyet	0,08	0,31	0,18	48,69
Çatalarık	0,14	0,19	0,17	3,53
Foça	0,07	0,47	0,23	91,88
Karagedik	0,19	0,22	0,21	1,65
Karagözler	0,10	0,30	0,16	48,25
Kesikkapı	0,09	0,23	0,19	111,00
Menteşeoğlu	0,17	0,23	0,20	7,26
Patlangıç	0,11	0,33	0,21	123,57
Pazaryeri	0,14	0,28	0,19	13,91
Taşyaka	0,08	0,29	0,18	41,27
Tuzla	0,04	0,51	0,19	107,90
Yeni	0,08	0,25	0,15	18,00
Average	0,04	0,51	0,20	50,51

Parks located in the city center were classified according to their spatial size. As a result of the classification, the park area of 9 neighborhoods is less than 50 decares. The park area of 3 neighborhoods is between 50 and 100 decares. The park area of 3 neighborhoods is more than 100 decares.

In the study, plant densities of the parks of each neighborhood were determined:

- Akarca neighborhood has 57.08 decares of park area. NDVI image and Table 5 showed that the minumum plant density Akarca neighborhood was 0.05, while the highest plant density was 0.35. In addition to these, the average plant density of the Akarca neighborhood was determined as 0.23.

- Babataşı neighborhootd has 80,45 decares of park area. NDVI image and Table 5 showed that the minumum plant density Babataşı neighborhood was 0.06, while the highest plant density was 0.40. In addition to these, the average plant density of the Babataşı neighborhood was determined as 0.21.

- Cami neighborhood has 3.29 decares of park area. NDVI image and Table 5 showed that the minumum plant density Cami neighborhood was 0.16, while the highest plant density was 0.23. In addition to these, the average plant density of the Cami neighborhood was determined as 0.19.

- Cumhuriyet neighborhood has 48.69 decares of park area. NDVI image and Table 5 showed that the minumum plant density Cumhuriyet neighborhood was 0.08, while the highest plant density was 0.31. In addition to these, the average plant density of the Cumhuriyet neighborhood was determined as 0.18.

- Çatalarık neighborhood has 3.53 decares of park area. NDVI image and Table 5 showed that the minumum plant density Çatalarık neighborhood was 0.08, while the highest plant density was 0.31. In addition to these, the average plant density of the Çatalarık neighborhood was determined as 0.18.

- Foça neighborhood has 91.88 decares of park area. NDVI image and Table 5 showed that the minumum plant density Foça neighborhood was 0.07, while the highest plant density was 0.47. In addition to these, the average plant density of the Foça neighborhood was determined as 0.23.

- Karagedik neighborhood has 1.65 decares of park area. NDVI image and Table 5 showed that the minumum plant density Kara-

gedik neighborhood was 0.19, while the highest plant density was 0.22. In addition to these, the average plant density of the Karagedik neighborhood was determined as 0.21.

- Karagözler neighborhood has 48.25 decares of park area. NDVI image and Table 5 showed that the minumum plant density Karagözler neighborhood was 0.10, while the highest plant density was 0.30. In addition to these, the average plant density of the Karagözler neighborhood was determined as 0.16.

- Kesikkapı neighborhood has 111.00 decares of park area. NDVI image and Table 5 showed that the minumum plant density Kesikkapı neighborhood was 0.09, while the highest plant density was 0.23. In addition to these, the average plant density of the Kesikkapı neighborhood was determined as 0.19.

- Menteşeoğlu neighborhood has 7.26 decares of park area. NDVI image and Table 5 showed that the minumum plant density Menteşeoğlu neighborhood was 0.17, while the highest plant density was 0.23. In addition to these, the average plant density of the Menteşeoğlu neighborhood was determined as 0.20.

- Patlangıç neighborhood has 123.57 decares of park area. NDVI image and Table 5 showed that the minumum plant density Patlangıç neighborhood was 0.11, while the highest plant density was 0.33. In addition to these, the average plant density of the Patlangıç neighborhood was determined as 0.21.

- Pazaryeri neighborhood has 13.91 decares of park area. NDVI image and Table 5 showed that the minumum plant density Pazaryeri neighborhood was 0.14, while the highest plant density was 0.28. In addition to these, the average plant density of the Pazaryeri neighborhood was determined as 0.19.

- Taşyaka neighborhood has 41.27 decares of park area. NDVI image and Table 5 showed that the minumum plant density Taşyaka neighborhood was 0.08, while the highest plant density was 0.29. In addition to these, the average plant density of the Taşyaka neighborhood was determined as 0.18.

- Tuzla neighborhood has 107.90 decares of park area. NDVI image and Table 5 showed that the minumum plant density Tuzla neighborhood was 0.04, while the highest plant density was 0.51. In addition to these, the average plant density of the Tuzla neighborhood was determined as 0.19.

- Yeni neighborhood has 18.00 decares of park area. NDVI image and Table 5 showed that the minumum plant density Yeni neighborhood was 0.08, while the highest plant density was 0.25. In addition to these, the average plant density of the Yeni neighborhood was determined as 0.15.

6. Conclusion

In the study, the plant densities of the parks located in Fethiye city center, which is one of the important tourism destinations of Turkey, were determined using remote sensing techniques. The highest (0.51) and lowest (0.04) plant density in the parks located in Fethiye city center were determined in the parks located in Tuzla neighborhood. In addition to these, the average plant density of the Fethiye city center parks was determined as 0.20. As the park area in the neighborhood increases, the difference between the maximum and minimum plant density increases. The highest average plant density (0.21) is observed in Akarca neighborhood. The least average plant density (0.15) is observed in the Yeni neighborhood (Figure 7).
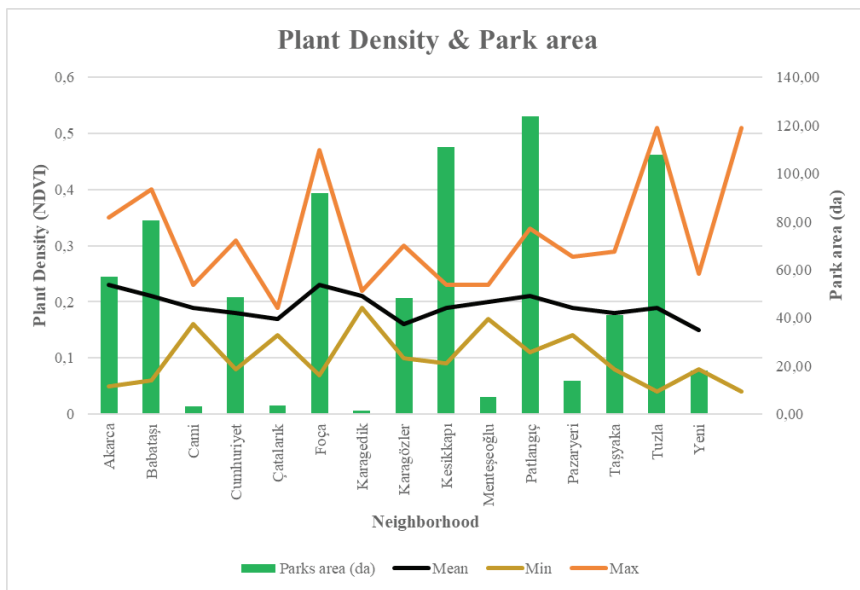

Figure 7: *Plant density and park area graph by neighborhoods*

The findings obtained as a result of the analyzes made in this study clearly show that remote sensing technologies are an effective method in detecting and evaluating the plant density in parks using Sentinel 2 satellite imagery with a spatial resolution of 10 m.

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Chapter 2

EVALUATION OF FETHIYE'S IMPORTANT NATURAL AND CULTURAL RESOURCE VALUES IN TERMS OF CONSERVATION STATUS

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1.INTRODUCTION

The ever-increasing needs of human beings, which have developed due to the rapid increase in the world population, bring along many problems. Increasing industrialization and construction actually means the reduction of natural areas. This situation creates a pressure on its natural resources and this pressure results in the deterioration of the ecological balance. Disruption of ecological balance is the source of many environmental problems. The concept of protection, which is the most important element in ensuring the sustainable use of natural resource values, is basically the measures that are developed to prevent the destruction of future resource values required for the continuation of life and determine the optimum use methods (Gül et al., 2010). Biodiversity, natural-cultural, historical and landscape resource values of natural areas should be protected not only for today, but also for future generations to benefit from these values (Baykal, 2006). Nature conservation is defined as protecting parts of nature and natural elements that are worthy of protection in the light of certain criteria, including the existence of plant and animal species living in nature, their habitats and living environments for the guarantee of human health and life (Ulun, 2008). Protection and improvement of the natural environment; conservation, prevention of damage, maintenance, repair and improvement of natural resources (Lucas 1992, Farina 2000). The development is; it is to make progress from simple to complex, from a lower state to a higher one (Hançerlioğlu 1996). With the emergence of the concept of nature conservation, there have been many developments in nature conservation throughout the world. According to the World Union for Conservation of Nature (IUCN), which is one of the most active institutions in the world in terms of conservation, a protected area is defined as "with clearly defined geographical boundaries, recognized, dedicated and legal or other legal or other services for the long-term protection of nature and associated ecosystem services and cultural values. It is defined as "an area managed with effective methods".

Sustainable use of natural resources can only be achieved with an effective conservation approach. Protected areas are not only the common heritage of their nation, but the entire world.

Protected areas in Turkey are evaluated within the scope of Forest Law No. 6831, National Parks Law No. 2873, Land Hunting Law No. 4915, Law No. 2863 on the Protection of Cultural and Natural Assets, Fisheries Law No. 1380, Zoning Law No. 3194 and Environment Law No. 2872. Important natural areas in our country are protected with 18 different protection status. Sometimes even a single area is given several protection statuses. Some of them were announced according to our national legislation, and some of them were created on the basis of internati-

onal conventions (Özden, 2005). In recent years, it has been realized that our natural resource values are not inexhaustible but irreplaceable. This realization led to the development of the concept of nature protection.

Fethiye, located in the west of the Mediterranean Region, is a district of Muğla province. Fethiye, which is very rich in terms of natural beauties, has many natural resource values in the borders of the district due to different cultural resource values belonging to the civilizations it carries traces of, its coast to the sea and different geographical features. 816.02 km^{2}were declared as Special Environmental Protection Area in 1988 in terms of its natural resource values. In Fethiye, which is branded with Ölüdeniz, which has a unique beauty in the world, many areas are protected with different protection statuses. In this study, the important natural and cultural resource values of Fethiye were evaluated in terms of their protection status. In addition to being a protected area, a balance of protection and use should be ensured in the planning studies to be carried out in Fethiye, which is an important tourism center.

2.MATERIALS AND METHOD

2.1. Material

The material of the study is the important natural and cultural resource values of Fethiye, which is an important tourism center of Turkey and protected by many different protection status within its borders. Natural resource values are Ölüdeniz, Babadağ, Göcek, Çalış, Ömer Eşen Nature Park, Butterfly Valley and Oyuktepe Bays. Cultural resource values are Fethiye Castle, Amintas Rock Tombs, Kayaköy, Telmessos Ancient City. Fethiye district borders are protected with Special Environmental Protection Area status (Figure 1).

Figure 1. *Location of the work area*

2.2. Method

In this study, which was conducted to evaluate the important natural and cultural resource values of Fethiye in terms of their protection status, analysis, synthesis and evaluation methods were applied as a method. For this purpose, the natural and cultural resource values, which are especially important in terms of tourism, within the boundaries of Fethiye district were determined. A literature review was made for each area, and the natural and cultural landscape characteristics of these areas were determined in the next step. At the last stage of the study, these areas were evaluated in terms of their protection status and solutions were offered to ensure a sustainable conservation-use balance (Figure 2).
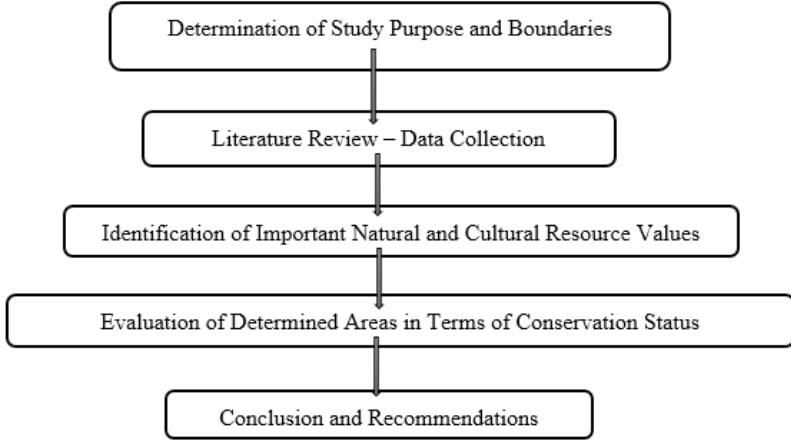
Figure 2. *Method flow chart*

3. RESEARCH FINDINGS

In this study, which was carried out in order to evaluate the important natural and cultural resource values of Fethiye, which is an important tourism center of Turkey and protected with many different protection status within its borders, in terms of their protection status, the natural resource values; Ölüdeniz, Babadağ, Göcek, Çalış, Ömer Eşen Nature Park, Butterfly Valley and Oyuktepe Bays. Cultural resource values are; Fethiye Castle, Amintas Rock Tombs, Kayaköy, Telmessos Ancient City.

3.1. Ölüdeniz: Ölüdeniz is a tourism center located at the western end of the Mediterranean Region at the intersection of the Aegean Sea and the Mediterranean. Its distance to Fethiye is 12 km.107 km2 in total, which includes the southern part of Fethiye District center, Ovacık, Belcekız and Hisarönü neighborhoods and Kayaköy settlement[of] . The average altitude is 315 m in Ovacık and Hisarönü neighborhoods (Figure 3).

Figure 3. *Ölüdeniz Nature Park*

The first of the conservation statuses within the borders of Ölüdeniz, which is an important tourism center, is the status of a nature park. **Nature Park;** It refers to parts of nature that have vegetation and wildlife characteristics and are suitable for the rest and entertainment of the public in the integrity of the landscape. Ölüdeniz-Kıdrak Nature Park has been declared in order to protect the flora richness of the region and the natural landscape formed by forest-sea-precipitate cliffs. Ölüdeniz - Kıdrak Nature Park is also a first degree protected area. The distance of the nature park to Fethiye district center is 16 km. The nature park was established as a one-day Forest Recreation Place in 1978, and with the Ministry's Approval No. MP.1/5-311 on 29/12/1983, an area of 950 ha was declared as a Nature Park together with the Kıdrak Forest Resting Area. It was declared as a 1st degree natural protected area by the High Council of Immovable Cultural and Natural Heritage on 13/11/1982 numbered A-4020.

Site or protected area, briefly, are places closed to construction (construction) that are taken under protection due to their natural, ecological or cultural values.

Natural site; It is defined as "areas that belong to geological periods, prehistoric and historical periods and need to be protected in terms of their rarity or features and beauties, which are aboveground or underwater areas that need to be protected". Natural sites are also classified as first, second and third degree sites.

1. Degree Natural Protected Area: These are areas that have universal value in terms of scientific preservation, that must be protected in terms of public interest due to their interesting features and beauties and that they are rare, and that will be preserved as they are, except for scientific studies for conservation.

2nd Degree Natural Site: These are the areas that can be opened for use by considering the public interest as well as the protection and development of the natural structure.

3rd Degree Natural Protected Area: These are areas that can be opened to residential use, taking into account the potential and usage characteristics of the region, on the way to the protection and development of the natural structure (Anonymous, 2015). Ölüdeniz region is also within the borders of Special Environmental Protection Area.

Special Environmental Protection Areas; Protection of the Mediterranean Sea against Pollution (Barcelona) are areas that have ecological importance in our country and the world due to an obligation brought by the contracting parties, but are under special protection by the Decree of the Council of Ministers because they are at risk of deterioration or

extinction due to pressures such as industry, tourism and construction. (Anonymous, 2015).

In addition, within the borders of Ölüdeniz;

- Fethiye-Hisarönü Roman building remains 1st Degree Archaeological Site
- Fethiye-Ölüdeniz - Inside the Settlement Area 1st and 3rd Degree Archaeological Site
- Ölüdeniz III. Degree Archaeological Site
- Oludeniz I. and II. Degree Natural Protected Areas.

Archaeological Sites

are settlements and areas where all kinds of cultural assets reflecting the underground, aboveground and underwater products of ancient civilizations that have survived from the existence of humanity to the present, and the social, economic and cultural characteristics of the periods they lived in.

1st Degree Archaeological Site: These are the sites that will be preserved as they are, except for scientific studies for protection.

2nd Degree Archaeological Site: Sites that need to be protected, but whose protection and usage conditions will be determined by the conservation committees and will be preserved as they are, except for scientific studies for protection.

3rd Degree Archaeological Site: Archaeological areas where new regulations can be allowed in line with the protection - use decisions (Anonymous, 2015).

Urban Archaeological Sites: These are the areas that contain the immovable cultural assets that need to be protected as defined in Article 6 of the Law No. 2863, and the urban textures that need to be protected in accordance with the same law article are found in the archaeological sites.

Urban Protected Areas; where cultural and natural environmental elements (buildings, gardens, vegetation, settlement textures, walls) are found together, which have architectural, local, historical, aesthetic and artistic features and are more valuable than the value they carry individually due to their coexistence (Anonymous, 2015).

3.2. Çalış: Çalış region is one of the oldest tourism centers of Fethiye with its hotels, restaurants, shopping and entertainment venues, bird sanctuary and windsurfing activities just behind its 3-4 km sandy beach. Çalış Beach is also known as one of the best spots to watch the sunset

in Fethiye. It is heavily used by domestic and foreign tourists during the summer months. It is 6 km from Fethiye town centre. Çalış region is the area with the longest sandy beach in Fethiye. In this region, it remains within the boundaries of the special environmental protection zone. The most important feature of Çalış beach is that *Caretta Carettas*it is one of the breeding and spawning areas ofFor this reason, there is a more controlled use on the beach, especially after the evening hours. From May to the end of July, adult turtles come to the beach and lay their eggs. Between July and September, the fry leave their nests and reach the sea. On the eastern border of Çalış is one of the most important wetlands of Fethiye. This area of 15 ha has been registered as the Bird Sanctuary Natural Conservation Park. This area is home to 201 migratory birds, 261 vertebrate and 29 invertebrate animal species, and 194 plant species. It offers a magnificent natural view pleasure in all seasons of the year. It is one of the most beautiful spots to watch the sunset in Fethiye. In addition, birdwatchers visit this region intensively to see the birds that visit here during migration time.under protection *Caretta Caretta* , it is also possible to observe the baby turtles leaving their nests and going to the sea. Çalış, which is one of the most suitable areas for windsurfing and angling, is one of the centers where many recreational activities can be done (Figure 4).

Figure 4. *Çalış*

3.3. Babadağ: One of the important plant areas, is located at an altitude of 1975 m. There are 50 endemic plants defined as rare and endangered worldwide in Babadağ flora. Babadağ is also the most important center of Turkey where paragliding activities are carried out today. Babadağ is a region with rich vegetation, consisting of limestone and limestone type rocks. It is covered with maple and cedar forests unique to our country. The region is a frequent destination for those who want to do paragliding. It is an important tourism center known all over the world with its unique geography. Babadağ is one of the nine protected hot spots in Turkey, besides being within the borders of the Special Environmental Protection Zone (Figure 5).

Hot spot; It means regions on earth where biodiversity is high, rich forest flora, with a high probability of being destroyed by humans and which need to be taken under immediate protection.

Figure 5. *Babadağ*

3.4. Göcek: Göcek, located within the borders of Fethiye district, is also a part of Fethiye-Göcek Special Environmental Protection Area. Göcek; It is a settlement concentrated in the coastal band, which is located in the Gulf of Fethiye and known as Göcek Bay. Except for the south side that opens to the sea, it is surrounded by the steep Taurus Mountains. Göcek, which acts as a calm and sheltered port due to the geographical structure of the gulf it is in, attracts attention in the international arena with its beautiful bays, islands of various sizes and clean sea. Göcek is located in the west of Fethiye District and on the border of Dalaman District. It is surrounded by the Mediterranean Sea to the west, Dalaman District to the northwest, Gökçeovacık District to the north and İnlice District to the east.

Tourism in Göcek has developed as yacht tourism. The fact that the bays are surrounded by mountains on the west and south has made this area a natural harbor. This has made the region an important natural marina in our country and in the world. There are four different international marinas in the town with a total yacht mooring capacity of 810. There are no multi-storey buildings and facilities in Göcek, which was taken under protection with the Special Environmental Protection limits on 12.06.1988. The majority of accommodation facilities are in the form of hotels with few rooms, apart hotels and pensions. The importance of tourism, which is in the field of occupation of 75% of the people today, is increasing day by day. Today, many Tourism Agencies and accommodation places serve in the region. Daily excursion tours, tourism offices, yacht tourism companies, municipality and private marinas contribute to the development of local tourism. The biggest income of the region is yacht tourism (Ardahanlıoğlu, 2014). Since Göcek is a Special Environmental Protection Area, there are no hotels. For this reason, hostels and apart ho-

tels have developed. Göcek, which was a small and quiet village until the early 1980s, was discovered with the development of tourism activities in Turkey and started to grow after this date and became an important center for yacht tourism in the region. Göcek bays and sea have the Blue Flag. The Blue Flag symbol is repeated every year as a result of the measurements made, and is withdrawn when necessary. Göcek is located within the borders of the special environmental protection zone. In the Göcek region, there are many islands that are protected under natural and archaeological site status. Some of these islands are Eğriçam Bay, Atbükü, Boynuzbükü, Taşyaka Bay, Sıralıbük, Manastır Bay, Hamam Bay, Kurşunlu Bay, Merdivenli Bay, Uzun Ali Bay, Tersane Bay, Büyük Yassıca, and Büyük Bay (İrez, 2006). (Figure 6)

Figure 6. *Göcek*

3.5. Ömer Eşen Nature Park: Nature Park, which is 113 kilometers away from Muğla city center, is approximately 1 hour and 35 minutes away from the city center. Nature Park is located 16.2 kilometers from Fethiye town center to which it is connected and is very easy in terms of transportation (Figure 7).

Figure 7. *Ömer Eşen Nature Park*

3.6. Butterfly Valley: From a historical point of view, it is known that the history of the valley dates back to the 4th century BC. It was purchased by a Tourism Cooperative in 1974. Butterfly Valley, which is recommended to be protected as a world heritage due to its endemic species, was declared a 1st degree natural site and 3rd degree archaeological site with the decision numbered 6361 of the Izmir Cultural and Natural Heritage Preservation Board on February 8, 1995. construction is closed. The region is also included in the natural habitat of Babadağ and its surroundings, which is one of the 9 Natural Habitats in Turkey declared by the Wildlife Conservation Society. Surrounded by steep rocky walls reaching 350 meters, the valley got its name from the more than 80 butterfly species it hosts, especially the tiger butterfly. Collector-photographer Rıfat Kİlar was influenced by the valley butterflies in the late 70's and pronounced the name of the sheep known as "Gürümsu" differently for the first time, saying that it should be called "Valley of Butterflies" (Anonymous, 2013). (Figure 8).

World Heritage: Natural formations, monuments and sites of international importance and therefore worthy of appreciation and protection are granted "World Heritage" status.

Figure 8. *Butterfly Valley*

3.7. Oyuktepe Bays: Aksazlar Bay, Büyük and Küçük Samanlık Bays, Boncuklu Bay and Kuleli Bay are referred to as Oyuktepe Bays. These coves, located in the west of Fethiye, are mostly visited by daily users due to their easy accessibility. These coves show the characteristics of forest resting places and are also used as C type recreation areas. **Little Hay Cove**; The area of Küçük Samanlık Bay, which is 3 km away from Fethiye, is 4.1 ha. Picnic tables, seating units, shower and changing cabins, WC provided by the private enterprise in the bay are in sufficient number (Figure 9).

Great Haystack Cove; Büyük Samanlık Bay, which is 7 km away from Fethiye, is open during the summer season and is operated by a private enterprise. The area of the sheep is 1.7 ha. The bay, which is a type C promenade, is also a forest resting place.

Kuleli Bay; The area of Kuleli Bay, which is 11 km away from Fethiye, is 3.7 ha. The bay, which is a type C promenade, is also a forest resting place. In Kuleli Bay, the reinforcement elements are at a sufficient level. It is also available in units such as WCs, changing cabins, shower units.

Type C promenade: Picnic units, local products, exhibition and sales, in order to meet the needs of the society for various recreation, entertainment and sports, to contribute to the beauty of the country and to allow touristic activities, with medium and low density of resource value and visitor potential, and in order to meet daily local needs. It refers to the promenade that includes the place, the arbour, and other recreational structures and facilities (Anonymous, 2013).

Figure 9. *Oyuktepe Bays*

3.8. King Tombs of Lycian Civilization: There are many rock tombs, three of which are temple type and the others reflect civil architecture examples, carved on the steep rocky slope in the south of Fethiye. All of the Rock Tombs were built in the Hellenistic period, so they witnessed all the civilizations that Fethiye lived in. Rock tombs are protected as historical and archaeological sites (Figure 10).

Figure 10. *King tombs*

3.9. Fethiye Castle: The castle rising to the south of the city is thought to belong to the knights of St. John. The castle, the first place where the city was founded, is surrounded by a wall, and today there are Roman walls under these walls and the walls built in the Middle Ages on it (Figure 11).

Figure 11. *Fethiye castle*

3.10. Kayaköy: Kayaköy's history goes back to BC in terms of philology. Although it goes back to the 3rd millennium BC, from the ancient ruins to the present day. A small number of sarcophagi and rock tombs dating to the 4th century have survived. All of the buildings on the slopes of the city were built by the Greeks who settled in the second half of the 19th century and the first quarter of the 20th century, with the rights granted to minorities in the late periods of the Ottoman Empire. The city was evacuated as a result of the exchange of Greeks living in the region with the Turks in Western Thrace during the founding years of the Republic of Turkey. The buildings in the city took on the appearance of a ghost town with the destruction of the door, window and top cover system due to natural factors (Figure 12). In the abandoned city, there are 350 to 400 residences, each of which is not larger than 50 m^2 in the period of use, does not block each other in terms of view and light, generally has two floors, the lower floors of which are cellars, and underground cisterns on the roof where the rain water is collected at the entrance. In addition to the residences, there are many chapels interspersed between the houses, two large churches, a school building and a customs house. Kayaköy is both an urban site and a 1st Degree Archaeological Site.

Figure 12. *Kayaköy*

3.11. Telmessos Theater: It was built in the early Roman period and AD II. All the elements of the theater were unearthed at the end of the excavations carried out in this theater, which was repaired in the 19th century. All of the upper rows of the theater, which has a diosome and two seating groups, were used as filling material in the cord work. In its current state, 2000-2500 people can sit in the theater (Figure 13). The original seating capacity of the theater is approximately 6000 people. In fact, Telmessos Antique Theater, which was lost by building a house on it, was unearthed again with the excavations carried out in 1991. Telmessos Ancient Theater is protected as a 1st Degree Archaeological Site (Anonim, 2014).
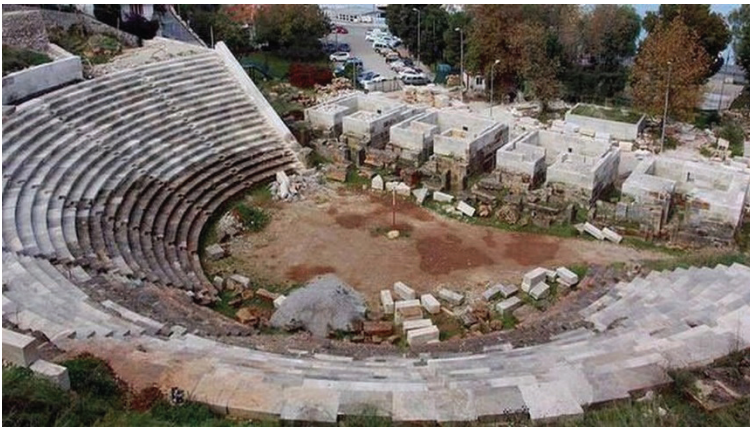

Figure 13. *Telmessos theater*

4. DISCUSSION AND CONCLUSION

Sustainable use of protected areas depends on the successful implementation of the planning process in these areas. All the plans in which the protection-utilization balance cannot be established in the protected areas remain incomplete. These areas, which are protected as points by short-term solutions, are compressed into tiny pieces. While declaring their protection status is based on many laws and regulations, human-induced pressures in these regions are ignored (Ardahanlıoğlu, 2014).

As a result of the physical planning made by neglecting the natural resource values, these areas are destroyed and their carrying capacity is forced and they become non-renewable. Sustainable use of natural resources is necessary in order not to endanger the living environments of both present and future generations. This can be achieved by observing the natural and ecological balance in the planning processes, taking into account and monitoring the interaction between land uses and natural resources (Çelikyay, 2006, Dudley 2013, Akten, et al, 2012).

In Turkey, especially since the second half of the 20th century, the increase in migration from rural areas to cities has brought along an irregular and unplanned settlement and construction in coastal areas. The policies implemented and the incentives given in this period also caused the industrial branches to settle in the coastal zone in addition to tourism investments. (Cihangir et al., 2007). In order to eliminate these pressures on coastal and marine areas, which are among our most important values to be protected, and to solve these problems, these areas should be evaluated within the framework of the sustainability principle, without disturbing their natural structure, by considering the balance of protection and use (Top et al., 2013).

In Fethiye, which has a rich potential in terms of natural resource values due to its coast to the sea, activities based on coastal tourism in Ölüdeniz, Çalış and Göcek should be planned on the basis of protection. In the light of the findings and observations made, the following suggestions have been made in order to ensure sustainable protection.

- The fact that tourism activities in Fethiye have increased since the 2000s has resulted in the coastal regions being under pressure. For this reason, in order to have an effective control in the area, it is necessary to monitor the coastal areas with certain periods.

- Tourism planning should be done and their density should be balanced, considering the natural carrying capacity for the coasts that are under heavy use in Fethiye, especially during the tourism season.

- Urbanization and uncontrolled developments around coastal areas should be prevented.

- Coastal ecosystems, sand dunes, forest areas and wetlands in coastal areas should be protected. The survival of these ecosystems, which will be affected primarily by any destruction to the coastal areas, will be ensured by the controlled use of the coast.

- Controls should be increased by establishing an effective control mechanism especially in the Calis Region. Uncontrolled use of wetland should be avoided.

- The continuity of Ölüdeniz Lagoon, which is within the boundaries of Ölüdeniz Nature Park, and Kumburnu Strait, which connects this lagoon with the open sea, should be maintained by considering the balance of protection and use.

- To ensure the sustainability of the scenic beauties, geological and geomorphological features, untouched flora and fauna and superior recreational values of the coasts of Ölüdeniz,

- To ensure that the plans to be made in these areas are compatible with the ecological, biological (flora-fauna), geological, geomorphological and landscape values of the area, which constitute the main resource values,

- Awareness should be raised about the protection status of the people living in the region.

Due to the fact that there are many protected areas with different protection status within the borders of Fethiye, which is an important tourism center of Turkey with its natural beauties and its coast to the sea, the planning activities to be carried out in Fethiye in the future should be evaluated within the scope of ecological planning and emphasis should be given to the uses where the protection will be at the forefront. It is an undeniable fact that regions where natural resource values are rich and especially sea coasts are under the pressure of wrong land use and tourism. These areas, which have intensive use especially in the summer months, are the areas that are highly demanded not only by domestic tourists but also by foreign tourists. Increasing demand brings with it more construction. For this reason, practices in protected areas should be carried out with an effective inspection mechanism.

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Chapter 3

EVALUATION OF THE OBJECTIVES OF THE 'XI. NATIONAL DEVELOPMENT PLAN' ACCORDING TO SUSTAINABILITY PRINCIPLES

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1. INTRODUCTION

A number of problems such as environmental pollution spreading rapidly in the world, deterioration of natural balances, destruction of cultural values and the danger of urbanization of rural places have brought the sustainability approach to the agenda (Mengi, and Meydan Yıldız, 2019: 186; Meydan Yıldız et al., 2022: 94). The use of the concept of sustainability, which is an attempt to integrate the natural and social environment, began in 1973 with the publication 'Ecological Principles Economic Development' published by Dasmann, Milton and Freeman (Thorns, 2004: 206; Meydan Yıldız and Şengün, 2019: 80).

The sustainable living model defines a participatory management approach in which urban-cultural identity and environmental rights come to the fore (Akkoyunlu Ertan, 2007: 24-25). Cultural factors reflect the way society understands and makes sense of the way of life, nature and its environment (Meydan Yıldız, 2018a: 180-182). The sense of responsibility of societies towards nature and what is natural for the continuity and continuity of their natural and cultural values is increasing day by day (Meydan Yıldız, 2017: 5).

Sustainability is a method that aims to ensure that today's and future generations live in healthy environments and that cultures, traditions and customs are maintained without discrimination of race, gender and disability. Sustainability refers to the imposition of restrictions on human activities on environmental resources within technological means and social coordination. Thus, thanks to the time to be granted for ecosystems to renew themselves, on the one hand, the unity of technology and social organization will be ensured in order to continue economic growth, and on the other hand, the resource needs of future generations will not be jeopardized (Meydan Yıldız, 2020: 130).

The survival of countries depends on the economic activities and competitiveness they gain on a global scale. However, irresponsible use of natural resources, which are scarce on a macro scale, or not recognizing the self-renewal periods of resources, will be the biggest obstacle in front of economic development in the long term (Meydan Yıldız, 2021: 336-337). In order to prevent waste of resources and to ensure economic and social development, National Development Plans are made in our country.

The National Development Plans include a general vision for the future of the country and the strategies to realize this vision. The objectives and policies of the National Development Plans constitute the backbone of the political blocks to be followed at other plan levels (Meydan Yıldız and Temur, 2022a: 480). In addition, National Development Plans have a guiding and regulatory role in the implementation of economic, social, ad-

ministrative, cultural and environmental developments at the international level by transferring them to the management process. The hierarchical basis of the planning process in our country is the National Development Planes. The legal nature of development plans within public law in our country is controversial. There are regulatory action, legal action opinions.

This study includes an examination of the main objectives and policies of the XI. National Development Plan in line with sustainability principles. In this study, the concept and principles of sustainability are explained by using literature review method. In the light of these explanations, it has been determined that the XI. National Development Plan includes the objectives of stable and strong economy, competitive production and productivity, qualified people and strong society, livable cities and sustainable environment, rule of law-democratization and good governance in accordance with the principles of sustainable development.

2. SUSTAINABILITY CONCEPT AND PRINCIPLES

In the Turkish Dictionary of the Turkish Language Association, the word to maintain is "to continue; to ensure that a situation, something, lasts, happens" (https://sozluk.gov.tr/). The meaning of the word is "the continuity and continuity of anything" (Keleş, 2013: 139; Kozak, 2014: 390). With the effect of environmental awareness spreading to the world towards the end of the 1960s, the protection of the earth's ecosystem and life intertwined with nature gained importance.

The creation of ecological, sustainable, clean, green, healthy or zero waste-zero carbon living spaces has become a global vision (Meydan Yıldız, 2018b: 745). The concept of sustainable development, which explains the balance between the environment and development, entered our lives with the Brundtland Report published in 1987 (Adams, 2001).

The concept of sustainability refers to intergenerational and intergenerational equality in terms of quality. In meeting vital needs, the use of natural resources far above the limit that the ecosystem can tolerate, the lack of recognition of the time required for nature to renew itself and unconscious consumption habits are the main starting points of sustainability (Meydan Yıldız, 2021: 326).

Sustainability can be defined as "the ability of a society, ecosystem or any continuous system to sustain its work without interruption, deterioration, overuse or overload the main resources that are the vital link of the system" (Kozak, 2014: 390). Sustainability principles, which have three dimensions as environmental, economic and socio-cultural, include the cautious use of resources without destroying them and the reduction of

poverty by ensuring economic vitality (Meydan Yıldız and Temur, 2022b: 16-17).

With sustainability, it is aimed that elements such as food, water, clothing, shelter, work, energy and cleaning, which are vital needs, are presented with the principle of social equality and are safe. In addition, the concept of sustainability includes the implementation of issues such as cooperation, accessibility to facilities and facilities, social interaction, health, education, democracy and cultural heritage by becoming a way of life and ensuring intergenerational and intergenerational balance.

Sustainability refers to maintaining the continuity and continuity of anything. When associated with management processes, a socially inclusive cultural change is necessary for sustainability to be transferred to life in consumption and production models (Meydan Yıldız and Seçkin, 2019). Consumption habits appropriate to nature and cultural activities that adopt a relationship of conservation and use can make this process possible.

Sustainable management: It is a development model in which a) economic competitiveness and sustainable production stages are established, b) balance between the past, present and future and environmental quality are ensured socially and culturally, c) renewable energy sources, sustainable transportation model and sustainable housing design are added to the urban management and planning process (Meydan Yıldız, 2018b: 447). Therefore, it is a form of management that can balance between productivity, investments and natural resources. The decision-making process that develops with accurate analyzes, public interest priority and environmental policies constitutes the sustainable development model.

In the sustainability of living spaces, the adoption of principles such as quality of life, competitiveness, economic power and ecological responsibility is also important (Mengi and Algan, 2003: 22-25). Local governments are the actors who know the natural resources specific to the settlement area, labor potential, hinterland relations, spatial separations and cultural structure best (Mengi and Meydan Yıldız, 2017). Local governments also have responsibilities for citizen law to ensure the implementation of sustainability policies. Local government units are the institutions that can ensure the implementation of the objectives and policies of the development plans on a local scale.

3. XI. NATIONAL DEVELOPMENT PLAN OBJECTIVES AND SUSTAINABILITY RELATIONSHIP

In order to achieve sustainable development, there must be an integrity between the economy and environmental policies. Thus, improvements in the social structure will be observed with it. In this context, sustainable development; environmental sustainability, economic sustainability and socio-cultural sustainability. Economic sustainability involves the stability of capital, social sustainability involves strong civil society and participation, and environmental sustainability involves protecting natural resources and meeting the needs of individuals (Author, 2006: 9; Goodland, 1995: 17). At the end of the targets and policies determined by considering the three dimensions of sustainability; healthy societies and livable cities with high quality of life will be formed. The important thing at this point is to decide what is to be maintained and improved. According to the classification made by Parris and Kates (2003), nature, life support and communities are the ones to be sustained. What will be developed is people, economy and society.

WHAT IS TO BE SUSTAINABLE?	WHAT IS TO BE DEVELOPED?
NATURE Earth Biodiversity Ecosystems	PEOPLE Children's survival Life expectancy Education Equality Equal opportunities
LIFE SUPPORT Ecosystem services Resources Environment	ECONOMY Wealth Productive sectors Consumption
COMMUNITIES Cultures Groups Places	SOCIETY Institutions Social capital States Region

Tablo 1. *Classification of Sustainable Development Goals (Parris and Kates, 2003: 3)*

The main purpose of sustainable development is to increase the quality of environmental and social life as well as to ensure economic viability. This aim also ensures the integration of the concepts of sustainable development and urban development. Since the actions and thoughtsof

individuals are shaped in cities, sustainable development and urban development are interacting. In order to achieve sustainable development, policies and practices that ensure sustainable urbanization should be reflected in the space (Karakurt Tosun, 2009).

Protection of ecological balance and sustainable development; however, it can only be realized with a sustainable planning approach (Meydan, 2013). Development plans are also a type of guiding plan that includes both the assessment of the current situation and the goals for development in economic, social, cultural, administrative and environmental issues. Policies on various issues, which constitute the top step of the spatial planning hierarchy in Turkey and for the development of our country, are formed in national development plans (Temur and Meydan Yıldız, 2022a; Temur and Meydan Yıldız, 2022b).

Planned development policies in Turkey started to be established for the first time as of 1963 within the scope of the I. Development Plan and continue to be planned development policies today (Çelik and Çetiner, 2019). The plan in which today's goals and policies are implemented is the XI. Development Plan. One of the main objectives and policies of the XI. Development Plan is "livable cities and sustainable environment".

In order to create livable cities and sustainable environment in Turkey, targets and policies should be established in the National Development Plans. In this context, in this study, the XI. Development Plan livable cities and sustainable environment targets will be evaluated within the scope of climate change.

Sustainable environment; It means transferring natural resources to future generations, that is, ensuring their continuity. One of the important issues of the future will be sustainable development. Sustainable development can be achieved through a sustainable environment. For this reason, it is necessary to identify the environmental problems faced by today's societies and to develop solution proposals. Solving environmental problems; sociality, democracy, equality, justice, human needs and environmental value. Achieving social justice, achieving economic prosperity and protecting the environment require complementary goals, objectives and policies (Commission of the European Communities, 1998). With the provision of sustainable environmental conditions, the quality of life will increase and livable cities will be created. Therefore, all these concepts should be considered as a whole.

The objectives of the XI. Development Plan consist of 5 main headings. These;

- stable and strong economy,

- competitive production and efficiency,

- qualified people and strong society,

- livable cities and sustainable environment,

- the rule of law, democratization and good governance.

Among these targets, livable cities and sustainable environment target has 8 sub-headings. These;

- regional development,

- urbanization

- dwelling

- urban transformation,

- urban infrastructure,

- rural development,

- environmental protection and

- disaster management.

Livable cities and sustainable environment targets; environmental, economic and socio-cultural, will be evaluated through three dimensions of sustainability. The main purpose of the regional development goals has been to ensure balanced development in our country. In order to achieve balanced development, it is aimed to reduce both intra-regional and interregional development differences (XI. Development Plan, 2019-2023). In line with this purpose, targets for environmental sustainability have not been determined and the targets for economic sustainability are as follows:

> *"An official statistical infrastructure will be developed that can measure regional development differences, especially production, income and employment data, on the basis of region, province and district."*

Regarding socio-cultural sustainability, the target is as follows:

> *"The Social Support Program will be restructured to encourage social entrepreneurship and social responsibility activities, especially in order to ensure the more active participation of disadvantaged segments of society in economic and social life, to increase employability by supporting productivity and talent development."*

The main objective of the urbanization targets is to create cities with high quality of life, respectful to the natural and historical environment, equal and accessible distribution of urban services, human-oriented and value-producing cities (XI. Development Plan, 2019-2023). In line with this purpose, the environmental, economic and socio-cultural targets are as follows:

> *"Our cities will be planned in coordination with the vision of development, with a multi-centered, mixed-use approach, especially one that ensures accessibility; In spatial plans, harmony with topography and disaster risk, climate change, geographical features and historical values will be taken as basis."*

> *"To develop the unique identity of cities; In order to protect and revive natural, historical and cultural values, a support program for local administrations will be developed by the General Directorate of İller Bankası A.Ş. (ILBANK)."*

> *"Protection of public spaces in cities, especially open and green spaces; increasing access and security; It will be ensured that it is reconstructed within the framework of human-nature relationship by being sensitive to women, children, the elderly and the disabled."*

> *"Within the scope of the green city vision, National Gardens will be built in our cities and the amount of green areas will be increased in order to increase the quality of life and adapt to climate change."*

The main objective of the housing targets has been to provide everyone with access to housing that is adequate, safe, economical, sustainable, climate change resilient and has infrastructure services. For this purpose, primarily low-income earners are considered (XI. Development Plan, 2019-2023). Amongthe targets set in line with this goal, the targets for environmental, economic and socio-cultural sustainability are as follows:

> *"In housing production, quality, robustness, accessibility, energy efficiency, disaster resistance standards will be developed and observed at every stage."*

"During the plan period, 250,000 social housing units will be produced for low-income and disadvantaged groups. "

The main purpose of urban transformation is to transform the areas under disaster risk and disaster hazard into healthy and safe areas and to provide the necessary standards in this transformation (XI. Development Plan, 2019-2023). In line with the targets established in line with this purpose, targets for economic and environmental sustainability have not been determined and the socio-cultural targets determined are as follows:

"Urban transformation; With its horizontal architectural understanding, it will be carried out in a way to include the renewal of historical centers within the framework of increasing the quality of life and developing urban awareness."

"Social impact analysis will be carried out before urban transformation applications."

"It will be ensured that urban transformation works are carried out in a way that supports the production of domestic and innovative materials."

The main objective for urban infrastructure is to ensure healthy and safe access of people in drinking and potable water, to minimize wastewater impacts, to increase recycling practices and to ensure sustainable urban transportation (XI. Development Plan, 2019-2023). Inline with this goal, the targets for environmental sustainability are as follows:

"Within the scope of the protection, development and sustainable use of water resources, basin-based plans, strategies and action plans will be implemented in an integrity."

"In order to ensure the effective use and protection of water resources, river basin management plans, sectoral water allocation plans, basin master plans, drought management plans, flood management plans, drinking water basins protection action plans for 25 basins will be completed."

"Basin planning will be made for the reuse of treated wastewater, especially agriculture, and the pressure on water resources will be reduced."

> *"The dissemination and sustainability of the national water information system will be ensured."*
>
> *"It will be ensured that drinking water and wastewater services are provided efficiently, adequately and in accordance with the standards, and the operating performance and investment efficiency of the responsible institutions will be improved."*
>
> *"Environmentally friendly modes of transport will be developed and non-motorised modes of transport will be encouraged in urban transport."*

In the targets set for urban infrastructure, the targets for economic sustainability are as follows:

> *"In the provision of drinking water investments and services, a reimbursement system will be developed to ensure that DSI's drinking water project financing is sustainable."*
>
> *"The SUKAP program will be developed to reduce physical losses."*
>
> *"A single card payment system will be implemented to expand the use of public transport systems."*

In the targets set for urban infrastructure, the targets for socio-cultural sustainability are as follows:

> *"Public awareness will be raised in the recycling of solid waste."*
>
> *"Zero Waste Project applications will be expanded."*
>
> *"Pedestrian zones free from motor vehicles will be created in historical and cultural attraction points and shopping areas in urban centers."*

The main objective in rural development is to increase rural employment, to combat poverty, to provide regular and adequate income opportunities in the countryside and to keep the population in the countryside (XI. Development Plan, 2019-2023). In line with this goal, the targets for environmental sustainability are as follows:

"Rural development supports will be programmed with a focus on farmers and the environment; arrangements will be made to eliminate the existing multi-headedness in the execution of the supports, and complementarity and effectiveness will be ensured in practice."

"Environmental support and incentives will be increased to improve the quality of life in rural areas and to turn the countryside into protected, living and producing areas."

In the targets set for rural development, the targets for economic sustainability are as follows:

"Within the scope of resettlement and settlement activities needed depending on various risk factors, appropriate structures will be built adjacent to the village or in the areas to be determined instead of the structures that threaten the safety of life and property, with priority given to those whose places are expropriated in rural areas."

"A coordination mechanism will be established for the effective use of the resources allocated for rural settlement."

"In order to ensure the sustainability of production and life styles in the countryside, the preservation of rural heritage and the protection of natural and cultural assets will be ensured."

"Statistical studies will be carried out to measure the socio-economic level of the countryside such as rural poverty, production and employment."

In the targets set for rural development, the targets for socio-cultural sustainability are as follows:

"Within the scope of developing the human capital of the rural community and reducing poverty, the anti-poverty efforts in the villages will be continued with a focus on production and employment."

"In order to develop the human capital of the

rural community, activities on farmer training and agricultural consultancy for family enterprises will be strengthened, access to non-formal education courses will be provided to the adult population, especially women and young entrepreneurs, and vocational training programs will be programmed on the basis of local products with high added value."

"In the activities aimed at combating poverty in the villages, priority will be given to households where disabled, poor and elderly individuals live and households engaged in seasonal mobile agricultural labor."

The main purpose of environmental protection is the protection of the environment and natural resources, the realization of environmental and climate-friendly practices, sustainable management and increasing environmental awareness (XI. Development Plan, 2019-2023). In line with this purpose, the targets for environmental sustainability are as follows:

"Work will be carried out within the framework of the Intended National Contribution to control emissions in buildings that cause greenhouse gas emissions and in the energy, industry, transport, waste, agriculture and forestry sectors."

"Air quality management practices will be activated to prevent air pollution from production, heating and traffic, and air quality will be improved by controlling emissions."

"The identification, registration, conservation, sustainable use, development, monitoring and trafficking of biological diversity and genetic resources will be prevented, and the benefits obtained from genetic resources and related traditional information will be brought to our country."

"Effective management of nature protection areas will be realized by increasing the amount of protected areas on land and sea in order to ensure the protection, repair and sustainable use of ecosystems and ecosystem services."

"By increasing the amount of protected areas on

land and sea, applications such as the creation of green corridors, planning and infrastructure works will be carried out to ensure the effective management of these areas."

In the targets set for the protection of the environment, the targets for economic and socio-cultural sustainability are as follows:

"Risk management and emergency response capabilities against major industrial accidents will be improved."

"Education and awareness raising activities will be carried out on environmental and nature protection and sustainable production and consumption in order to increase the environmental awareness of the society."

"The environmental label system will be expanded."

The main purpose of disaster management is to raise the awareness of thesociety against disasters, to create disaster-resistant and safe settlements, and to minimize the loss of life and property. (XI. Development Plan, 2019-2023). Inline with this goal, the targets for environmental sustainability are as follows:

"Disaster hazard and risk maps will be prepared by taking into account the scenarios related to the effects of climate change throughout the country. "

In the targets set for disaster management, the targets for economic sustainability are as follows:

"Turkey Disaster Risk Reduction Plan will be prepared for disaster risk and harm reduction activities."

"The capacity to prepare and implement local disaster prevention projects for disasters that have happened or are likely to occur will be increased."

"Risk maps will be prepared according to disaster types in places with high disaster hazard levels."

"Priority will be given to strengthening common

use areas such as hospitals, schools, dormitories, which are of particular importance in disaster preparedness and post-disaster response, and critical infrastructures such as energy, transportation, water and communication."

In the targets set for disaster management, the targets for socio-cultural sustainability are as follows:

"It will be ensured that the cultural and natural assets in Istanbul are made resistant to disasters."

"Social awareness against disasters and emergencies will be increased and the capacities of the units responsible for disaster management at the local level will be strengthened."

"Awareness raising activities will be carried out throughout the country against disasters and emergencies, and social awareness will be increased through training and awareness centers."

4. CONCLUSION

With the increase in environmental concerns in the world, the concept of sustainability has come to the agenda and both its content and scope have expanded in the historical process. After all, sustainability; It has been accepted as a development model that considers balance and equality. In Turkey, development plans are a type of high-level plan in which goals that take into account balance and equality are determined. In order to achieve the development goals, the targets for sustainability should be established in the upper level plans. The XI. Development Plan includes the objectives and policies that guide spatial plans. In this study, the relationship between the objectives of the XI. Development Plan and the environmental, economic and socio-cultural components of sustainable development is discussed.

In the XI. Development Plan, environmental sustainability targets for regional development have not been determined and infrastructure works related to economic and socio-cultural sustainability and targets have been determined to ensure the active participation of disadvantaged segments of society in economic and social life.

When the environmental, economic and socio-cultural targets for urbanization are examined; It is seen that a planning approach considering

climate change, historical values and geographical features is adopted. At the same time, reconstructing the nature-human relationship that is sensitive to women, men, the elderly, children and the disabled is important in the context of sustainability. At the point of preventing climate change, the choice of location of the national gardens in the cities is among the targets that increase the quality of life both environmentally and socializing in these places.

When the environmental, economic and socio-cultural targets for housing are examined; the goal of energy efficiency, robustness and disaster resistance in housing production is within the scope of economic sustainability. The target of social housing for low-income and disadvantaged groups is a goal for socio-cultural and economic sustainability.

In line with the targets established for urban transformation, targets for economic and environmental sustainability have not been determined and social impact analysis will be carried out in these areas, the use of domestic and innovative materials, and the understanding of transformation for urbanity awareness are among the socio-cultural sustainability targets.

When the targets related to urban infrastructure are examined; The goals of ensuring and protecting the effective use of water resources, the reuse of treated water, the dissemination of national water information systems, and the encouragement of non-motorized transportation types are important in terms of environmental sustainability. The single card payment system in public transport is associated with economic sustainability. The objectives of raising public awareness about recycling, expanding zero waste project practices and creating pedestrian zones free from motor vehicles are within the scope of socio-cultural sustainability.

When the targets for rural development are examined; rural development supports will be programmed with a focus on farmers and the environment, combating rural poverty, training farmers, agricultural consultancy, efforts to increase production and employment in rural areas are the goals related to environmental, economic and socio-cultural sustainability.

When the targets for the protection of the environment are examined; Prevention of greenhouse gas and air pollution, determination of biological diversity, effective management of nature protection areas, environmental and nature protection trainings to increase the environmental awareness of the society, environmental label system is related to environmental, economic and socio-cultural sustainability.

When the objectives related to disaster management are examined; Determining the scenarios for climate change, preparing risk maps in

disaster risk areas, making cultural and natural assets disaster resistant, conducting training and awareness activities against disasters and emergencies throughout the country are related to environmental, economic and socio-cultural sustainability.

Ultimately, it is seen that the XI. Development Plan tries to balance the environmental, economic and socio-cultural structure, so that the XI. Development Plan contains goals that are compatible with the sustainable development components.

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Chapter 4

19-20. TH. CENTURIES IDEOLOGIES FOR HOUSING PROBLEMATIC REFLECTIONS TO THE ISTANBUL

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1. Introduction

In this article, mainly focused on new architectural and urbanism "ideas" and "ideologies" which was developed in Europe since the 19th century to solve the "housing" problematic since the industrial era and its reflection to the Europe and Türkiye present day. These ideologies first influenced the Europe and later their reflections spread to Türkiye through the European architects and planners. New ideologies first emerged as "utopias" and later they played significant role in the development of new theories and doctrines especially in "housing". They were also considerable effects in the development of architectural and urbanism theories and doctrines these ideologies appeared in Europe from the middle of the 19th century. Indeed, the main problem of industrialization period was focused on the "housing" the problematic specifically. Thus, involved to one of the significant problems in the cities "housing" problematic gained importance, therefore the new ideologies developed to find a solution. However, to solve the housing problems was needed a long-term process extended to nearly century from the 19th to the 20th century. The "housing" problematic also revealed the other issues of the society living and hygienic conditions.

The new innovative planning ideologies in 19th century and their reflections in Türkiye were through the European architects and planners. In the 19-20th century, some ideologies in architecture and planning arose from mostly European ideas. Some of the new ideologies in the 19th century and the beginning of the 20th century never been applied as a realistic project and remained only "utopia". Mannheim was defined the "ideology" as persuaded substance to advance of the interests of class or group within the context of an established social order (Manheim, p. 203-261). However, these projects which were concentrated on "utopian" ideas and ideologies at first, later they played an important role in the solution of problems and began to implement as realistic projects and turned into as realities. Later, these "Utopias" also transformed the society influencing their lifestyle through "urban planning ideologies ". Reflection of the newly developed design and planning approaches in the context of the new ideologies in Architecture and urban planning were seen firstly in 19th century in Europe and all world and finally, in the early 20th century in Turkey. 20th centuries new projects that were arranged by new norms suitable for public-health actually stemmed from "utopian" projects such as Benjamin Ward's "utopian" city (*Hygeia*) which were developed in the 19th century (Merlin, 1991, p.27).

1.1 The 19th Century Theories and Ideologies the Housing Problematic in Industrial Era

The industrial period was the turning point of housing problematic and the problems of the cities that have been reflected until today. Industrialization first appeared in England in the 18th century, affected profoundly the social structure in Europe and France in a social and political context. In the cities some problems confronted by industrialization and its effects; migration, irregular urban-growth in the newly developed slums in the areas where they mixed with newly opened factories. Thus, with hasty increase of population housing became more expensive, also it made impossible to find healthy, livable housing in cities. The newcomers in the city to work in the factories was directed to living in slums of the cities' peripheries and outer quarters. Public-health and safety were became the most important problems in industrial cities on that era (Pinon&Vidal 2001, p.57) Industrial city dwellings had unhealthy living conditions; people were lived in narrow houses that also lack of air and light and diseases were widely seen. In this period, conditions of poor public-health that even initiated the mass deaths in cities (Flamand, 2009, p.19). Industrial city dwellings: For example, "town-houses" built side by side in cities such as England and London, where industrialization is intense, away from public-health (Mumford, 1991, p.569). Thus, the housing problems experienced in the industrial period led to housing shortage or the lack of necessary and sufficient hygiene in the cities.

Indeed, to solve the housing problems was needed to long-term process also it would be last long time. A radical and permanent solution for housing problem might be take many years than the expected. Also, the first projects aimed to solving housing problematic would not be able to be implemented and would remain in utopia. The real solution to the housing problem was to be realized only when utopian projects gradually turned into reality. So, some innovative steps were taken by the pioneers of urbanism to establish new urbanism theories which was divided into two periods: "urbanism" and "pre-urbanism" (Merlin, 1991, p.24). The "urbanism period" embodied the whole of urban planning practices. However, the "pre-urbanism period" was signified that urbanism theories were not only applied but also a period the new theories were produced. Thus, these developments led the development of "urbanism" as a new discipline even though it was remained as a "utopia" as long years without application known the theoretical basis only.

Based on the plans prepared with innovative "ideas" in the 19th century, these were the projects and social discourses that were seen as impossible for that period. This societal "social problem" affecting cities

first were in the dimension of utopia (Choay, 1979, p.15). Innovative projects in the 19th century were also reflected in "housing" planning.

The social basis research led to the emergence of a new housing system such as "social-rental housing" (which solves the problem of housing for low-income people, as low-cost, and affordable model). The first planners were called social utopians, they drawn attention to the "social" problems in the cities underlying urbanization. Charles Fouriér, Étienne Cabet, Jean-Baptiste Godin, Pierre Joseph Proudhon, Benjamin Ward-Richardson, "pré-urbanists" (predecessors of urbanism) were known as social utopians (Coskun, 2017a, p.26)

Fig.1. *19th.century, Fouriér Phalanstère. (Palace-house) Fig. 2. 19th century, Godin Le Familistére, Bnf., Biblothèque Nationale de France. (Social-house) Bnf, Biblothèque Nationale de France*

1.2. 19th Centuries Pioneers of Developments of the Housing İdeologies Utopias and Utopians

Finding a solution to the housing problem of the industrial era first was via the premises in the development of some urbanism theories. Although many of these projects remained as "utopia" with their search for solutions to the housing problem, they played an important role in the development of future housing projects. One of the first solution to the housing problematic on that era was proposed by Charles Fouriér. C. Fouriér, was a French social thinker, and one of the leading "Pré-urbanists" also was the founders of "social-utopia" (Merlin, 1991, p.27) According to F. Choay: Innovative planning based on "public-health" put forward in the projects of prominent social utopians such as C. Fouriér (Choay, 1979, p. 23). These projects were led to the development of earlier urbanism ideas and the significant projects, such as the Guise, C. Fouriér, and J. B. Godin (Merlin, 1991, p.27).

They were known as developer of the housing theories as pioneers of the urbanism theories also pioneers and social-utopians, and they sought to advanced solutions to the urban problems that evolved with technology (Choay, 1979, p.16) 19th century utopist projects led to the emergence of innovative projects later even some influences have been seen in beginning of the 20th century.

Utopias first arose as a utopia than effected the architectural and urbanism theories even transformed the society. Likewise, the Mannheim declared that: "we might change the whole of society to-morrow if everybody would agree" (Manheim, 1985, p.203-265). The utopians first searched to find answer the problems of the 19th century industrial society. Later, from the 19th century onwards, they developed new theories, doctrines, and projects to find solutions to the problems of industrial society and the housing problematic. Indeed, the real solution to the housing problem was to be comprehended only in the process via utopias gradually turned into reality. However, the other problematic was to specify a "housing" model for society accordance to the public-health of that period. Some of the prominent thinkers and philosophers of the period would develop theories and subsidized to the solution of the "housing" problematic. According to L. Mumford: architecture should be simple, and the "houses" should be designed according to personal necessities and lifestyles spatially (Merlin, 1991, p.29). Innovative projects were first developed as utopia that guide the development of urbanism towards the end of the 19th century. With the social problems underlying urbanization and social problems, the first utopians were called social-utopians.

Therefore, in the 19th century, progressives searched a model for "housing" problem and decided that the standard "housing" model should be a "*phalanstère*" (palace-house) rather than a "slum" (poorhouses). This specified model should had been neither a "*bourgeois*-house" nor a "marquise-house" (houses for rich people) (Choay, 1979, p. 23). Since the "housing-model" was considered appropriate as being an example of a palace. (Because of the largest residential building was considered the French Palace of Versailles). The model based on the "palace-house" to provide social justice in society since the social-utopians not aimed dwellings separated into rich and poor. The idea of "housing" should be considered the best solution and would be suitable for all segments of social class. Thus, Fouriér's the "*phalanstère*" (palace-house) model was considered to premise for many people, as a solution to the densely populated industrial city of the 19th century (Merlin, 1991, p.25). Fouriér was influenced by density of population in big-cities and its evolution, thus he aimed to design a residential with multi story like "palace" where the many people lived in. Thus, "*Phalanstère*" (palace-house) the idea

of social evolution as parted of the industrial society with Fouriér's philosophical view was reduced to one piece housing model" (Choay, 1969, p.32).

Another early theorist of the 19th century was Godin, who known for his research on the problems of workers and poor people in France, especially during the industrial period. Jean Baptisté André Godin was a 19th century French industrialist, an entrepreneur, writer, and political theorist. J. B. Godin followed in Fouriér's footsteps and Godin's "housing-model" was a social housing model, also influenced by the ideas of K. Marx and the social theories of social utopians based on "human" (Paquot, 2009, p.7). Godin was visited the Paris and discovered the misery of the people's living and working conditions and he was disappointed (Rey, 2009, p. 26-27). The *Familistére*, the factory building of J. B. Godin in Guise, France, was planned accordance the social communal lifestyle. The aim was to improve social life on a humanitarian basis and to search solutions to the "public-health" and poor living conditions in the industrial period (especially workers). J. B. Godin designed the complex of the factory and workers' residences nearby. C. Fouriér's "palace-house" like the Versailles Palace in Paris as a "hotel like house" a block with courtyard (Rey, 2009, p. 26-27).

Also, many of these ideologies never been applied in architectural projects or city plannings remained only on theoretical basis. Thus, these projects whether architecture or city planning were divided into two groups, those who design them and those who implement them. Furthermore: also, planner called two different ways: theorists and practitioners.
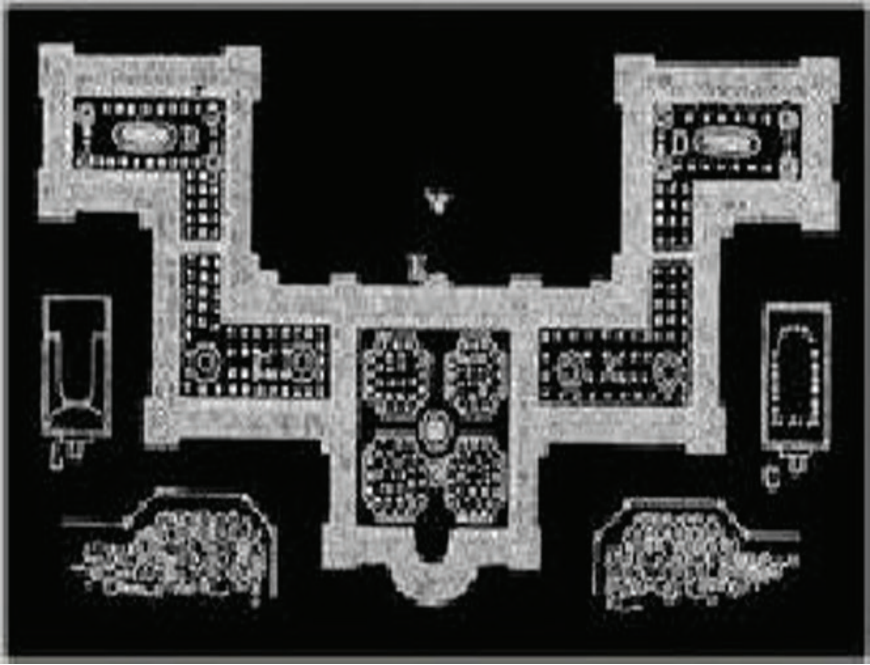
Fig. 3. *Fourièr, Utopian planning, "Phalanstére". Habiter l'Utopie, p.23*
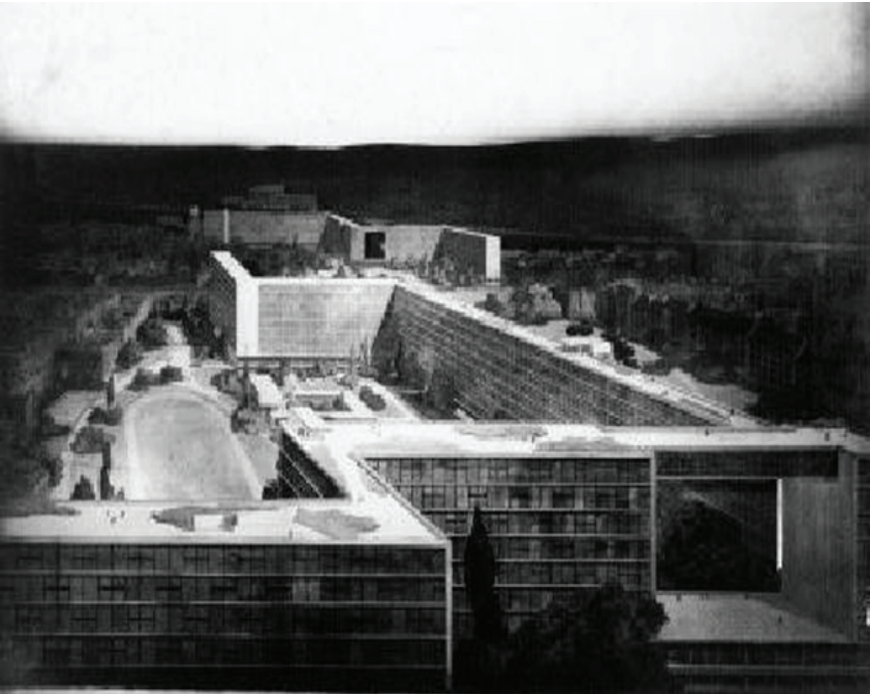

Fig. 4. *Le Corbusier, Ville Radieuse. Fondation Le Corbusier*

1.3. 20th Centuries New Ideologies and the Modern Architects and City Planners

By the 20th century, new, innovative, contemporary, and modern urbanism theories were developed. One of the predecessors which was known as model progressists was the first prominent planner Cerda the founder of advanced "urbanism" theories with the first modern planning of Barcelona in 1858 (Merlin, 1991, p.31). Cerda was developed an innovative system with a new proposal against the traditional and densely urbanization with a new project. The new empty areas mid of the plots contribute to green-areas of the city, and with the equipment of the modern world-aesthetics brought innovations to urban planning by using plants, greenery, trees and lighting (Choay, 1980, p.237). Cerda's innovative and modern urban planning theories would be inspired by the next urban planners.

In the 20th century, developed modern city models and theories were emerged. Thus, in this context two models came to the fore: Tony Garnier with the new "building" planning and Le Corbusier with the new "urban" planning (Choay, 1979, p.24) This method was adapted to cities dominated by traffic and highways in the 20th century as an innovative method not seen before. The advocates of the "ideal city" were indicated the developing urbanism in the 20th century (Paquot, 2013, p. 35). These innovative methods were supported by CIAM and its defenders of modern city also against the traditional city, in the 1933. Indeed, the urbanism developed by pre-urban practitioners in the orbit of modernity and increasingly became universal, also the universal human factor was important in Le Corbusier's urban design (Merlin, 1991, p.42). At the beginning of the 20th century, significant changes occurred and played a role in the development of the new "housing models" and "typologies". The CIAM approved new rules *la Charte d'Athéna* (Le Corbusier, 1943) as well as the zoning rules which were different from the French urbanists (Doğrusöz, 1981) applicated as specified for regions in the cities according to functions (Bruant, 2011, p. 245), (Prost, 1948), (Coskun, 2021). It also brought certain rules and regulations for unhealthy urbanization would be ensuring improvement in cities through municipalities (Massiah, 2012, p.102). Also, CIAM proposed new regulations for "public-health" due to the growing population and transportation problem, thus the multi-story planning supported that would occupy less space in the cities located in a regular geometric system (Choay, 1979, p.26).

As the founder of the "modern-architecture", Le Corbusier pioneered new housing ideologies and developed new housing models defending "standardization". Indeed, the method of "standardization" was applied

in similarly almost every city by Le Corbusier with a similar plan scheme in for France, Japan, USA, and Northern Africa (Choay, 1979, p.34-35, p.41). In the early 20th century aside from Le Corbusier the other architect and planner group realized plannings in France, Europe and developed new planning ideas and ideologies depend on "realistic ideologies".

Fig. 5. *Henri Prost, Istanbul European Side Master Plans Between Pera -Şişli-Levent Axis. IFA Archives, Paris.*

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2. In the Early 20th Century Reflections of the New Architectural Ideologies in Istanbul

Multi-story "housing" projects, supported by CIAM and known as modern architecture, that emerged in Europe in the 20th century, were also implemented in Istanbul in similar way. The beginning of the 20th century, French planner Henri Prost was invited to Turkey for planning the Istanbul city in the context of the modernization project (Bilsel, 2011, p.101). Henri Prost's planning ideas based to old French *l'école* (school's) tools: *l'embellissement* (beautification), *l'hygiène* (hygiene, public-health) and traffic regulation. Likewise, Henri Prost's planning idea was stemmed from utopians planning methods: aimed to planning houses featured 20th century "public-health" standards.

In Istanbul, Henri Prost envisioned development of the city axis to the Levent District in his Master Plans. In Istanbul, as a new city axis Levent was aimed to develop by extending by the tramway from Taksim to Şişli quarter. In the 1950's, the Levent wanted to plan as as a new modern housing settlement. Prior to the 1950 elections, in 1949, the Istanbul Mayor L. Kirdar was requested from Aron Angel planning of the Levent Project while Henri Prost was in Paris. (Boysan, 1999, p.35-37) Aron Angel was also an architect-planner who educated and had a

diploma from the ESA, *l'Ecole Spéciale Architecure* (an Urbanism School also Henri Prost gave the urbanism lectures).

2.1. The Early 20.th. Century Istanbul, Levent Project: Example of the "Social-Utopians".

In the Levent project, H. Prost previously had the idea of developing new housing models specificly produced fot Istanbul, likewise in Europe of the period. Contrary to the Historic Peninsula, which consisted of small parcels, Levent Farm, which was on the new development axis of the city, was a vacant broad land. Although H. Prost's Levent project was first thought to related to the "garden-city" models in France, however, it was emphasized that by Aron Angel himself explaining that he used some concepts and architectural elements inspired by Le Corbusier in Levent project.

Fig. 6. *Istanbul, Levent in the Early 20th Century, old Farm Area in Bosphorus Heights. Photo Anonyme.*
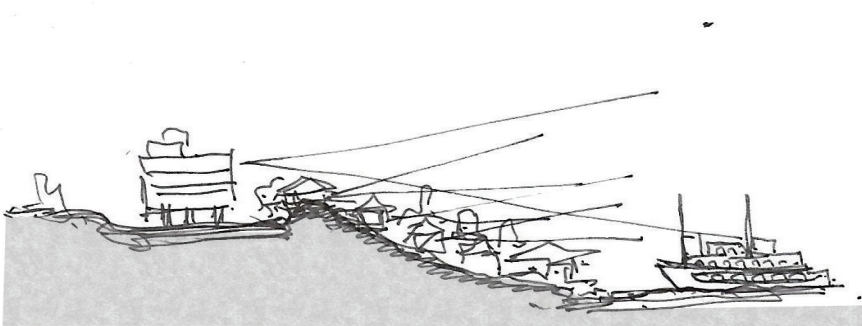

Fig. 7. *Henri Prost and Aron Angel's proposal for Levent District, Istanbul Bosphorus Heights. Sketch H. Coskun Doctoral Thesis, 2017, p. 222.*

Although the project was inspired visually from Le Corbusier's Marseille-Block model *l'Unite d'Habitation,* the main idea was originated from utopian ideas and collective living style in the theoretical context. Henri Prost aimed the first the "public-health" likewise "utopians' applied reminiscent plans of the 19th century social-utopians, where the many families resided in collectively in same building (Coskun, 2017a, p.221). The idea was like social-utopians Godin and Fouriér's collective buildings with multi story where the many people lived in. However, this planning idea of the Henri Prost not coincided with the living style people of Istanbul as well as the Municipality of Istanbul on that time**.**

According to Henri Prost's colleague architect-planner Aron Angel's description: this project, was planned by himself and Henri Prost resembled the one of the Le Corbusier as a high-rise residential block built on raised columns called by Le Corbusier *pilotis*. *Pilotis*: was allowed for the circulation of cars and other vehicles also view of the green-areas with less intervention (Le Corbusier, 1980, p.239). Henri Prost and Aron Angel's Levent project was a "modern" housing model, like Le Corbusier's *Habitation d'Unité de Marseille* (Marseille Block) that designed as social-utopians "*phalanstére*" (multi-story palace-house) model accordance to understanding with different public life norms derived from "social-utopians".

Fig. 8. *Unite d'Habitation Marseille,,Le Corbusier The raised columns called pilotis Photo, H. Coskun, 2011.*

Fig. 9. *Unite d'Habitation, Marseille. Fondation Le Corbusier.*

Aron Angel explained the project: "In Levent project I planned high-rise buildings but, these buildings would not appear from the Bosphorus as a principle of the planning ideas: To avoid the seen in silhouette we replaced the buildings in the lower areas of land and there was nothing else on the ground level, thus all green might be seen. Down the buildings: garage and the cars would not be placed the ground level and garden, garage, and laundry rooms would be placed in the building 6.5 m. up from the ground" (Boysan, 1999, p.35-37)**.**

In the statement of Aron Angel: Henri Prost's Levent planning was raised with columns on the ground called *pilotis* were a very modern planning likewise the Le Corbusier's *Habitation d'Unite de Marseille* (Marseille Block). This building model was also related to some influences by the H. Prost and Aron Angel's previous obscure utopist ideas and planning methods though Prost and Le Corbusier, basically, implement of very different planning methods (Merlin, 1991, p. 27) However, based on the project, it also was included collective-common living spaces: "The garage was planned under the buildings would not be at ground level here were planned at a height of 6.5 m from the ground also first-floor for market might be purchased to food and drink, also was planned a nursery for children on a floor in the middle as wellas the meeting rooms and restaurants on the top floor, thus every building would be a kind of cooperative" (Boysan, 1999, p.35-37)**.**

In the mid-19th century, with new, innovative, radical lifestyle norms of social-utopians: "*Phalanstére*" (multi-story, palace-house) building model was also reacted in Paris city previously due to its uncommon social communal

lifestyle with had many common areas. For centuries in the Ottoman Empire, residents were lived behind windows shutters *kafes* and wall with an indoor lifestyle, so, Henri Prost and Angel offered a "*phalanstére*" (multi-story-residence-palace) model based on social utopians was very different norms of communal lifestyle with a common cafe, a dining room, iron-laundry area with common social areas might have had a reaction by residents as an interfere of their conservative lifestyle.

"The residences were planned by A. Angel with H. Prost in Levent consisted of blocks of 15 m.-20 m., 20 floors, each floor was approximately 20 m2 per person, for a total of 600 people" (Boysan, 1999, p.35-37). "In the residences, the meal would be prepared on the floors above and everyone would be able to see the sea in common dining room while eating also planned two-room and three-room apartments included kitchenettes. According to reports: Also, a Mon charge was planned to carry for meals as well as the laundry with the idea of the woman exempted from home-works" (Boysan, 1999, p.35-37).

According to A. Angel: H. Prost's Levent project was deemed inappropriate by the new Municipality, citing "social" life norms that did not coincide with the Turkish family lifestyle. After Henri Prost left the Istanbul city, another Turkish architect and planners K. Ahmet Aru and R. Gorbon re-planned the project of previous architect-planners Aron Angel and Henri Prost, which was not implemented by the new Municipality (Coskun, 2017a, p. 221).

Levent Project was a large-scale housing planning consisting of multi blocks and several planning stages and in which different housing types were used in each section. After the 1950s, approximately 500 houses were built in areas such as Levent and Koşuyolu districts with the partnership of Türkiye Emlak Kredi Bank-Municipality partnership (Pulat, 1992, p.17). In the 1960s, after H. Prost, Levent planning was carried out by Emlak Bank, which built large-scale housing projects (Coskun, 2017a, p. 339). The 1st Levent Project generally consisted of "garden-dwellings"; II. Levent was made in 1951; III. Levent, in 1952-53 and finally IV. Levent was built (Tekeli, 2013, p.354). The project of A. Angel in this section was IV. Levent Project.

In the 1950s, the socio-economic policies of Atatürk's period were also undergoing a liberal change. During this period, H. Prost was seen as close to the old Government's ideas and his plans were not approved by the new Government and Istanbul Municipality which defended American policies. Although H. Prost did not adopt the views of the new government, he worked with the Governor of the Municipality F. K. Gökay, until 1951 (Doğrusöz, 2016).

In the post-Prost period, the committee under the direction of K. Ahmet Aru was also criticized H. Prost's plans. H. Prost would also state that K. Ahmet Aru who realized the Levent project after him was against designing housing for the "middle-class" in Levent (Akpınar, 2010, p.178). (Probably, H. Prost, who adopted the "social-housing" policies, was against the expensive "middle-class" and "upper-class" housing.) After that, the social policies implemented during the Atatürk period would change radically and adopted liberal enriching policies would gain more importance with the influence of the new government (Doğrusöz, 2016).

Fig. 10. *Istanbul, Levent project, after Henri Prost re-planned by K.A. Aru, R. gorbon. Photo, A.Avcı.*

Fig. 11. *Istanbul, Levent District, Today. Developed as Business Disctrict next to old Levent Housing Project. Photo, Destock.*

However, the Levent project was originally planned as a «middle-class» model housing project. In H. Prost's housing solution proposals

for Istanbul was one of 2-3 exemplary housing models for the "middle-income group". This model, which was generally developed and applicated as a housing model with a Bank-Municipality partnership model, a "bank-housing" model (Doğrusöz, 2016). This new model after H. Prost implemented by Bank-contractor", "Bank-municipality", etc.; "Bank-housings" that Banks such as Emlak Bank and Yapı Kredi Bank provided economic resources were planned and new models were developed (Bilsel, 2010, p.184). Most of these projects were for the "middle-class" was implemented with the new "bank-partnership" model after H. Prost: Koşuyolu, Çamlıca, Acıbadem etc. and on the European side, Mecidiyeköy, Levent etc. according to H. Prost's ideas (Bilsel, 2010, p.184). This model, as housing-project, which was mostly applied by banks, was also known, and called of name of these banks like Emlak-bank project, Yapı Kredi bank projects, Iş Bank projects, etc. (Coskun, 2021). This model was implemented typo-morphologically «outside the city» and «inside the city» after Prost (Coskun, 2017a, p. 219). It stated that these projects not existed today, even though they kept in Istanbul Municipality on that era however, today the project does not exist.

3. Conclusion: Mid and Late 20.th. Century,End of the Ideologies in the World and Türkiye

Although European housing models were not well known, in Türkiye it was planned generally via the European architects who would later come to country. These projects first developed in Europe for many years, finally they would apply in Istanbul by the European architects. The Levent project as planned with modern European blocks was a significant among these projects. Although the first Levent project was originally planned by Henri Prost and Aron Angel as a collective living style in theoretical context similar in European utopian models, also visually modelled Le Corbusier's modern blocks. However, the project was not accepted by the Governors of the time.

Although the new project was thought to different from the previous Henri Prost projects in theoretical context however, another European model was applied as a modern block and typology. Later, in the post-Prost period the new Levent project by K.A. Aru and R. Gorbon was implemented by Emlak Bank as a Bank-Municipality partnership model. After the Bank-partnered housing projects gained popularity as new housing models (modern blocks or garden-city model) widely applied on the European side and the Anatolian side throughout the city of Istanbul.

In the 1950's, was a breaking point in all the world architecture and planning. Thus, previous planning ideas totally changed due to new liberal political view and globalisation all world (Coskun, 2017b). In the

late 1940s, with the Government change the Turkish urban and housing policies was radically altered. The social based planning and housing policies abandoned, and. new liberal political view adopted instead of old social policies. Due to the liberal and enrichment policies Government of the time concentrated produce of "mid-class" and "upper-class" housing.

After the 1950s, the "housing" was emerged as new problematic first time in the city with massive migrations. Thus, the demand for multi-story houses where the many families could live together, like the multi-story housing models developed by utopians since the industrial revolution in Europe, increased. Although the Government devoid of the developed institutions: Banks, Municipality, etc. to produce large-scale housing like Europeans, however with the limited resources of the state, allocated to the large-scale housing projects planned in newly developed districts; Levent, Kadıköy, and Koşuyolu.

In the 1960s, the responsibility of housing construction was handed out to totally private- sector, this made a radical change for the housing construction system. Thus, in the Historical Peninsula the housing production model evolved to production of "property-housing" model where the private-constructors built houses for newly developed *bourgeoisie* people. The plots, the blocks and building-blocks surrounded by the roads and streets drawn in Henri Prost's Istanbul Master plans were applied uncontrolled by the private-contractors of the period, on the lands sold by speculators. In the post-Prost period, the planning of the Historical-Peninsula mainly realized in this way. In the 1960s-1970s due to growing irrepressible mass migration problem, increased uncontrolled the housing construction. Furthermore, after the 1980s, uncontrolled the poor and slum regions began to emerge, and this situation worsened the urbanization of the city.

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Chapter 5

PLACE PRODUCTION: INVESTIGATION OF ENVIRONMENTAL DESIGN-I STUDIO PROCESS

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Space is defined as the field that separates people from the environment to a certain extent and is suitable for the continuation of actions. Space surrounds the human being and creates itself with the boundaries formed by all its physical and perceptual characteristics. The concept of space does not have a form by definition, but it can be redefined as it can be limited and transformed together with formal elements. (Ching, 2002). It is a three-dimensional expression of the distances and gaps between human beings, humans with the environment, and objects with objects, and briefly the space that surrounds us (Gür, 1996). Space is the place bounded by spaces. Therefore, not every space is a place. However, this distinction between "space" and "place" is very difficult to establish and explain (Düzenli and Yımaz, 2021).

When we think of space, we tend to think of external spaces or geometric areas and volumes. Moreover, as Lefebvre (1991) argues, space cannot be thought of as an existential phenomenon, but rather is a social product under constant construction. A space becomes a place because it gains meaning for an individual. (Tuan 1977). Relp (1976) explains the meaning of place by examining people's experiences on the place. According to Relph, who tries to define the relationship between space and place by researching the basic behaviors of people in the world, the quality of a place is largely dependent on human thoughts, behaviors and experiences. Geographer Yi-Fu Tuan's concept of "Topophilia", which points to a much deeper bond between people and places, actually points to a deep bond between people that can change the nature of a place (Alpak and Düzenli, 2020).

According to Schulz (1979), architecture is making the Genius Loci visible. In understanding the Genius Loci, Schulz saw meaning, identity and history as important values. Aristotle (1997) argues that place has the power to hold objects together and that unplaced objects are lost. Husserl (1962) focuses on the concept of kinesthetic, that is, place connected to movement. With such an approach, he has become an active part of the place in the experience. Lefebvre (1991) defines space as a set of social facts and relationships. The place is in the structure that shapes our lifestyles by providing opportunities and expresses our social ideals (Kolb, 1990).

Various theories and definitions about the place from past to present can be listed as follows;

- Canter (1977) Place Theory: According to this theory, in order for a space to be transformed into places that meet human needs, its physical characteristics, social characteristics including human existence and various activities, and semantic features for people

must be understood. Therefore, people's tendency to use or prefer a place is related to what we can do in that place and how we feel there. Canter (1977)'s place theory is that until we know the physical characteristics of a place, the behavior patterns associated with that place, and people's ideas about these behaviors, means not defined. It states that when a place is evaluated as an environmental or architectural object, it should be evaluated not only as an abstract concept or an independent context, but also as a use and experience. Canter says that experience of a place is a combination of both physical and social components. For this reason, the activities in the space transform into the place as a result of people's understanding, definition and evaluation of an environment.

- Yi-Fu-Tuan (1977) Topophilia: defined space as 'movement and freedom' and place as 'stop and security'. In other words, the space is defined as allowing movement and the place as a pause. In other words, every stopping point in the movement creates experiences as a result of the bonds and relations established with that space, allowing the space to turn into a meaningful place. Tuan, while describing the difference between space and place, defined space as a region with defined boundaries. He also defined special locations within this area, where some needs are met, as places. This causes the space to be seen as less important than the place.

- Lefebvre (1991) said that "to change life, we must first change the space". Accordingly, place is achieved within space only when movement, interaction (with man and nature), activities, and a contextual meaning are explicit. As it can be understood from these definitions, the place is not just a geometric space, it is a constantly changing phenomenon that creates communication and interaction by giving meaning and value to it.

The spaces handled in the Landscape Architecture discipline are open spaces. Finding an answer to the question of what makes open spaces turn into "places" is important for creating living spaces where people communicate with each other. The most important skill that should be taught to landscape architecture students during the seven semesters from the Environmental Design Project I course to the Graduation Project should be the ability to transform the space into a place.

Within the scope of this study, how the first year students who stepped into the profession of landscape architecture for the first time transformed the space into a place within the scope of Environmental Design

Project I course, and what their experiences and skills were while providing this were evaluated.

Transformation of Space into Place

According to Creswell (2004), places are spaces where people interact, touch and connect, and meaningful locations. The difference of space from place is that it is an area that has no meaning. When people establish a relationship with the space and assign a meaning, the space becomes a place. Place is a part of space that is used, experienced, and loaded with meaning and value by people. In other words, spaces become places with the stratification of the lived experience in that space. In other words, place is formed by the intertwining of people with each other and their environment (Tuan, 1977).

Figure 1. *Transformation of Space into Place*

In this case, the following questions come to mind:

- Why do people have a high level of relationship with some places while the level of relationship they have with others is low?

- Why do some spaces become meaningful place that are experienced and paused/interrupted, while others remain as unused area?

The answers to these questions are the priority issues that should be answered in the project course of landscape architecture students. The answers to these questions are obtained in line with both the critiques given by the course supervisor during the course and the data obtained by the student during the first 6 weeks of research.

Canter's Place Theory (1977) (Place Theory) states that the answer to these questions will be determined by the Design Value of the Space, and Users first evaluate the qualities of the space in creating a perception of the space, then reach functional and semantic inferences about the space based on their previous spatial knowledge and experiences. What is expressed here is the place experience (Özkan and Yılmaz, 2019; Özkan and Porsuklu, 2021). Experience is an action that takes place at any time and under any condition between the user and the elements that make up the

place where he is at that time (Dewey, 1983-1939 s.lw.13-25). When the parameters that make up the Place Experience are examined;

Physical Features that surround, limit and form the space

• Social Features of human being based on behavior and use, including human existence and various activities.

• The Perceptional/Cognitive Features depending on the emotional relationship between people and the place, that is, the Semantic Value it carries for people, should be evaluated as a whole (Alpak et. al., 2018).

This can be explained with the awareness of multidimensional design in design. It is necessary to understand the physical features such as comfort, image, accessibility, social features including usage, activity, human presence and various activities, and the experiences, attitudes, values, beliefs, preferences of the users related to the space, i.e. the semantic features it has for people. These are the features that contribute to the transformation of the space into place and the creation of the spirit of place (Alpak and Düzenli, 2020).
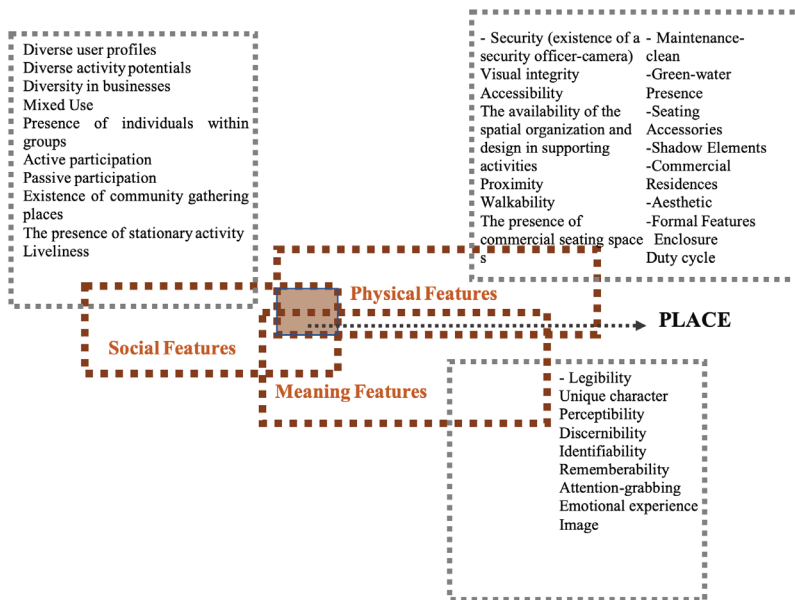

Figure 2. *Parameters that enable the transformation of space into place*

The Process of Transformation of Space into Place in Environmental Design I Studios

Design begins in the human mind, is non-linear and includes various processes that result in a product (Eren, 2022). In the Environmental Design I studio, students are expected to create a conceptual setup and reflect this setup to the final product. During the course, the parameters that transform the place into a place were determined, both as a result of the students' own research and in line with the information given by the course supervisor. The general purpose of the environmental design I studio is to provide topography design, elevation solution, to highlight the creativity of students without limiting them, and to gain the ability to transform the space into a place (Alpak et. al., 2018; Özkan et. al; 2016). In this direction, the parameters available in the literature to be used in environmental design I studios in the transformation of the space to the ground are shown in Figure 3.
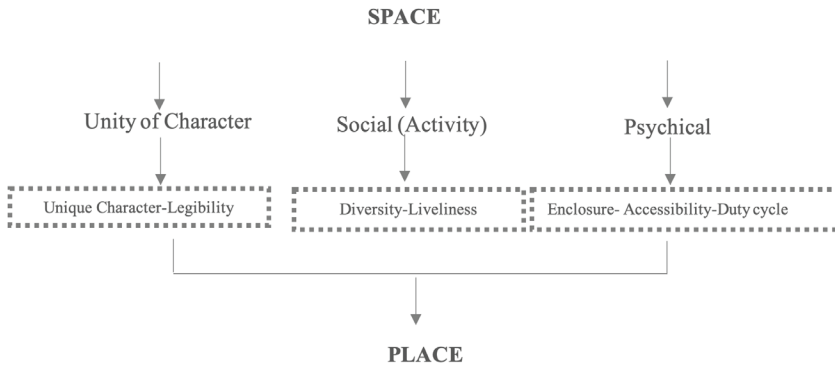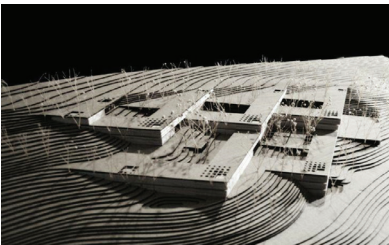
SPACE

Unity of Character	Social (Activity)	Psychical
Unique Character-Legibility	Diversity-Liveliness	Enclosure- Accessibility-Duty cycle

PLACE

Figure 3. *Design Parameters to be Used in Environmental Design I Studio*
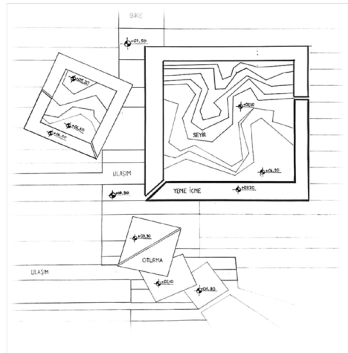
In this study, KTU Landscape Architecture Department II. Semester "Topography Design" student projects (EDP - I) Research Examples and the final product design project Plan, Section and Models were used. Students are first asked to come up with a concept. Because a conceptual thinking system is needed in order for a design to have a strong quality (Eren, 2019). Then, they are expected to find examples of character unity that will reveal the originality, creativity and readability of their designs and to create space organizations for this. In this process, at the same time, the main activity is determined for which need and for whom the design is revealed. And the social dimension of the design is developed. What is expected from the student here is that the design created by determining the unity of character is not only original-creative in terms of form, but also determining the original aspect that differs from the others in terms
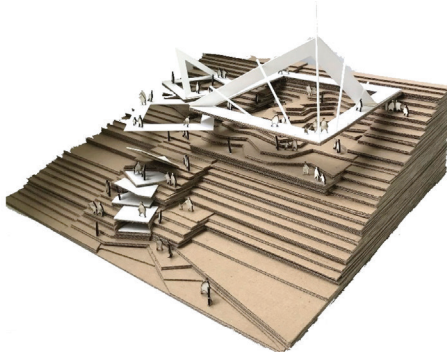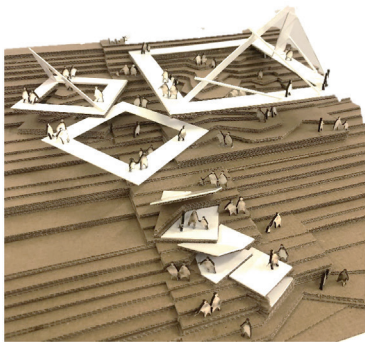
of effectiveness. Finally, it is the creation of the physical dimension in which the relations between the spaces are established, their boundaries are determined, the balance of emptiness (Duty cycle) and connections are established. Character unity, social and physical dimensions are the expected processes in the transformation of a design organization space into a place. This design process covers 16 weeks.

As a result of all these stages, interrelated spaces that respond to user needs and activities are constructed. This stage is not a short process, but a process that is expressed as a model by working on it for weeks. Thus, the final product (Plan-Section-Model) that is different and unique from each other is obtained. This constitutes the main material of this study. Since this is a difficult and powerful process, the longest working interval is given to the model making phase. The last two weeks are reserved for the completion of the plan, section-views and model work of these studies approved by the instructor. These materials were examined within the scope of this study and the transformation process of the place into the place was revealed.

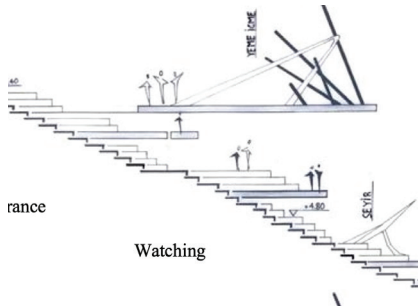**Table 1.** *Transformation of space into place process of Bedirhan Çebi*

Formation of Unity Character	
Sample Research	
	SELECTED UNIQUE CHARACTER: SQUARE **CREATIVITY:** The Organization That Squares Create When They Come Together Terraces created in the third dimension, the use of the upper and lower levels together, and the new space setups formed from this draw.
	LEGİLEBİLİTY: In order to avoid confusion, to create a readable design organization, harmonic forms that do not disturb the unity of characters were chosen, while monotony was tried to be avoided by establishing contrasts between the sizes of the forms in order to ensure the harmony of the activity and space.

FORMATION OF PSYCHICAL PLACE	
 Plan	**DUTY CYCLE:** A Balanced Distribution Is Made Between Built Environment and Green Area. Thus, a balanced occupancy-space ratio was achieved in the study area. **ACCESSIBILITY:** By providing transitions between venues, activities were ensured to be related to each other and an uninterrupted transportation axis was provided in the whole area. **ENCLOSURE:** The most important element in creating a sense of place is by delimiting the spaces. By using the covering element and the reinforcement, the boundaries between the spaces are made to create a feeling of being surrounded.
FORMATION OF SOCIAL PLACE	

Space ⟶ Place
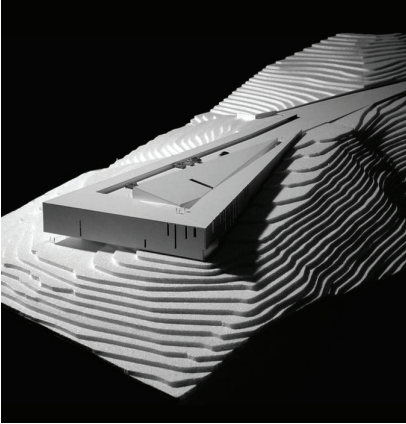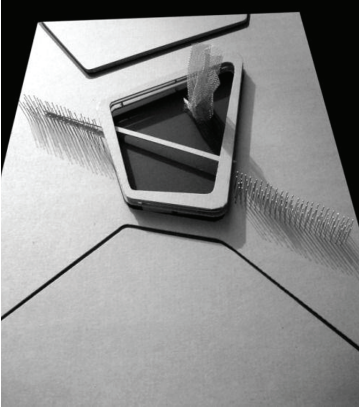
Concept: **Watching**

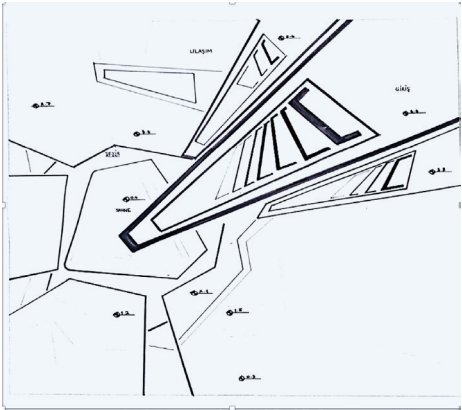In order to meet the socializing needs of people and at the same time to meet the viewing activity, viewing terraces at different levels were created. The lower levels of these terraces are designed as steps where sitting, resting and eating can be done. It is the most important design decision taken to transform the space into a floor so that all viewing terraces can easily see the view and do not block each other.
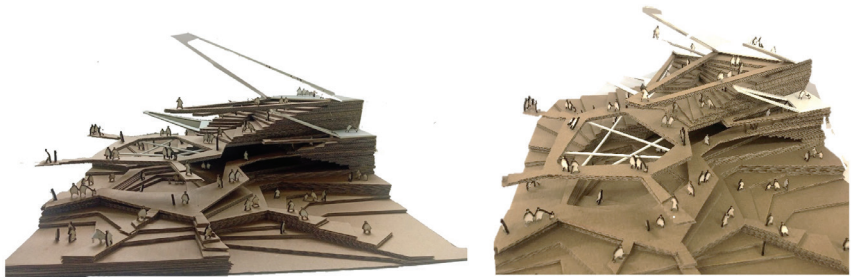
The key to creating livable-living spaces is the well-established process of transforming the space into a place. In addition to teaching students how to design creative and unique spaces in the project courses of the Karadeniz Technical University landscape architecture department, it is aimed to produce living spaces that respond to user needs and have a variety of activities. The final product that Bedirhan Çebi reached within the scope of the project course in the 16-week period, has a unique character, high aesthetic dimension, suitable space setup for the main event chosen, terraces with elevation suitable for viewing, as well as a variety of activities that will strengthen the social dimension and transform the space into a place. The design process was completed by adopting the importance of floor production within the scope of the environmental design project I course, which took the first step into professional life with the awareness of multidimensional design.

Table 2. *Transformation of space into place process of Hayrunisa Fişne*

Formation of Unity Character	
Sample Research	
	SELECTED UNIQUE CHARACTER: PENTAGON-TRİANGLE **CREATIVITY:** combining two different forms, creating a system without causing confusion and chaos while doing this, Thinking and constructing the Upper and Lower Levels together is the most important original aspect of this project. **LEGILIBILITY:** In order to avoid confusion and to create a legible design organization, one of the two different forms was used more dominantly and thus chaos was prevented. The use of two different forms in a balanced way has prevented monotony. By bringing the harmonious forms side by side, readability is achieved by providing integrity at the same time.
FORMATION OF PSYCHICAL PLACE	

Plan	
	DUTY CYCLE: A Balanced Distribution Is Made Between Built Environment and Green Area. Thus, a balanced occupancy-space ratio was achieved in the study area. **ACCESSIBILITY:** By providing transitions between the venues, the activities were ensured to be related to each other and an uninterrupted transportation axis was provided in the whole area. **ENCLOSURE:** The most important element in creating a sense of place is by delimiting the spaces. By using the covering element and the reinforcement, the boundaries between the spaces are made to create a feeling of being surrounded.
FORMATION OF SOCIAL PLACE	

Concept: **Open Air Theater**

The main goal of this project is to design an open-air theater where people can have fun. While doing this, steps have been designed in different sizes and sizes to give people a comfortable viewing pleasure. In addition to this, space setups related to the main event space where general activities such as eating-drinking, resting, chatting can be done.
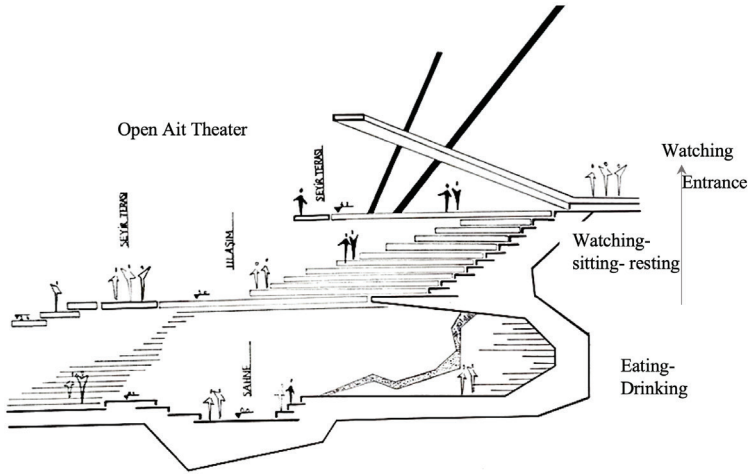
Results

Place production is an important issue that experts in open space design focus on. It requires a challenging process that needs to be considered as a whole, both physically and socially. Making the right plans, creating inviting and attractive spaces with a variety of activities, as well as thoughtful and fictionalized space organizations, are the key points of place production. The place produced with this point of view are the basic point of producing lively-successful spaces.

It is very important to educate students who are educated in the discipline of landscape architecture, where experts who will make open space design are trained, with this perspective and to make them adopt it (Kurdoğlu et. al., 2019). Developing this aspect of the student is one of the primary goals in the environmental design courses of the Department of Landscape Architecture at Karadeniz Technical University (Bayramoğlu et. al., 2019; Bayramoğlu and Seyhan; 2021). The first step of this is the Environmental Design Project I- Field Plastic course, which is the beginning and foundation of the project course. In this course, in which the student learns how to organize a space organization for the first time, it is ensured that both a creative-original formal approach, an inviting-attractive design that constitutes the social aspect of the design, and a place production with an approach in which the physical aspect and the boundaries of the space are determined. It will be possible for students who experience the transformation of space to place for the first time, integrating these skills into their entire education life, and even reflecting

them on their professional business life, when they gain this awareness when they start their education life. For this reason, individuals who gain this perspective in their first project lesson will increase the probability of producing living-alive, high-utilization, successful places, instead of creating empty, unsuccessful spaces with borders, even when they are expert landscape architects.

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Chapter 6

THE EFFECTS OF MODEL IN LANDSCAPE ARCHITECTURE EDUCATION

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1.Introduction

Design is defined by many people as an effort to add aesthetics to the external appearance of the environment or objects. Aesthetics is an aspect of design, but design means much more than that: Design is a non-routine, defined, open-ended problem-solving activity based on the idea of creativity (Bonnardel, 2000) and is an activity that requires multifaceted thinking, the ability to connect between different objects-concepts. The design process is; it is an activity in which the designer synthesizes his creativity, mental thinking power, the data collected by all his senses from the environment and his innate abilities as a whole. The most important part of this process because it builds creativity, "creativity and design" to be able to approach to the solution of design problems from many different angles, starting a new relationship and the relationship between existing ideas or re-designing comfortable-fast-independent, Fluent design thinking and being able to reflect all of this (Eren et. Al, 2022; Ertekin and Çorbacı, 2018; Ünsal, Polatkan, 2011). The design process is usually discussed in three headings as research, design and evaluation (Özkan et al, 2017).

The research process:

The most important stage when designing an urban space is the information collection stage, that is, the research part where the design problem is determined (Lawson, 1980). When designing an open space, the primary goal should be to investigate the expectations and needs of the users of the space from that space and to transfer the identified deficiencies to the design stage (Preiser 1991). In this direction, various analyzes are carried out in the research part while starting a design;

a.) By examining the indoor-outdoor patterns and their uses with spatial analysis, the following evaluations are made;

- The opening points, functions and elevations of the existing structure, if any; other structures (children's playgrounds, sports field, recreation area); accessories (camellia, seating element, garbage lighting); underground elements (sewerage, water electricity, natural gas, telephone) are determined.

- The relationship of the existing circulation system with the design area is determined and

- General perceptual landscape values; dominant view, point of view, focal point, unwanted landscape, noise, olfactory effects are determined.

b.) Functional analysis is formatted by the physical traces left by the user in the field and the needs of the user. In the environment,

"every interaction leaves a mark" (Sommer and Sommer, 2002). In line with this idea, the traces left by the individual in the field enable an opinion to be reached about how a physical environment is actually used by people (Gür, 1996). Therefore, when analyzing the environment from a functional point of view, the designer should also use physical traces. From this point of view, by analyzing the current situation and possibilities in the research process, the following evaluations are made:

- The walking tracks of the users are determined and
- User needs are determined

c.) The analysis of natural landscape data has an impact on the decisions of plant type selection and space organization, as well as on the identification of existing plant species in the area to be designed and the identification of plants to be protected. This situation affects the design decisions regarding the planting and the determination of the event areas. In this context, the following evaluations are made;

- Climatic data (Wind, humidity, temperature, precipitation)
- Topographic data (Slope)
- Soil data (Soil type)
- Natural vegetation (Trees, shrubs, ground coverers)

The process of designing:

After the research stage, the designer is expected to make an original design suitable for the area. Although the design problem is common, the solution that each designer finds to the problem will be different. Because design is a problem-solving process, even the same designer can approach a design problem in an infinite variety of ways. Design is a part of the continuous problem solving process. Design is to make decisions within uncertainties" and "diversity reduction" (Regular et al., 2017). The design process starts with the Leke Diagram, which will be designed according to the needs-activities list obtained in the research section, which activities will be held where, location, proximity-distance and transportation of the spaces that determine the characteristics of the area. At this stage, without determining the format of the event venues, only their locations and relationships are being established (Alpak et al., 2018). Then, the stage of producing sketches, that is, producing options, is started, in which the size, shape and positions of the event venues determined in the stain diagram will be determined according to the event to be held and the

number of people. Finally, the designer reaches the design product by transferring all these works he has done (need-activity, measure and form, the relationship between the aspects of the activity areas and the fiction of the Decoupling of the position, that is, the transition of activities, forms) to the final sketch work. By making model between these stages, the suitability of the ideas for the area and the harmony between the design and the topography are checked.

Evaluation process:

Evaluation is actually an evaluation method in which the satisfaction of the space and the satisfaction of the users are investigated after the implementation process of a designed project is completed and after it has been used by the users for a certain period of time (Özkan et al., 2017).

Within the scope of this study, the focus was on the three-dimensional expression of the sketches, which enable the embodiment of abstract thoughts developed within the scope of the design process. Because it is quite important that the form that the designer portrays and imagines in his mind is transferred to two dimensions in order to serve a purpose and include a creative feature, as well as transferring them to three dimensions. In this context, the effects of model making on learning will be emphasized.

2. Model Making as a Three-Dimensional Form of Expression

The model is generally considered a presentation tool and is essential for communication in many disciplines, including architecture. The use of models in design is different from their use in other disciplines (Abdullah et al., 2006). Since designers are dealing with new and non-existing ones, models are used for designers to conceptualize, communicate, evaluate and realize their thoughts about design (Cannaerts, 2009).

Models are scaled three-dimensional expressions or a concrete representation of the design and they take their measurements from the drawings. They enable the design products to be perceived and explained more easily. Models not only explain the design to other stakeholders, but also play an active role in the architectural design process. Because designers tend to use models to help them understand complex situations. Models make complex realities understandable, processable and feasible. By reducing complexity, it focuses attention on certain aspects. The model can be seen as a lens through which a reality is interpreted and represented. A model can also act as a discovery tool, allowing new questions to arise,

hypotheses to be formulated, alternative solutions to be explored. Modeling consists of two techniques, physical and digital modeling:

- Digital modeling uses computers as a design tool. Digital modeling enables the creation of precise, detailed, controllable, geometrically complex models that can be easily reproduced, reconstructed and allow the exploration of different design diversity (Eren and Yılmaz, 2020).
- Physical models are models. What distinguishes them from digital models is their tactility, the way they are perceived visually and the fact that they are directly intervenible. A physical model is inherently difficult to reproduce and takes time to create, which is why variations are even more difficult to create. However, Mark Burry sees this slowness as a positive and states that this reflective moment is missing in digital modeling (Cannaerts, 2009).

One of the three-dimensional expression methods prepared at scale in order for design products to be perceived and explained more easily is a model. Models can also be characterized as scaled-down models depending on a specific scale. One of the modeling methods used in the education of design disciplines that require three-dimensional thinking, such as landscape architecture, is model making. Obtaining the ability to make models provides two benefits to the designer candidate: first, the designer can visualize his thoughts in three dimensions, and this situation supports the process of learning creativity, which is a complex structure. The second allows him to express himself to people outside the profession. Because in order to understand the spatial relationships in the models; unlike drawings, no specific training is required in order to communicate with that space.

Model; it is a design tool that enables the designer to establish a relationship between the idea and the reality. Besides being a physical representation, the model also highlights the designs as a real object. All details in the design can be shown directly through the model. Unlike two-dimensional drawings, the designer can move around the model or the model can be moved to evaluate the design from many different angles (Spankle, 2012).

Why does a landscape designer make models?

- It reveals in advance the errors that may occur in the design due to its three-dimensional expression.

- The model transforms the abstract designs of the designer into concrete.

- Model is a form of three-dimensional sketching for the designer; It allows the designer to see and feel their ideas.

- The model helps sectioning and enables the designer to see the mistakes made while sectioning.

- The design creates a base for modeling the product in digital environment.

For this reason, within the scope of the study, the importance of the designer candidates in the early stages of the design process to be able to make models, the difficulties they experience when making models and the effects of model making on learning are examined in detail.

3. Material and Method

Within the scope of the study, Karadeniz Technical University, Department of Landscape Architecture, 1. Starting from the "Drawing Techniques" course given in the semester, the studies carried out in the "Environmental Design Project Courses" are discussed. These courses are compulsory courses that aim to teach students how to express their designns in two and three dimensions. In this study, models made by students at various scales were used as materials in the course.

3.1. The Content of The Drawing Technique Course and The Model:

The course covers a 12-week period and each course consists of two parts;

I. in the department, the theoretical information about the subject and the information about how to use this information in practice are explained to the student by the faculty member through examples.

II. in the section, an application is made on the topic described (Figure 1); it is checked how much of what has been taught the student has learned, and when necessary, feedback on the topic is made, the application is repeated. The mock-up applications made during the course are spread over a five-week period of time. The student first makes the plan drawing, then the model of this plan, and after making the model, a cross-section is taken (Figure 2). With this application, it is aimed to improve the three-dimensional vision of the students and to make their cross-sectional taking more concrete.
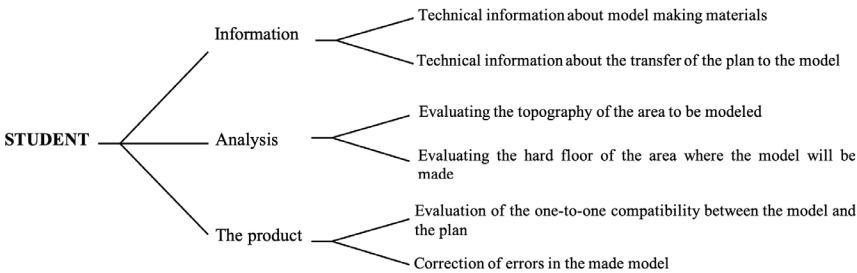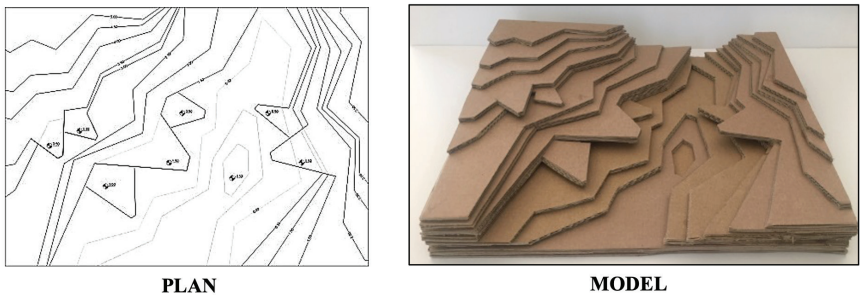
Figure 1. *The functioning model of the course*

PLAN   MODEL

Figure 2. *I. Stage: model making*
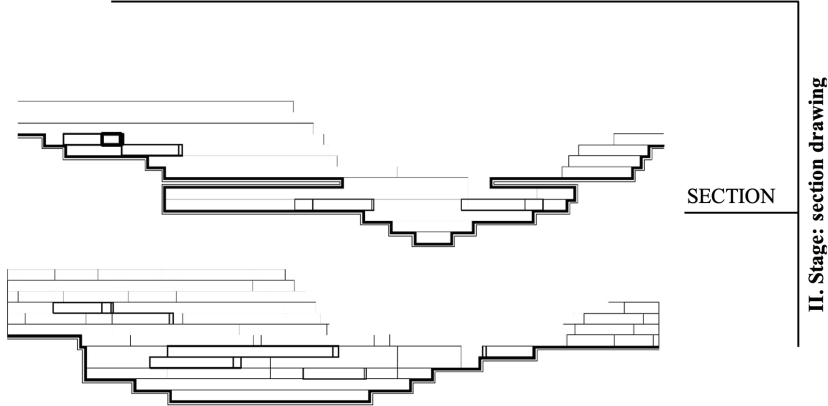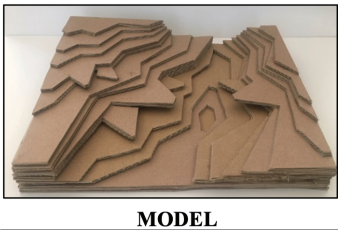

MODEL

SECTION

II. Stage: section drawing

Figure 3. *II. Stage: section drawing*

3.2 The Content of the Environmental Design Project Course and the Model:

Design education aims to teach students how to design or discover their own design methods. Environmental Design Studio, forming a landscape architecture education; decision making, spatial design, and concepts such as the organization of all human activity taken as a whole (Rodiek, and Steiner, 1998), and which constitutes the main backbone of landscape architecture education course. The design studio represents a place where students should comprehend, present and defend design ideas, acquire architectural skills and techniques. In addition, the studio enables the understanding, perception, construction and expression of a space with the drawing language based on the acquired knowledge (Casakin, 2004). The studio has the task of teaching three basic aspects of design education: visualizing what is designed in the mind, gaining the ability to represent and think architecturally.

Environmental design Project (EDP) courses are the most important courses in which students start to learn design and the creative process. Because in these courses, the synthesis of problem solving skills based on creativity is made with the information obtained from all courses. For this reason, within the scope of the course, students are encouraged by the faculty member to both bring solution suggestions to the problem given with their knowledge and to use their creative capacities in these solution suggestions. Thus, an environment is provided for the student to use both his creative and intellectual capacity.

Environmental design project courses at KTU Landscape Architecture Department 1. class II. The semester begins and continues throughout the educational process. Each project course has a different concept, a different scale and content.
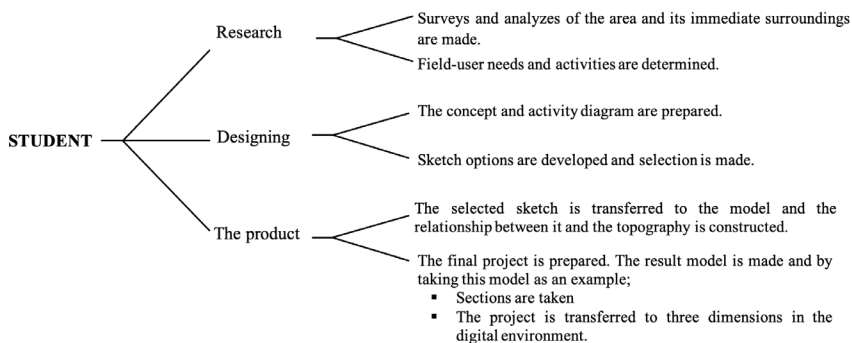
Figure 3. *The functioning model of the course*

Models in environmental design project courses;

Conceptual models: At the beginning of the design process, the model shows the suitability of the conceptual relations of the design problem to the field of study. These models can be seen as a kind of design study tool used to express the nascent design idea in three dimensions. In other words, these models are used as a thinking tool like a sketch. Because the models can be produced in simple ways with easy-to-work materials and allow quick changes on them, it provides a flexible environment for the designer in the design process. Thus, they allow the design thinking to be generated spontaneously.Conceptual models are a way of thinking that is used especially in the CTP1 course as tools that reflect the design idea. Here, the design starts on the mock-ups, then transferred to the sketch, elaborated and turned into the final project.

1. **Stage:** EDP1 result product, in which the model is used as a sketch
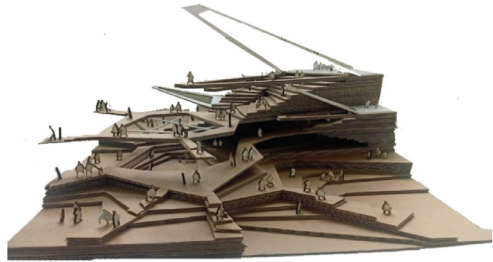
2. **Stage:** Conversion of the model to the plan
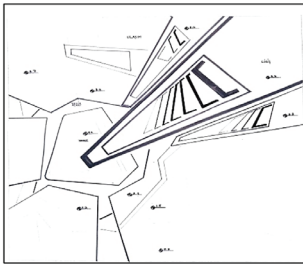
3. **Stage:** Drawing of sections
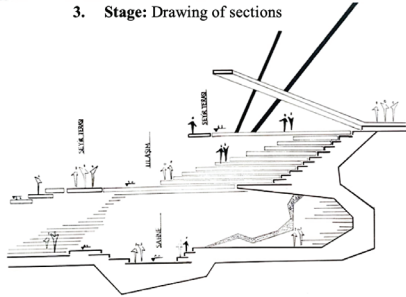
Figure 4. *Conceptual models*

Terrain Models: These are the models made at the beginning of the design process. This model is a scale representation of the existing topography where the design will be made. It includes features that can affect the design such as the natural structure of the land, existing structures, circulation and vegetation. Thus, by creating a base for the design proposal, it helps to create a design that is compatible with the topography.

Models that Improve the Design Proposal: These models enable the compatibility of the selected sketch with the existing terrain structure

to be checked. Thanks to the model, when the design is applied to the topography, it reveals the formal relationship between the topography and the design product. As a result, jeans errors on this model are seen, these errors are corrected and the model is made again. This feedback; continues until the ideal harmony between the design product and the terrain is achieved. The resulting mock-up makes it easy for the designer to transfer the project to three dimensions and take sections.The models that develop the design proposal are used starting from the EDP2 lesson to the EDP6 lesson. Traditional model making, which allows the creative thoughts of the designer candidate to be transferred to three dimensions; It provides coordination of hand-eye-skill.
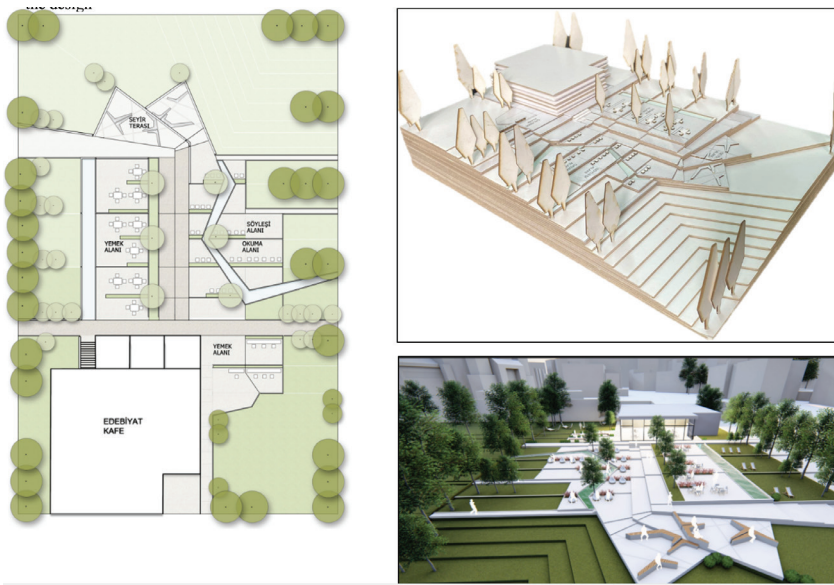
Figure 4. *Conceptual models*
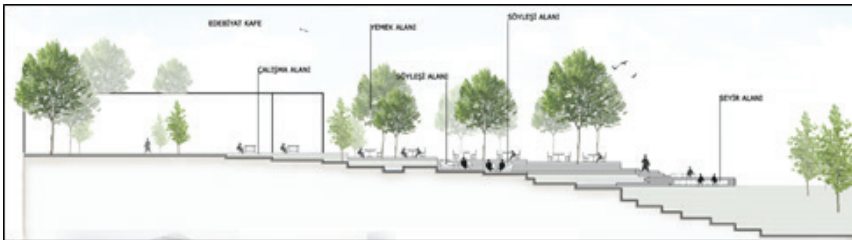
Figure 5. *Models that Improve the Design Proposal*

The contributions of model making to students can be summarized as follows;

- Contribution to learning the basic concepts (Scale concept, jeans concept, cross-section and appearance, techniques of transferring the design product to the model are learned.)

- Contributions to personal development (Developing manual dexterity, thinking more comprehensively and embodying abstract thinking are learned.)

- Contribution to design education (It teaches visual thinking, developing creativity, seeing the designed object in the mind in a realistic way, developing strategies for creating and producing three-dimensional images, and visualizing plans in mind.)

4. Results

The development of model-making skills allows to transform the thought designed in the brain into concrete form in the best way. This skill; It is a tool that enables the designer to express himself in design-oriented departments such as landscape architecture and enables the designer to visualize design problems and make them evaluable and solvable. The designer's ability to make models; It enables the person to visualize objects and situations in his mind and to act on these images. Courses that support these features are very important in landscape architecture education.

Depending on these results, physical models have an important role as a design and learning tool. The primary factors that strengthen this role are; Models have easy-to-understand, realistic textures and physical assets. Despite the indisputable advantages of today's digital technology and design world, 3D modeling programs in diversity, practical use and sharing methods (Büscher et al., 2001; Atalay et al., 2002), models reveal a reality and form that can be viewed from many different angles. Therefore, they have a very important role as a design, application and presentation tool (Farrelly, 2012).

As a result; In addition to its contributions to the design, the model making process improves the professional abilities and skills of the student and facilitates learning, together with the reality experience it provides to the student and the designer. The basic knowledge and skills that determine the limits of a student or designer's conceptualization and visualization skills are the features that make him a designer. Model making is an important design and learning method with its structure that develops this knowledge and skills. In addition, as a result of this study, it is possible to conclude that model making and use can be used as an efficient method of designing, producing and presenting for many other potential disciplines and courses.

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Chapter 7

BLURRING BORDERS OF KNOWLEDGE AND SPACE: INTERFERENCE OF GEOGRAPHY IN ARCHITECTURAL KNOWLEDGE

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This study aims to discuss the effects of geography as a discipline to architectural knowledge. The main hypothesis of the work is derived from the blurring borders of paradigms. This ambiguity makes the borders of knowledge invisible among the two disciplines; geography and architecture. The subject of the geography, which is recognized by contemporary geographers as a tempting experience that brings society, culture, place and nature together in a single explanatory framework. In simple terms the subject of the geography is the world as a whole. Especially in the last two centuries, it focuses on the world which is created by nature and at the same time which human beings are rapidly changing. Since the ancient times, the spreading of the human being on the world has changed the geographic appearance and created new ways of living so the geography has become the study of the past and present and impacts the relation between man and his environment.

For geographers, the environment people live in is a source and a place above all. Because they are interested in the environment as a resource. Initially the discipline of geography was to understand the physical properties of geographical issues, gradually as a social construct, geographers are also concerned with the meaning of tradition, law, power, prosperity and beauty of the environment as a resource. Thus, geography has become a bridge between the physical and cultural worlds, as a natural and social science. Geographical knowledge is actually constructed by societies. In that sense geographers ask the following questions; why people and their activities take place in that specific place and time? How do the features and activities in one place interact to differentiate it from others? Why the distribution of people and their activities or phenomena change?

In the light of these questions, Kant, who taught geography at Köningsberg University for 43 years, tried to compare history and geography (Tümertekin, 1997: 3). By comparing the knowledge of history and geography with each other, Kant put forward that geographers examine the differences between places just as historians emphasize the differences between time periods (Tümertekin, 1997: 3). Geography is the study of place; which is socially constructed and historically situated. On the other hand Alexander von Humboldt and Karl Ritter discussed the four stages of geography which gained contemporary academic validity according to the developments observed in time: Geoscience tradition (examining the physical world), human-place tradition (culture environment tradition), spatial tradition (18th century Kant attracted attention to the center of the tradition), field investigation tradition (Tümertekin, 1997: 6). Apart from these fields, the most important contribution to spatial knowledge of the geography has come in the agenda by the seminal works of David Harvey (1989), Soja (1989) and Cooke (1990).

Cities and the built environment are constantly observed by geographers as places under human intervention. In the megalopolisating world order, the formation of architectural knowledge and the knowledge of geography interact each other with the blurring borders of these two disciplines. In this paper, it will be argued in which ways architecture history writing has changed in reference to blurring borders of these two disciplines; architecture and geography.

Geography, History and Space

Evaluating by the evolution of the sciences that dealt with the space, it is the geography that first notices the place, history and geography are divided into two separate branches from philosophy since the history gives priority to time and geography gives priority to space. While history refers to time, geography refers to space; Tekeli (2019) explains the equivalency of time and space through the scientific method of Heredot. Heredot is a historian, but geography is not completely cleared from its historical method. Heredot indicates that it is necessary to go to the place to learn about its history. According to Tekeli's definition, Heredot was not a scientist working in archives, he travelled on earth to form his scientific perspective. In this context, nothing happens regardless of place. Everything occurs in the space. Time and space are the most complicated concepts of the epistemological field because they are not assets (Tekeli, 2019).

As discussed above on Heredot, history is a field of science that is learned in place and from place rather than transmission of knowledge. In other words, history is not independent of geography. The plan of the city is completely the subject of geography as a three-dimensional problem. In the modernization process, the integration of the space with time as the fourth dimension and the evaluating the region is an extension of a neo-kantist geography. Therefore, there are separate regions and rules. The problem of the designer is to grasp the conditions that created that region. This requires a theory based on objective representation with universal validity. However, there is no such claim of universality in the field of science of geography. All other scientific fields, economics, sociology, and all natural sciences, in a sense, followed a method developed with a neo-positivist paradigm, and geographers did not follow. Geography is the basis of spatial sciences. Other spatial sciences, architecture and urbanism emerged mostly for practical purposes.

As mentioned, the starting point in the development of time and space exist in history and geography in ancient Greece. Before the end of the 20th century history was defined only by the knowledge of time and geography was defined only as a pattern of spatial knowledge (Uludağ, 1998). But time and space have been discussed as a dilemma in the

historical process and this distinction continues nowadays. Today, time has become dominant and the place has been completely neglected. All economic theories come to the fore over time. Tekeli emphasizes the belief that space is of the same importance as time (Tekeli, 2019). Because time and space are in the same position. Conceptualisation of time and space is the task of disciplines like history and geography to understand societies and social practices.It is something we notice, because of the duration of events and their sequencing. Since all human activities are constitutive of eventsthe main concern of history is the conceptualisation of time and space together. Space, on the other hand, is something that we notice due to the spread of objects, and it adds meaning by shaping the position of those objects relative to each other. If we realize the time of the events, according to the duration of the events, by arranging them in a row, there is a spread of objects in the space. Space, in another words, is not a point, the objects cannot be gathered on the same point according to the spread in space. Objects spread to different locales and form the space which means understanding social life human practices, spatial grounding of societies, social events. Every event is spatial and temporal at the same time

The new Kantian human geography that emerged at the end of the 19th century is a regional approach. According to Tekeli, geographers established the formation of regions in this period, and historians established their narratives regionally. In other words, it has an equivalent position in the definition of cases experienced in this period of time (Tekeli, 2003: 2). According to this understanding, time and space are absolute. The information used when dividing the earth into regions is the information of the systematic (physical) geography. The most important emphasis of Tekeli for this period is that there is no discussion about the relative or absolute of the space and the dynamic structure of the earth's differentiation. Creating this dynamism creates an interaction between nature and society (Tekeli, 2003: 2). NeoKantian Geography is valid to reflect the reality of the pre-industrial and early industrialization periods, but it is insufficient to understand the power of transforming nature in accordance with the wishes of the nature and the accelerating economic and social change and is done through representative maps (Tekeli, 2003: 3). The validity of the laws proposed in the neo-positivist human geography is tested with the outside world, and the objective representation of the outside world is considered to be possible, and its representation is made with Euclidean geometry (Tekeli, 2003).

Physical geography is a systematic geography and the space here has not an abstract existence. It is the place of the earth. When it is said geo, it is the meaning of earth. When we say something on earth, it is expressed as an absolute language, although it is relative. The view of

systematic geography includes universal rules. In 1953, the first objection was made by Schaefer (1953) in the Journal of American Geographers that geography, like other social sciences, should be directed towards the generally valid rule, not the difference (Tekeli, 2003: 387).

While the world was moving in such an order, in 1953, Schaffer's famous article, *Exceptionalism*, was published criticizing this situation (Tekeli, 2019). By this event in the 1960s, it started with the experience of a neo-positivist / qualitative revolution against neo-quantitative geography, which is the dominant paradigm in the field. Neo-positivist geography brings with it a multi paradigm approach. The spread of the concept of paradigm occurs after Thomas Kuhn's book The Structure of Scientific Revolutions (Kuhn, 1962).

As mentioned above, with the geography becoming multi paradigm since 1968, Tekeli (2019) states that with the student events in 1968, there was a crisis of significance in the world. Geography and time geography are composed of different objects in this crisis of significance. Paradigms begin to live at the same time. While the predominant paradigm was neokantianist geography, all the region concepts synthesized came from neokantianist geography. After the qualitative geography begins to develop, these two geography groups come into conflict with each other. On the other hand, new branches started to develop in the discipline of geography. Especially with the release of the Antipode magazine, for the first time, phenomenological and Marxist geography emerged.

Multi Paradigm and its Effects to Architecture History Writing

Geography has been under the influence of many different paradigms, from antiquity. The most important of these is the transition period from the regional approach to the positivist approach. This transition, which is a revolutionary nature for geographical knowledge, has been introduced from many different perspectives and different sources. The concept of paradigm became widespread in the early 1960s after Thomas Kuhn (1962) published the *Structure of Scientific Revolutions.*

If we deepen the concept of "paradigm", which found one of the most concrete definitions in Thomas Kuhn's book "The Structure of Scientific Revolutions", it caused a significant change in understanding in the last quarter of the eighteenth century, not only in geography but in many other areas Kuhn envisioned a dynamism for the development of sciences. "Paradigm" was based on observations from the history of astronomy rather than a dominant paradigm in a science field. In this context, the paradigm for Kuhn is single, dominant and not absolute, but variable and

multidisciplinary (Tekeli, 2019). Tekeli states that when we move from the natural sciences to the social sciences, multi-paradigm becomes more important. The multi-paradigm method for the social sciences also is applied to *Discourses*. The growth of the scale of the earth as one of the objects is removed from being relative to the reality Foucault discusses as discourse and is carried to the claim of generalizations with an absolute evaluation. After the evolution/manifestation of the new paradigm which is more descriptive and comprehensive the new paradigm prevails and the old paradigm was erased. The situation that was accepted as normal development of of a paradigm in every science field. Kuhn developed his theory mostly based on his observations on the history of astronomy (Kuhn, 1992).

Multi-programminess / paradigmism is a situation under these assumptions. But when you move from the natural sciences field to the social sciences, multi-paradigms become more important. In the field of social sciences, it is not possible to exclude interests and world views. Therefore, it would be appropriate to approach this area by using the concept of *discourse* of Foucault (1977). While a discourse on a subject remains valid for a certain period, when it is insufficient in social practice, it is replaced by a new discourse. But once more than one interest groups are accepted in a society, it is necessary to admit that more than one discourse is present at the same time (Tekeli, 2012: 383). Tekeli describes the main question of multi-paradigm in social sciences as:

"It can be said that each paradigm consists of common problem areas, world views, concepts used, ways of representation, independent variables and working habits that are adopted by a certain number of academics in order to guide their own science practices. Today, determining that one / every field of science is very paradigm makes science an activity where the most accurate / truth is determined, making it a place where multiple explanation claims live. Such an environment requires that to be a dominant one in its tolerance, even if there is a sharp competition among scientists. In other words, the world of science is reshaping its ethics." (Tekeli, 2012).

With the effect of neo-quantitative revolution geographers abandoned their old ranks and created new ranks in the geography, which became a multi paradigmatic act. For example, Olsson, who was a quantitative paradigmer, progressed in the field of phenomenological geography. David Harvey published his book "Explanation in Geography" in 1969. This was the basic book that accounted for the quantitative geography paradigm. Two of Harvey's four articles in "The City and Justice", which he published after this book, consisted of his articles when he was a neo-positivist, and the last two showed that he had jumped into the Marxist

paradigm. Bunge, who wrote one of the basic books of quantitative geography, was influenced by the suffering of blacks in American cities and moved to the field of humanist geography (Tekeli, 2012: 385). In this complex era it is impossible to be the follower of one paradigm to understand the complexity of sociality and space. Instead it is prominent to see the complexity of relations.

Architectural Knowledge and the Discipline of Geography

In architectural research the problem is in the base of the knowledge as in all disciplines. The right question is in the context of architectural problem. The more clearly the problem is defined, the higher the chance of success will be. Initially, the problem lays and the way of interaction occurs in environments. While the definition of the problem changes as a dynamic fact geography is also dynamic. As geography is one of the oldest forms of enquiry and there is little argument that professional geographers do not agree with what the discipline actually is. What has been practiced as geography has changed (Unwin, 1992: 1). This dynamic essence also effects the knowledge of geography and architecture because geography is the first science that deals with space. The discipline of geography especially effects the strategy of architectural epistemology. The process of generating knowledge with research cannot be reduced to a mechanical, routinized data generation process. Although such routinization effort is observed in some approaches but research is basically designed as a creative process (Tekeli, 2008: 3). As is seen in this paper, the main arguement is how the discipline of geography is providing creativity to architectural knowledge. The research begins with curiosities, problems, and values, and reaches new insights on insights. But this point reached is a kind of intermediate stop. It will constitute the starting point for new research. But the researchers of spatial sciences cannot do it in the same way. They have to explain the solution after explaining the problem (Tekeli, 2008: 1, 2).

In this sense the geography's research method especially effects the qualitative research. It can be defined as studies whose findings are not reached by statistical procedures or other quantitative means. Rather than dealing with quantities that can be measured, they analyze by focusing on personal experiences, interpretations, and the meanings of fact and what kind of representations we can include in our scientific analysis, considering that social activities take place on space of the earth? (Tekeli, 2008: 16). As the study evaluates the effects of geography on architectural knowledge, it appears in two discussions borrowed from Tekeli's (2008) method of choices for spatial researches; this study re-evaluates these choices with their geographical effects on spatial sciences. These are *the*

problem of scale and the way of representation (the evaluation of place/ space).

Today's globalizing world societies in the territory of nation state as integrated units is insufficient. Today social/geographical in global; national and local restructuring is redefined in scales. But this is most importantly, a social researcher's own research what scale or scales hierarchy (home, community, city, region, nation, earth) (Tekeli, 2008: 18). Scale is socially produced by the geographical structures of interaction.. Studies show that a separate theoretical explanation for each scale must be established in different fields of science. Because the micro level theories are not valid at the macro levels and vice versa (Tekeli, 2008: 18).

These levels are driven from geographical explanations because regional scale differs from each other in geographical manner. Because geography as a discipline not only concerns the physical qualities but also the cultural meanings that gives the scale its difference. The scale defines architectural knowledge in a dynamic manner. Every problem of research needs a specific method with a difference in scale in macro and micro levels. These scales give architectural knowledge a creative base for the method of spatial research.

The way of representation (the evaluation of place/space).

According to philosophy of science, the space and time have the same position in explaining social sciences. The space and time also have the equal importance in explaining social events. As explained before today the time has more in social sciences than space. And also the space is excluded (Gregory, 1994: 62). The reason behind the spaces' secondary position and the inability of this consideration is discussed by geographers. Because the differences in social facts changes with geographical effects, geographers' today offers the same importance of time and space (Tekeli, 2008: 18) as Lefebvre (Lefebvre, 1991) evaluates social relations with space which gives the place its identity and importance. So the most important effect of geography on architectural knowledge is the way it represented the *place.*

The representation of place also includes representative cultural data in architectural research. If we do not consider the place, the space will be abstract. But if we consider the space in phenomenological manner, adding it to its meaning, the space will be a cultural product (Tekeli, 2008: 18). This phenomenological way of representing space is derived from the discipline of geography. The first to use the term *place* is the phenomenological geographers to whom architectural knowledge borrowed the term 'place' from. By this way architectural researchers use

the metaphors of places on their research (Eilen, Cornel, 1991). One of the most important conceptual categories of social science research is field research. The field research going to the *place* where the researcher is interested in and highlights the process of directly collecting information from there (Tekeli, 2008: 5). The place is on the origin of this process.

Concluding Remarks

The discipline of geography constitutes the knowledge of architecture with its dynamic earth space. Every method do not suit every position. Thus, with its dynamic presence, the place which gives the epistemology of architecture its essence and the scale makes the differences visible gives the dynamic way of thinking to architectural writing. Architectural knowledge in fundamentally concerned with human behaviour, social practices, space and time constraints. As a discipline it needs the illumination of concrete processes and changes in social life. Geography as a discipline has space as the main subject matter and time to establish the knowledge of human behaviour and relations. In that sense there has been always a dynamic relation between architecture and geography that provides creativity to architectural knowledge

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Chapter 8

ACCESSIBILITY BY BICYCLE TO ZAFER SQUARE IN KONYA CITY

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1. INTRODUCTION

Increases in vehicle ownership and income levels also affect quality of life. The traffic problems that arise as a natural result of this require adjustments in the planning of the transportation system. Especially in the transportation system in our cities, the preference of environmentally sensitive, reliable, egalitarian, sustainable and holistic policies have become a necessity. In order to improve the quality of life of cities, minimize transportation problems and save them from the negative effects of traffic, projects and infrastructure should be planned to expand the sustainable transportation system and the use of bicycles, which are a part of this system. Due to the increase in private car ownership in recent years and the problems this situation creates in accessibility, the use of bicycles is supported in order to prevent loss of value in the environment we live in and to make cities more livable. This process should also include ensuring the safety of cyclists and integrating cycle paths with other types of transport as an important transport option in cities. Therefore, it is important that the use of bicycles in urban traffic is implemented within the scope of environmentally friendly transportation policies.

In order to provide sustainable transportation, which is one of the most important steps of sustainable urban development, the adoption of non-motorized transportation is dominant. In this context, bicycle transportation is a very important issue for sustainable transportation. Increasing the adoption and use of bicycle transportation in cities, reducing motor vehicle traffic in city squares, which is one of the most used areas of people, and ensuring that people have access to city squares by bicycle are very important for the sustainability of transportation. As a matter of fact, in this study, it is aimed to examine bicycle transportation in order to provide sustainable transportation in cities. In this study, the use of bicycles, which is an effective and active method of sustainable transportation system, is evaluated at the scale of Konya city. Zafer Square was chosen as a sample area in the context of the effects of bicycle accessibility to city squares on sustainable urban development. In the access to Zafer Meydanı, which is used intensively by the public and where the traffic congestion is the highest, the location, facilities and problems of the bicycle are examined by using the on-site observation and examination method. As a result, it has been determined that the bicycle access to the public squares can be provided with bicycles, and that the bicycle paths in and around the city are integrated with the city square and offer effective and active use and this situation is important for sustainable urban development.

2. CONCEPTUAL FRAMEWORK

In its most basic sense, transportation means the transportation of people, goods and services from one point to another. In addition, transportation is basically grouped according to the location of transportation, such as road transport, rail transport, air and sea transport. The issue of city traffic diversifies according to the geographical structure, population and flow of goods of the city (Karagöz, 2019: 11). In urban traffic, which is defined under two main headings as personal and public transportation, personal transportation consists of pedestrian transportation, bicycle transportation and the use of private vehicles. Buses, trams, subways, subways, ferries, etc. are also a method of transportation used in public transportation that allows individuals to travel together to reduce transportation costs (Güngör, 2012: 19).

2.1. Pedestrian Transportation

Due to the increase in the volume of motor vehicles and related motor vehicle traffic in the last 50 years, pedestrians and pedestrians' use time on the street has undergone serious changes. Although pedestrians rely on a variety of human mobility, pedestrian paths and the activities performed vary greatly. From this point of view, the classification of pedestrians also changes. Pedestrians sitting or standing, pedestrians playing in groups, pedestrians walking for different activities, pedestrians walking slowly (running), pedestrians receiving assistance (including motor vehicles used by the disabled), pedestrians responding to emergencies and their vehicles. These pedestrians can be individual or group according to their type. Some pedestrians may be pedestrians who supervise animals. Pedestrians can also be reserved for children, teenagers, adults, the elderly and the very old; similarly, pedestrians who need help and pedestrians who do not need help may be encountered (Şenbil, 2012: 480). Pedestrian transportation is the first form of transportation in human history. Running and walking can be summarized as traveling from one place to another without any shipping costs or carrying goods. The appeal of pedestrian transportation is that it does not bring extra costs to individuals financially, does not depend on any timetables and transportation routes, and offers health benefits to individuals as well. On the other hand, the low speed in pedestrian transportation and the fact that it creates fatigue in long-distance travel are negative aspects. In addition, design errors in today's urban transportation infrastructure make pedestrian transportation even more disadvantageous.

Pedestrian access is used from the beginning of the journey to the vehicle, from the vehicle to the end of the journey and when switching

between vehicles. For this reason, it can be said that pedestrian transportation is the most basic transportation option in urban transportation. Throughout history, cities have expanded in the form of pedestrian traffic, then with the invention of wheels, cars, steam power, and electricity, and the invention of vehicles that use fossil fuels, cities have begun to expand and their surface areas have continued to expand. Among the global sustainable types of transportation, pedestrian transportation is the most common preferred mode of transportation (Kös, 2015: 13).

Pedestrian access can be made in various parts of the city. These; sidewalks can be divided into pedestrian crossings, recreational activity areas and squares (Beyazıt, 2017: 44). Pedestrian transport also offers economic benefits to individuals and society without any additional cost. It is also an ecologically sensitive transport method as it does not cause environmental pollution. Pedestrian traffic also has social and cultural benefits. These benefits can be listed as strengthening the relationship between cities, transforming streets and squares into living spaces rather than just transition areas and contributing to social integration (Beyazıt, 2017: 46).

2.2. Bicycle Transportation

Cyclists make up a subset of pedestrians. A bicycle is a man-powered vehicle with one (sometimes two) human (or 3) wheels, or an electric motor (in some cases equipped with a bicycle stand) that provides additional thrust for human energy. The fact that the bicycle is sometimes a sports or recreational vehicle and sometimes a means of entertainment supports the basic function of the bicycle as a means of transportation in different ways. Cyclists don't have the diversity that pedestrians have to offer. Children's cyclists, adult cyclists, elderly cyclists. However, this diversity increases with the variety of bicycles: tricycles, tricycles with fixed loaders, bicycles with load baskets, bicycles with child seats (for transporting cargo, children, pets), bicycles with separate accessories, etc. (Şenbil, 2012: 481).

A bicycle is a personal means of transport, which is moved on two wheels with the help of pedals. Similar to pedestrian transportation, bicycle transportation does not depend on any schedule or route. However, unlike pedestrian transport, there are initial investment costs and low maintenance costs. It is preferred because it is cheap, noiseless, does not harm the environment, makes a positive contribution to personal health and offers access to every desired point. On the other hand, it also has various negative effects. Some of these negative features are; It is affected by adverse weather conditions, is not suitable for long-distance journeys, requires longer travel time than vehicles and depends on the structure of

the terrain. In addition, giving priority to vehicles in today's transportation system makes it necessary for bicycle users to create safety and comfort barriers themselves (Kuru, 2017: 33-34).

2.3. Sustainable Transport

The rapid development of industrialization after the First World War and the increase in the flow of people and goods accordingly and the increase in the number of motor vehicles in parallel with the population growth made the highways an effective transportation policy (Yalın and Bilgiç, 2007: 462). However, itis necessary to maintain the ecological balance when determining the u transit network. Air and noise pollution from traffic leads to traffic accidents resulting in loss of life and property. The unplanned use of A razin also increases traffic problems. Transportation planning is necessary to find solutions to all these problems, to improve the quality of city traffic, to choose the most suitable conditions for the environment and to ensure the sustainability of the transportation system (Source, 2005: 84). Within the scope of sustainable urban transport planning, rational land use, economy and environmental issues are comprehensively addressed and the importance of non-motorised transport (pedestrian and bicycle) is emphasized.

Transportation should not be understood as the transportation of people, goods from one place to another. Today, transportation, accessibility and mobility have become an indispensable concept for its infrastructure and superstructure, which includes comprehensive transportation and circulation concepts, and at the same time allows for the conservation and maintenance of natural resources. Sustainable transportation planning mainly designs an environmentally friendly and accessible transportation system in urban transportation. It plans to protect the quality of the environment, natural and cultural assets and the texture of the built environment, to give priority to pedestrians and disabled individuals, to reduce the traffic load and to break the principle of motor vehicles being a priority, and finally to adopt a holistic approach (Eryiğit, 2012: 33). Unlike traditional transportation planning methods, these plans reveal why these methods are unsustainable and truly sustainable options. When creating a sustainable transportation plan, the decisions to be taken and the principles to be formulated should be evaluated according to sustainability precursors, and this situation should be taken into account in the high-level plan and the low-level detailed plan (design and implementation) (Kuru, 2017: 36).

2.4. The Place of Cycling in the Sustainable Transportation System

Urban traffic can cause traffic congestion, air pollution, energy consumption, and noise problems. Meanwhile, noise from transport is an important issue in many cities. Transportation infrastructure and motor transportation require a large amount of land for transportation (Öztürk, 2019: 11). Today's cities are under the pressure of motor vehicles. The amount of land allocated to roads and parking areas is very large. Multifunctional public places accessible by cars have noise and air pollution problems (Eryiğit, 2012: 53). The way to reduce the use of motor vehicles is to use fewer vehicles and thus reduce the length of the road traveled by vehicle per person. In order to achieve this, it is necessary to take action on three issues. These; Increasing the use of bicycles and other forms of travel such as public transport by building cycle paths and cycle paths, changing land use and urban design policies to support these alternative types and reducing the number and time people need to travel, regulating the social and economic costs of driving and pricing transportation reforms, fuel, road use, parking, motor vehicles and vehicle registration fees.

When we look at the definition of sustainable transport, all beneficiaries of transport are social costs (including costs that must be borne by future generations). In addition, external factors such as traffic accidents, air pollution, traffic congestion, noise, increasing carbon dioxide and oil imports are also important factors that threaten the sustainability of the transportation system (Eryiğit, 2012: 73). To make a residential area more livable, sustainable transport plans should always be a top priority. Sustainable transportation systems should be planned correctly in order to reduce the negative impact of increasing private vehicle ownership on the natural and built environment (Eryiğit, 2012: 74). The objectives of policies and strategies aimed at reducing urban vehicle dependency, which threatens the environment and human health, and encouraging the use of bicycles for non-motorized transportation, are accepted as steps to establish a sustainable transportation system. In today's world, the ever-increasing population and the physical movement of this population from one place to another cause traffic problems. In addition, the rate of penetration of motor vehicles into urban life, the cost of entering nature and the damage to the environment are too high to be ignored. The use of bicycles is an environmentally friendly transportation that provides energy efficiency (Özalp and Öcaçar, 2008: 25).

The transport of bicycles must be able to meet all the needs of cyclists during active and sedentary periods. Therefore, bicycle accessories should be taken into account as well as bicycle paths. These include bicycle equipment, parking, storage and transfer places, traffic signs, guide signs and symbols (Aslan and Güneri, 2020: 2).

There are basically 3 types of bicycle parking schemes. These:

1. tie or lock with a chain from the wheel and its frame to make it inoperable,

2. using poles or other fixed elements to lock in the parking lot,

3. locker, cabinet or locked in a closed space, can be listed as follows (Aslan and Güneri, 2020: 2).

3. THE PLACE OF BICYCLE AND PEDESTRIAN PATH IN TRANSPORTATION IN ZAFER SQUARE

3.1. Bicycle Use

Konya Zafer Square is located in İhsaniye district, within the borders of Selçuklu district, at the intersection of Alaaddin Boulevard and Atatürk Street in the city center. In the area where Zafer Square is located, there are many cafes, patisseries, restaurants, luxury clothing stores, classrooms and educational institutions. For this reason, Zafer Square is a gathering, entertainment and resting place for local people. In Zafer Square, there are Kültürpark Square, Kılınçarslan Square, Zindankale Car Park, Konya Anatolian High School (Gazi High School), Provincial Health Bureau, Alaaddin Hill, Regional National Education Bureau, Social Security Institution, Seyh Sadrettin Konevi Tomb, Atatürk Monument, Saint Poul Church (Figure 1).

Figure 1: *Zafer Square and Its Surroundings (created by the authors)*

Zafer Square is surrounded by the central business district and business district. Kültürpark Square is located in the north of the square, Kılınçarslan Square in the northeast, Alaaddin Hill in the northeast, Form Junction in the west and residential areas in the south. It can be reached from Atatürk Street, Abdül Ezel Paşa Street, Amber Reis Street, Kazım Karabekir Street and Alaaddin Bulvarı.

Figure 2: *Zafer Square North South Entrances (created by the authors)*

The main task of Zafer Square is to house all the areas of use, markets, banks, bookstores, clubs, etc. Everything is gathered in and around the square. Zafer Square keeps the pulse of Konya as the most active placeof the city. The structure of Zafer Square is similar to Istanbul's Istiklal Street and Taksim Square. It is possible to reach Zafer Square and its surroundings by all public transportation such as buses, minibuses, trams. As a result of the observation, it was found that most users used buses and trams to reach the region.

In Konya bicycle path planning, the routes developed in Figure 3 belowwere divided into stages and a time plan was made. For this reason, the principle of connecting the existing bicycle paths to the city center has been adopted and suggestions have been made for bicycle transportation in Konya. In addition, it has been connected with the rail system line. In the medium and long term, bicycle paths are planned to serve the whole city and functional areas. Highways and intersections were also taken into account in the segmentation of bicycle paths.
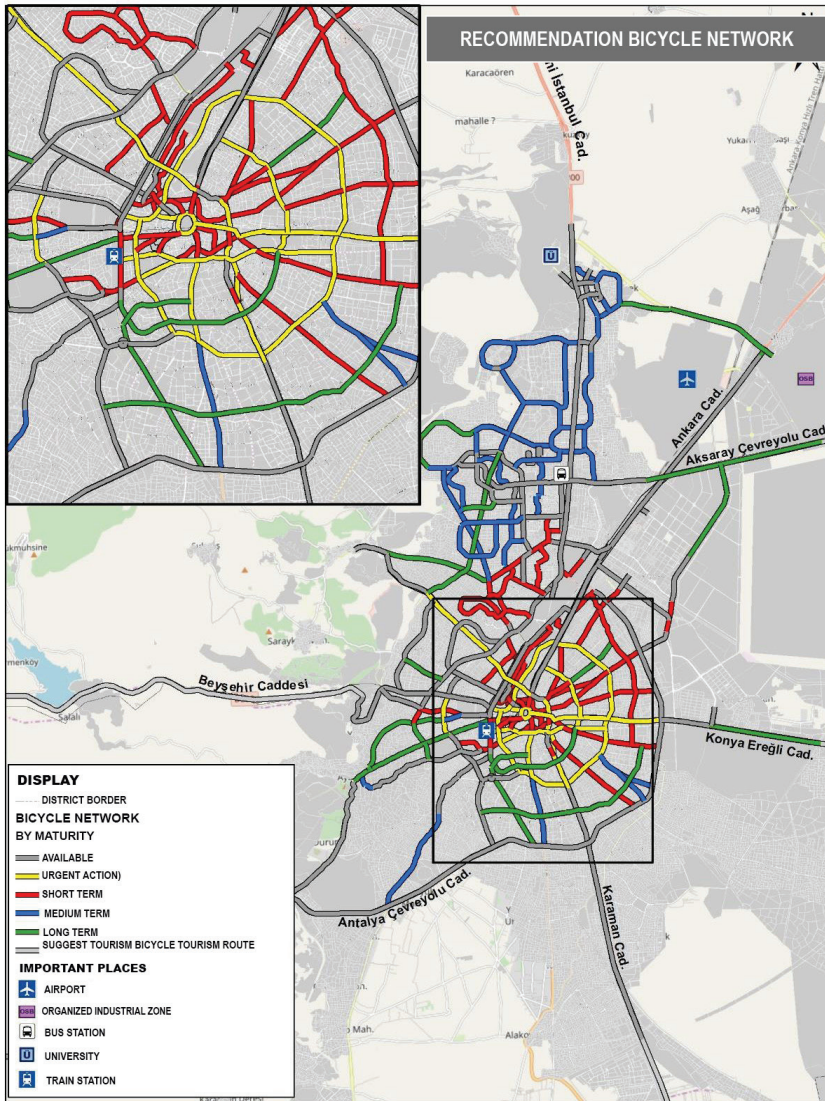
Figure 3: *Konya Bicycle Paths and Suggestion Bicycle Paths (Konya Metropolitan Municipality, Department of Transportation, 2022)*

While there are space-saving bicycle parks in the form of umbrellas and automobiles offered by Konya Metropolitan Municipality, multi-storey bicycle parks have started to be built with new projects. Umbrella bicycle parks are usually located at intersections and bicycle tram stops, while bicycle parks in the form of cars are usually located on the roadsides and at bus stops. Since the multi-storey bicycle parks are new projects, they were built on Alaaddin Boulevard, which is currently located in the city center (Figure 4).

Figure 4: *Bicycle Parking Areas (Çakır, photo archive)*

3.2. Bicycle Tram

Konya's most preferred means of transportation in public transportation is the tram. The tram line consists of two lines. These are the Campus-Alaaddin and Aladdin-Adliye tram lines. In order to increase the use of bicycles in Konya, the old trams were made suitable for bicycle use and 13 bicycle stops were added to the Campus-Alaaddin tram line. There is no bicycle stop at the Zafer Square tram stop, which is the working area. The nearest bicycle tram stop is the previous one which is the kültürpark tram stop.

In addition to the bicycle tram, one of the services that provide multi-modal transportation to users is buses that can carry bicycles. Apparatus with a capacity of two bicycles is installed on the buses used in public transportation in Konya city center. These apparatuses are located at the rear of the buses. After placing their bicycles in these devices located at the back of the bus, the cyclists continue their journey by getting into the bus (Figure 5).

Figure 5: *Bicycle Tram and Public Transport Use (Çakır, photo archive)*

3.3. Zafer Square Pedestrianized Areas

Today, in many cities, especially in densely populated city centers, pedestrian and vehicle traffic have been separated from each other and completely separated into pedestrian areas and converted into areas that provide mobility. In Zafer Square, where there is a pedestrian density in the city center connecting Selçuklu, Meram and Karatay districts in Konya, Kazım Karabekir Street has been pedestrianized and closed to vehicle traffic. Zafer Square is the intersection point and gathering center of public transport (Figure 6).

Figure 6: *Zafer Square, Kazım Karabekir Street Satellite Image and Pedestrianization Project (created by the authors)*

Taking into account the pedestrian density in Zafer Square and Kazım Karabekir Street, the Transportation Coordination Center (UKOME) decided to close the area to vehicle traffic. With the decision of the Transportation Coordination Center dated 13/11/2004 and numbered 2004/10, Kazım Karabekir Street was closed to vehicle traffic (Konya Metropolitan Municipality, 2022a). With the pedestrianization decision implemented in 2005, the routes of public and private public transport vehicles were changed (Figure 7 and Figure 8).
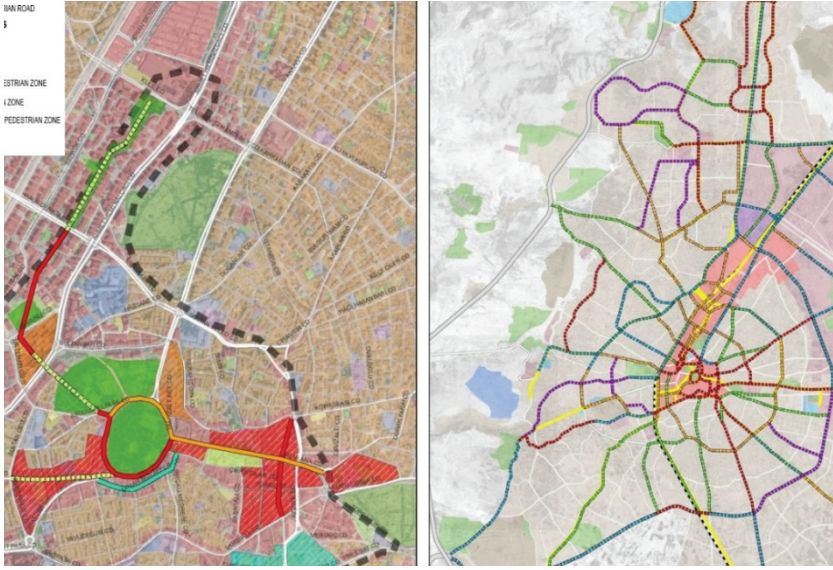
Figure 7: *Pedestrian Transportation and Bicycle Transportation Statuses (created by the authors)*

Figure 8: *Current Pedestrian Transportation Situation in Zafer Square (created by the authors)*

Looking at the choice of location of the pedestrianized street; It is one of the busiest streets of Konya. It is seen that pedestrian priority decisions are taken because public transportation vehicles are used intensively in the city. Traffic density was prevented by changing the route of vehicle roads. The pedestrianization of Kazım Karabekir Street necessitated new regulations on the transportation structure, landscape units and building functions.

3.3.1 Change of Transport Structure

Before Zafer Square was pedestrianized, Kazım Karabekir Street and Atatürk Street were connected to Alaaddin Boulevard. With the pedestria-nization project, Kazım Karabekir Street was completely closed to traffic and opened to pedestrians. While Kazım Karabekir Street and Atatürk Street were open to traffic in the direction of arrival and departure, Kazım Karabekir Street was closed to vehicle traffic and bus routes and vehicle paths were changed. As a result of the transportation of vehicle traffic to Abdül Ezel Paşa and Sultan Cem Streets, pedestrian transportation was facilitated without disturbing the urban transportation network.
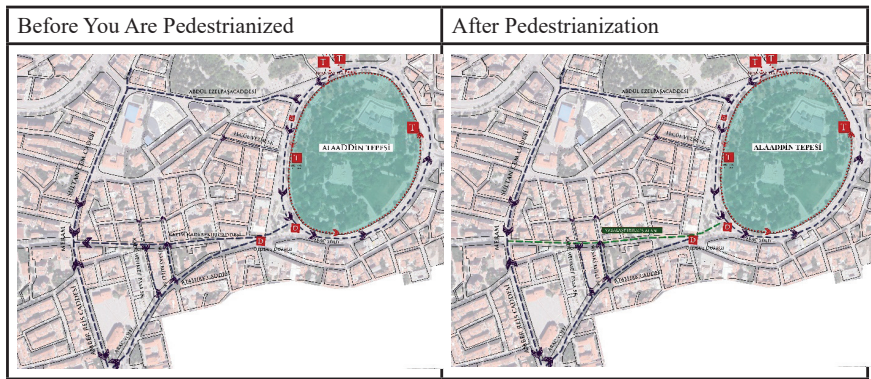
Figure 9: *Zafer Square Transportation Exchange (created by the authors)*

After the pedestrianization project, Mehmet Paşa and Misakı Mil-li Streets, which provide a connection between Atatürk Street and Ka-zım Karabekir Street and are open to the vehicle road, prevent pedestrian access. Distinction is provided between pedestrian and vehicle paths by pontoons. The intersection of the pedestrian axis of these two streets ma-kes it mandatory for pedestrians to make controlled crossing at the points where these streets intersect and restricts the pedestrian axis.
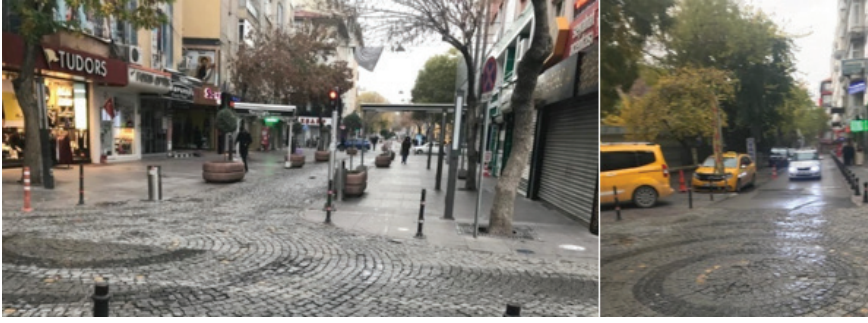
Figure 10: *Streets That Cut Pedestrian Access (Çakır, Photo Archive)*

As a result of the closure of Kazım Karabekir Street to vehicle traffic, public transportation routes have been changed. While the public transportation stops going to the east (Alaaddin Hill) were preserved, the west-oriented stops on the borders of Meram District were moved to the Kültür Park stop on Abdül Ezel Paşa Street.
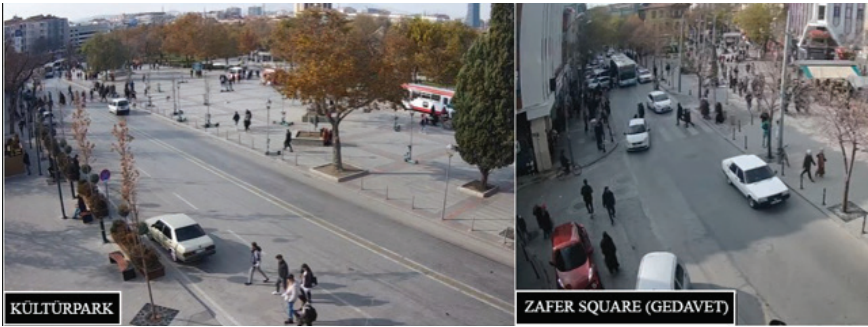
Figure 11: *Public Transport Stops (Çakır, Photo Archive)*

In the pedestrianized area, movable pontoons have been placed in order to provide vehicle entry through Atatürk Street in case of emergency and in order to provide vehicle access. Mandatory changes were made in the buildings with vehicle entrances over the pedestrianized street and vehicle entry was started to be made through Atatürk Street. Due to the fact that the working area is located in a busy area in terms of pedestrian and vehicle traffic in the city, a large part of the buildings are used as workplaces and the owners of the workplaces have private vehicles, and the use of private vehicles because the public transportation vehicles are not preferred by those who come to the center have made the need for parking felt very much. In order to solve this problem, Zindankale O park was built in 2011 and Konevi Parking Lot was built in 2015.

3.3.2. Change of Landscape Units

Along with the pedestrianization activities, the texture of the green space has been increased and seating equipment, lighting elements and attractive landscape elements have been designed. Before pedestrianization was made in Zafer Square, the high level of hard ground, the low green areas and even the trees only on the sidewalks made it difficult for pedestrians with narrow sidewalks. The seating units in the Nutuk park and Gedavat park, which are connected to Zafer Square, did not meet the needs. After the area was closed to traffic, the area was limited and supported with seating units with water elements. Nutuk Park and Gedavet Park have been completely removed and have become hard ground around the pool element. To the south of the Gedavet park, the municipality-owned café was designed and the need for parking on the lower floor was met (Figure 10).
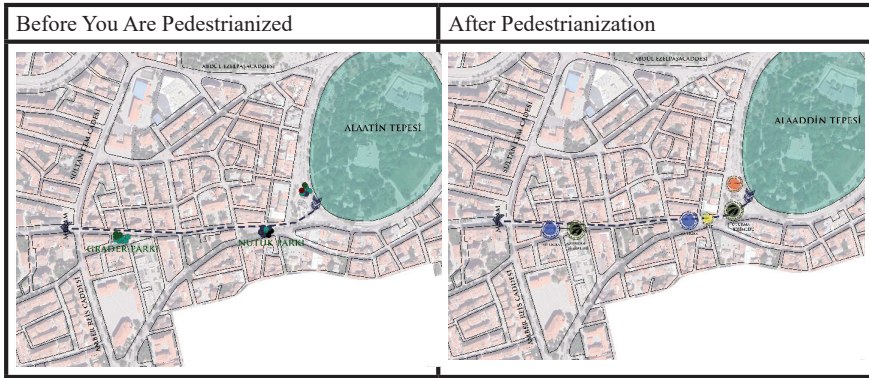
Figure 12: *Replacement of Zafer Square Landscape Units (created by the authors)*

The green areas in Nutuk Park have been replaced by hard ground and water areas after the pedestrianization project (Figure 13).

Figure 13: *Change of Gedavat Park (Çakır, Photo Archive)*

The benches in Gedavat Park, located to the west of Zafer Square, have been removed and the number of seating units in the open area has been reduced. Pots and garbage cans have been added to Zafer Square symbolically along the ground clock and pedestrian. Bicycle parks are also located in the square. With the closure of Kazım Karabekir Street to traffic, the ground was laid in the area without any elevation difference (Figure 14).

Figure 15: *Kazım Karabekir Street and Zafer Square (Çakır, Photo Archive)*

3.3.3. Change of Building Functions

With the pedestrianization of Kazım Karabekir Street, pedestrian freedom has been provided in the space. Before the pedestrianization project, it is seen that there are public functions, historical buildings, residential and commercial units in the area. As a result of the increase in pedestrian density in this area, with the façade transformations of the buildings made in 2021, there have been changes in the building functions in accordance with the needs in accordance with the pedestrian needs. Residential areas began to change into restaurants, cafes, banks, clothing and electronics stores (Figure 16).
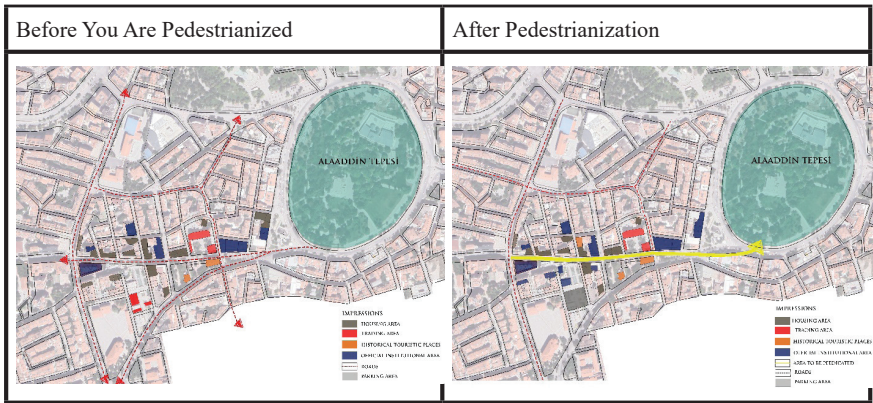
Figure 16: *Zafer Square Building Type Change (created by the authors)*

With the change of function, the structures were demolished and rebuilt in superficial renovation and structures that have completed their life. The most important change on the street was the four-storey Social Services Directorate building next to the Hoca Hasan Mosque and the structures belonging to the Child Protection Agency behind it were demolished and replaced with an indoor and outdoor car park, café and seating areas (Figure 17).
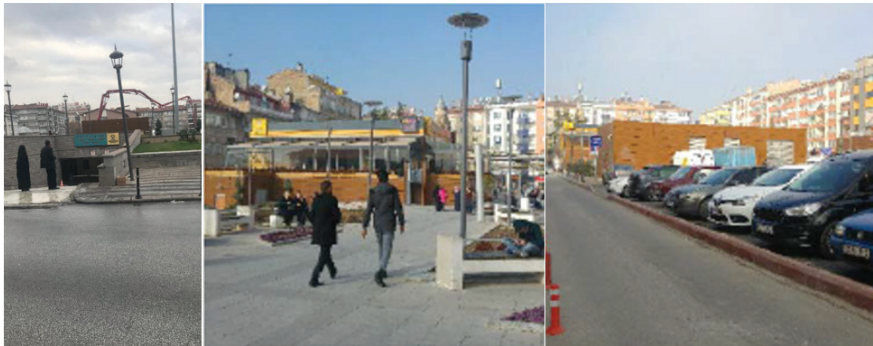
Figure 17: *Konevi Car Park and Cafe Belonging to Metropolitan Municipality (Çakır, Photo Archive)*

4. FINDINGS

As a result of the researches on the use of bicycles in Konya Zafer Square, it is seen that the economic and environmental problems arising from the passage of vehicles are increasingly coming to the forefront. Although there are important bicycle use studies and practices throughout the city, these practices are not reflected in Zafer Square. This makes it difficult to control how many bicycles can enter the area. In addition, the heavy traffic on Alaaddin Street, Atatürk Street, Amber Reis Street and Kazım Karabekir Street around the region causes pedestrians and cyclists to experience great difficulty when entering the region.

4.1. Accessibility

In the examinations made in Konya Zafer Square, the accessibility of bicycle traffic to Zafer Square was evaluated and it was observed that it was not possible to enter the Zafer Square bicycle path. Although bicycle bridges have been built and bicycle parking areas have been arranged in the city center, it has been determined that these areas cannot be entered from bicycle paths. In addition, bicycle paths are located only on the main traffic arteries of the city, and one of the other problems identified for accessibility is the lack of continuity of the established bicycle paths. Figure 18 shows that there are no bicycle paths on the route connecting Mevlana Square and Zafer Square.

Figure 18: *Zafer Square Entry Point (Çakır, Photo Archive)*

When bicycle transportation to Zafer Square is evaluated in terms of security; The fact that cyclists access the area using the vehicle path draws attention as an important problem. Improving the safety of

bike lanes is crucial to encourage bike transport. Especially in bicycle parking lots, frequent bicycle theft adversely affects bicycle use. Due to the observed results, there are problems of the lack of any safety measures for cyclists, the absence of lighting elements and bicycle boxes on the roads for night cyclists, the parking of vehicles on bicycle paths, the overflow of commercial units around bicycle paths and the occupation of bicycle paths by pedestrians. In addition, since Zafer Square is the most active place in the city, it is seen that both pedestrian traffic and vehicle traffic create security problems. Since Atatürk Street, Aladdin Street, Kazım Karabekir Street and Amber Lise Street are found to have important traffic axes, users are not allowed to enter the area by bicycle. The fact that vehicle traffic is a priority on these streets also causes pedestrians and cyclists to experience safety problems.

Figure 18: Bicycle Parking Spaces on Atatürk Street and Bicycles Left on the Pedestrian Path (Çakır, Photo Archive)

4.2. Holistic Planning

It was determined that Zafer Square bicycle transportation did not meet general planning standards. Some of the important problems are; insufficient parking for bicycles, inability of bicycle paths to reach Zafer Square, lack of arrangements for cyclists at intersections, no resting places on the road and no planning for the possible transfer of bicycles by other means of transport. For this reason, it has been observed that the preference for bicycles is very low. Due to the insufficient capacity of bicycle parking spaces, it is often encountered that bicycles are parked under trees

and under railings near parking lots. In Figure 19, it is seen that there is no bicycle path to the north of Zafer Square, which can reach the entrance at the intersection of Alaaddin Boulevard and Abdul Ezel Paşa Street, but there is a bicycle park.

Figure 19: *North Entrance to Zafer Square (Çakır, Photo Archive)*

In Figure 20, there is no bicycle path and bicycle parking station on the walking axis, which borders Aladdin Boulevard in the North-South direction of Zafer Square. Cyclists are seen locking their bikes to trees or lighting poles. It has been observed that not regulating bicycle traffic at the intersection of vehicle traffic and bicycle can cause serious problems. At some intersections with heavy traffic, cyclists are forced to act as pedestrians at unsafe signalized intersections.
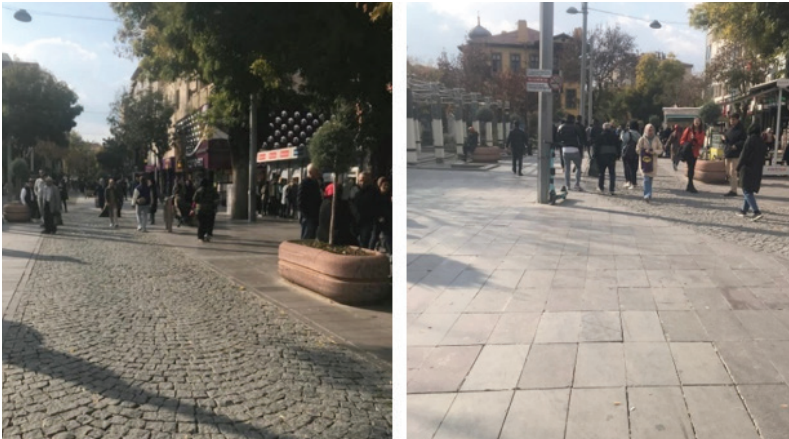
Figure 20: *Zafer Pedestrian Path (Çakır, Photo Archive)*

In Figure 21, it is seen that there is no bicycle path on Form Junction (Kazım Karabekir Street) that provides access to Zafer Square. Although bicycles are used intensively at the public transportation station in Zafer Square, there is no possibility of entrance to the Square.

Figure 21: *Form Junction (Çakır, Photo Archive)*

In Figure 22, it is seen that cyclists cannot enter the Zafer Tram Stop, which is heavily trafficked on Aladdin Boulevard.

Figure 22: *Atatürk Bulvarı Tram Stop (Çakır, Photo Archive)*

According to the results of the Konya Zafer Square observation, it was observed that the use of bicycles was intense and that there was a habit of cycling all over the city. Since they do not know how to use bicycles throughout the city, there is no work to educate those who do not use them and to bring them to bicycle transportation. There is a smart bicycle rental system for those who cannot use it because they do not have bicycles. However, since the system is limited to the main road route of the city, it has been determined that the usage rate is low.

4.3. Transportation Problems

Due to the fact that Zafer Square is located in the city center and public transportation routes are determined from this area, it provides convenience in transportation by using trams, buses and minibus public transportation. However, due to the fact that Zafer Square acts as a transition, the pedestrian density around the stops is quite high (Figure 24).

Figure 23: *Transportation Problems Around Zafer Square (Çakır, Photo Archive)*

There are two parking areas in Zafer Square, Zindankale and Konevi. Although there are two parking areas, the roadsides and the streets in the area are used as parking lots. In addition, since there is no space reserved for two bicycles, the service vehicles used by commercial houses are parked on the sidewalks (Figure 24).

Figure 24: *Parking and Bicycle Problems Around Zafer Square (Çakır, Photo Archive)*

With the pedestrianization project, it was observed that the vehicle and pedestrian axle were not completely separated from each other and that these axles intersected at four points. The interruption of the pedestrianized Kazım Karabekir Street by vehicle disrupts the continuity of the pedestrian path.

4.4. Suitability of Urban Furniture for Bicycle Use

A pedestrian axis is formed that is limited by the structures around Zafer Square. Since this pedestrian suspension is completely open-topped, seating areas along the road are limited. The benches and pots by the tree in the area are used as seating units. Lighting poles are used as bicycle parking and recently scooters are haphazardly connected to lighting poles.

Figure 25: *Bicycle Suitability of Urban Furniture (Çakır, Photo Archive)*

In the area where the pedestrianization project was made, a pedestrian axis was created with cobblestone. The use of slippery marble is seen at the entrances of the buildings. Although the surface of these marbles

is stoned, it gives a hard time in the winter months. Since the cobblestones are not a suitable coating for bicycle use, bicycle users do not prefer bicycles in this area. With the pedestrianization project, the transition opportunities in the area have been facilitated, but since there is a dense pedestrian, bicycles are not preferred in this area and time is spent in the form of walking after the bicycles are placed in the parking areas. With the new arrangement, the glazed pavilion in Zafer Square has been removed and replaced with seating units, lighting, water elements and bicycle parking in the open area.

Figure 26: *Zafer Square Urban Furniture (Çakır, Photo Archive)*

4. CONCLUSION

Since our country is still in the class of developing countries, mixed traffic flow is generally dominant in urban transportation in Turkey. In Konya, there are special minibuses, municipal buses and tram lines in urban traffic. Bicycle use is common due to the fact that the city is geographically flat. However, despite this high usage, there is still a disconnect in bicycle paths in the city. For this reason, bicycles are used unsafely in traffic. The inadequacy of bicycle paths restricts access to public spaces. Today, it is seen that transportation planning methods are far from sustainability components, passenger vehicle dominance and non-motorized transportation vehicles are outside the planning. It is worth noting that automobile dominance is increasing rapidly in areas that should be reserved for cyclists, and this is the

main mode of transport that should be adopted in terms of sustainable transportation in many cities of the world.

When the current transportation systems in the world are evaluated; Despite many risks such as air pollution, noise pollution, fuel problems, traffic accidents, motor vehicles are generally used due to their comfort and fast access. Many developed and developing countries, increasing population and the damage caused to the environment by motor vehicles are in search of alternative transportation methods such as bicycle transportation and pedestrian transportation. Although the bicycle has been in Turkey for many years, its use in transportation has been encouraged but it has not been perceived as a type of transportation due to weather conditions, natural structure or insufficient infrastructure; instead, stationary bicycles in recreation areas were seen as a sports tool. Due to the fact that bicycle paths aredesigned disconnected from each other and are not planned in integration with other transportation systems, the rate of bicycle use is low. These bicycle paths, which are built independently of each other, prevent access to city centers and public spaces. As a result of the researches, the bicycle paths in Konya end on the periphery of the city center. For this reason, we can say that in order to increase the use of bicycle paths, a bicycle network should be established in the city squares, especially in the city center. In addition, decisions should be taken to facilitate access to Victory Square from the city peripheries and within the city. Bicycle paths should be implemented as a whole. The integration of Victory Square with the public transport system must be redesigned. It would not be wrong to say that sustainable pedestrian safety can be achieved when implemented as a whole together with safe bicycle parking areas.

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Chapter 9

THE HOLISTIC APPROACH IN THE CONTEXT OF URBAN SUSTAINABILITY: THE CASE OF ISTINYE SHIPYARD AND ITS SURROUNDING AREA

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1. Introduction

Industrial heritages, which symbolize a period with their remains, continue to be valuable to the city and its inhabitants owing to their potential (Büyükköz, 2013; Kaya et al., 2015). In line with the idea of a sustainable city, the idea of reintegrating abandoned industrial areas back into the city, making them available for public use, and redefining the character of industrial cities in a sustainable way has recently come to the fore, which has contributed significantly to the improvement of living quality and land usage (Kaya et al., 2015; Oğuz et al., 2010; Loures and Panagopoulos, 2007; Tolga, 2006).

Today, there is a significant risk of industrial regions being destroyed as a result of careless and ineffective protective measures. However, these abandoned urban areas in the city will be transformed into social attractions that benefit the city, its residents, and cultural tourists by fostering social harmony through sustainable design strategies, which will provide economic, social, and urban sustainability (Saygı, 2008; Loures and Panagopoulos, 2007; Lyle, 1985).

Due to the lack of an appropriate management strategy regarding the sustainability of idle historical industrial buildings in our nation, the reuse of these structures with a sustainable approach is contingent on random circumstances. Under the guise of urban development, the destruction of industrial historic buildings has sometimes been a viable option (Uyanık, 2011; Yılmaz, 2015). Understanding the industrial past is crucial, as is including the relevant professional groups and the public in the decision-making and renovation process (Loures and Crawford, 2008; Loures and Panagopoulos, 2007).

2. Material

2.1. Historical Identity

By the Golden Horn coastline of İstanbul, the shipyards of İstinye, Lengerhane, Hasköy, Haliç, Camialtı, and Taşkızak are regions of cultural, industrial, and architectural significance. Ottomans utilized the İstinye coast and its environs (little Golden Horn), which flourished mostly in the middle of the sixteenth century and were chosen as the study area, as a shipyard and caulking yard. The area of the shipyard was recognized as a protected area by Istanbul's No. 1 Council for the Conservation of Cultural and Natural Assets in 1995 (Köksal, 2005) and placed under protection. Lengerhane and Hasköy Shipyards, two of the shipbuilding yards located on the Golden Horn's coastline, have experienced urban transformation and are now the Rahmi M. Koç Museum. The Camial-

tı and Taşkızak Shipyards are application sites for the Haliçport Project, and their urban transformation is still in progress. Haliç Shipyard is still situated on the Haliç coast and has retained its uniqueness from the past to the present (Figure 1). The identity card of historical process of İstinye Shipyard is detailed in Table 1.
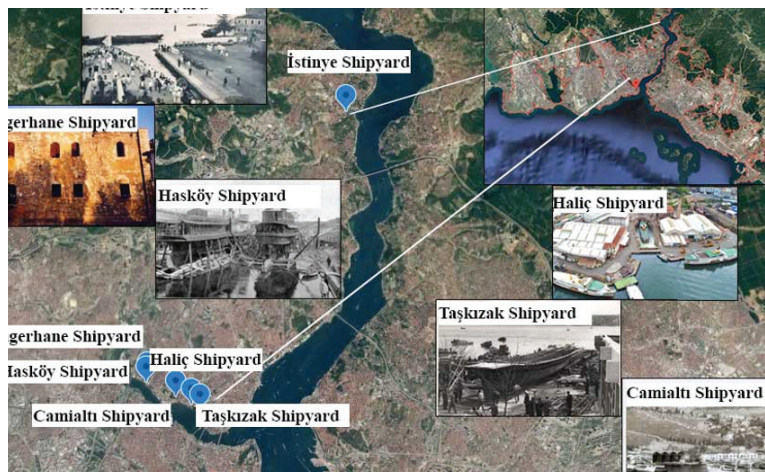
Figure 1: *İstinye Shipyard and Shipyards by the Golden Horn Coastline.*

Table 1: *Historical Identity Card (Akköse, 2007; Aysu, 1989).*

HISTORICAL IDENTITY CARD OF İSTİNYE SHIPYARD		
1856	A license was granted for the building of a shipyard for the maintenance, repair, and production of commercial vessels	Figure 2: View of İstinye Shipyard in 1914 (URL 1).
1912	A shipyard in the Bosphorus, İstinye Havuz ve Destgahları (İstinye Pools and Workplaces) Inc. (Figure 2), was established on an area of 11400m2	
1918	After the Armistice of Mudros, the shipyard was occupied by the British and after The French dominated the shipyard(Figure 3).	
1928	İstinye Shipyard was purchased by the state	Figure 3: Yavuz and Midilli battleships at Istinye Shipyard in 1916 (URL 2).
1944	The shipyard is connected to the General Directorate of State Maritime Routes and Ports.	

1956	Many cruise ships were built in İstinye Shipyard (Figure 4).	
1980	In the 1/50,000 scale İstanbul Structural Plan, Istinye was designated as a historical and cultural environment-dependent tourism spot (Figure5)	Figure 4: View of İstinye Shipyard in 1959 (URL 3).
1981	According to the 12th provisional article of Bosphorus Law No. 2960, İstinye was forced to be moved, and as a result, it was included in the Protected area of the Bosphorus Preview Structural Plan and classified as a tourism area	
1982	With the decision of the High Council of Immovable Monuments and Antiquities dated 5.2.1982 and numbered 13515, it was requested to repair the damaged quay towards Tokmak Cape and to prevent the accumulation of ships outside the shipyard.	Figure 5: View of İstinye Shipyard in 1975 (URL 4).
1983	The Ministry of Public Works and Settlement prepared the İstinye Bay Local Structural Plan, which includes a 300-bed facility, a yacht dock, parks, restaurants, tea gardens and parking lots.	
1985	According to Article 12 of the Bosphorus Law No. 2960, the İstinye Shipyard was closed, and this region was designated a tourism center. It was also designated a Tourism Center by decree 85/10036 of the Council of Ministers(Figure 6).	Figure 6: An overview of the İstinye Shipyard in İstinye Bay 1985 (URL5)
1991	The shipyard was moved. The shipyard's structures were demolished, and no sign of our industrial past remained in the region.	
2010	İSTMARİN has announced Teknepark (Marina) Project (Figure 7) for İstinye Shipyard (URL 6).	
2012	İSTMARİN has established a Teknepark (marina) with space for 180 boats and yachts. On the coastline, portable and floating piers were developed during the building period (URL 6).	Figure 7: İstinye Teknepark (Marina) Project (URL 6).
2022	Some areas on and around the shore of İstinye have survived to the current day, although their role is undetermined.	

2.2. Location

The study area consists of the İstinye Shipyard and its environs (Figure 8), which are located on the European Side of İstanbul in İstinye Bay, which is part of the Bosphorus Preview. The İstinye Shipyard, located at 41°06'46.5 "N latitude and 29°03'21.0 "E longitude, is situated on İstinye Street, a seaside road. Since 2012, İstinye Shipyard has not undergone any significant renovations. The 2014 aerial photo reveals that little has changed from its current condition (Figure 9). A two-way car entry-exit point and pedestrian sidewalks are located at the entrance to the shipyard (Figure 10). The footpath extends till the parking lots. Within the area, there is no continuity in pedestrian traffic. The roadway continues till it reaches İstinye Pier. A cafe and parking lot are located at the left entrance of the neighborhood (Figure 11). The cafe has a tiny movable children's playground. Only in this section of the shipyard can the user-coastal link be seen (Figure 12).

Figure 8: *Location of İstinye Shipyard.*

Due to the presence of the cafe and parking lot in this area, the sea view has been obstructed. The petrol station for yachts and boats at the marina is located in this area near the parking lot's exit (Figure 13). This axis also contains the facility that houses the İstinye Coast Guard Command. There is also a parking lot to the right of the entrance to the area. It was noted that the parking lot also accommodated camper vans. Additionally, there are unused ships in the area. At the exit of the parking lot, there is İSTMARİN building of the İstanbul Metropolitan Municipality.

The roadway extending from this region connects to the building of İS-PARK technical support unit. At the end of the roadway, there is a sign for Istanbul Vessel Traffic Services of the Directorate General of Coastal Safety, but no structure or active formation was visible in the area (Figure 14). The neighborhood is littered with construction debris and trash cans and is in a severely neglected state (Figure 15). Coastal access and use are restricted (Figure 16). With the introduction of ferryboat services between İstinye and Çubuklu in 2017, vehicle circulation began to increase in the region. At the entrance of İstinye Pier, there are security checkpoints for cars and pedestrians (Figure 17). Until 2020, the vacant space was utilized for one month annually during Ramadan celebrations.

Figure 9: Aerial Photograph of 2014 (URL 5).

Figure 10: Istinye Shipyard Entrance.

Figure 11: Area where the cafe is located.

Figure 12: Coastal use of the cafe.

Figure 13: Gas (Petrol) filling point.

Figure 14: Area closed for use.

Figure 15: Waste containers.

Figure 16: Unmaintained coastal area.

Figure 17: İstinye Pier Entrance.
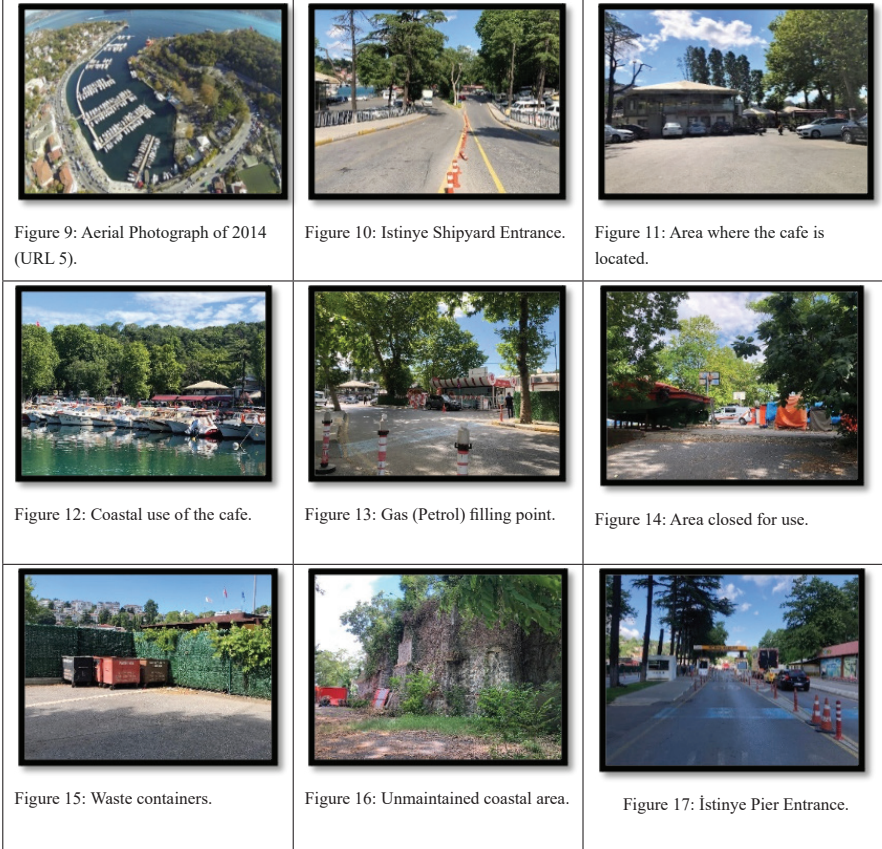
The prohibitions that began with COVID-19 impacted urban leisure activities. As of 2020, the Ramadan celebrations organized by Saryer Municipality in the İstinye Shipyard Area will no longer be held. The shipyard, which is only operational for one month every year, is now fully abandoned. After the impacts of COVID-19 subsided in 2022, the region was reclaimed by the Saryer Municipality. It was selected as the starting location for the May 19th celebration march.

3. Method

In the conceptual framework designed for comprehension and assessment, different study methodologies have been combined to provide a holistic framework. The method investigates the İstinye shipyard and its environs as a case study. In this study, field detections and observations were conducted, and the factors were categorized and assessed within the context of inclusive design and quality characteristics. The parameters and their respective criteria are described below (Table 2).

Table 2: *Inclusive design and spatial quality parameters (adapted from Voordt, 2005; CABE 2006; İnceoğlu, 2007; Çınar Altınçekiç et al., 2014).*

Urban-scale Inclusive Design and Quality Parameters		Criteria	
Comprehensibility	Reachability	Easy to understand, comprehensible, approachable, accessible, meeting expectations and minimizing the use of force	Integrated transportation system featuring pathways for pedestrians, private vehicles, public transportation, and bicycles.
	Accessability		Lack of street and sea route Access
	Percievability		Perceptibility of the landscape, sense of closedness and openness, presence of distinctive and unique elements, variety of equipments
	Distinguishability		Clarity and sharpness of the image, size of the visible area, perceptibility of the image
Flexible	**Flexibility**	A design that allows for a variety of uses and gives flexibility in use	Ensuring utilization even if circumstances alter
	Sociability		Lively, inviting, exciting, pleasing, relaxing
Suitability	Security	Safe, easy to use, comfortable, adequate and respectable	Presence of management or a responsible individual for the area (Police station-mobile security, no security at all)
	Quality		Construction-Maintenance Services (Cleaning, maintenance, repair etc.)
	Sustainability		Utilization of renewable energy, utilization of natural resources and materials, presence of biodiversity, identity
Sensitive	**Comfortable**	Sensitive to people's wants, desires, and words	Adequateness of walking and resting locations for seniors, children, the disabled, etc.
Equality	Utilization	Producing multiple solutions for different needs, no prohibitive obstacles, equal use for individuals	Sosyal activity, space diversity, and use for everyone

In order to assess the current state of the area, a survey based on the correlation between inclusive design principles and quality parameters was developed. 160 individuals were asked to provide a score of 0 (no correlation), 1 (the given factors are present), or -1 (the specified criteria are unrelated) to the quality parameter criterion. In evaluating the survey questionnaires, the IBM SSPS statistical package program was used to conduct a chi-square test in descriptive statistical analyses such as arithmetic mean, minimum and maximum values, standard error, and standard deviation. In addition to assessing user satisfaction using the survey, hypotheses based on quality standards and inclusive design principles were also examined.

3. Results

Skewness and kurtosis values between +1.5 and -1.5 are accepted as normal distribution (Tabachnick & Fidell, 2013). Since the skewness and kurtosis values of our survey data are between ±1,5 values, they show normal distribution. As a result of the study performed in İstinye Shipyard and its environs, attempts were made to determine the socio-demographic characteristics of the area's inhabitants. The area is favored primarily by those in the 22-35 and 36-50 age groups. It was revealed that the majority of users have bachelor's degree. It was found that individuals who visit the shipyard and its environs come from nearly every occupational category, but students are less likely to visit. When the income level was analyzed, it was found that users with incomes of 15.000 TL or more ranked top with a rate of 27.5% (Table 3).

Table 3: *Socio-demographic characteristics of the users*

Factor	Group	Frequency	Ratio (%)	Factor	Group	Frequency	Ratio (%)
Gender	Female	86	53.8%	Occupation	Student	4	2.5%
	Male	74	46.3%		Civil servant	30	18.8%
Age	19- 21	12	7.5%		Akademician	12	7.5%
	22- 35	56	35.0%		Employer	40	25.0%
	36- 50	48	30.0%		Retired	24	15.0%
	51- 65	26	16.3%		Housewife	22	13.8%
	65 and up	18	11.3%		Self-employement	28	17.5%
Educatio-nal Status	Primary	22	13.8%	Income Level	1500- 4500 TL	10	6.3%
	High school	42	26.3%		4500- 7500 TL	34	21.3%
	Bachelor's degree	66	41.3%		7500- 10000 TL	22	13.8%
	Graduate	16	10.0%		10000- 15000 TL	38	23.8%
	Doktorate	14	8.8%		15000 TL and up	44	27.5%
					No income	12	7.5%

Participants' perspectives on the current state of İstinye Shipyard and its environs were analyzed (Table 4). Participants deemed the quality characteristics of reachability and accessibility, which are included in the comprehensible principle of inclusive design, to be adequate in the area, however perceivability and distinguishability were absent. According to the participants, the area partially meets the flexibility, security, and sociability criteria, but falls short in terms of quality, comfort, utilization, and sustainability.

Table 4: *Survey results of the current situation of the study area.*

Inclusive Design and Quality Parameters		Criteria	Frequency	Percentage (%)	Score
Comprehensibility	Reachability	Integrated transportation system			
		On foot - private vehicle - public transport – bicycle	114	71.3%	+114
		On foot - private vehicle	20	12.5%	0
		Only on foot	26	16.3%	-26
	Accessability	Lack of street and sea route Access			
		By street and sea	98	61.3%	+98
		By Street	60	37.5%	0
		No access	2	1.3%	-2
	Perceivability	Perceptibility of the landscape, sense of closure and openness, presence of distinctive and unique elements			
		All	46	28.7%	+46
		One of them	66	41.3%	0
		None	48	30.0%	-48
	Distinguishability	Clarity and sharpness of the image, size of the visible area, perceptibility of the image			
		All	46	28.7%	+46
		One of them	76	47.5%	0
		None	38	23.8%	-38
Flexible	Flexibility	Ensuring utilization even if circumstances alter			
		Use for everyone	36	22.5%	+36
		Use of few different types	68	42.5%	0
		No use	56	35.0%	-56
	Sociability	Lively, inviting, exciting, pleasing, relaxing, etc.			
		Presence of all	26	16.3%	+26
		Presence of two of them	72	45.0%	0
		None of all	62	38.8%	-62

Suitability	**Security**	Presence of management or a responsible individual for the area			
		Police station- mobile security	20	12.5%	+20
		Mobile security	104	65.0%	0
		No security at all	36	22.5%	-36
	Quality	Construction-Maintenance Services (Cleaning, maintenance, repair etc.)			
		Presence of all	36	22.5%	+36
		Presence of only one of them	48	30.0%	0
		None of all	76	47.5%	-76
	Sustainability	Utilization of renewable energy, utilization of natural resources and materials, identity			
		Presence of all	34	21.3%	+34
		Presence of one of them	26	16.3%	0
		None of them	100	62.5%	-100
Sensitive	**Comfortable**	Adequateness of walking and resting locations for seniors, children, the disabled, etc			
		Adequate for everyone (elderly, children, handicapped etc.)	26	16.3%	+26
		Partly adequate	40	25.0%	0
		Inadequate	94	58.8%	-94
Equality	**Utilization**	Equal use for individuals			
		Presence of social activity- different place	34	21.3%	+34
		Partly presence of one of them	34	21.3%	0
		Inadequate	92	57.5%	-92

Based on the scores derived from the parameters, 14 field-related hypotheses were evaluated and H3, H6, H9, and H14 were confirmed (Table 5).

Table 5: *Hypotheses related to the field*

Code	Hypothesis	Quality Parameter	Score
H1	The assessment of the quality of a place by its users depends on whether or not the activities and functions are satisfactory.	Flexibility	-20
H2	Users' perception of the area's quality is based on whether or not they feel the range of activities to be sufficient.	Utilization	-58
H3	Users' opinion of the quality of the parking lots is contingent on whether or not they deem the accessibility sufficient.	Reachability	+88
H4	The assessment of the quality of parking spots by users is depending on whether or not they find the space comprehensible.	Perceivability	-2
H5	Whether users believe a parking area to be safe influences their impression of the space's quality.	Security	-16
H6	The user's opinion of the space's quality relies on whether or not they can perceive the image within the space.	Distinguishability	+8
H7	Users' opinion of the area's quality is based on whether or not they find a social atmosphere there.	Sociability	-36
H8	Users' perceptions of the place's quality vary depending on whether or not they feel the area comfortable.	Comfortable	-68
H9	Whether users perceive the place as being of good quality relies on whether they regard its spatial characteristics to be adequate.	Perceivability	+8
H10	Users' perceptions of the area's quality vary depending on whether they regard the area's natural resources to be sufficient.	Sustainability	-66
H11	Users' perception of the space's quality depends on whether they consider the space's identity sufficient.	Sustainability	-66
H12	Users' perception of the area's quality is based on whether they deem the biodiversity to be sufficient.	Sustainability	-66
H13	The perception of the space's quality by the users is dependent on the space's flexibility.	Flexibility	-20
H14	Users' perception of the space's quality is depending on whether or not they consider the accessibility sufficient.	Accessability	+96

The chi-square test performed between gender-utilization, educational level-sustainability, and age-flexibility variables revealed a p-value less than 0.05 ($p<0.05$) for the link between sociodemographic characte-

ristics and quality parameters. A significant association existed between the factors. The independent chi-square test conducted to examine the association between gender (female, male) and utilization (social activity, existence of distinct places) found, with a 95% level of confidence, that the statistical value between the variables was significant. While 77% of the respondents who answered to the utilization parameter as a social activity and the presence of diverse places were female users, 59% of the respondents who favored that the area was underutilized were male users (Table 6).

Table 6: *The relationship between gender and presence of use*

	Value	Degrees of Freedom (df)	Confidence Interval
Pearson's Chi-square	7.217[a]	2	.027
Probability Rate	7.457	2	.024
Linear Connection	6.957	1	.008

The chi-square test used to examine the link between education level and the question concerning the sustainability of the location yielded a p-value less than 0.05 ($p<0{,}05$). Education level significantly differentiated sustainability. It was established that 31% of people who responded to the question on sustainability (use of renewable energy, use of natural resources and materials, existence of biodiversity, and identity) regarding 'all of them' had a primary school education. It was determined that 41% of people who responded to the query regarding the 'two of them' had a high school diploma and 54% had a bachelor's degree (Table 7).

Table 7: *The relationship between education level and sustainability*

	Value	Degrees of Freedom (df)	Confidence Interval
Pearson's Chi-square	18.475[a]	8	.018
Probability Rate	18.737	8	.016
Linear Connection	11.858	1	.001

As the statistical value between the variables was less than 0.05 ($p<0{,}05$), the independent chi-square result used to find the association between age and flexibility was deemed significant. 19- to 21-year-old population who were 15% of the responders replied with a less variety of use. The age groups 22- 35 and 36- 50 with a rate of 44% are the ones who

responded that the use parameter is for everyone. 35% of those between the ages of 22 and 35 and 27% of those between the ages of 51 and 65 stated that there are few different types of use. 43% of the users who indicate no usage in the area are between the ages of 36 and 50. 14% of users aged 65 and older said ''none,'' indicating that there is no utility (Table 8).

Table 8: *Chi-square test showing the relationship between age and flexibility parameter.*

	Value	Degrees of Freedom (df)	Confidence interval
Pearson's Chi-square	17.831[a]	8	.023
Probability Rate	22.880	8	.004
Linear Connection	3.041	1	.081

Table 9 displays the reactions of local users to the ideas created for Istinye Shipyard and its environs. With the response ''strongly agree,'' 89% of users ranked top the recommendation that the shipyard should be turned into a comfortable space for everyone, including children, the elderly, and the disabled, first. The suggestion of using the land as a parking lot, which is the present status, was found negative by 39% of users. Other proposals produced for study area were preferred by users as well.

Table 9: *Recommendations for study area*

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
It is necessary to construct areas where the human-sea link is maintained and the quality of coastal use is enhanced.					
Frequency	-	2	28	56	74
Ratio (%)	-	1.3%	17.5%	35%	46.3%
It should be developed as a sustainable area that prioritizes natural resources.					
Frequency	-	6	12	46	96
Ratio (%)	-	3.8%	7.5%	28.7%	60%
The area should be revitalized and functionalized in accordance with its industrial character.					
Frequency	4	-	16	50	90
Ratio (%)	2.5%	-	10%	31.3%	56.3%
The area should be transformed into a physically and sensory accessible space with no restrictions.					
Frequency	-	2	12	36	110

Ratio (%)	-	1.3%	7.5%	22.5%	68.5%
It should be a socially sustainable space dominated by compact urban life.					
Frequency	4	-	18	44	94
Ratio (%)	2.5%	-	11.3%	27.5%	58.8%
It should be converted into a region where green spaces and biodiversity are prioritized.					
Frequency	-	-	2	36	122
Ratio (%)	-	-	1.3%	22.5%	76.3%
The area should continue to function as a parking lot.					
Frequency	62	32	28	6	32
Ratio (%)	38.8%	20%	17.5%	3.8%	20%
It should be redesigned with sustainable urban renewal that includes the provision of renewable energy..					
Frequency	2	2	14	52	90
Ratio (%)	1.3%	1.3%	8.8%	32.5%	56.3%
The shipyard should be converted into a comfortable space for children, the elderly, and the disabled.					
Frequency	-	-	2	16	142
Ratio (%)	-	-	1.3%	10%	88.7%
Participatory design process in which users are involved in the planning process should be implemented.					
Frequency	-	-	6	26	128
Ratio (%)	-	-	7.5%	16.2%	76.3%

4. Discussion and Conclusion

The traces left on urban space by phenomena such as global capital flows, technological advancements, and rent-based economic expansion are both extremely dominating and threatening. Instead of providing the city with an identity, these phenomena set the stage for the emergence of interventions that will erase or even destroy its traces. As a matter of fact, İstinye shipyard and its environs, which were selected as the study area, are also very sensitive in this regard.

Industrial heritage, buildings, and regions should be viewed as re-sources that contribute significantly to the redesign of the evolving urban environment by virtue of their symbolic and functional meanings and the-ir ability to distinguish the area.

As a result of the social analyses conducted in the study area, residents of the region believe that the old shipyard area should be utilized in a manner that contributes to the city's culture, economics, and way of life. Users of study area have expressed a desire for the region to be altered from its existing status. It has been discovered that the industrial identity of the neighborhood has no influence on its users. It has been established that designing İstinye Shipyard and its surrounding area based on inclusive design principles would produce more reliable outcomes, that it will be appropriate to revitalize the lost industrial identity of the shipyard with sustainability, and that uses for everyone should be prioritized.

In many post-industrial landscapes, urban revitalization plans are implemented that incorporate green infrastructure, recreation, biodiversity, and renewable energy. Similarly, İstinye Shipyard and its environs should follow the same vision while planning, and the administration should implement a process that includes the participants.

As the İstinye Shipyard is located inside the Bosphorus Preview Zone, the restoration works that will be conducted in and around the shipyard will give identity to the Bosphorus and the area. Any activity performed in this area should enhance the natural perspective of the region. The land's usage as a public place in harmony with the natural and built environments enhances the quality of life of its users and adds to the cultural landscape heritage. Industrial area renovation projects are globally gaining importance for landscape architecture. In terms of cultural landscape, the interpretation of the place during design and the overlap of the selected methods with the area are of utmost importance. Instead of singular studies in which spatial traces are discussed, holistic approaches that provide the evaluation of spatial attributes collectively ought to be examined. The criteria supporting inclusive design within the study's scope will provide suggestions for the design guides.

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Chapter 10

DETERMINATION OF FLOOD RISK AREAS BY GEOGRAPHICAL INFORMATION SYSTEMS: EXAMPLE OF TRABZON ORTAHİSAR

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1. Introduction

The water that collects in a certain bed and flows into the sea or lake is called a stream. Although streams, which are drainage channels of surface waters in the hydrological cycle, contain less water than other water sources, they are also important geologically, biologically, historically and culturally, thanks to their water and nutrient transport properties (Yenil & Şahin, 2016). Small streams are called streams, streams larger than streams are called brooks, and streams larger than brooks are called rivers without being bound by a specific rule (Cengiz, 2007; Karakoç, 2019). The river systems, which are the most important elements of the landscape, and the coastal ecosystems surrounding them serve as corridors connecting the patches in the landscape matrix (Yıldırım et al., 2013).

As long as stream corridors are not destroyed, they provide natural flood control by regulating the flow regime, improve water quality by filtering pollutants coming with surface flow, regulate the temperature of aquatic and terrestrial habitats and control soil loss. Stream corridors fulfill five basic functions: habitat, transmission/transport, barrier/barrier, filter/filtration, source and sink. Stream corridors create a habitat for the fauna to feed and reproduce, thanks to its habitat function. Thanks to its transmission function, it provides the transport and transmission of energy, water and aquatic organisms, plant nutrients and seeds from one place to another. Stream corridors, thanks to the vegetation they have, keep the suspended particles carried by the wind and soil surface and prevent the temperature of the water from rising by forming a barrier against the sun rays falling on the water surface in hot regions. It also helps to deliver the water to the accumulation areas in a clean way by filtering the pollutants carried by the surface flow. The soil originating from the areas around the river corridors serves as a sink for living things and substances such as pesticides, seeds and animals. In addition, they function as a resource because they spread the objects and resources they have around them (FISRWG, 1998; Serengil et al. 2021).
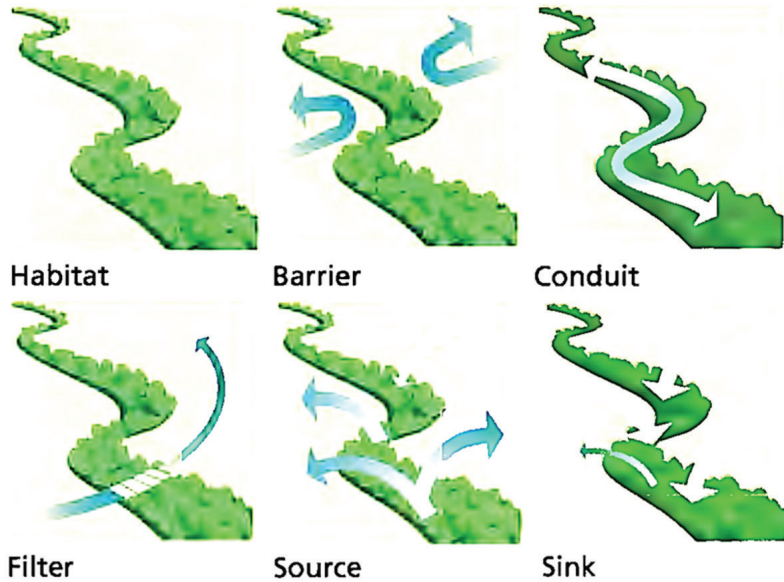
Figure 1. *Functions of river corridors (FISRWG, 1998)*

The banks of the rivers, which enable agricultural activities, hydrological cycle, recreational activities and create resources, have accelerated the development around them and have become the prominent areas of cities as one of the important functions of urban development (Kılıçaslan & Özkan, 2005; Sağlık et al., 2012; Sarıçam & Coşkun Hepcan, 2015). In addition, the rivers in the city are an important component of the city, as they create a habitat for various living species, shape the urban identity (Alpak et al., 2019), affect the environmental quality and microclimatic comfort, as well as meet the recreational needs of the people of the city and contribute ecologically, socially and culturally. Today, river ecosystems are at risk due to human activities that are not compatible with natural ecosystem functioning and affect the flow, quality and structure of rivers (Çetiner & Şahin, 2020). In particular, population growth and the concentration of the increasing population in cities, the uncontrolled spread of urbanization towards river beds, narrows the cross-sectional area of the stream and causes floods to occur (Gülbaz, 2019). Increase in impermeable surfaces due to wrong practices in cities, lack of urban open space, infrastructure etc. Along with the problems, climate change and the increase and irregularity in precipitation regimes pass the surface flow of precipitation waters and make cities and urban people vulnerable to floods and overflows (Seyhan & Bayramoğlu, 2021; Sılaydın Aydın & Kahraman, 2022).

Floods are among the natural disasters with a high destructive power that occur suddenly and periodically, negatively affecting the life around the river with the increase in water flow in the river beds (Mahmood Siddiqui et al., 2011; İbrahim et al., 2017; Oğraş & Önen, 2019). Although floods are natural processes that depend on time, today, as a result of human activities, they have moved away from their natural processes and have become an unexpectedly sudden natural disaster. For this reason, one of the important elements that should be dealt with in planning is flood areas (Yıldırım et al., 2013). Due to climate change, it is predicted that one billion people will live in cities at risk of flood disaster by 2060, and those living in large coastal cities are especially at risk (Dinç, 2019). Spatial planning is becoming increasingly important in the fight against flood risk. Geographical information systems and remote sensing technologies, which enable rapid, analytical and effective decision-making, play an important role in providing controlled urban development and planning the flood risk in urban areas (Ogato et al., 2020). In addition, the basis of a comprehensive flood management plan is based on the mapping of sensitive areas (Tomar et al., 2021).

This study aims to develop suggestions for flood risk management by determining the flood risk areas in Trabzon Ortahisar district with the help of GIS in order to make the cities resistant to natural disasters and to draw attention to spatial planning in accordance with the climate.

2. Study Area

Ortahisar is the central district of Trabzon province, geographically located between 40°58′55.72″ and 41°00′09.56″ north latitudes and 39°49′38.12″ and 39°38′17.06″ east longitudes. Spread over an area of approximately 234 km², the district consists of 42 districts. The total population is 334,228 according to 2021 TUIK data.
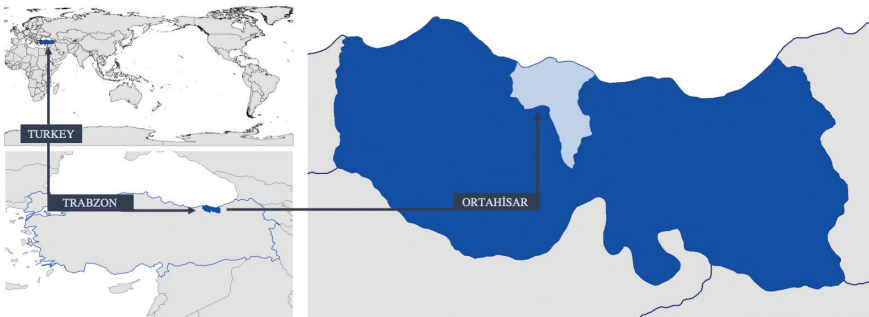

Figure 2. Study area

The height factor plays an important role in controlling the flood direction movement and the depth of the water level (Stieglitz et al., 1997; Gigovic et al., 2017). The elevation levels within the study area start from sea level and reach up to 2035 meters. Since the slope factor is important in determining the direct water flow rate and duration, it is an important indicator in determining the areas where flood risk may occur. When the slope status of the study area is examined, the area of 194.22 km^2 has a slope of 15% or more, the area of 12, 62 km^2 has a 10-15% slope, an area of 7.15 km^2 has a 5-10% slope and an area of 20.19 km^2. It is seen that the area has a 0-5% slope. Since a large part of the area consists of very steeply sloping areas, the water flow rate is an important threat, while flat and nearly flat areas spread over an area of 20.19 km^2 are at risk of flooding. Aspect factor is vegetation density, soil moisture etc. It makes more sense when combined with other factors. In Turkey, the fact that north-facing slopes receive more precipitation than south-facing slopes creates a more risky situation when soil moisture is taken into account, while south-facing slopes may be more at risk when the presence of vegetation is taken into account (Ocak & Bahadır, 2020). When the aspect groups within the study area are examined, it is seen that the flat area and north-facing slopes that are more at risk have an area of 17.07 km^2 and an area of 103.80 km^2 facing northwest and northeast.
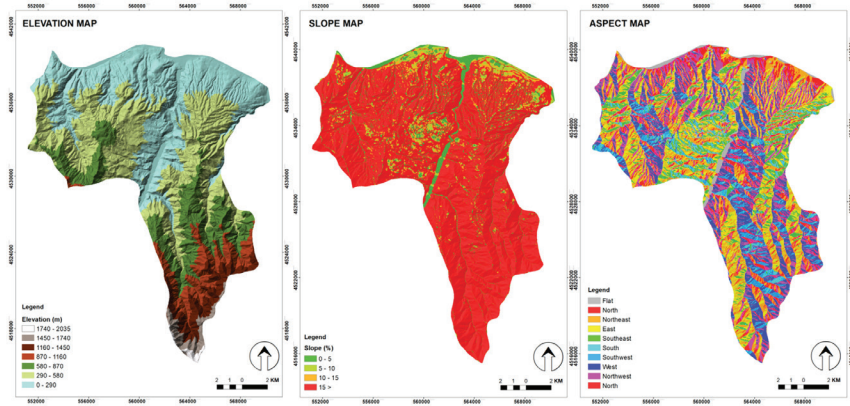

Figure 3. *Elevation, Slope and Aspect Map*

Soil structure and infiltration capacity affect the water absorption and properties of the soil. As the infiltration capacity decreases, the risk of flooding increases as the amount of water that will flow to the surface will increase. The most common large soil group in the study area is red

yellow podzolic (P) soils with an area of 116.95 km^2 and brown forest (M) soils with an area of 95.84 km^2. Gray brown podzolic (G) soils cover 1.20 km^2, while alluvial (A) soils cover 1.39 km^2. In areas where the ground is soft and porous, water may leak through the pores, while in saturated, impermeable soils, water passes into the surface flow. In this case, the geological formations in the area create significant effects on the water that will pass into the surface flow. When the geological formation in the study area is examined according to the icona rock class, it is seen that volcanics and sedimentary rocks with low permeability are in the majority with an area of 195.02 km^2. In addition, terrestrial clastic formations are found in an area of 18.89 km^2, clastics and carbonates in an area of 12.02 km^2, unseparated quaternary formations in an area of 9.64 km^2 and granitoids in an area of 2.88 km^2.
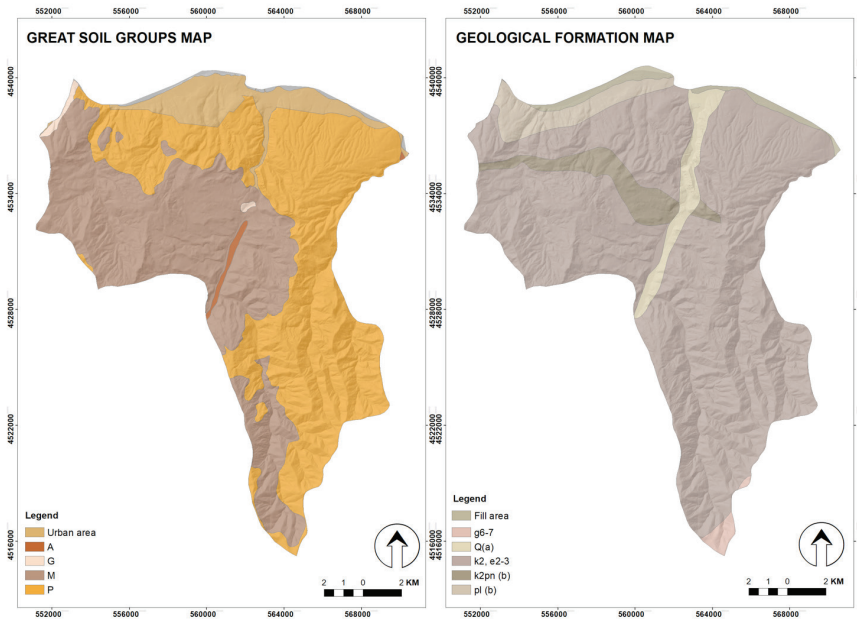

Figure 4. *Great Soil Groups and Geological Formation Map*

Land cover is a factor that has significant effects on surface runoff and soil water retention. One of the biggest problems of today is that urban areas gradually spread and cause land use changes. Urban and industrial areas are mostly buildings, roads, parking lots, etc. Since they consist of impermeable surfaces, they reduce the infiltration capacity of the soil, retain water and increase the risk of flooding (Gigovic et al., 2017). Corine land cover classes of Ortahisar district are regrouped as forest, grassland, cultivated land, built area and water surfaces. Within the forest class, there

are broad-leaved forests (311), coniferous forests (312) and mixed forests (313). There are natural meadows (321) and plant change areas (324) within the grassland class. Within the cultivated land class, there are orchards (222), mixed agricultural areas (242), agricultural areas (243) with natural vegetation. Within the construction area class, continuous city structure (111), discontinuous city structure (112), industrial and commercial units (121), highways, railways and related areas (122), ports (123), airports (124), mineral extraction fields (131), construction sites (133) and sports and entertainment areas (142). Sea and ocean (523) are included in the class of water surfaces. The forest class in the area covers 42.67 km^2, the grassland class is 3.84 km^2, the cultivated land class is 159.23 km^2, the construction area is 27.89 km^2, the water surface covers 1.15 km^2. While the type and amount of precipitation is an important factor in terms of flood risk, changes and irregularities in precipitation regimes, especially due to climate change, increase this effect even more. The amount of precipitation in the study area was prepared using the Schreiber method (Doğru & Güngöroğlu, 2022) and ArcGIS kriging tool using the data obtained from the MGM. Accordingly, the minimum amount of precipitation in the area varies between 801 and 1803 mm.
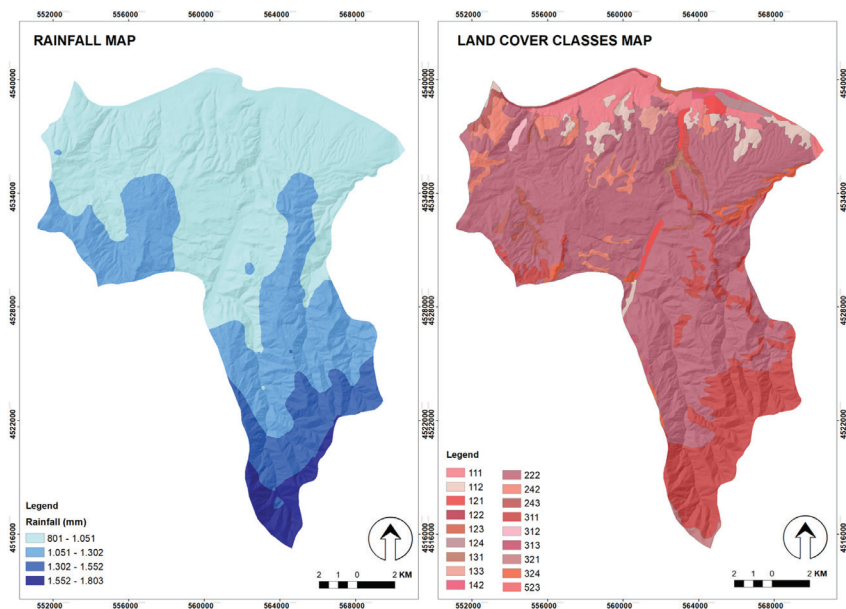

Figure 5. *Rainfall and Land Cover Classes Map*

3. Method

After the literature review on the subject, the impact factors to be used for flood risk analysis were determined. As a result of the investigations, slope, aspect, elevation, geology, soil, precipitation amount and land use were accepted as flood risk factors for Ortahisar district. In order to analyze the flood risk in the district, the relevant data was collected and a database was created through geographic information systems. Relevant data and data sources are given in Table 1.

Table 1. *Data and data sources of flood risk analysis factors*

Data	Data Source
Elevation	USGS SRTM Digital Elevation Model
	1/25000 HGM Hometown Maps
Slope	1x1 m resolution DEM reproduced by the synthesis of USGS and Hometown maps
Aspect	
Geology	MTA Geosciences Map Viewer Module
Soil	1/25000 Soil Map
Rainfall	MGM Meteorological station data
Land Cover Classes	Copernicus Land Monitoring Service

After the preparation of the database, previous studies on flood risk analysis were examined and the subunits of the impact factors used were determined (Oğuz et al., 2016; Şengün et al., 2019; Ocak & Bahadır, 2020; Ogato et al., 2020). For the elevation data of the area, the 25x25 resolution DEM data obtained from the USGS SRTM Digital Elevation Model and the contours on the 1/25000 scaled country maps prepared by HGM were checked with the contours and the differences were eliminated. Then, a new DEM data with a resolution of 1x1 m was produced with the contours obtained. With this generated DEM data, the slope and aspect data were prepared by using ArcGIS Slope and Aspect tools, respectively. The data of the geological formations were downloaded as KML by drawing them on the MTA Earth Sciences Map Viewing service. Then, the geology data were prepared using the ArcGIS KML to Layer tool. Large soil groups were made ready by digitizing on 1/25000 scale soil maps. In order to produce precipitation data of the area, the station information of MGM Trabzon was brought to the ArcGIS environment as a point. Then, using the Create Random Points tool based on this station, random points were assigned to the boundaries of the study area. The height data of these assigned points were processed with the Extract Multi Value Points tool.

Then, using the Schreiber method, the amount of precipitation received by each assigned point was calculated with the Raster Calculator tool. According to the Schreiber method, the amount of precipitation increases by 54 mm for every 100 meters of elevation increase. Finally, precipitation data of the area was prepared using the Kriging tool. The land cover of the study area was prepared by downloading the classes from the Copernicus Land Monitoring Service system.

Impact factors were reclassified according to the determined subunits using ArcGIS 10.8 program. According to the new classification made, the criteria for each sub-unit were scored between 1 and 5 (Table 2). After classification and scoring, all factors were converted into a data set consisting of the same units ready to be overlapped. Finally, flood risk analysis was performed by selecting equal impact ratio with ArcGIS Weighted Overlay tool.

Table 2. *Classifications and scoring of flood risk analysis factors*

Factor	Classification	Area (km^2)	Score
Elevation (m)	0-407	120,22	5
	407-814	74,76	4
	814-1221	24,72	3
	1221-1628	12,27	2
	1628-2035	2,29	1
Slope (%)	0-5	20,19	5
	5-10	7,15	4
	10-15	12,62	2
	15	194,22	1
Aspect	N, F	17,07	5
	NE, NW	103,80	4
	E, SE, S, SW, W	113,31	3
Geology	Fill area	4,92	5
	g6-7	2,88	5
	k2, e2-3	195,02	4
	pl(b)	18,89	3
	Q(a)	9,64	2
	k2pn(b)	12,02	1
Great Soil Groups	Gray Brown Podzolic Soils (G)	1,20	5
	Alluvial (A)	1,39	5
	Brown Forest Lands (M)	95,84	3
	Red Yellow Podzolic Soils (P)	116,95	3
	Urban area	16,81	4
Land Cover Classes	Forest	42,67	1
	Pasture	3,84	2
	Cultivated Land	159, 23	3
	Construction Area	27,89	4
	Water Surfacess	1,15	5

4. Findings

According to the results of the flood risk analysis, it has been determined that especially the coastal region and river valley floors are faced with a high flood risk, and the flood risk is medium or low in regions with high altitudes. The flood risk of 89.23% (207.1 km^2) of the district is middle risk, 10.05% (23.33 km^2) is at high risk and 0.72% (1.68 km^2) is at low level. When the land uses of the areas under flood risk are examined, it is seen that the city structure, industrial and commercial areas, mining and construction sites, airports and ports are under the highest risk level. Orchards and mixed farmlands are at medium and high risk, while areas with broad-leaved forests are at low risk. According to the results of the analysis, the first risk group is urban areas, while the second risk group is agricultural lands.

The study area has a steep and uneven terrain due to its geographical location. At the same time, the fact that most of the geological formation types in the area are less permeable causes the rain water to pass into the surface flow without being drained. For this reason, underground water resources in the region cannot show richness, and surface waters, namely rivers, show excess. The flood risk is expected to be high in the study area due to the fact that most of the water coming from the rain passes to the surface flow and the region is a region that receives heavy rainfall.
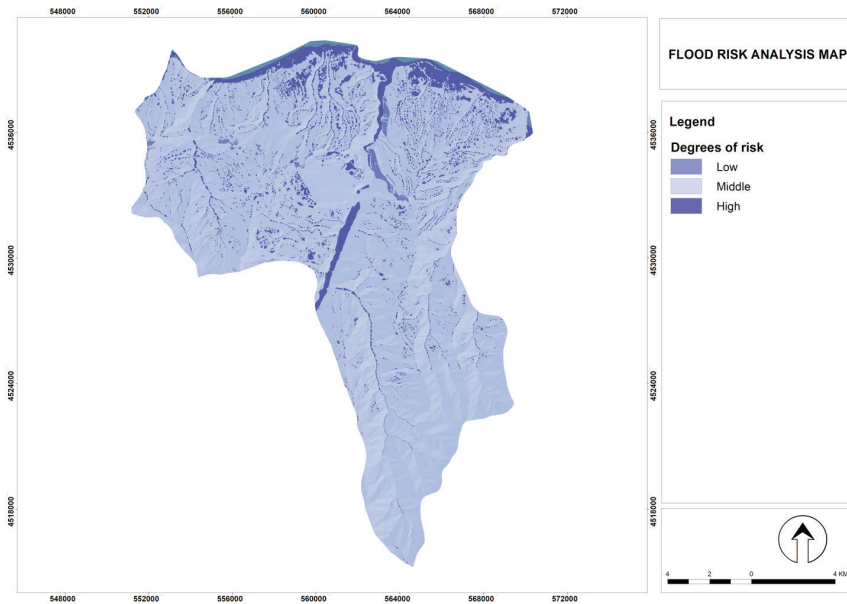

Figure 5. *Flood Risk Analysis Map*

In 1990, a flood disaster occurred in the Değirmendere basin in the study area due to heavy rains and this disaster caused serious damage. Since 1990, due to the wrong land use decisions, settlement, industry, transportation, etc. along the river bed. The establishment of the facilities continued and the river bed continued to be occupied. As a result of these wrong policies, the flood risk in the region continues to increase. In this study, it has been revealed that these regions are the areas with a high flood risk degree.
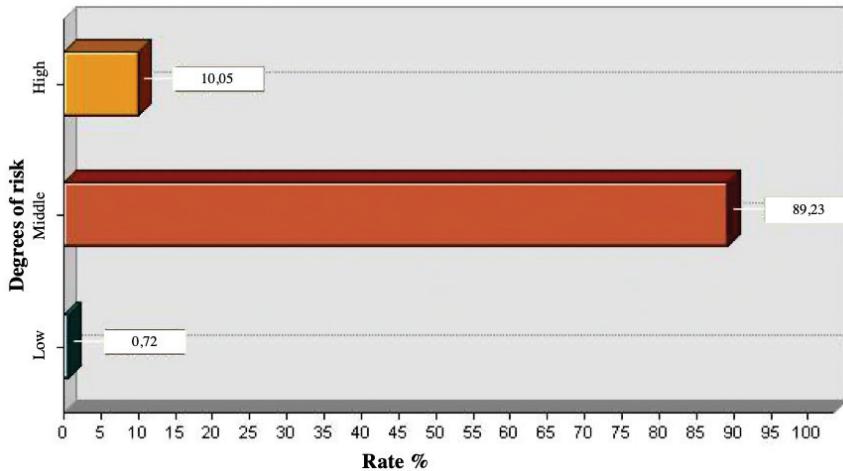

Figure 6. *Flood risk degrees and distribution ratios*

5. Conclusion

Flood disasters are among the most common natural disasters in the world and in Turkey, especially in recent years. In order to create sustainable and livable cities, it is very important to develop solutions for this big problem that cities will face today and in the future. As a matter of fact, due to climate change, especially coastal cities are under serious risk due to both the rise in sea water level and the waters that pass into the surface flow with increasing precipitation. This study determined the flood risk areas in Ortahisar district and revealed the necessity of preparing long and short-term risk management plans for sustainable water resources development and flood management.

Water is in a natural cycle where it transforms into solid, liquid and gas forms in surface and groundwater, ocean and atmosphere. In particular, changes in land cover hinder the natural cycle of water and pollute existing limited clean water resources. In the natural process, some of the water that falls on the earth with precipitation is slowed down by plants,

helping the soil to leak water slowly. Unfortunately, the green areas that will provide this service in urban areas and the surfaces where the water will meet the soil have decreased gradually and the impermeable surfaces have increased. This causes the water to pass into the surface flow without being absorbed. This causes both underground sources not to be fed adequately and water sources to decrease, as well as the water that passes into the surface flow by taking various pollutants with it and mixing with the surface waters, causing water pollution. Especially the rough terrain and impermeable rock structures of the eastern Black Sea region cause the region to be poor in terms of underground resources. Due to the land structure and the ground it has, a small amount of water is absorbed in these regions and most of it passes into the surface flow. For this reason, it is extremely important to protect the existence and quality of surface waters, especially in these and similar regions, and to be prepared for possible risks.

Rain harvesting, rain gardens, structured wetlands, green roofs, etc., in order to reduce the impact of urban areas, which are both the factors and the areas most affected by the flood risk and water quality deterioration. should implement sustainable drainage systems practices. For sustainable flood risk management, risk maps should be created, emergency response plans for designated areas, various zoning regulations, and sustainable spatial solutions to reduce flood risk should be developed.

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Chapter 11

THE SCOPE AND DEVELOPMENT OF DISCIPLINES, MULTIDISCIPLINARY, TRANSDISCIPLINARY AND DIGITAL HUMANITY CONCEPTS IN DESIGN EDUCATION

Ceyhun ŞEKERCİ

1. Introduction

In recent years, with the increase in information access and methodological changes in research, the use of multi-disciplinary knowledge has gained importance as well as the use of one-way disciplinary knowledge in problem solving in the design process. Although most of the researches in the field of professional and design education seem to proceed through a single discipline, there are studies that contribute to and benefit from in different disciplines (Piaget, 1972). Based on this idea, defining the discipline and looking at the relations between disciplines will facilitate the formation of the interaction that is or will be established in the design processes.

With the participation of digital technologies in the design processes, it can create an understandable approach by producing practical solutions to design problems that had a complex structure before. In addition, thanks to the opportunities provided by digital technologies, it has made it possible to evaluate different disciplines in the field of design with a holistic approach.

In this study, the definitions of the concepts of disciplinary, multidisciplinary, transdisciplinary and digital humanities were made and their place in the historical process, its educational and professional development, its past in the fields of design, differences, similarities and breaks from each other were examined.
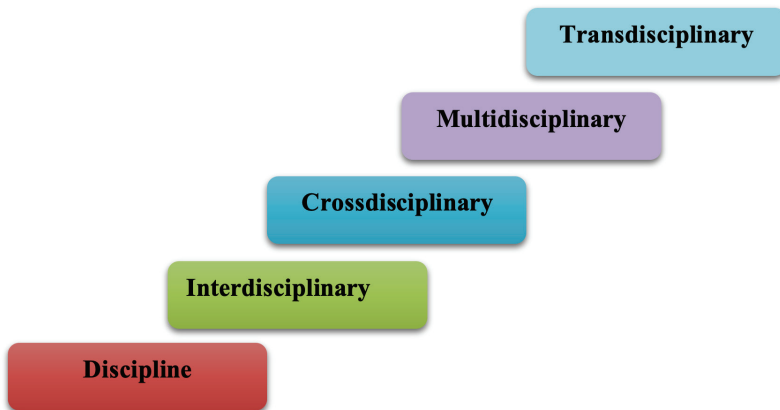
Figure 1. *Schematic development of the interdisciplinary relationship*

2. Concepts

In this section, the definitions of disciplinary, multidisciplinary and transdisciplinary, digital humanities concepts are made, its past in the field of design, its place in the historical process, its educational and professional development, differences, similarities and breaks from each other are examined.

2.1. Discipline

2.1.1. Definition of Discipline

The word 'discipline', which is of Latin origin, was used in the sense of education and knowledge, and pointed to the manners of learning. Firstly, it was also used in the sense of forcing people to obey the rules by punishing those who do not obey the rules. The common point in the definition used within the scope of our research is to point out the relationship of the discipline with "knowledge, scientificness, scientific methods".

The Turkish Language Institution defined the term discipline as "the whole of the knowledge that is or may be the subject of teaching, the branch of science". Discipline is a research area that has its own content, methods and infrastructure, can produce knowledge in the field of study and has proven that it can further develop this knowledge (Berger, 1970).

Piaget, on the other hand, defines discipline as a field that has a history, procedures, methods and is self-contained. Generally speaking, it can be said that a discipline is a field that determines its own terminology, problems, methodology and content (Ulusoy, 2007).

2.1.2. Key features of the discipline

Table 1. *The defining criteria of the disciplines are given in.*

1.	In a discipline, there are specific elements that include thought production such as concepts, forms, propositions, harmonies, rhythms.
2.	A discipline has followers and history.
3.	A discipline has its own specialized language.
4.	A discipline has its own social fabric.
5.	A discipline has an area of dominance on which the interests of its members are focused.
6.	A discipline has methods to test not only content but also hypotheses.
7.	The principles, premises, cognitive values and assumptions of a discipline form a coherent whole.
8.	In a discipline, new definitions can be brought to old concepts and new concepts can be produced as needed.
9.	There is communication between members of a discipline.
10.	Members of a discipline can communicate in environments such as conferences, symposiums, congresses, panels.
11.	A discipline develops educational tools and processes to promote and disseminate itself to the world.

2.1.3. Development of the discipline in the design profession

At the core of the design discipline areas; spatial planning, design art and culture. Since this art and culture includes contemporary educational and professional responsibilities for the continuous construction of not only structures but also changing and transforming national, regional and urban relations; It is also clear that building-space design, urban planning and landscape design, and the necessity of language unity taking into account the different scales and qualities of interior design.

The housing need of the society makes it necessary to design a space. In line with this need, the primary goal is to shape and evaluate the space according to the needs of the user. Interior architecture-architecture fields are design disciplines that create and organize space by meeting these needs according to comfort and aesthetic values (Demirarslan 2006).

In the discipline of interior architecture, a designer designs the building and equipment elements in the interior in detail, taking into account the needs of the users and taking into account today's requirements (Kazamia and Kafaridou, 2010). Although the discipline of Interior Architecture is a new discipline, it also explores material color and texture preferences, as well as providing physical comfort such as lighting, acoustics and air conditioning (Figure 2).
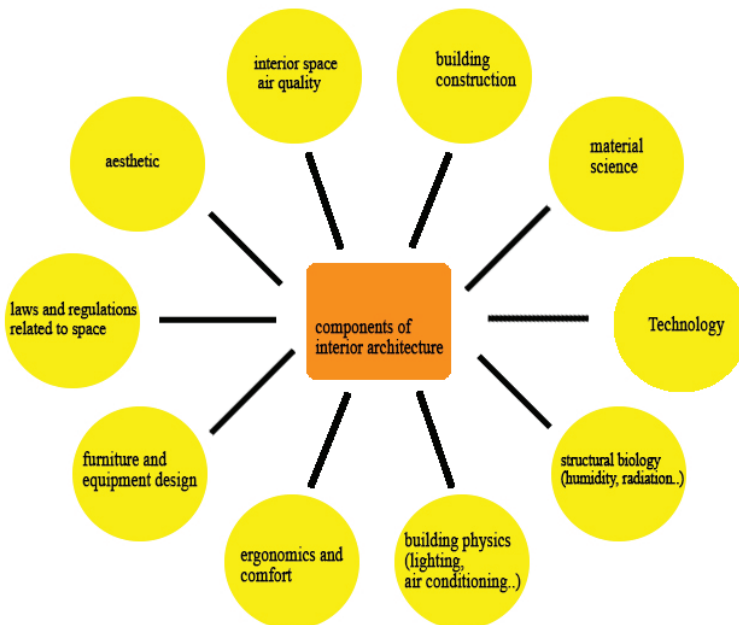

Figure 2. *Components of interior architecture as a design discipline*

The discipline of interior architecture, which is a new discipline, has led to the emergence of new concepts as a discipline that has been influenced by the innovations brought by technology and increasing environmentalist approaches since the second half of the 20th century. Some of these concepts are sustainable space design, parametric design, computational design, ecological space design.

2.2. Multidisciplinary

2.2.1. Definition of Multidisciplinary Concept

The concept of multidisciplinary, which emerged with the change of the term interdisciplinary over time, is defined as the coming together of more than one discipline on a single subject (Aktan, 2007). Multidisciplinary is also defined as everyone doing their own job on a common event or issue and not being interested in the work of another (Petrie, 1976). In the multidisciplinary approach, individuals who specialize in parallel or different disciplines are in minimal relationship to solve the problem or event, even if they do not interfere with each other's work.
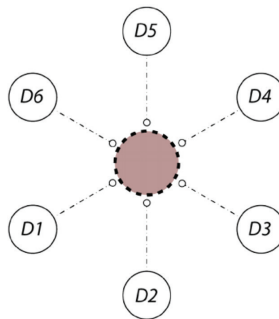

Figure 3. *Example of a multidisciplinary diagram*

In multidisciplinary studies, the target determined in the study to be achieved is divided into more than one sub-discipline and shared in accordance with the disciplines of the experts (Figure 3). Disciplinary experts, who have different disciplinary knowledge, try to reflect the knowledge they have reached with their disciplinary expertise. Experts convey information by working only on issues related to their discipline. In multidisciplinary studies, the aim is not to open new fields, as in disciplines, but to produce solutions and reveal knowledge by coming together of more than one discipline to the existing problem. The characteristics of the multidisciplinary approach are given in Table 2.

Table 2. *Features of the multidisciplinary approach*

1.	Several disciplines work together.
2.	Individuals with different fields of expertise can work independently of each other, as well as sequentially or in parallel.
3.	Individuals with different fields of expertise are responsible for their own disciplines.
4.	Individuals with different expertise have different roles.
5.	Each discipline has a different goal.
6.	Each discipline has its own limits and should not be ignored.
7.	It is additive, integrative and collaborative.
8.	It is externally dependent.
9.	Each discipline has its own methodology.
10.	It teaches information about each discipline.
11.	Uses complementary information and perspectives to address a question.
12.	Different disciplines approach the event / situation from their own perspective, each according to their own skills..
13.	The result is the sum of the individual parts.

There are certain differences between a multidisciplinary and disciplinary approach. These differences are listed in Table 3.

Table 3. *Comparison of disciplinary and multidisciplinary concepts according to criteria*

Comparison Criteria	discipline	Multidisciplinary
Scope	Education and research are conducted around a single discipline.	Education and research are carried out by making use of more than one discipline.
Compromise/ deepening	There is specialization and deepening on a single discipline.	It is believed that it will be much more useful to use different disciplines while analyzing any subject or problem.
Methodology / method of analysis	Microanalysis and reductionist approach are dominant in education and research.	Macro analysis and inclusive approach dominate in education and research.

innovation/ creativity	It is believed that the externality effects of innovation and creativity that may arise in a discipline are strong and that other disciplines will benefit sufficiently from these external benefits.	There is a belief that an interdisciplinary approach will yield much more successful results in terms of innovation and creativity.
Problem solving	The problem is analyzed around a single discipline and a solution is produced.	The problem is analyzed around more than one discipline and solutions are produced. Or experts from different disciplines come together in the same team and try to find solutions.
Synergy	Since integration with other disciplines cannot be achieved, the level of synergy is low.	A high synergy is achieved by the integration of different disciplines. There is a lot of synergy to be gained as the understanding of "team work" is adopted.

2.2.2. The development process of the multidisciplinary approach

The first work on the multidisciplinary approach is seen in Plato's Politea. According to his ideas, progress in human learning can develop with blended units. In the course of time, ideas supporting this view have been put forward. Rousseau claimed that learning that takes place in an environment isolated from the environment by making use of only the book in education is different from the real world, irrelevant and meaningless. In Russian psychologist Vygotsky's social learning teaching, interactions between disciplines and Gardner's theory of multiple intelligences helped explain the multidisciplinary approach (Hayles, 2015).

Contemporary understanding of science has made it necessary to be multidisciplinary in many fields. The concept, which was at the core of the Renaissance period in the past, today constitutes the most important mechanism and ideology that contributes to the development of science and technology. Since the 2000s, a multidisciplinary approach has been taken as a basis in the fields of medicine, health, engineering, architecture and design. In the multidisciplinary approach, the event or situation is no longer just a branch of science. With the multidisciplinary approach, the understanding of creating common solutions between the humanities and technical sciences has begun to emerge (Adams and Forin, 2013).

There are two main reasons for the need for a multidisciplinary approach.

1. Differentiation of the individual's way of perceiving the world

2. Emergence of new fields of work

From a psychological point of view, the way an individual perceives the world is important. While trying to perceive the outside world, the individual mostly uses the knowledge and skills of different disciplines while seeking solutions to the problems they encounter. Therefore, a multidisciplinary approach is important. Education, research and practice, which are organized only with a disciplinary approach, connect with real life, but they cause difficulties in combining information and using it, it becomes unpleasant and boring, and reduces the motivation of the individual.

The emergence of new fields of study requires the formation of different knowledge and the renewal of existing knowledge. In a space design, the relationship between the discipline of interior architecture, working with other disciplines such as architect, electrical engineer, mechanical engineer, graphic designer, industrial engineer has developed and has created a new interdisciplinary research topic. It is impossible to examine these emerging new fields within the narrow scope of traditional disciplines. In a sense, the multidisciplinary approach is formed naturally as a result of the development of different fields.

2.2.3. Development of a multidisciplinary approach in design education

Multidisciplinary studies, the importance of which was recognized in the 20th century, emerged in design education with the design concept after 1950. Along with innovative searches in the field of design, the approach of new design schools has accelerated the spread of multidisciplinary understanding. Design discipline has become a concept associated with the term multidisciplinary in the 2000s (Trummer and Lleras, 2012). Because designers should be expected not only to design the form of the product, but also to be experts in areas such as presenting, producing, selling, marketing and distribution of the product they designed. However, it is not correct to expect the current design discipline to dominate this area alone. In this context, it should be important to eliminate this deficiency by exchanging information from other disciplines (Özcan, 2011). In this case, the necessity of multidisciplinary work arises.

Most of the interdisciplinary relations used in the field of design education in the world are encountered. Rensselaer Polytechnic Institute, one of the notable interdisciplinary programs in the field of design, is the De-

sign, Innovation and Society program, which provides a BS degree. The program consists of a series of studio lessons that include the multidisciplinary work of the students. The program not only provides solutions to the design problem in the studio courses, but also provides the integration of the humanities and social sciences with technology into the courses. It is seen that the program, which supports the studio courses, integrates with a perception that covers the whole process from a new product design to the marketing of this product, the design and the user.

The multidisciplinary education approach of design schools in the USA enabled the art to become stronger after 1950 (Trummer and Lleras, 2012). The proliferation of creative design practices with experimental approaches in design education has also increased the interdisciplinary and multidisciplinary practices of interdisciplinary art (Öztürk, 2016). "Carneige Mellon University" in the USA is one of the important schools that provide multidisciplinary education at the undergraduate level in the field of design. Different disciplines in the field of fine arts form a joint program at the school. These programs are humanities, social sciences, science, computer science, and arts programs. Programs are defined as interdisciplinary programs. Students can choose courses from five different schools: fine arts, architecture, art, design, drama and music.

At the summit of the Danish Design 2020 Committee, it was discussed that cooperation with the humanities, social sciences and sciences should be done in order to bring a multidisciplinary approach to design students (The Vision of the Danish Design 2020 Committee, 2011). It has been concluded that design, which is among the basic disciplines due to its multidisciplinary binding role, should be included in all other disciplines.

Multidisciplinary changes in design education have not only been in the form of curriculum renewal and creating programs, but have also led to the opening of different universities. One of these universities is Aalto University in Finland. This university is the first established interdisciplinary university (Restarting Britain Report, 2011)

In line with the multidisciplinary approach in France, the Paris-Saclay Campus will be established in 2020. This campus is planned to bring together 22 universities and research institutes. The campus is organized to serve approximately 20 thousand personnel and 30 thousand students. The aim of the developers of this campus is to create the first community of people who are leaders, talented and committed to innovation by combining university campuses at a multidisciplinary level (Öztürk, 2016).

In order to reveal the multidisciplinary approach, new universities are established in some countries, while in some countries cooperation between universities is made. In Australia and Hong Kong, institutions

with intensive research across disciplines cooperate with institutions with less research (Kazamia and Kaforidav, 2010).

Similar approaches have begun to be tried in faculties providing education in the fields of design in our country. In the departments of Interior Architecture and Industrial Design at Istanbul Technical University, Mimar Sinan Fine Arts University, Bahçeşehir and Doğuş Universities, a common curriculum application was carried out at a rate of 14-18% in certain periods, especially in the first grades.

In the first year at Maltepe University, the departments of Ship and Yacht Design, Architecture and Interior Architecture provide education together, in the second year, the departments of Architecture and Interior Architecture work together, and from the third year, each department continues their education with their own studio studies and theoretical lessons. In addition, interior architecture education progresses depending on the architecture curriculum (Ulusoy, 2007).

In addition, it is seen that architecture and design students take courses from different disciplines in graduate programs in order to catch a multidisciplinary perspective in our country. In this context, designers try to provide versatility with interdisciplinary communication in design education by getting support from not only technical sciences but also experts from disciplines such as art, graphic design, communication and law.

Flexibility in design education applied in our country and especially in developed countries, education in others from different disciplines, horizontal-vertical transitions, joint education programs between countries, workshops, conferences, meetings offer a perspective where both the specialization increases and the relations between the branches of science intersect in very different fields.

Table 4. *Characteristics of students who have a multidisciplinary approach in design education*

1	Student interprets indoor and outdoor space according to new developments.
2	Evaluates the design problem from multiple perspectives.
3	Monitors and interprets professional developments.
4	Establishes relationships with different disciplines.
5	It adopts teamwork and team understanding.
6	Analyzes information correctly.
7	She thinks artistically as well as technically.
8	She transfers her thoughts to reality in line with the possibilities and needs of the society.
9	Mutual respect develops between the lecturer and the students.
10	Students develop the habit of questioning "why" before accepting a thought or a proposition.
11	Can think more creatively, uniquely, and unconventionally.
12	The ability to synthesize and integrate develops.
13	Develops listening ability.

2.0.4. Development of a multidisciplinary approach in the design profession

With the developing technology, the design that directs human life includes different disciplines. Architectural design, space design, graphic design, fashion design and industrial design are just a few of them. In the traditional approach, the designer gave priority to functionality and form in the product, no matter what field he served (Choi, 2006). Today, the designer has moved a little further away from the design of form and functionality and has turned to an approach where the meaning and communication of the product are at the forefront. Therefore, it has become a multidisciplinary discipline by assuming a binding role between different disciplines (Figure 4).
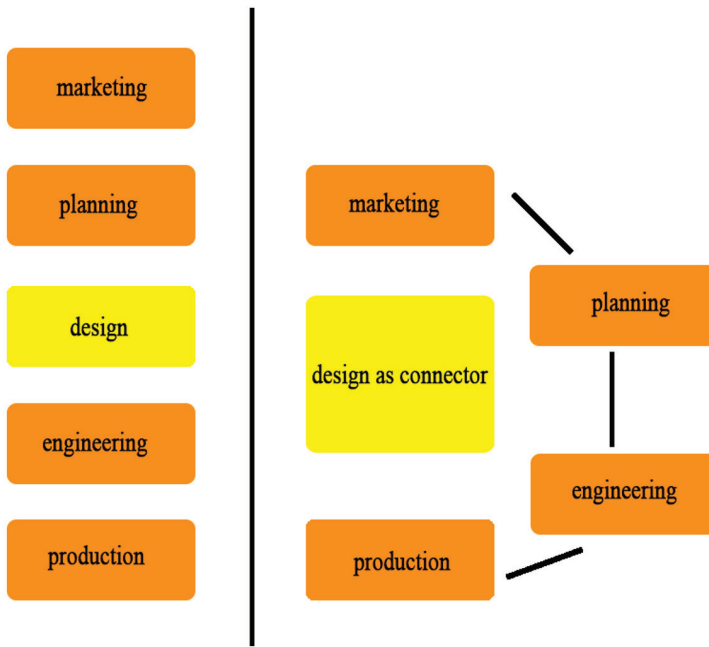
Figure 4. *Past (left) and future (right) role of design*

If we refer to the design-oriented professions from a wider perspective, starting from the planning-based disciplines, the vertical relations created by the branches of urban design, regional and urban planning, architecture, industrial design, interior design allow studies at different design scales. We can also talk about an association that changes according to the requirements with performing arts design, graphic design, communication design, fashion design, landscape architecture, and classical art branches such as ceramics, painting and sculpture. In other words, we can talk about a big picture consisting of a multidisciplinary and transdisciplinary platform (Figure 5).
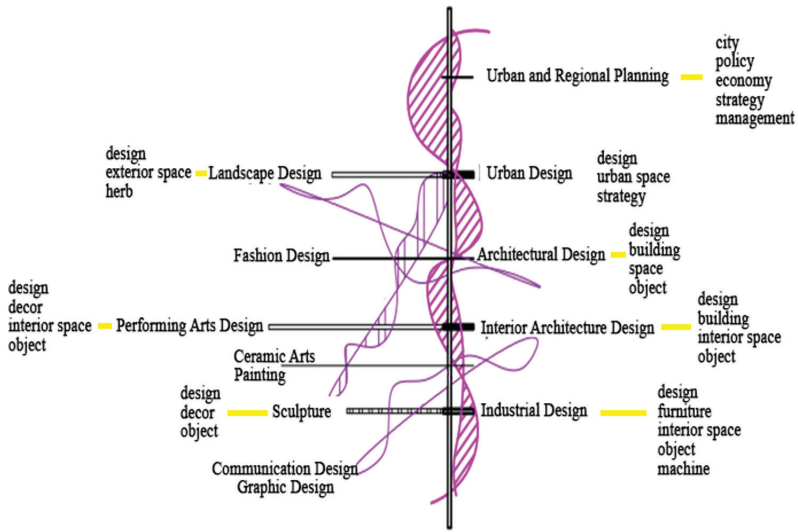
Figure 5. *Space spiral: Multiple expressions (Ozmen, B and Yanar, S; 2016)*

The post-modern values of the digital age, the emergence of flexible and anti-hierarchical systems, multiple perspectives require us to adopt a more sensitive approach to the problems brought about by specialization in design disciplines. In the fields of design, an approach that starts with design and carries out a multi-faceted discipline together in the process is observed.

2.3. Transdisciplinary

2.3.1. Definition of the concept of transdisciplinary

The suffix 'trans-', which comes from Latin origin, gives the meaning of "beyond -" to the word it comes before. With this word, it is meant to go beyond an existing border. With this approach, the term 'transdisciplinary' is expressed as going beyond disciplines.

The concept of transdisciplinary aims to bring people from different disciplines together at a common intersection point about the problem, and it aims for each discipline to offer its own solution. It can also be considered as the transdisciplinary approach and the introduction of different proposals to the same situation, even if the disciplines do not intersect.

Transdisciplinary studies try to go beyond disciplinary perspectives by combining the intellectual frameworks of different disciplines. In these studies, disciplinary information is placed on top of each other in the same

center, evaluated from a new point of view, and integrated into processes (Figure 6). Therefore, transdisciplinary studies come into play in areas where problems or researches that transcend two or more disciplines are the subject.
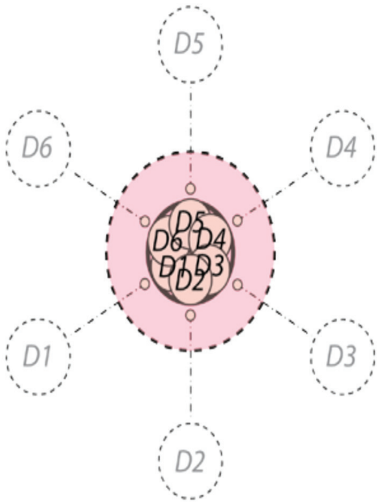

Figure 6. *Transdisciplinary working processes*

A stronger centrality and holistic research process can be mentioned in transdisciplinary studies. It provides a different perspective on the study by revealing new research on disciplinary knowledge.

2.3.2. Development of a transdisciplinary approach in design education

The transdisciplinary approach aims to provide unity, harmony and order by linking the influence on the verticals of the education system. Many studies fail to progress due to lack of coordination. However, this situation can be overcome by transdisciplinary. Harold Linstone proposes a multidisciplinary educational stratification in design education. With the students trying to establish interdisciplinary connections with their own efforts, the progress in the design processes of the students will take a structure that cuts the disciplines in a systematic structure. Beyond the aim of multidisciplinary, some limited interdisciplinary normative experiments with the systematic coordination of multidisciplinary in the stages of design education cannot be included in the discussion of university reform. Because the new aims of universities have not been clearly defined. The basic structure of transdisciplinary education can be understood in terms of the back interaction between education-research and service fun-

ctions. This approach can basically be expected to bring a new perspective to life sciences regarding human and environment interaction.

2.3.3. The development of a transdisciplinary approach in the design profession

The increase in interactivity that has developed with the modern period has in recent years not only been a structural discipline in the field of design engineering, but the development of digital technologies and its inclusion in the field of design has now gone beyond interdisciplinary interaction and prepared the importance and environment of interdisciplinary work instead of multidisciplinary work in design processes.

The idea of creating a sustainable world in the field of design with the effect of global warming allows it to contribute to the development of smart building technologies by including engineering fields in the field of design, beyond being just a design discipline in the field of architecture. In this way, ecological green architecture constitutes a transdisciplinary approach under sustainable architecture, due to the development of the field of sustainable design.

In parallel with these developments, it is emphasized that a design profession will emerge in the future that will unite all these specialized professions such as mechanical construction and electrical engineering, in addition to professions such as the design discipline architect and interior architect, under a single roof (İmamoğlu, 2011).

2.4. Digital Humanities

2.4.1. Definition of Digital Humanities Concept

"Humanities", which has Latin origins, are defined as academic disciplines that study human culture. Anthropology, geography, music, philosophy, religious education, linguistics, visual arts constitute the humanities (Figure 7). Humanities in the 15th century; It was a course consisting of ethics, history, poetry, rhetoric and grammar philosophy. With the introduction of the computer into daily life, the humanities wanted to expand their research methods with computer-aided approaches. Digital Humanities studies, which emerged in the 1960s, have turned into a new field of science today.

Experts in the humanities field have developed numerous large and small scale numerical design tools. Their aim is to present and visualize new data obtained from research. They carry out this activity under the name of digital humanities.

The main topics of Digital Humanities are text analysis, digitization and data mining. In addition, issues related to data processing methods are also included in the scope of digital humanities. These topics include image analysis, complex network analysis, and spatial humanities. With these approaches, striking visualizations can be prepared with different techniques in order to examine works of art, texts, ideas, cities and people.
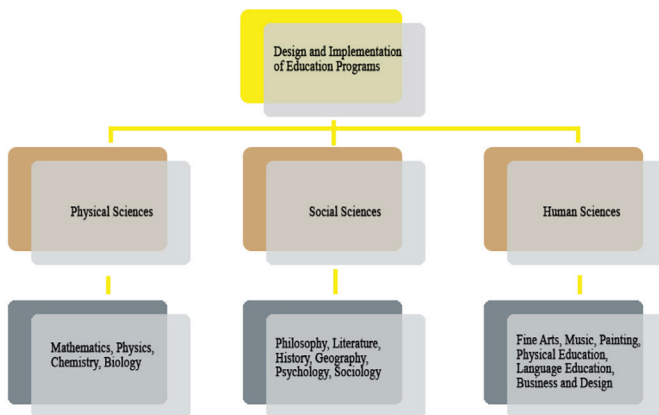

Figure 7. *Schematic representation of training programs*

Humanists need to embrace the methods hidden behind the word 'digital' and learn a different way of thinking in order to use computer-based methodologies. All successful digital humanities studies include asking questions posed by the humanities in a way that can be answered by numerical methods (in a sense, their translation into digital).

2.4.2. History of Digital Humanities

In the West, the study of the humanities can be traced back to ancient Greece as the basis for a comprehensive education for citizens. In Roman times, the seven liberal arts concepts included grammar, rhetoric, and logic, along with arithmetic, geometry, astronomy, and music. These subjects opened up skills or ways of doing to humanity and formed a large part of medieval education.

With the Renaissance humanism of the fifteenth century, with the transition from classical fields to fields such as literature and history, a significant shift occurred when human practices began to enter the subject of study rather than practice. In the twentieth century, this view began to be questioned by the post-modernist movement, which sought to redefine the humanities in more egalitarian terms appropriate for a democratic society.

2.4.3. Development of digital humanities in design education

The development of digital technologies and environments has enriched the possibilities of information search, access, use, production and transmission. Libraries, which are considered as cultural memory institutions that protect and present information resources from the past to the present, transfer them to future generations, have also transferred their collections to digital environments with the effect of these continuous developments and user needs. In this context, libraries have intensively focused on digitization studies and have started to offer digitalized information resources through various information systems. These efforts, especially to increase the visibility and use of information resources, directly affected the studies carried out in the field of humanities; It has brought about the formation of an interdisciplinary structure called "digital humanities", which is based on the analysis, interpretation and re-creation of the information obtained from digitized content with the help of various tools and equipment. This emerging structure has brought a new dimension to the information organization, classification, access and protection/storage functions of libraries.

2.4.4. Development of digital humanities in the design process

In the traditional design process, where computer technologies are not used, designs are made on paper, and after the design reaches a certain stage, communication with different disciplines (civil, mechanical, electrical engineers, etc.) is provided (Figure 5). The designs are reshaped in line with the decisions made by different disciplines. This means both a waste of money and a waste of time. In addition, retrospective revisions prolong the design process and make more mistakes.

Nowadays, designs are made in computer environments. Computers are preferred more in terms of time, speed and economy. In addition, it requires less labor and reduces drawing errors compared to traditional methods. Thanks to the preparation of designs in digital environments and developments in communication technologies, the interdisciplinary design organization is also changing. There are different disciplines in the period from the beginning of the design to the completion of the design.

The healthy execution of the design organization in the digital environment is possible with the efficient use of technological opportunities. A number of problems are encountered in organizations that do not have sufficient technological equipment and knowledge. In the design process, in relations with other knowledge disciplines such as engineering fields,

the use of computer software, graphic standards and coordinated communication concepts come to the fore. The most common problem in today's business organizations is seen as communication problems with the use of different software and different standards. In order to rationalize these problems, the use of interdisciplinary standardization and common software and the use of appropriate communication methods gain importance.

3. Conclusion

From the study data, it has been seen that multidisciplinary and transdisciplinary concepts have begun to take place more systematically in the world of education and science in the 21st century. The research and education system based on specialization on a certain discipline in the field of design has gradually reduced its importance and left its place to multidisciplinary research and education.

Today, designers are expected to specialize in many subjects. This situation enables the design discipline to interact and communicate with other disciplines and brings an interdisciplinary approach in design education. Multidisciplinary interaction will make it easier for the designer to reflect his talent and originality, feed the design process and allow new experiences to emerge.

Fields such as digital humanities, business and engineering are included in design education, undergraduate and graduate programs are carried out jointly with different disciplines at the global level, and multidisciplinary universities are established. In our country, current educational practices in design education are reviewed, interdisciplinary graduate programs are opened and undergraduate programs are branched out. The development of policies in order to contribute to the design discipline and design education in many countries, and the receipt of positive notifications as a result, causes us to question how much support is given to design in our country.

Recommendations

- Design education should be given not only in fine arts and architecture faculties, but also in faculties of other related disciplines (humanities, business administration, engineering, etc.).

- Instead of opening new undergraduate departments in order to have a better quality education, design departments are integrated within themselves or with different departments; Interdisciplinary institutions can be created with multidisciplinary work.

- The number of graduate programs can be increased in order to support newly opened undergraduate programs.

- Applications (virtual design studio) where technology is integrated into design education can be increased.

- It is reported that design applications focus on people in the future, so a program should be created with genetics, medicine and biological sciences.

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Chapter 12

GIS-BASED EVALUATION OF THE SUFFICIENCY OF GREEN AREAS: CASE OF SERIK CITY CENTER

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1. Introduction

Cities are in a constant state of socio-cultural, socio-economic, ecological and physical change due to population growth and migrations in the world (Aida et al., 2016; Chan & Vu, 2017; Olgun et al., 2022). It affects cities positively or negatively depending on the objectives, strategies and activities carried out. In our country, the urban population is increasing due to both the increase in the population and the migration of individuals living in rural areas to the cities. Depending on the population increase, cities develop according to the spatial plans (spatial strategy plans, environmental plans and zoning plans) (Selim et al., 2014; Çınar et al., 2015; Olgun & Yılmaz, 2019a). At the same time, population growth in cities, regional migrations and increasing ecological problems have made it necessary for city planners, ecologists and landscape architects to introduce new methods for the sustainable urban development of these regions (Herold et al., 2002). For this reason, many countries are working to create environmentally sustainable cities and redesign existing cities from an ecological point of view (Coşkun Hepcan et al., 2013; Mutlu et al, 2018).

There are differences according to the countries in the planning of cities, and each country has laws and regulations determined according to its own internal dynamics. In Turkey, there are legal regulations for the planning of cities that were published and entered into force in different periods (Olgun & Yılmaz, 2017a). Today, the legal dimension, especially for the planning of urban green areas, consists of the zoning law numbered 3194 and the "Regulation on Making Changes in the Regulation on the Principles of Making and Amending the Development Plan" published in the Official newspaper number. 23804 on September 2, 1999. At the same time, it brings some suggestions in the Spatial Plans Construction Regulation published in the official newspaper numbered 29030 in 2014. In this context, in order for planning studies to be effective and efficient, they must be legally valid and applicable. In particular, the zoning plans are legally sound and applicable; It allows the plans to be on a solid legal basis, not to be changed frequently, to protect the integrity between the plans, to carry out a complete interdisciplinary study while preparing the zoning plan, and to ensure coordination between public institutions and organizations (Ulutaş, 2005; Altıntaş, 2007 Aydemir et al., 2018). However, cities have different settlement types depending on their geography, topographic, hydrological, climatic and socio-economic and demographic characteristics. For this reason, it is not possible to provide a single settlement order or create a green area system in line with the legal legislation (Olgun & Yılmaz, 2017b; Olgun & Yılmaz, 2019b)

Urban green spaces are one of the important components of the city for urban and its inhabitants (Selim et al., 2021). Scientific research on urban green spaces reveals the benefits of these spaces (Sadeghian & Vardanyan, 2013; Kolimenakis et al., 2021). In addition to important environmental services such as increasing the quality of water resources and air, filtering wind and noise, and regulating the microclimate of the city, urban green spaces provide social and psychological services that are vital for the livability of modern cities and the well-being of urban residents with the natural spaces they offer in the urban area (Ulrich, 1981; Kaplan, 1985; Chiesura, 2004; Gao et al., 2011). Ecological and environmental functions (contribution to urban infrastructure, pollution control, biodiversity, and nature protection, etc.), economic and aesthetic functions (energy saving, property value, etc.), functions in terms of design and planning, social and environmental functions of urban green spaces for the city and its inhabitants. It has many different functions and benefits such as psychological functions, human health, recreation and well-being (Quintas & Curado, 2009; Haq, 2011; Vlad & Brătăşanu, 2011; Yılmaz et al., 2016; Olgun, 2019). Especially during the pandemic period (Cov19), the importance of urban green spaces in sustainable modern urbanization has been understood once again (Moreno et al., 2021). In this context, green spaces are one of the elements that should be considered primarily in the planning of cities due to both their functions they have and the benefits they provide to the city (Olgun & Yılmaz, 2019c; Olgun & Selim, 2021).

The legal element regarding green space planning in Turkey is the zoning legislation. The approach to green areas in this legislation is to provide a certain size of green space per person. When the Zoning Law No 3194 was enacted in 1985, the amount of green space per capita was foreseen as 7 m^2. In the Regulation on the Principles of Making and Amending the Development Plan, published in the Official newspaper dated September 2, 1999 and numbered 23804, the amount of green space per capita was increased compared to the previous value, and 10 m^2 within the boundaries of the municipality and adjacent areas, and 14 m^2 outside these boundaries. has been foreseen. In the zoning plan, there is no foresight that guides green space planning other than numerical criteria for green areas (Zengin & Yılmaz, 2001; Doygun & İlter, 2007; Manavoğlu & Ortaçeşme, 2007; Selim et al., 2014; Çınar et al., 2015).

In order for the whole city to benefit from the ecological, economic, aesthetic, social and psychological functions of urban green spaces, urban green spaces must serve the whole city. For this, urban green areas should provide a homogeneous distribution throughout the city. But Johnson-Gaither (2011), Jennings et al. (2012), Tabassum and Sharmin (2013), Reyes et al. (2014), Wolch et al. (2014) and So (2016) in their studies

on the distribution of urban green areas in different cities concluded that green areas do not show a homogeneous distribution in spaces and that green areas do not serve the whole city (Olgun & Selim, 2021). Similar results were obtained in studies conducted in our country. In this regard, as a result of the studies carried out by Yenice (2012), Gökyer and Bilgili (2014), Manavoğlu and Ortaçeşme (2015), Önen (2015) and Olgun (2019), it was found that the parks in the study areas show a heterogeneous distribution throughout the city, and the people of the city could not benefit from the parks sufficiently.

69 articles on "adequacy green space" were published in the inquiry made in December 2022 in the Web of Science Core Collection. 271 articles on "green space per capita" have been published. When the categories in which they were published were examined, more than half of the articles were published in the environmental studies category. Other prominent categories are urban studies, public health, geography, ecology, forestry, urban and regional planning studies, respectively (WOS, 2022).

As in the planning of cities, geographic information systems are among the most frequently used methods in the analysis and evaluation of green areas in cities, with the convenience and accuracy they provide (Liping et al., 2018; Olgun & Yılmaz, 2019c; Ardahanlıoğlu et al., 2020; Benliay et al., 2020; Çınar et al., 2021).

Green areas, which have an important place in terms of urban ecology and the quality of urban life of the people of the city, are as important as the location, size, distribution and ecological characteristics of green areas per capita. Today, GIS-based technologies are used effectively in the analysis and evaluation of green areas. In the study, it was aimed to evaluate the adequacy of the green areas in the city center of Serik at the neighborhood scale by using GIS-based technologies.

2. Material and Method

The Serik district of Antalya province was chosen as the research area (Figure 1). The district is surrounded by the Manavgat district to the east, the Aksu district to the west, Burdur and Isparta provinces to the north, and the Mediterranean Sea to the south. The district, located in the east of Antalya province, is an important tourism center of the region with its valuable cultural and natural resources and many alternatives it offers to its visitors. In addition, the Mediterranean climate, which is dry and hot in the summer and warm and rainy in winter, is dominant throughout the district. The district was partially established on plain land and is 1,220 km2 in area and according to TURKSTAT 2021 data, the population of the city is 134953. While husbandry and forestry are carried out in the rural

areas of the district, it is seen that agriculture, especially early vegetable harvesting, is done in the lowland parts. By Looking at the district's natural resources, it is seen that the Western Taurus Mountains rise in the north of the district, and Köprüçay and Aksu Streams are the region's most important rivers. In addition, Akbaş, Acısu, Üründü, and Beşgöz streams flow into the Mediterranean from here. Historical ruins such as Aspendos and Sillyon stand out in the district with their tourist importance (Olgun & Selim, 2021; Olgun et al., 2022).
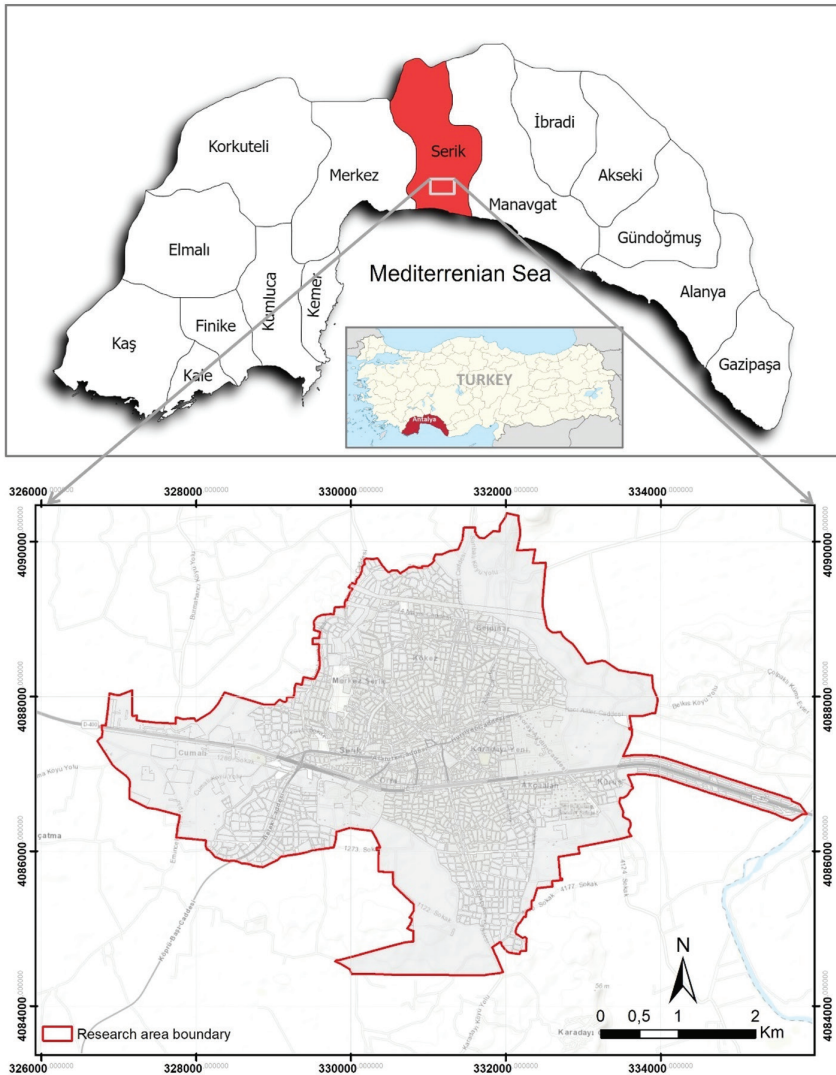

Figure 1. *Study area*

In the study, the neighborhoods, development plans, green areas and neighborhood populations within the boundaries of Serik municipality constitute the main material of the study. In addition, studies on Serik and literature studies on the concept of green space were also used. First, the projection correction of the 1/1000 Scale Implementation Development Plan, which was obtained from the Serik Municipality in its digital environment, was made. Post-correction data is placed in world coordinates according to the WGS_1984_UTM_Zone_36N coordinate system. Then, these data were arranged at the neighborhood scale and the database needed for the study was created. Data entries were made to the created database in accordance with the purpose of the study. Maps were created by classifying the data in the database. For each neighborhood, the amount of green space in the neighborhood was proportioned to the population of the neighborhood, and the amount of green space per capita at the neighborhood scale was calculated and evaluated.

3. Results

In the study, existing recreation areas, city and neighborhood parks, children's playgrounds, intersections and medians in the city center of Serik district were examined within the scope of green space. The zoning plan planned for the city of Serik is 2184 hectares and the city consists of 10 neighborhoods. The neighborhood boundaries and the neighborhood population are given in Figure 2 and Figure 3. 73426 people live in the city center of Serik (TURKSTAT, 2022). The neighborhood with the highest population is Merkez neighborhood (16842) and the least populated is Belpınar neighborhood (903).
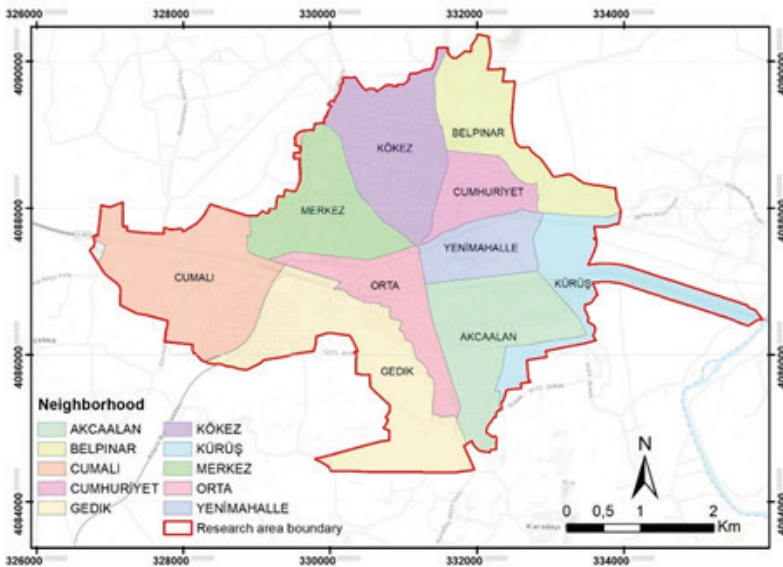

Figure 2: *Distribution of neighborhoods in Serik City Center*
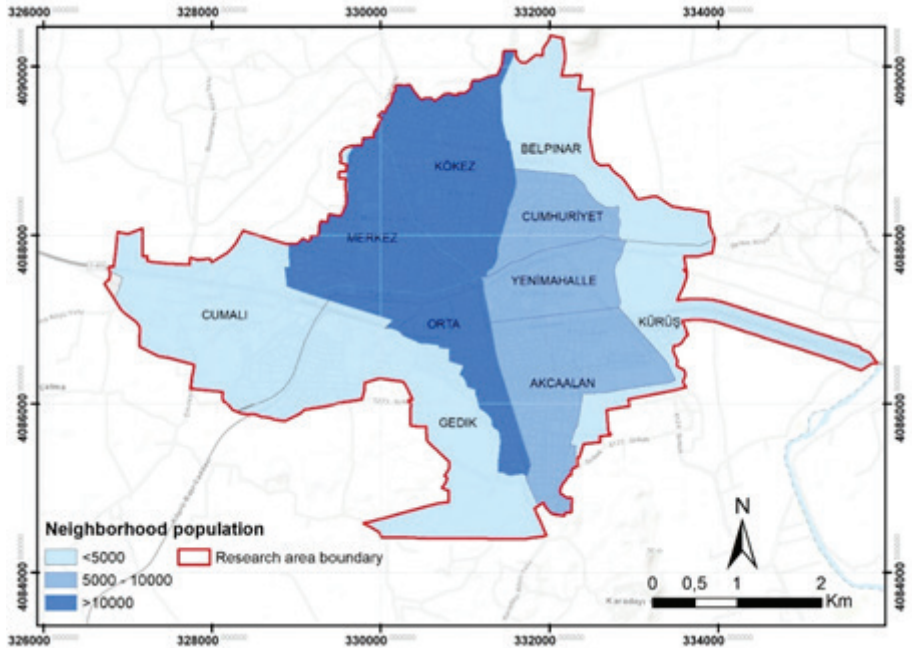
Figure 3: *Distribution of neighborhoods population in Serik City Center*

The green areas examined in the study are generally the areas under the management and responsibility of Serik Municipality. The planned green space presence in Serik City is given in Figure 4. A total of 1094586 m² green area is planned in the city of Serik. The most green area planning was done in Gedik neighborhood (227077 m²) and the least in neighborhood (22258 m²). Considering the population of 2022 in the study, the distribution of the amount of green space per capita at the neighborhood scale is given in Figure 5.
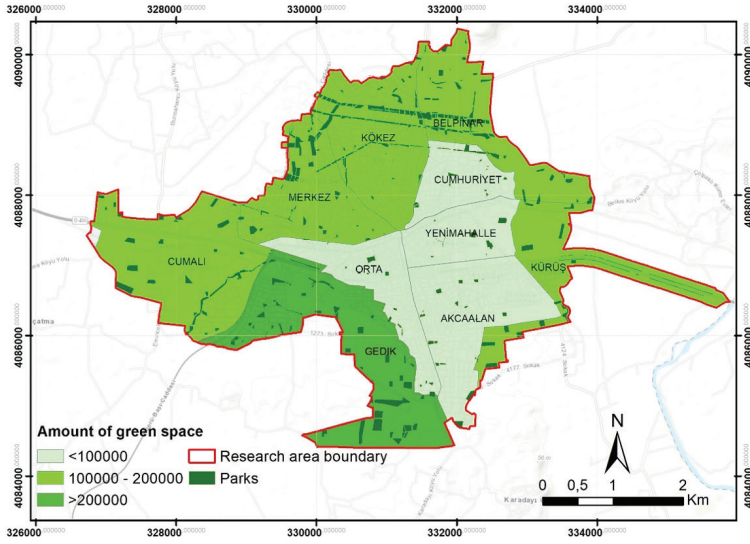
Figure 4: *Distribution of amount of green space by neighborhoods in Serik City Center*
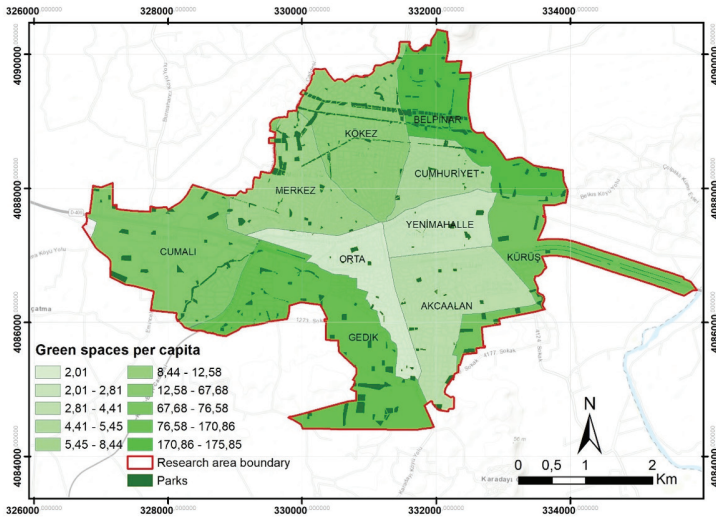

Figure 5: *Distribution of amount of green space per capita by neighborhoods in Serik City Center*

The population of Serik City at the neighborhood scale, the presence of green areas and the amount of green space per capita are given in Figure 5. It has been determined that the maximum amount of green space per person is in Belpınar Neighborhood with 175.85 m^2, and the minimum is in Orta neighborhood with 2.01 m^2. The

average amount of green space per person in the city center has been determined as 52.67 m^2. When the neighborhoods are evaluated in terms of the amount of green space, the population living in the neighborhood and the amount of green space per capita:

- 9683 people live in Akçaalan neighborhood, and 42700 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 4.41 m^2.

- 903 people live in Belpınar neighborhood, and 158797 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 175.85 m^2.

- 2148 people live in Cumalı neighborhood, and 145377 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 67.68 m^2.

- 5107 people live in Cumhuriyet neighborhood, and 27837 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 5.45 m^2.

- 1329 people live in Gedik neighborhood, and 227077 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 170,86 m^2.

- 14481 people live in Kökez neighborhood, and 182236 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 12.58 m^2.

- 1554 people live in Kürüş neighborhood, and 119005 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 76.58 m^2.

- 16842 people live in Merkez neighborhood, and 142211 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 8.44 m^2.

- 13446 people live in Orta neighborhood, and 27088 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 2.01 m^2.

- 7933 people live in Yeni neighborhood, and 22258 m^2 green sapaces were planned for this neighborhood. The amount of green space per capita in Akçaalan neighborhood has been calculated as 2.81 m^2.

4. Conclusion

The green areas examined in the study consist of recreation areas, urban and neighborhood parks, children's playgrounds, intersections and refuges, which are under the management and responsibility of Serik Municipality and used by the public. In this study, where the amount of green space is determined at the neighborhood scale and its adequacy is investigated, it has been determined that the amount of green space per capita is sufficient in Belpınar (175.85 m^2), Gedik (170.86 m^2), Kürüş (76.58 m^2), Cumalı (67.68 m^2) and Kökez (12.58 m^2) neighborhoods in the city center of Serik (Figure 6). It has been determined that the amount of green space per capita in five neighborhoods in the city center of Serik, namely Merkez neighborhood (8.44 m^2), Cumhuriyet neighborhood (5.45 m^2), Akçaalan neighborhood (4.41 m^2), Yeni neighborhood (2.81 m^2) and Orta neighborhood (2.01 m^2), is below the standard.
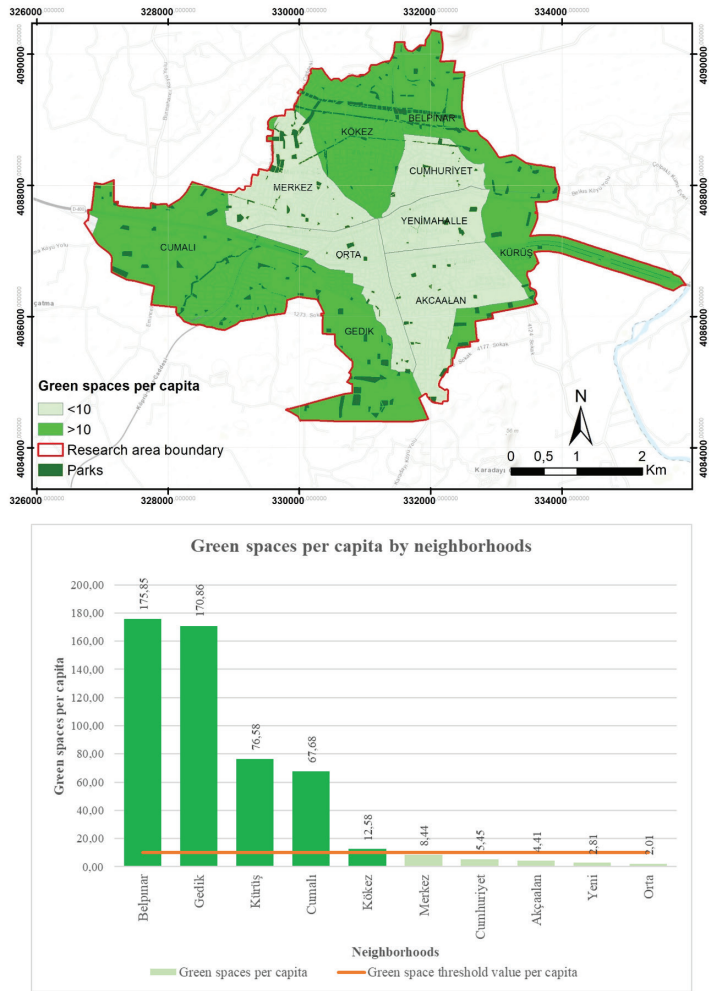

Figure 6: *Adequacy of the amount of green space per capita by neighborhoods in Serik City Center*

While some cities provide the amount of green space required per capita determined by different institutions and organizations in the world (such as the United States Health Organization, European Union, United Nations, World Health Organization), many cities remain below these determined amounts. According to the data obtained from Baycan Levent and Nijkamp (2004), Emür and Onsekiz (2007), Haq (2011), Vázquez (2011), Morar et al. (2014) and Khalil (2014); Frankfurt (154 m²), Stutgart (153 m²), Edinburgh (144.59 m²), Espoo (140.00 m²), Vienna (125.44 m²), Hannover (112 m²), Stockholm (107 m²), Washington (50 m²), Bristol (49 m²), Budapeşte (37 m²) are the three top spaces with the highest amount of green space per capita, while Jeddah (0.90 m²), Buenos Aires (1.90 m²) and Tokyo (3.00 m²) are the three cities with the lowest m² in terms of the amount of green space per capita. This subject has been examined by researchers in the example of different cities in Turkey and the amount of active green areas for the sample cities has been revealed. As a result of the researches carried out in 39 cities, it is seen that apart from 3 cities, other cities do not meet the 10 m² standard specified in the zoning laws and regulations (Olgun & Yılmaz 2017a; Olgun & Yılmaz, 2019a). When evaluated in terms of the study area, the amount of active green areas of 10 square meters per capita is provided in the zoning plans, but this rate cannot be provided in practice. At the same time, providing quantitatively sufficient green space value for the whole city does not show that it is sufficient on the basis of neighborhoods. As Olgun (2019) stated in his study, one of the most important components of sustainable urban planning is the homogeneous distribution of urban green areas in city plans. Therefore, the distribution of urban green spaces in cities determines the positive effect of the ecological, economic, aesthetic and sociological benefits provided by urban green spaces on individuals living in that region (Demir et al., 2015). Considering the city of Serik from this point of view, some neighborhoods have sufficient green space, while the rate of green space in many neighborhoods is low. For this reason, it is important to consider the distribution of green areas at the neighborhood scale in the zoning planning studies in terms of creating sustainable zoning plans.

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