

# RECENT STUDIES IN PLANNING AND DESIGN

## Editors

Assoc. Prof. Dr. Arzu ALTUNTAŞ

Prof. Dr. Şevket ALP



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# RESENT STUDIES IN PLANNING AND DESIGN

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(The Licence Number of Publisher: 2014/31220)  
TURKEY TR: +90 342 606 06 75  
USA: +1 631 685 0 853  
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Iksad Publications – 2022©

**ISBN: 978-625-8405-94-1**  
Cover Design: Arzu ALTUNTAŞ  
March / 2022  
Ankara / Turkey  
Size = 16x24 cm

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## PREFACE

Planning and design are two phenomena that have both interrelated and divergent features. While this allows different professional disciplines to evaluate planning and design issues from their own professional perspectives, it also provides the opportunity to work together. Thus, the interaction between professions is inevitable. In this book, there are very valuable studies that contain information on planning and design issues of different but interacting professional disciplines such as architecture, city and regional planning, landscape architecture etc.

We would like to thank the authors who contributed to the realization of this study with their chapter articles and made us use of their valuable ideas and research. We would also like to thank Assoc. Prof. Dr. Seyithan SEYDOŞOĞLU and IKSAD Publishing staff for their support and knowledge during the formation and publication stages of the book. We hope that the book will be useful both to our colleagues in the planning and design professions and to everyone who is interested in the subject.

Sincerely yours

Editors

March, 2022



**CHAPTER 1**

**COMPARISON OF DIFFERENT INDICES USED  
FOR SHORELINE EXTRACTION FROM LANDSAT  
8 OPERATIONAL LAND IMAGER IN THE  
CONTEXT OF COASTAL PLANNING**

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## **INTRODUCTION**

It is estimated that there is approximately 504,000 km of coastline worldwide and more than 50% of the world's population lives in coastal areas (Toure et al., 2019), and it is known that coasts are facing a demographic intensification process (Small and Nicholls, 2003). Global population density seriously damages dynamic and fragile coastal-marine ecosystems and often leads to major problems and social conflicts due to the loss of important ecosystem services (de Andrés et al., 2018; Ardahanlıoğlu et al., 2020). Coastal areas are areas with high economic value in terms of settlement and sensitive areas in terms of ecological characteristics of the landscape. For this reason, the landscape management plans of the coasts are constantly discussed (Shan, 2020). Coastal planning and coastal management aims to ensure the sustainability of resources and the environment (Chang et al., 2018). Especially, coastal areas and coastal ecosystems of terrestrial ecosystems are areas with high conservation value that can provide ecosystem services to people and that need to be protected in terms of social-cultural, economical and ecological perspective (You et al., 2018).

The determination of the coastline plays an important role in the planning of coastal areas (Toure et al., 2019). The coastline has a dynamic structure that shows the transition between land and sea and is defined as the physical interface of land and water (Dolan et al., 1980; Hagenars et al., 2018). In addition, the shoreline is expressed as the intersection of the coastal land and water surface, which shows the rising and falling water edge movements due to the tides, shows

flexibility depending on various physical and atmospheric events (Hilton et al., 2020). However, the satellite images makes it possible to obtain the clear coastline according to the conditions of that day. Many scientific studies are carried out on the detection of the coastline, together with the development in remote sensing technologies (Gens, 2010; Cham et al., 2020). It is stated that shoreline detection is mainly achieved by processing aerial photographs and satellite images (Parthasarathy and Deka, 2021). Therefore, it is important to evaluate different image processing approaches for shoreline detection (Toure et al., 2019).

Three approaches are generally performed to automatically determine the shoreline using remote sensing images; edge detection approaches, the band threshold methods and the classification approaches (Zhang et al., 2013). Edge detection approaches are used as a method to define the boundary between water and land as an edge and automatically extract it (Paravolidakis et al., 2018). Basically, it works by separating two different areas with color tones and defining a discrete area. The band threshold methods are based on assigning appropriate threshold values to the bands in the captured image through the user and the interface used, and thus clearly distinguishing the water and the coast from each other (Karaman, 2021). Treshold methods are simple and fast, but are often used to divide panchromatic (Pan) images into two classes. But, they are not sufficient for complex images such as multispectral (MS) and hyperspectral (HS) images. Classification approaches, on the other hand, classify the land cover by dividing it into various classes, and in this context, it is an approach that aims to reveal the coastline by

separating water and other land uses (Sekovski et al., 2014). It is basically divided into two as object-based classification and pixel-based classification (Chen et al., 2018). Object-based classification defines similar pixels as objects by adding the spatial, textural and contextual parameters of the spectral values of the pixels to the analysis process and classifies them within this scope (Sreekesh et al., 2020). In pixel-based classification, pixels are classified using spectral information. There are many indices developed using different band combinations, including pixel-based ones (Faridatul and Wu, 2018). These indices can be used in different areas according to the satellite image used, the bands of the related satellite image and the purpose of the user and give high accuracy. In this context, the main goal of remote sensing studies for coastline inference, i.e. automatic detection of the coastline, is to determine the coastline in a shorter time with less cost and less labor with high precision and to generate data that can be used for coastal planning.

In this study, the shoreline was determined and compared by using the indices that are frequently preferred in the literature in automatic shoreline extraction with pixel-based classification. At the end of the comparison, the indice that gave better results with higher accuracy and less cost is revealed. It is envisaged that this study will be a guide in future scientific research on automatic shoreline detection.

# 1. MATERIAL AND METHOD

## 1.1 Study Area

The main material of the study is the coastal area in the northwestern part of Northern Cyprus at the coordinates of 35°19'19.96"N and 33°0'20.84"E (Figure 1).



Figure 1. Location of the Study Area

The total coastline length of Cyprus is approximately 780 kilometers. The study area covers a coastal length of approximately 9 km. The Cyprus island, located in the Eastern Mediterranean basin, has been heavily affected by tectonic activities due to plate movements, and it is reported that the tectonic uplift of the island still continues depending on these activities (Öztürk, 2013). Therefore, identifying and monitoring coasts is important for the island within the scope of coastal planning.

## 1.2 Data Sets

The basic data set in the study consists of Landsat 8's Operational Land Imager (OLI) sensor images and shoreline extraction indices that are explained in details below. These satellite images, which can be accessed free of charge via USGS Earth Explorer official web site,

formed the dataset of this study are generated with the algorithms applied to the bands they contain.

### *1.2.1 Satellite images*

Landsat 8 (formally Landsat Data Continuity Mission, LDCM) was launched from California, USA in 2013 with the Atlas-V rocket. Landsat 8, the most recently launched Landsat satellite, carries the Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS) devices (USGS, 2022). Landsat 8 OLI used in the study has 9 spectral bands, including the Pan band (Table 1).

**Table 1. Landsat 8 OLI Band Designations**

	<b>Bands</b>	<b>Wavelength (micrometers)</b>	<b>Resolutions (Meters)</b>
<b>Band 1</b>	Coastal aerosol	0.43 – 0.45	30
<b>Band 2</b>	Blue	0.45 – 0.51	30
<b>Band 3</b>	Green	0.53 – 0.59	30
<b>Band 4</b>	Red	0.64 – 0.67	30
<b>Band 5</b>	Near Infrared (NIR)	0.85 – 0.88	30
<b>Band 6</b>	SWIR 1	1.57 – 1.65	30
<b>Band 7</b>	SWIR 2	2.11 – 2.29	30
<b>Band 8</b>	Pancromatic	0.50 – 0.68	15
<b>Band 9</b>	Cirrus	1.36 – 1.38	30

Landsat 8 satellite images of July 2020 were used in the study. Preferred images have 0% cloudiness. Atmospheric correction has been applied in QGIS software in order to improve the atmospheric errors in images taken and the data has been converted into a ready state. In addition, the

filtering process was applied to noises in the maps produced as a result of the applied indices.

### *1.2.2 Used indices*

A reference shoreline was created in order to determine the accuracy of indices to be used for the shoreline extraction. This shoreline was obtained by on-screen digitation in ArcGIS software after georeferencing the current Google Earth satellite image (Fig. 2).



**Figure 2. Example of Shoreline Definition with On-Screen Digitation**

- **NDWI (Normalised Differences Water Indice)**

The NDWI was originally proposed to detect water surface in wetlands and measure its dimensions. It is an indice that is frequently used in shoreline extraction (Maglione et al., 2014; Kafrawy et al., 2017). NDWI is derived from the NIR (near infrared) and SWIR (short wave infrared) wavelengths used in satellites. The SWIR reflection reflects the change in vegetation within the water. On the other hand, NIR reflection is affected by the dry matter content of the leaf, but not by the water content (Hossain et al., 2021). The general formula of the NDWI indice proposed by Gao in 1996 is given below (Szabo et al., 2016).

$$NDWI = \frac{NIR - SWIR}{NIR + SWIR}$$

- **mNDWI (Modified Normalised Differences Water Indice)**

Xu (2006) proposed the proportionalization of bands to more clearly detect fluid water in satellite images by the mNDWI. In mNDWI, the green band is used instead of the near infrared band because the green band has higher reflectivity than the near infrared band. In Landsat 8 OLI satellite image, green band is the third band and shortwave infrared is the sixth band. The equation of the mNDWI spectral indice used for Landsat 8 OLI is given below (Szabo et al., 2016).

$$mNDWI = \frac{Green - SWIR}{Green + SWIR}$$

- **NDVI (Normalised Difference Vegetation Indice)**

NDVI is derived using principles similar to NDWI. This is a well-known indice used to study vegetation by exploiting the differential response between the near infrared band and the red band. It can also be used to define two more classes, water and soil (Saeed and Fatima, 2016). It is a preferred indice for shoreline extraction in the literature (Kafrawy et al., 2017; Mondal et al., 2021; Alicandro et al., 2021). Red and NIR bands are used in NDVI calculation. NDVI is calculated by the following method;

$$NDVI = \frac{NIR - Red}{NIR + Red}$$

- **AWEI (Automated Water Extraction Indice)**

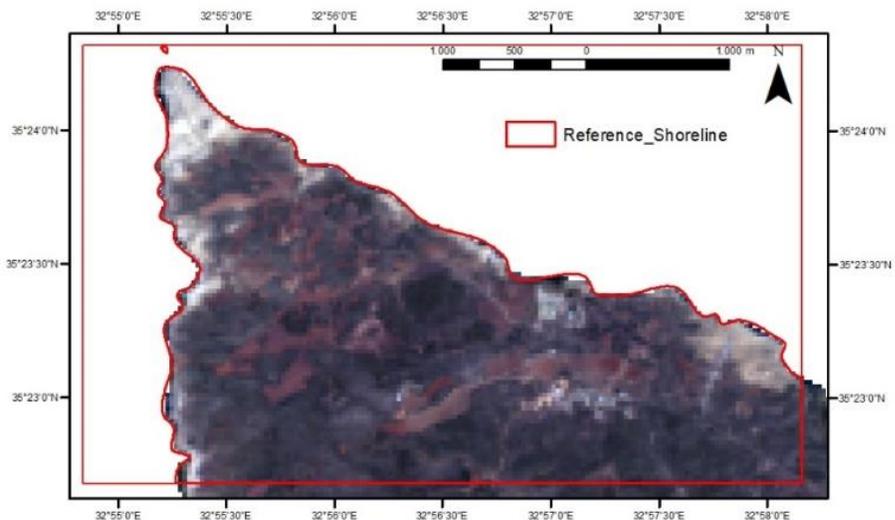
The main purpose of AWEI is to maximize the separability of water and non-water pixels by using band differentiation, splicing and application

of different coefficients (Sunder et al., 2017). Accordingly, two separate equations are proposed to effectively suppress non-water pixels and remove water surface with improved accuracy. AWEI is used to improve classification accuracy in areas including shadows and dark surfaces that other classification methods often do not correctly classify (Wicaksono et al., 2019; Kelly and Gontz, 2018). The formula for the AWEI indice is given by the following equation (Mustafa et al., 2017):

$$\text{AWEI} = 4 * (\text{Green} - \text{SWIR2}) - (0.25 * \text{NIR} + 2.75 * \text{SWIR1})$$

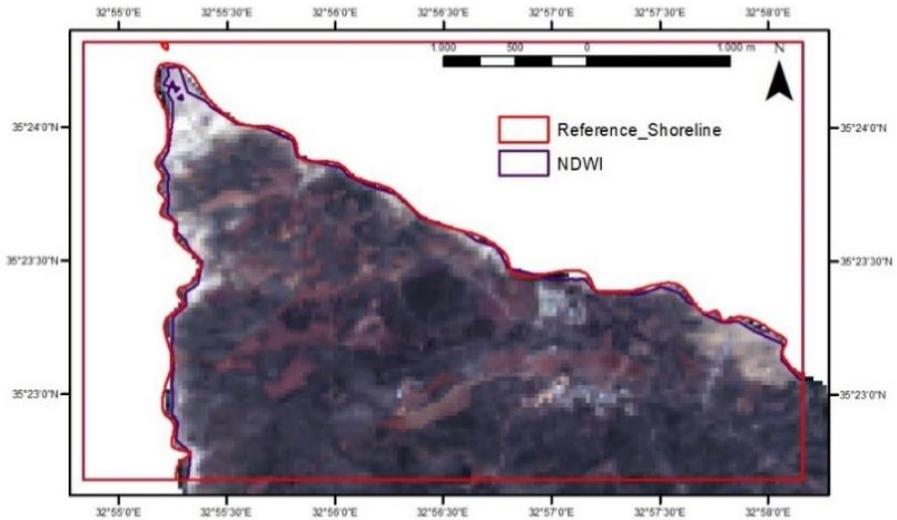
## 2. RESULTS

The reference shoreline (Fig. 3) obtained by on-screen digitation along the boundaries of the study area, ignoring the user's errors, has a total length of 8,931.48 km.



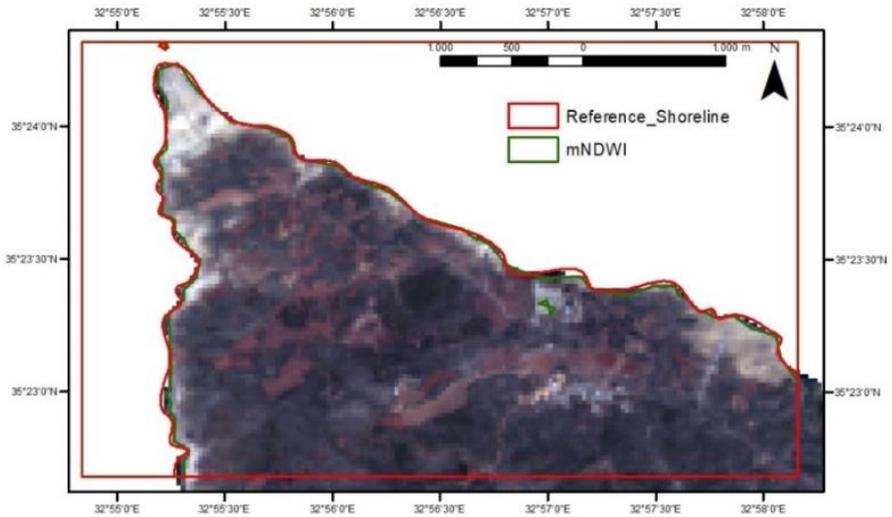
**Figure 3. Reference Shoreline**

The coastline length obtained by NDWI is 8,551.09 km. There is a difference of 380.39 m from the reference shoreline length. Significant part of this difference occurs in the rocky areas where wave action is intense at Koruçam cape (Fig. 4).



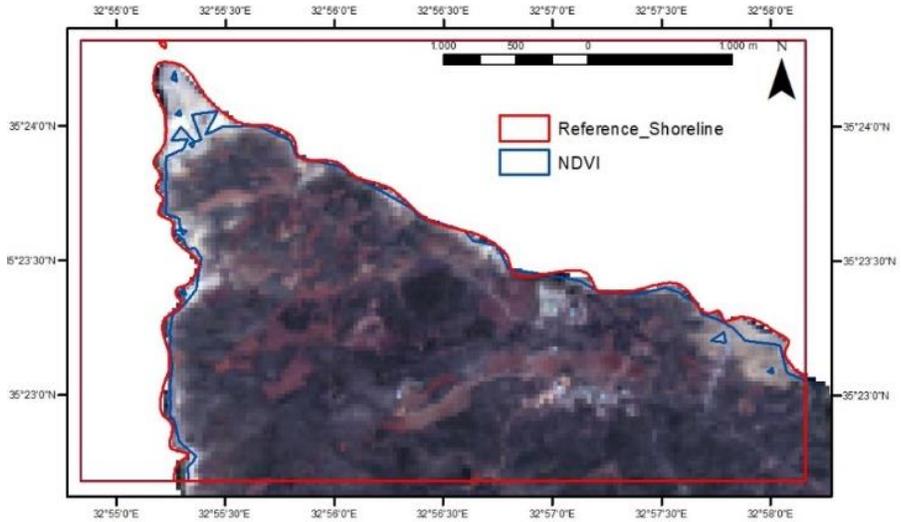
**Figure 4. Comparison of Reference Shoreline and NDWI**

The coastline obtained by mNDWI is 8,623.98 km long. There is a difference of 308.50 m from the reference shoreline length. The mNDWI obtained by the modification of NDWI, gave slightly improved and more accurate shoreline determination compared to NDWI. When compared with the reference shoreline determination, it can be seen that the error is evenly distributed along the shoreline (Fig. 5).



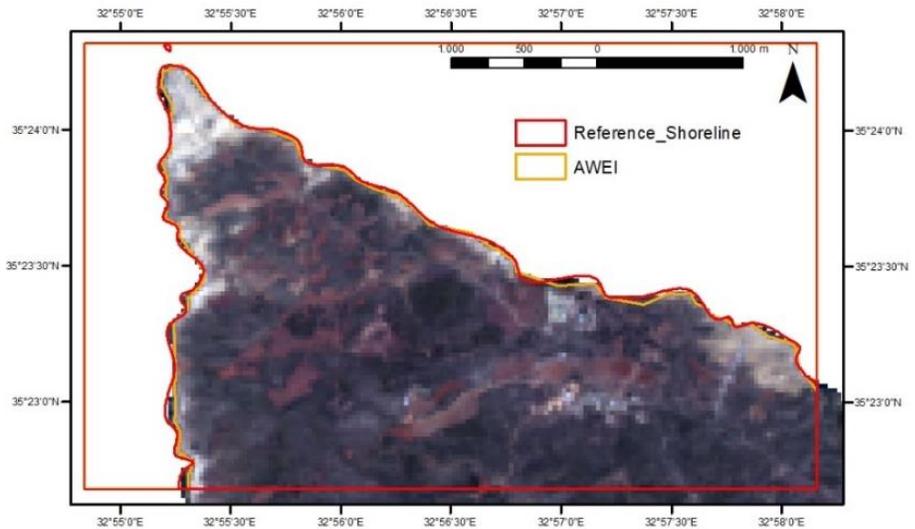
**Figure 5. Comparison of Reference Shoreline and mNDWI**

The coastline length obtained with the NDVI is 8,659.27 km. There is a difference of 272.21 m from the reference shoreline length. However, the coastline obtained by NDVI did not include the sand dunes and rocky areas, especially in Koruçam Cape, and produced a rather faulty result. It has been observed that these errors are quite high along the coast. Differences in reflectance values in the red wavelength throughout the study area show that this indice, which is generally used for vegetation, can determine the shoreline, but the error is higher than other indices (Fig. 6).



**Figure 6. Comparison of Reference Shoreline and NDVI**

The shoreline length obtained with AWEI is 8,646.39 km. There is a difference of 285.09 m from the reference shoreline length. When compared with other indices used in this study, it can be seen that this index gives the closest result to the reference shoreline. The resulting shoreline shows an equal distribution throughout the entire area. It is understood that the errors are due to wave movements (Fig. 7).



**Figure 7. Comparison of Reference Shoreline and AWEI**

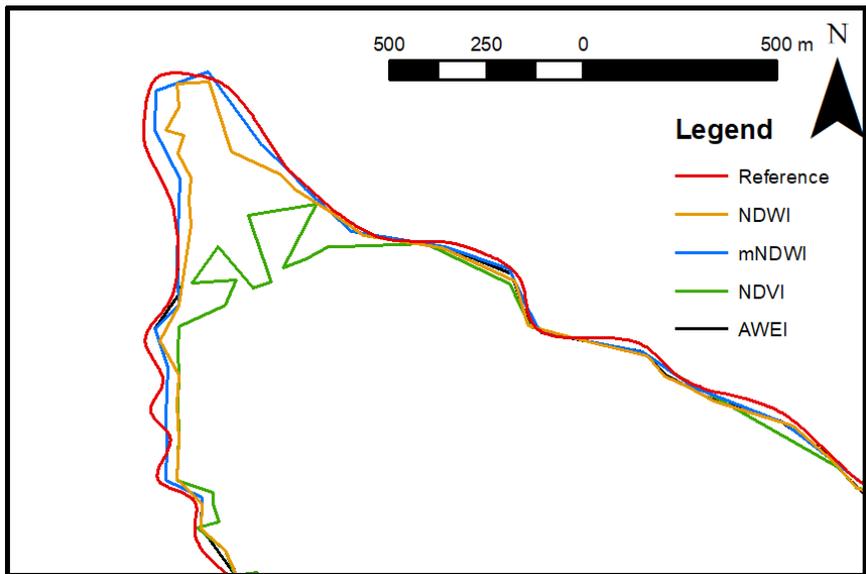
In this study, which was carried out on the northwest coast of Northern Cyprus with the indices that are frequently preferred in the literature for coastline extraction using Landsat 8 OLI images, it was seen that the coastline can be extracted automatically with the relevant indices. In this context, it has been understood that the use of remote sensing data in shoreline extraction instead of traditional methods will be more efficient in terms of time and cost.

### **3. DISCUSSION AND CONCLUSION**

In coastal area planning, the determination of the shoreline is necessary in terms of legal-managerial and administrative aspects (Selim et al., 2016). The motivation of this study is that Cyprus, the third largest island in the middle of the Mediterranean, has great strategic and geopolitical importance, therefore the sensitivity required by this

importance should be taken into account in all kinds of spatial planning. In this study, the northwest coast of northern Cyprus was taken into account, and automatic shoreline extraction was performed in approximately 9 km coastal area. In shoreline extraction, NDWI, mNDWI, NDVI and AWEI indices were used and compared on Landsat 8 OLI images. These indices are the most preferred indices in many scientific studies on shoreline extraction in the literature (Mukhopadhyay et al., 2012; Maglione et al., 2014; Vos et al., 2019; Hossain et al., 2021; Sunder et al., 2017; Le Hung et al., 2020; Guo et al., 2017). Using these indices and taking into account Landsat 8 OLI free satellite images made it possible to quickly map the coastline of the region (Costantino et al., 2020). In the study, the comparison of the coastline produced using the relevant indices with the reference coastline was provided by the controls made for every 250 m along the coastline. The findings obtained in this context; showed that the coastline that is most compatible with the reference coastline in the relevant study area was obtained by AWEI that is automatically extracted. It is followed by mNDWI, NDWI and NDVI, respectively. In the literature, it has been stated in various studies that mNDWI gives higher accuracy than NDWI (Wicaksono et al., 2019), and in this study, the same result was reached when the two related indices were compared. However, in some studies, it is said that NDWI is more effective than modified NDWI in both Landsat 8 and Sentinel images (Karaman et al., 2021). This difference can be interpreted as the characteristics of the satellite imagery used, the physical structure of the study area, and the land cover in the study area (Sunder et al., 2017;

Wicaksono and Wicaksono, 2019). When the mNDWI and NDWI indices are compared with AWEI, it has been reported in the literature that AWEI gives better results (Sunder et al., 2017; Le Hung et al., 2020). Findings from this study also showed that shoreline extraction with AWEI is more effective than other indices used (Fig. 8).



**Figure 8. Comparison of Automatically Extracted Shorelines**

AWEI is advantageous in water body detection in sandy and rocky coastal morphology (Li and Gong, 2016), and can compensate for shadow-induced disturbances (Feyisa et al., 2014), but it is not as good as NDWI and MNDWI in detecting settlements, vegetation, and water bodies around harbors. (Yang et al., 2015; Wicaksono and Wicaksono, 2019). The shoreline obtained with NDVI gave less accuracy than the other algorithms used. Especially on the coasts where there is no

vegetation, stony, rocky and dune density, the error rate is quite high. AWEI, mNDWI, and NDWI in terms of their spectral and spatial quality gave higher accuracy (Sarp and Ozcelik, 2017) than NDVI (El Kafrawy et al., 2017). The results of the study are largely in line with the relevant scientific studies in the literature. Although, results obtained in this study are ranked as AWEI, mNDWI, NDWI and NDVI according to the most accurate shoreline detection indices, they may vary in different satellite images and different study areas. Land use, land cover, coastal uses, morphological structure of the land, satellite image features used, etc. Such features may cause the applied algorithms to be advantageous and disadvantageous compared to each other. Therefore, different indices should be applied for each study area in coastal planning and automatic detection of coastline, and the indice that gives the most accurate result for the relevant study area should be selected.

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## CHAPTER 2

### **THREE PILLARS OF TEKE PENINSULA: KUMLUCA, FİNİKE AND DEMRE WITH REGARD TO COASTAL AND TOURISM LANDSCAPES**

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## INTRODUCTION

By definition, peninsula is the land that parts surrounded by water on three sides, appear in very different scales and with examples. Teke peninsula covers a wide geographic territory between Antalya and Muğla in the southwest of Turkey. While the Gulf of Antalya in the east and the Dalaman Stream in the west define the coastal part of the peninsula, Teke Peninsula extends to the Lakes region in the mountainous areas, stands out with its very different landforms and landscape diversity.

The peninsula, which coincide with the Lycian civilizations in ancient times, is also known as the Lycian region. Ancient Lycian cities are located on the Teke Peninsula. The Lycian League, found in the 1<sup>st</sup> century BC with of 23 cities, is the first democratic union in the history, which has been a source of inspiration for many democratic systems of today. The important cities of this federation were Patara (capital), Xanthos, Pınara, Olympos, Myra, Tlos and Phaselis (Kültür ve Turizm Bakanlığı, 2022a).

Home for different civilizations throughout history, the region was defined as Teke-il sanjak in the 15th-16th centuries in Ottoman time. The name Teke, given to the region due to the Tekeli Turkmen family, which dominates the Antalya branch of Hamidoğulları. When the land taken under Ottoman rule over Teke dynasty, the region was organized under the name of Teke-il involving Tekeoğulları and Teke beyler (Çelik, 2011).

The name, Teke also coincides with the Goats, which is compatible with the steeply sloping topography of the Taurus Mountains and the very hot and dry climate. Goats, which are the basic element of animal husbandry, one of the most important livelihoods of the region, are an important part of the culture of the Teke peninsula. Çelik (2011) reported that İbni Said el-Mağribî, who passed through the region in 1260, points out that many nomads lived in the mountainous area between Antalya and Denizli and the beautiful carpets they weaved.

Teke peninsula includes coastal landscapes shaped by the interaction between land and the sea. Evidently, wide coastal plains formed by rivers, mountains, Mediterranean forests, high mountain plains and multiple examples of natural landscape. On the other hand, human and nature interaction throughout the cultural history in the region has brought about the formation of rich cultural landscapes, since ancient cities.

From east to west, Kumluca, Finike and Demre represent three important regions of Teke Peninsula extending from the coast up to the high mountain areas. In addition to the vast coastal plains and agricultural landscapes, the rural landscapes on the passing lands distinguish these 3 districts from the others. While Kumluca stands out with its greenhouses and orchards and agricultural landscapes; found by the Phoenicians Finike famous for its orange is a small coastal settlement. Demre, on the other hand is known as the birthplace of the historical Santa Claus.

On the other hand, the natural and cultural diversity of the region is an important attraction for tourism activities. According to Kalkan (1995), people's visits from one place to another in order to see natural, cultural and historical places in different places are evaluated within the concept of tourism. Tourism is called after either collective or individual trips for the purpose of enjoyment, relation, pleasure and participating in cultural and artistic movements without the intention of earning money or settling down (Atik, 2003). Today, coastal tourism is among the types of tourism such as mass tourism, nature tourism and cultural tourism. The development of coastal tourism, which is based on the existence of the sea and coasts with a wide variety of recreational activities providing services such as accommodation and hospitality, depends on natural structure features such as coastal geomorphology, vegetation and climate.

In this study, the natural and cultural features of Teke Peninsula is examined in case of three coastal settlements of Kumluca, Finike and Demre with regard to coastal and tourism landscapes. Being an important settling region since the ancient time, the peninsula provides opportunities for maritime trade, as well as being an important agricultural centre with wide coastal plains, besides natural and historical potentials for tourism.

## **1. MATERIAL AND METHOD**

Teke Peninsula on the South-west Mediterranean coast of Turkey and three coastal districts of Kuşluca, Finike and Demre were chosen for the study. The region, is also known as the Lycia in ancient times, especially from the coastal part, where the name Teke Peninsula was derived from the Teke Boyu Turkmens who settled in the region in the Seljuk period. The region includes Kemer, Kuşluca, Finike, Demre, Kaş, Kalkan districts as well as many historical cities goes back to the Lycian times.

The landscape diversity in the region, which starts with the seashore and coastal land, continues with agricultural landscapes on the coastal plains, rural landscapes on the passage between coast and inland and forest landscapes in the high mountain areas. With its favourable climatic conditions, its location opening to the entire Mediterranean and its rich natural resources, many historical settlements from ancient civilizations to the present time constitute unique examples of cultural landscapes in Teke Peninsula.

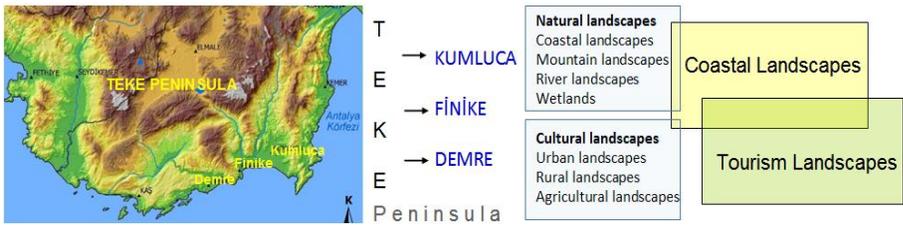
Material of the study consists of landscape characteristics of Teke Peninsula in general and three important coastal districts of Kuşluca, Finike and Demre that represent the characteristics of Teke Peninsula both along the Mediterranean coast and the mountain parts.



**Figure 1. Location of the Study Areas**

Method of the study is first evaluate natural and cultural features of Teke Peninsula as well as history and time lines that evolved with regional landscapes. In the second phase three important coastal districts Kumluca, Finike and Demre are appraised with regard to their brief history, important cultural assets and economic activities.

Landscape types are defined for the same three districts categorised natural and cultural and subcategorised according to presence of human impact. Subsequently regional landscapes types are discussed in relation to coastal and tourism landscapes (Figure 2).



**Figure 2. Methodological Approach of the Study**

## **2. LAND OF LIGHTS LYKIA TEKE PENINSULA**

According to the Turkish Language Association, the peninsula is “a piece of land connected to the mainland on one side and almost completely surrounded by water on the other sides (TDK, 2005). The peninsula stretching into the Mediterranean between the Gulf of Antalya and the Gulf of Fethiye, the region overlapping with ancient Lycia is called the Teke Peninsula. The peninsula, known as Lycia in ancient times, was named Teke Peninsula with the settlement of the Teke tribe during the Seljuk State. The inner parts of the peninsula are also referred to as Teke Region (Atalay, 2015) regarding to the Mediterranean geography, Teke Plateau, especially with its high mountainous parts represents the main part of the peninsula.

The land behind low lying shore of the peninsula is consist of the steep escalating mountains that shaped by the Taurus Mountains. Flatlands, plains and plateaus in mountainous areas that created by the alluvial that carried by rivers and streams along the coastline characterise the natural structure of the Teke Peninsula, as well as opportunities for local livelihood and culture. Kumluca, Finike and Demre embody the large

coastal plains where they are the most valuable agricultural area on the coast.

Narrow and long coastal peninsulas, tiny and long islands, natural drainage channels and straits parallel to the coast that created a land form and morphological structure that suitable for surfing, swimming and diving which allows accommodation and sheltering of boats, especially yachts benefiting from the sea (Yaman Kocadađlı, 2012).

Geologically, Teke Peninsula consists of autochthonous (Beydađları autochthon) and naps structural units. As a result of the north-south compressional regime, the Beydađları autochthon has emerged several times before the Eocene and Miocene. Lycian nappes emplaced on the Beydađları autochthon from the north and/or northwest in the lower Miocene as a result of the region's re-compression regime at the end of the middle Eocene and caused a large geomorphological folding on a large scale. The last significant movement of the Lycian nappes was the thrust of the old formations on the new sediments by reverse faults after the Miocene (Yaman Kocadađlı, 2012)

In connection with natural landscapes, the mountains have undergone Pleistocene glaciations in the Teke region. According to Kuzucuođlu et al. (2019) Teke Peninsula extends between the Aegean Sea in the west and the Aksu thrust in the east consists of crustal block formed of thick Mesocoic platform carbonates so-called Lycian Nappes. Bayrakdara and ılđın (2017) articulated that Karadađ is one of the mountain chains in the Teke Peninsula (Teke Region) that exposed to Pleistocene glaciation such as Beydađları, Akdađ and Sandıras in the region.

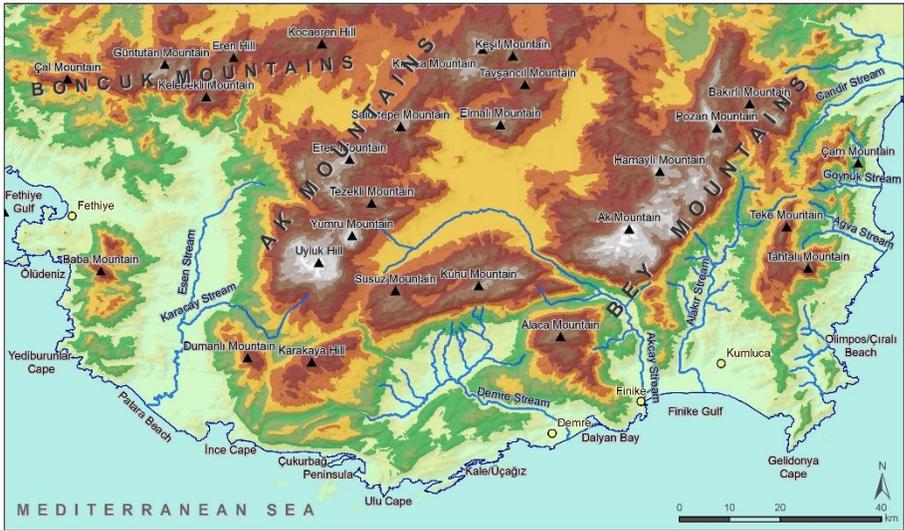
Kuzucuoğlu et al. (2019) defined Teke Peninsula on the western Taurus as massifs of the home to only a few short rivers south through narrow gorges in direction of the Mediterranean. In the basin, high diverse lithology successions have caused the development of beautiful geomorphological landscapes carved by different erosion.

The soil characteristics of the region are defined alluvium in the coastal plains, brown forest soils in the forested areas, non-calcareous brown Mediterranean soils and occasionally cracked rocks.

Teke peninsula is defined by xeric forests of the inner Anatolia, semi-humid forests in the high parts of the Mediterranean, and maquis and red pine forests behind the coast. According to Atalay (2015), cedar forests are seen on the north-facing slopes of the mountains in the south of the region, black pine and oak forests towards the north become widespread. Sayhan (1990) stated that the vegetation of the Teke peninsula is classified in 3 groups; Mediterranean maquis vegetation and red pine forests on the coast and behind the coast, red pine and cedar mountain forests in the upper parts and alpine vegetation in high mountain area

The connections between the mainland and the islands close to the coast are established by sea lines along the Mediterranean coast. The ancient Lycian settlements in the region are connected to each other by a network of mountainous roads (Çevik, 2002). Named of the ancient territory, the Lycian Way that an important cultural route for regional tourism is based on the transportation system in the ancient period.

Kumluca, Finike and Demre stand out with their karstic structure developed on the limestone bedrock from the coastal plains up to the mountains. The coast, shaped as a result of the interaction of the rivers and the land become prominent with rich coastal landscapes.



**Figure 3. Topographical and Geographical Features of Teke Peninsula (Original, 2022)**

### **2.1 Kumluca, “Home of Yörüks”**

Located in the eastern part of the Teke Peninsula, Kumluca has been in the settlement area of many states since ancient times as Lycians, Phoenicians, Romans and the Solims are known as the first settled communities respectively. Ekşi and Akdağ (2017) informed that since the beginning of the 13<sup>th</sup> century, present settlements have been formed by the Yörüks, Turkish nomads in Anatolian region. Kumluca has offered proper geographical and climatic conditions for permanent settlements which are necessary for the survival of Yörüks. They prefer

to spend winters in more mild coastal areas, and summers in higher elevated mountains with cooler habitats. As a result of strong interaction with the natural environment, their traditional nomadic culture has been formed. Yörüks have shaped their survival according to the location and conditions of the environment where they live in, and developed experiences related to nature and natural processes involving animals and plants

The region known as İğdir during the Seljuk period, İğdir sub-district of Teke Sanjak during the Ottoman period. İğdir and İğdirmaa Kardıç Township which is roughly surrounded by the western villages of Antalya in the east, the Mediterranean Sea in the south (Güçlü, 2007). Today, Kumluca is of the two districts in this area.

The fact that morphological units differ in short distances has brought richness and diversity in physical geography and regional landscapes. Kumluca draws attention with its mountains, plains, valleys and plateaus, displays diverse landscapes. The southern parts of Kumluca district are lowland near sea level and the northern parts are rather mountainous. The district centre was established on an alluvial plain brought by Alakır Stream and Gavur Stream from the mountains. Surrounded by mountains on three sides, Kumluca is located on a fertile plain that extends up to mountain zone.

The livelihood of 80% of Kumluca is based on agriculture which has an important role in the economy of the district. In addition to productive coastal plains, the suitability of climatic factors brought quality in the fruit and vegetable production in Kumluca.

## ***2.2 Finike, “Port of Phoenicians”***

Named after Phoenicians, Fenike was founded by the Phoenicians in the 5th century, under the name of Phanikos, where Aykırçay River meets the Mediterranean Sea. During the ancient history, Finike served as a port where Limyra, the capital of Lycia, exported agricultural products to the Mediterranean cities and became one of the most important trade centres of the Phoenicians.

Meaning scarlet horse or scarlet herd of cattle" in Greek Finike was founded in the 5th century in the mouth of Acıçay *Arykandos* under the name of Phoinikos. The first place Finike was established is called Iskele District *Pier quarter*, through which Acıçay Stream creates a canal passing through the city that served as a port, for loading and unloading cargo (Finike Kaymakamlığı, 2022).

Prevailing economic structure in and around Finike is agriculture which is the core of production landscapes comprising gardens, green houses, fields and orchards that typical to the region. The biggest source of livelihood in the region is fresh vegetables and citrus fruits. In particular Finike Orange that received geographical indication in 2008 differs from other orange species with its aroma and taste. In addition, there is a small amount of fishing in the region. However the seasonality of tourism in Finike calls for alternative income for local economy.

## ***2.3 Demre “Myra” and “place of St.Nicolas”***

Demre (Kale) in the south of Teke Peninsula is bordered by Finike in the east and north, Kaş in the west and the Mediterranean Sea in the

south. Surrounded by mountains on three sides, the land on which the district was founded consists of fertile alluvial soils brought by the Demre Stream.

Located in the centre of Demre, the ancient city of Myra, was founded on the plain of the same name Demre. The connection between the city and the sea was provided by the convenient waterway to the west of the *Myros* Demre Stream. Sea transportation and trade of the region was also carried out from *Andriake* Çayağzı Port. (Kültür ve Turizm Bakanlığı, 2022a). Myra ancient city was very famous for rock-cut tombs and the number of rock-cut tombs in Myra alone is estimated to be over 100 (Atik et al., 2013). Lloyd (2000) pointed out that Myra owed its fame for being an important harbour where huge grain ships traded in cereals and in second century *Horrea Hadriani*, reference is made to the silos of Emperor Hadrian, massive structures used to store supplies before they were transported (Çevik, 2009).

According to Strabon, as referred to Myrrh in Lycian inscriptions, the name of Myra originates from the word of the place name "Myrrh", which may have historically evolved into Myra and then Demre, derives from the myrtle plant (*Commiphora myrrha*), from which the famous Myra oil is produced. (Antalya Valiliği, 2021).

Being a strong member and one of the six big cities in the Lycian League, Myra was founded in the Hellenistic Period. It was 2<sup>nd</sup> century AD, Myra witnessed a great development. The city has become the Metropolis of the Lycian League; many buildings were built and repaired with the help of rich Lycian people. Myra was the place where

St Nicholas lived and accordingly during the Byzantine Period, Myra was one of the leading cities in terms of religion as well as administration and become famous with the name of St. Nicholas' (Santa Claus). He was the bishop of the city in the 4<sup>th</sup> century and that after his death he reached the rank of saint and a church was built in his memory after his name (Kültür ve Turizm Bakanlığı, 2022a).

Lately, Demre gained the status of a village with the name Eynihal in 1904 during the Ottoman Empire, became a Town Municipality in 1968, and indicated as a district with the name Kale in 1987 (Antalya Valiliği, 2021).

Surrounded by mountains on three sides, the land on which the district was founded consists of fertile alluvial soils brought by the Demre Stream. In Demre District, where typical characteristics of the Mediterranean climate with hot summers and rainy winters. Yaman Kocadağlı (2012) reported that Demre Plain is the second largest coastal plain in Teke Peninsula. Most of the mountainous areas surrounding the Demre Plain are composed of neritic lime stones. The transition from the high mountain areas where the karstic shapes are located to the Demre Plain is usually on steep slopes. Demre Plain consists of quaternary alluvium carried by the Demre Stream.

Like two other districts in Teke Peninsula, the economy of Demre is based on agriculture. Due to its location on a fertile plain and its favourable climate, early-season vegetable cultivation and citrus fruit production are common. However, rich cultural heritage in Demre has been the source for tourism activities almost all around the year where

St.Nicholas is one of the attraction Recently, with the evaluation of historical heritage, tourism activities have been revived

### **3. LANDSCAPE DIVERSITY IN TEKE PENINSULA**

#### ***3.1 Natural Landscapes***

##### ***3.1.1 Coastal landscape***

Geological and morphological features in Teke Peninsula played important role in the formation of coastal landscapes. Different coastal forms are seen in the peninsula ranging from a natural beach with fine pebbles, sand and dunes to the steep sea cliffs (Figure 4).

Yaman Kocadağlı (2012) indicated that the Mediterranean coasts between Kaş and Demre are known as "Dalmatian type" due to their structural extensions of land towards sea creating many small bays, gulfs, islands and peninsulas along the coastline. The coasts between Demre and Finike are girintili-çıkıntılıdır. On the other hand the coast from Finike to Akçaaörgü Cape has a very long beach, where Beymelek Lagoon offers a valuable habitat for biodiversity (Figure 4, Figure 12).

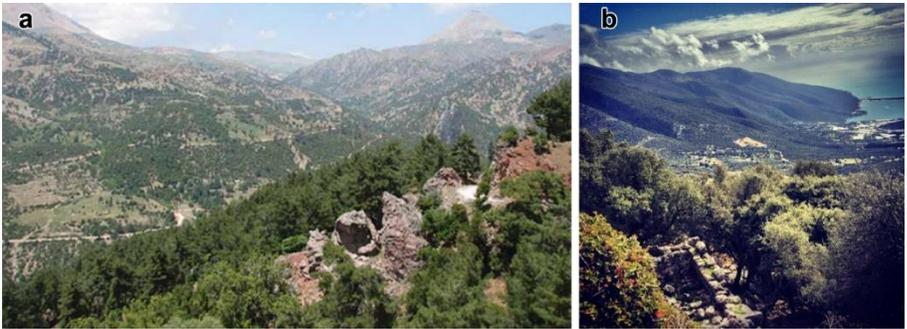


**Figure 4. Coastal Landscapes Mavikent (a), Kaleüçağz (b) (Antalya Valiliği, 2010; Öner, 2009)**

### ***3.1.2 Mountain landscapes***

Mountains are natural upward projections of the earth's surface and prominent land forms in the landscape. Teke Peninsula is a very mountainous and rugged place. According to Yaman Kocadađlı (2012) except for the alluvial filled plains on the coast and some depression floors in the interior, a high relief is generally characterise the peninsula.

From east to west main mountain chains Kızıl Dađ, Markiz Dađı, Kuz Dađı, Sarnıç Dađı, Salur Dađı, Toçak Dađı, Keşlik Dađı, Gülmez Dađı align in the hinterland of Teke Peninsula. Mountain landscapes are characterised by Mediterranean forest and xerophilous maccia vegetation that tolerant to very hot and dry climate (Figure 5, Figure 12).



**Figure 5. Mountain – Forest Landscapes Kumluca (a), Demre (b) (Antalya Valiliđi, 2010; Kùltür ve Turizm Bakanlıđı, 2022b)**

### ***3.1.3 River landscapes***

River is a large natural stream of fresh water often fed by tributary small creeks and streams and pours into the sea. They are a kind of wains that drain water on the earth surface. There are four major rivers in terms of both draining the area and forming an important morphological unit in Teke Peninsula. These are Demre Stream, Düden, Acıçay, Gavur, Karasu, Akçay (Başgöz Stream) and Alakır Stream. Streams play an important role in shaping and draining the region between Kalkan and Kumluca.

Akçay and Alakır Çayı create Finike Plain, Demre Stream that creating Demre Plain are also natural watercourse passing through settlements and plains. Due to the limiting steep topography, even low – flat river beds are used as agricultural land along the available and suitable side of the rivers (Figure 6, Figure 12).



**Figure 6. Demre Stream Landscapes (Yaman Kocadağlı, 2012; Kültür ve Turizm Bakanlığı, 2022b)**

### ***3.1.4 Wetlands***

Wetlands are valuable ecological systems formed in either swampy or marshy lands. Some of them are developed on the coast between land and sea such as lagoons, salty meadows, reed beds and marshland. Natural history of coastal quaternary pockets shows the most of the flat lands on the coast were wetlands before the land has become culture and cultivated. Beymelek Lagoon and Andriake Harbor in Demre are important coastal wetland systems in the peninsula (Figure 7, Figure 12).



**Figure 7. Wetland Landscapes Beymelek Lagoon (a), Andriake Harbor (b)  
(Kültür ve Turizm Bakanlığı, 2022b; Öner, 2009)**

## ***3.2 Cultural Landscapes***

### ***3.2.1 Urban landscapes***

Urban landscapes are the areas with multiple functions of shelter, employment, education, health, etc. with high building and population density. Nucleus of settlements concentrate on the coast side bay side, benefiting availability of sea and the coast. Urban landscapes in Teke Peninsula are represented by the main settlements of Kumluca, Finike

and Demre. In Kumluca, urban settlement are inextricably linked with intensive greenhouse vegetable production and greenhouse cultivation, where Finike urban landscapes are grew by the intact relation with the sea (Figure 8, Figure 12).



**Figure 8. Urban Landscapes, Finike (a, b) (Antalya Büyükşehir Belediyesi, 2022; Yaman Kocadağlı, 2012)**

### ***3.2.2 Rural landscapes***

Relating to the characteristics of the country, farming and agriculture, rural landscapes are the areas with low building and populations density sparsely settled often enclosed by natural environment. Rural landscapes in Teke Peninsula are rather located in remote parts where the land is available for agriculture and farming. Greenhouse production is prominent in the coastal part, and animal husbandry and forestry in the mountainous areas are the main sources of livelihood in rural landscapes (Figure 9, Figure 12).

In Finike most of the rural settlements are located in the mountainous areas behind the coast. Number of 18 villages resemble the rural landscapes in Finike, where rural population is engaged in agriculture,

animal husbandry, tourism and forestry work in forest areas where greenhouse production is predominant. A small number of rural population living in 10 villages are engaged in agriculture, animal husbandry, tourism and forestry work in Demre.

Rural landscapes in Kumluca are stationed in 26 villages. Most of the rural settlements are located in the mountainous areas behind the coast. Coastal rural settlements on the other hand are neighbouring largely by urban settlements and transitions of greenhouses and orchards.



**Figure 9. Rural Landscapes; Finike, Yazır (a) and Kumluca, Altınyaka (b)  
(Original, 2022)**

### ***3.2.3 Agricultural landscapes***

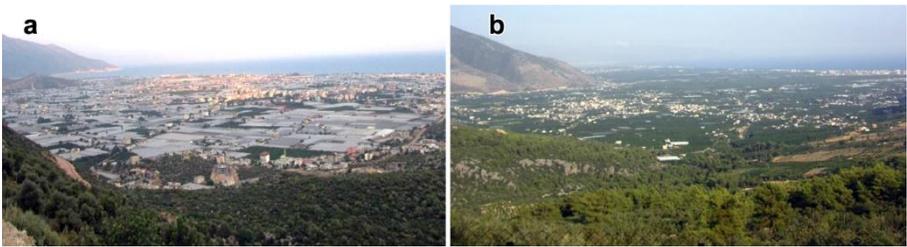
In Teke Peninsula, in the western part of Antalya, the mountains that are perpendicular to the sea did not allow the formations of large flatland and coastal plains. On the other hand related to cultivating land, raising crops, raising livestock; large land is needed for agriculture activities. Therefore, coastal plains of Kumluca, Finike and Demre represent the most important agricultural landscapes not only in the peninsula but also in Antalya province (Figure 12).

Hopefully, three districts have extensive coastal plains for agricultural production. Agricultural landscapes in the Teke Peninsula are more or less depends on plant production of fruit and vegetables. Majority of vegetable production is carried out in greenhouses. Open field agriculture is rather based on fruit production and cereals.

Agriculture takes place on wide alluvial plains in the coastal part in Kumluca where orange and pomegranate are most grown goods. Mainly orange and citrus fruits are grown in Finike including orange, grapefruit, tangerine and lemon. Culturally and etymologically a plain *Turunçova* called after *Citrus aurantium* bitter orange due to fact that citrus species are most produced product in the district (Figure 10). Agricultural production in Demre, which is the smallest district of Antalya in terms of surface area, is carried out in the flat areas on the coast and in the sloping areas behind the coast. The fruit that produced the most in Demre are olive and orange.

At the same time, historically grain cultivation with dry farming system in the coastal parts of Teke Peninsula has been a long tradition since the ancient times. Atik et al. (2013) confirmed that the Lycian land was an ideal location for cultivating important products, grain in particular Lloyd (2000) pointed out that Myra owed its fame for being an important harbour where huge grain ships traded in cereals and in second century Horrea Hadriani, reference is made to the silos of Emperor Hadrian, massive structures used to store supplies before they were transported (Çevik, 2009).

The main grain types produced today in the coastal areas between Kalkan and Kumluca are wheat, barley, corn and oats. However, wheat is the most important grain in dry farming areas in terms of both the amount of production and the width of the area where it is grown. As the testimony, granaries where the cereals being stored and kept are unique vernacular structures in the region.



**Figure 10. Agricultural Landscapes Demre Plain (a) and Turunçova (Yaman Kocadağlı, 2012)**

### ***3.2.5 Historical landscapes***

Besides the opportunities offered by the Mediterranean and the coast, as well as the climate, the rich natural resources of the region abled Teke Peninsula to host many different civilizations and cultures throughout history (Table 1). The neolithic, chalcolite, bronze age, middle iron age, archaic period, classical Lycian period, Hellenistic period, Roman and Byzantine periods and Turkish periods can be summed up for the region.

Names Lycia in the ancient time, Teke Peninsula owns a variety of historical cultural landscapes from ancient, Byzantine, Seljuks,

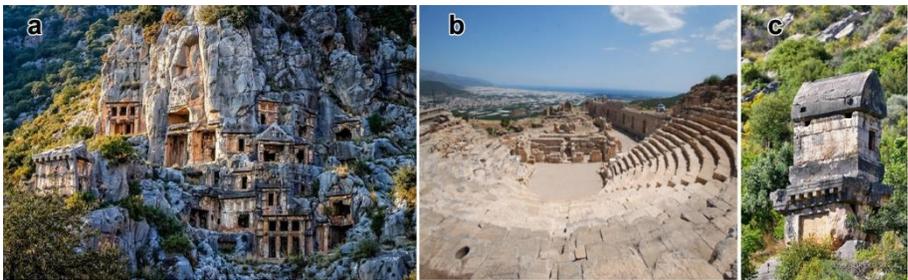
Ottomans and modern times. On the other hand tradition lifestyles of nomadic Yörüks have brought rich cultural imprints in the territory.

Some of the historic sites can be summed up as Rhodiapolis, İdebesos, Korydalla in Kumluca; Arkyanda, Arnea, Limyra in Finike; Myra, Anriake, Trebenda, in Demre (Figure 11). Moreover, sunken city Simena in Kale Üçağız is a coastal landscape with historic value as well as Kale Village. Many other historic sites and landscapes are situated around in these three districts mostly concentrating on the western side (Figure 12).

**Table 1. Chronology of the Ancient Lycia Region (adjusted from Borchhardt, 1999; Çevik, 2002; Antalya Valiliği, 2004; Bayburtluoğlu, 2003; Akşit, 2007; Umar, 1999; Atik et al., 2013)**

<i>Period</i>	<i>Occupation and important episodes</i>
2000 BC	- Appearance of the first Lycians, called Luqqu or Luqqa in eastern Egyptian sources - First human record of an axe found in Lycian city of Tlos
1400 BC	- King of Hittites, Şuppiluliuma, announced the concord of Lukka (Lycia)
1375 BC	- King of Cyprus complained about Lycians (Lukka) to Egyptians
1284	- Lycians allied with Hittites in Kades war between Hittites-Egypt - Egyptians referred to Lycians (Lukki) as one the sea peoples
1200 BC	- Frigian Dynasty
720 BC	- Lycia region fell under the influence of the Attika-Delos Sea League
750 BC	- Gagai, Korydalla and Rhodiapolis in Lycia established as Greek cities
600-700 BC	- Xanthos was the capital of the region
500 BC	- Rock tomb architecture first recorded
520 BC	- First stamped coins as a sign of commerce
470 BC	- Victory of Kimon, Commander of Attika-Delos in Eurymedon

540-405-358 BC	- Persian occupation
360-333 BC	- Karia Dynasty
334 BC	- Arrival of Alexander the Great and Macedonians
301-197 BC	- Ptolemaic rule (Egyptian-based dynasty)
192 BC	- Seleucid rule (Syrian-based dynasty)
200 BC	- Lycian League was set up, with 23 Lycian cities
190 BC	- Handed over to Rhodian
168 BC	- Roman Senate recognised the freedom of Lycia
43-200 AD	- Lycia became a Roman state
141 and 240 AD	- Earthquakes devastated many cities in Lycia
300-325 AD	- Recognition of Christianity - Myra was metropolis
324-337 AD	- St Nicolas of Lycia was a bishop during the reign of Emperor Constantine
600-700 AD	- Prosperous growth in Lycia
1207 AD	- Arrival of Seljuks
1300 AD	- Menteşeoğlu Principality
1390 AD	- Arrival of Ottomans
1830 AD	- Political reforms in Ottoman State
1923 AD	- Foundation of Turkish Republic



**Figure 11. Historic Landscapes; Myra (a), Rhodiapolis (b), Limyra (c) (Antalya Büyükşehir Belediyesi, 2022; Kültür ve Turizm Bakanlığı, 2022b; Kültür ve Turizm Bakanlığı, 2021)**

#### 4. RESULTS AND DISCUSSIONS

Teke Peninsula, also dedicated *Land of Lights* Lycia throughout the ancient history is very special area not only with cultural history but also natural history of geological time lines which evidently have brought a unique diversity to its landscape. Karstic geomorphology involving since the end of the middle Eocene caused a large geomorphological folding on a large scale and diverse landforms in the peninsula.

Kumluca, Finike and Demre are three pillar of Teke Peninsula standing on the coastal plains and further extending to the hinterland of mountains (Figure 12). The regions has multiple inherent and distinguished characteristics; it the place of agriculture that nearly half of greenhouse production of the Antalya province stands on this three districts.

There is not only agricultural production, but many festivals are organized especially in order to increase and develop the market share of the agricultural products and to preserve the local traditions. Kumluca Agriculture and Greenhouse Festivals, Finike International Hasyurt Fair, Demre Santa Claus Festival are some of these celebrations. The festivities held between December and July are also an important attraction for tourism activities in the region.

The region is a place of cultural history that many historic landscapes and sites are the core attractions for tourism. Kumluca has been home of Yörük, Finike was established as the port city of Phoenicians and is

an intact coastal town with its marina. Demre, namely *Myra* was the birth place of St. Nicolas, Metropolis of the Lycian League an important belief centre in the 4<sup>th</sup> century.

Coastal landscapes are the part of land between sea and the mainland that shaped by the interaction between water and the land. They may be in the form of cliffs, dunes, beaches, ria, lagoons or wetlands. Range of coastal features in Teke Peninsula varies from long strip of beaches in Kumluca and small bays and gulfs in Finike to lagoons, wetlands, islands and peninsulas in Demre (Figure 3 and Figure 12). Most of the coastline meet mountain landscapes, coastal plains and in some cases coastal wetland and urban landscapes in the case of Finike.

Regarding to the size total coastline length in Antalya Province is 634 km, while Teke Peninsula from Antalya Harbour to Fethiye covers 505 km. Kumluca has the longest coastline with 76 km amongst three coastal districts, where Demre has 63 and Finike has 31 km long coastline strip.

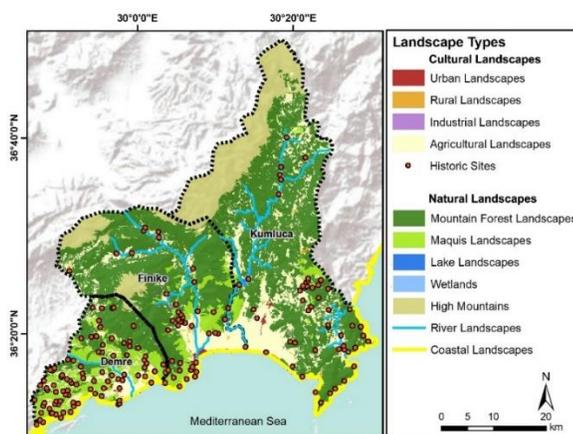


Figure 12. Landscape Diversity in Teke Peninsula (Original, 2022)

Tourism landscapes are the areas shaped either by the attempt for tourism developments or areas of high cultural and natural value for tourism. Teke Peninsula is not a tourism centre of its own but comprise South Antalya Tourism Development region on the eastern part.

Concerning Kumluca, Finike and Demre, the number of tourist facilities certified by the Turkish Ministry of Culture and Tourism in three districts is around 34 (Tunç, 2021). Most of the touristic facilities operate in coastal and forest landscapes close to the coast. In recent years, some investments have been made in the name of tourism in Sahilkent, Hasyurt, Beykonak and Mavikent in order to extend the number of tourism accommodation sites.

However, there are another type of tourist facility of Deniz Obaları based on an old tradition of holidaying in Antalya province. According to Sargin (2017), Deniz Obaları Sea Homes are seasonal settlements that located in the coastal part of Mavikent in Kumluca district. Along the coast of Kumluca, there are 670 marine boats in Kum neighbourhood and 140 in Mavikent. These sea homes often preferred by local people and domestic tourist.

Coastal landscapes in the region also offer possibilities for yacht tourism. Setur Finike Marina, which was put into service in 1997 with the conversion of the existing small port into a marina has a capacity of 500 yachts, 350 on sea and 150 on land. Located in the centre of Finike, all services are provided in the marina for yachts as a gateway to the Mediterranean.

Tourism and landscape are closely related. Regarding to threshold where tourism meets coastal landscapes and where coast meets with tourism landscapes these two landscapes are like twins on is complementary or another. Kumluca, Finike and Demre districts in Teke Peninsula are highly rich with coastal landscapes with 170 km long coastline as well as other natural landscapes and cultural landscapes.

Tourism are not only about the aesthetics of nature but more about the diversity of natural land forms and historic cultural landscapes. In this respect, geographical distribution of historic sites in Kumluca, Finike and Demre show these places are also potential for tourism landscapes. Taking tourism product into account with travel, accommodation, recreations and cultural site-seeing, close proximity to Kemer centred Southern Antalya Tourism Region, is greater advantage for accommodation. The presence of high landscape diversity in the region must be taken as a useful planning tool to create sustainable tourism contrary to mass tourism developed in Antalya Province since the 1970's.

On the other hand, in the three pillars of Take Peninsula Kumluca, Finike and Demre, the most important source of income is agriculture, and there is a strong need to develop tourism without damaging agriculture and agricultural landscapes in such manner that does not contradict, but even supports each other (Tunç, 2021).

The optimal use of resources for both conservation and development policies depends on an assessment of their sensitivity to change.

Protecting not only natural values, but also human-made cultural and ethnographic values is of great importance for a sustainable development (Benliay, 2009).

To keep the denotation of Teke Peninsula *land of lights* Lycia, and to preserve natural and cultural heritage it is important to understand that integral part of tourism landscapes rely not only on coastal landscapes but intact combinations of regional landscapes as the reflection of cultural and natural identity of the territory.

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**CHAPTER 3**

**AN EVALUATION ON THE PROCESS AND  
RESULTS OF URBANIZATION**

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## **INTRODUCTION**

In the simplest terms, urbanization can be expressed as "the population shift from rural areas to urban areas, the decrease in the proportion of people living in rural areas and the adaptation of societies to this change" (Sanyaolu, 2018).

From the development of the earliest cities in Mesopotamia and Egypt until the 18th century, there was a balance between the majority of the rural population with agriculture-based subsistence and the population of towns where economic activity mainly occurred. In these rather small-scaled towns, activities such as manufacturing took place in the markets, and commercial centers were formed. Due to the primitive and relatively stagnant form of agriculture throughout this long period, the ratio of the rural population to the urban population has followed a stable equilibrium (Eraly, 2007).

By comparison, the European population living in cities is around 8-13% at the beginning of the 18th century. From the middle of the 18th century, this rate rose rapidly. With the beginning of the British agricultural and industrial revolution at the end of the 18th century, a significant change occurred from the rural-urban population balance that continued for years. There has been an unprecedented increase in migration from rural areas and, therefore, the urban population (Malanima, 2009).

Adopting the broader definition of urbanization, we can say that the urbanized population in England and Wales accounted for 72% of the total in 1891. In other countries, this percentage was considerably

lower. For instance, 37% in France, 41% in Prussia, and 28% in the United States (Watson et al., 1993).

At the beginning of the 20th century, only 15% of the world's population lived in cities (Annez and Buckley, 2009). The year 2007 witnessed the turning point in which more than 50% of the world's population lived in cities (Watson et al., 1993).

While this rapid urbanization is a positive phenomenon due to economic development, in the following periods, cities spread out of the city borders and spread uncontrollably. Therefore, it has turned into an "urban sprawl," which caused various environmental, economic and social problems. Urban sprawl appeared as a settlement that first emerged as a suburban system created outside the city periphery in American cities. New settlements spread outside the city borders in unplanned and uncontrolled urbanization.

Urbanization is a multidimensional concept that has different characteristics in different processes. Accordingly, various ideas have been put forward in the literature about the concept of urbanization, its causes, and its consequences. This study explains the relationship between urbanization and migration and its effects. Then, the urbanization in the "industrial revolution" is examined. It is the most significant factor in the phenomenon of migration and, therefore, urbanization. It has given the most effective acceleration to urbanization in the historical process until that period.

Later, urbanization in the post-World War II period, rapid population growth, and its effects on urbanization are examined. Finally, the

reasons and aspects of urban sprawl, the damaging part of rapid urbanization, are discussed.

## **1. DEFINITION OF CITY AND URBANIZATION**

Cansever (1994) defined the city's significance by emphasizing the physical aspect of the city as follows: "It is the most important and greatest physical product created by man to organize his life and the structure that directs and surrounds human life. "Bookchin defines the city as a social eco-community. In this definition, the city is an area occupied by a large population of people connected for some common needs (Bookchin, 1999).

The basis of the first emergence of cities is based on the establishment of the first settlements in the form of primitive villages to shelter and protect against dangers. In the following periods, trade developed due to the increasing products in the villages and the construction of transportation networks to other villages. Due to the growing population and the damage caused by the conflicts between villages, defensive city walls were constructed. These small villages became larger-scale settlements, and the first cities emerged (Mikaeili and Memlük, 2013).

Until the Industrial Revolution, there was an organic, continuous, compact, and low-speed growth in cities in general for a long time. In many examples of today's cities, the part of the old city with this texture appears to form the historical and central core of the city, particularly as the region defined by the remains of the city walls in most examples (Mumford, 1961). Generally, cities started to grow around this central

core continuously. A wide variety of definitions and criteria and determining factors are put forward regarding the city's definition (Keleş, 2000). If we group these factors and definitions under a general title, cities are defined from the following aspects:

- Definition of City Based on Population
- Definition of City Based on Economy
- Definition of City Based on Sociological and Cultural Differences
- Definition of City From Based on Managerial Perspective

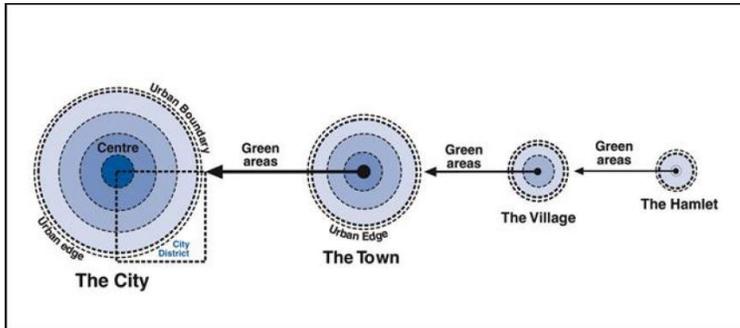
### ***1.1. Definition of City Based on Population***

According to the population, settlement areas can be divided into villages, towns, cities, etc. These definitions may differ from country to country. For instance, according to Turkish legislation, the population must be over 10,000 for a settlement within the urban hierarchy to have urban status. Table 1 explains the population required to be a village, town, city, and metropolises according to Turkish legislation. (Social Studies, 2020; Legislation Information System, 2020).

**Table 1. Population and Residence (Social Studies, 2020; Legislation Information System, 2020).**

<b>Population</b>	<b>Settlement</b>
2.000 or less	Villages
2.000-10.000	Town
10.000-500.000	City
More than 500.000	Metropolis

In line with the Urban Renaissance in the United Kingdom, according to the "Urban Task Force" report led by Lord Rogers of Riverside, the transformation from a small village to a city is demonstrated in Figure 1.



**Figure 1. A Schematic Representation of the Transformation from A Small Village to A Large Village and then A Town and Finally A City (Urban Task Force, 1999)**

### ***1.2. Definition of City Based on Economy***

When the city is considered from an economic point of view, it is defined as an economic mechanism that operates in non-agricultural works of the urban population and emerges to meet the constantly changing needs of the society in the process of production, distribution and consumption of goods and services. In this context, the city can be expressed as a place where agricultural products are distributed, many non-agricultural products are produced, and a unit where both agricultural and non-agricultural products are controlled (Niray, 2002). In economic terms, Jane Jacobs defines the city as “a settlement that constantly creates its own economic development with its own local economy” (Jacobs, 1969).

### ***1.3. Definition of City Based on Sociological and Cultural Differences***

Sociologically, the city can be defined as a group of people and buildings gathered in a wide area with different activities and lifestyles (Niray, 2002). Taneri (1978) also expresses the sociological definition of the city as "a large, dense and continuous settlement formed by people who do not resemble socially" (Taneri, 1978: 19). Similarly, Keleş (1996) expressed the sociological aspect of the city as a densely populated, continuous settlement and a settlement unit consisting of socially similar people and their activities (Keleş, 1996:75).

According to Lewis Mumford, since the foundation of the city, it has been a settlement with sufficient density to provide many products and services in a confined space, and is equipped to collect and transmit the products of civilization, to meet the changing needs of society. In addition, in this context, the city is defined as a structure that can accommodate the complex new requirements brought about by growth over time. In addition, the city is considered as a part of the socio-economic structure of the period in which it existed and the society in which it is located (Mumford, 1961).

### ***1.4. Definition of City Based on Managerial Perspective***

The city's definition from a managerial view differs from country to country and even from state to state in countries such as the United States. The administrative definition for Turkey is handled based on population, and the urban population is generally defined as the

population within the municipality's boundaries (Niray, 2002). In this context, Table 1 shows the population threshold for the city.

## **2. IMPORTANT FACTORS IN THE URBANIZATION PROCESS**

Although urbanization has gone through different processes in different cities and has shown different qualities, significant accelerations and triggering factors are seen in the urbanization process when the subject is viewed from a broad and global perspective.

In this context, the subject is discussed under the headings of urbanization-migration relationship, urbanization-industrial revolution relationship, and urbanization in the post-World War II period.

### ***2.1. The Relationship between Urbanization and Migration***

Urbanization is more commonly known as population-based growth. In measurements in population-based urbanization, the changes in rural-urban population ratios are mostly considered.

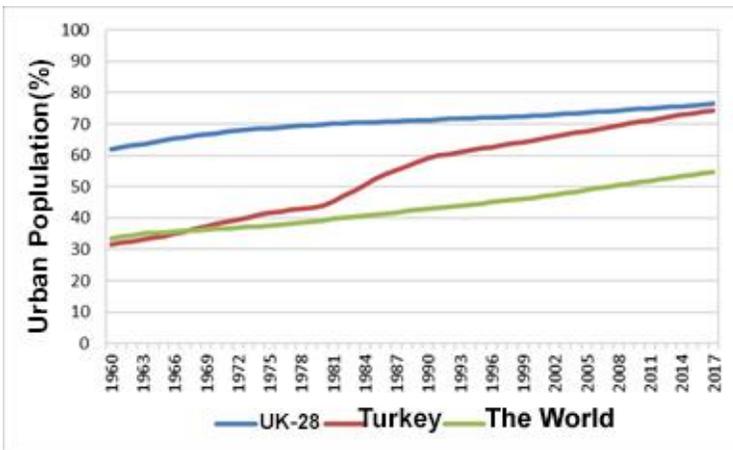
Addressing the phenomenon of urbanization by adding economic, political, and social dimensions apart from the population is based on industrialization and economic developments (Aydemir et al.; 2004).

Urbanization refers to a continuous change in cultural, economic, and social structures, apart from population-based growth. For this reason, the phenomenon of urbanization differs according to each country. For this reason, unanswered questions and issues that do not have a consensus on the subject of urbanization continue. In this context, the

direction of the urbanization phenomenon in the future and the uncertainties of the potentials on this issue are discussed (Davis, 1965).

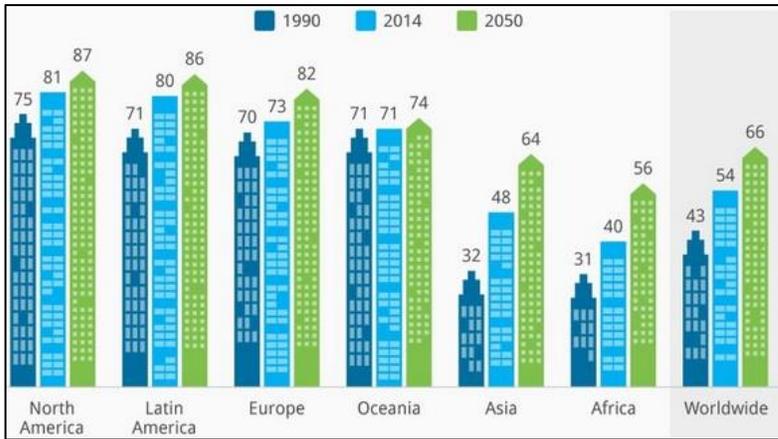
Thus, the growth of cities was realized both in terms of population and physical development. These areas are transformed into commerce, industry, and service functions. According to the World Bank data; The rate of the population living in urban areas in 2017 is shown in Figure 2 as the average in Turkey, European Union countries, and the world. According to Figure 2, while the population living in urban areas in 28 countries of the European Union is 76.4%, this rate is 74.4% for Turkey. The worldwide average is 54.3% (World Bank, 2017).

In line with the requirements of the rapidly increasing population in the period after the 1950s, there has been a rapid increase in population-based urbanization. Figure 3 demonstrates the percentages of the population living in cities in different continents from 1990 to 2014 and the predictions for 2050.



**Figure 2. Percentage of Urban Population in the European Union, Turkey and the World between 1960-2017**

The newly published “World Urbanization Possibilities” report by the United Nations shows that there is a continuous increase from rural areas to cities and this increase shows that cities continue to spread gradually (Figure 3).



**Figure 3. Population Rates in Cities on Different Continents by Region and Expected Rates in 2050 (BMDKOR, 2014)**

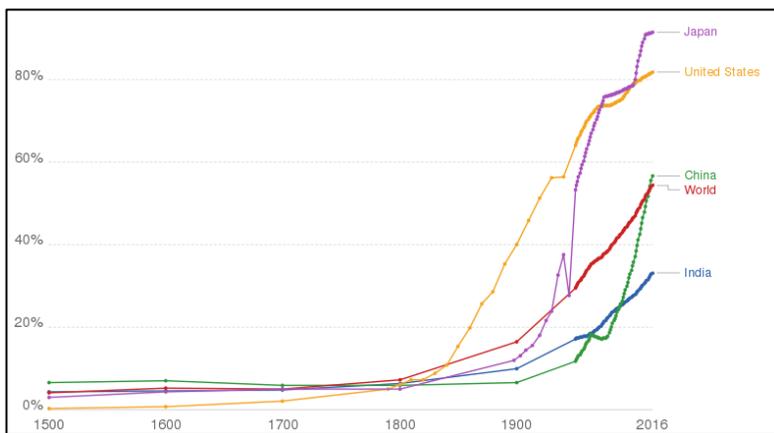
While the data in 1950 showed that 30% of the world's population lived in urban areas, this figure reached 54% as of 2014. By 2050, it is predicted that this rate will reach 66%. While there is a significant influx of cities in North America, Africa is shown as the driest region in urbanization. 40% of the total population in Africa lives in cities. The world's most populous city stands out as Tokyo, with a population of 38 million (BMDKOR, 2014).

## ***2.2. The Relationship between Urbanization and Industrial Revolution***

The industrial revolution can be considered the most significant influential factor in urbanization. Many cities and human migration from rural areas to existing cities have increased with industrialization. As the number of cities increases or grows, the urbanization process continues. In this respect, urbanization also shows a population agglomeration process (Berry, 1973).

In a period that continued with the industrial revolution, new job opportunities in the factories caused people to migrate from the villages to the industrialized cities. New factories required labor, and industrial production was ahead of agricultural production in many areas.

In addition, developments in transportation supported the phenomenon of migration and urbanization, particularly in the 18th century. In this context, there is a direct relationship between urbanization and industrialization (Aydemir et al., 2004).



**Figure 4. Urbanization in the Last 500 Years (Our World in Data, 2020)**

Figure 4 demonstrates that while urbanization showed an extremely low rate until the 18th century, even in countries with important steps in industrialization, it accelerated to a great extent after the changes created by the industrial revolution in the 18th century.

The excessive migration from rural to urban areas leads to a lack of balance between increasing urban population and provision of housing facilities in particularly underdeveloped and developing countries. Therefore, this problem has caused unplanned settlements and consequently unplanned urbanization, bringing diverse social and economic negativities for cities.

These changes have altered the urban structure and the functions of rural areas. For instance, distorted and unhealthy settlements have emerged due to the ineffective use of agricultural or green lands in the city periphery and converted agricultural and green areas into residential areas (Mikaeili and Memlük, 2013).

With these changes, as being close to cheap labor and raw materials gained importance, the industry moved beyond the old traditional city boundary, and workers' cities emerged at the periphery of the business districts.

In addition, with the industrial revolution, many people started to go to factories and business centers outside the city periphery. In other words, people's workplaces and living spaces were no longer close to each other (Gillham and MacLean, 2002).

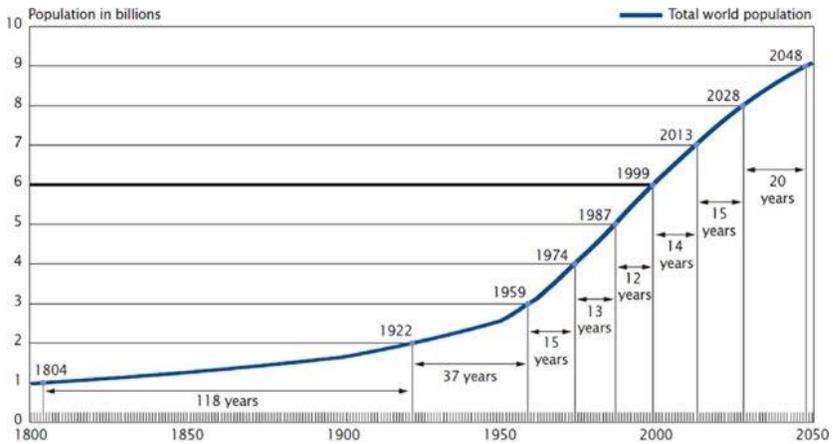
On the other hand, the general population in the world has increased, which has accelerated the population growth in cities. According to Aydemir (1989), this "two-way growth" phenomenon started with the migration of the population living in rural areas to the cities at first. Still, it continued as the cities grew and approached rural regions of the following periods. This phenomenon of migration took place in different periods in the form of a gradual migration in many countries.

### ***2.3. Urbanization in the Post-World War II***

As World War II had significant effects on many issues in the world, it was a period in which tremendous changes were seen in cities in terms of structural and population changes. Many cities, chiefly in Europe, had seriously been ruined during the war. In the post-war period, it is seen that the rebuilding of the cities and the rapid re-establishment of the factories for economic development started the migration flow to the cities. With it, a new form of urbanization was experienced. Industrialization efforts that revolted after the destructions of World War II and the challenges for rebuilding the ruins of the war have played an essential role in these cities taking their present forms. There are also efforts to keep up with this process in newly developing or underdeveloped countries. Although these efforts appeared in industrialization in such countries, they caused them to live this process at a much slower pace (Niray, 2002).

One of the most striking aspects of urbanization after World War II is the rapid increase in the world population. After the industrial revolution, developments in medical issues are seen in many science

branches. Accordingly, in the 19th century, the death rates decreased considerably. Furthermore, developments in production lead to an increase in food products, and these issues have accelerated human population growth worldwide. This acceleration has gained much more significant momentum in the period after World War II. As seen in Figure 5, while the world population was less than one billion in the 1850s, it increased to about three billion in the 1960s, and at a similar rate, it raised more in the following years (Şahin, 2016).



**Figure 5. Development of World Population (1800-2050) (Brücher, 2017)**

While this rapid urbanization was a positive phenomenon in some countries by following a planned and controlled process, in some countries, it has brought adverse effects due to lack of balance between migration flow to cities and the development of urban infrastructure.

In this regard, a different aspect of urbanization, which was first seen in the United States, emerged. It was an urbanization model in which settlements were established in the suburbs, and the cities had started to

spread beyond the city's borders. After the widespread production and use of the car in American cities, a sprawled urban growth system, dependent on private vehicles, far from the city center, was adopted over the suburban areas. In this system, the city center is predominantly defined as a business area, and suburbs are majorly where people live. Although urbanization and urban growth can bring many advantages, "urban sprawl is the least desired dimension of urban growth" (Aydemir et al., 2004). Urban sprawl, which has continued until today and continues, can differ from country to country and sometimes from city to city, both in causal and physical form.

#### ***2.4. Urban Sprawl as One of the Consequences of Urbanization***

The rapid urban growth that started with the Industrial Revolution continues in the 21st century, both population and city borders. Developments in the field of construction technologies also facilitated more construction in cities. Notably, after the Second World War, cities started to grow rapidly with the increasing immigration to cities due to the rising factories and job opportunities in the cities. This issue accelerated the construction of more settlements for the rapidly rising population in the cities. Therefore, the land required for new settlements has caused the disappearance of agricultural lands and natural green areas around the city.

The rapid growth of cities caused an increase in the use of motor vehicles and led to the deterioration of environmental quality, uncontrolled and excessive population density, and social segregation. The suburbs on the city's periphery began to merge with the rural areas,

and residential and commercial areas emerged. The sprawling urban forms often fail to offer quality housing at affordable prices in residential areas within walking distance. Therefore, to access quality housing, people have preferred housing in areas far from the city center and where housing costs are low. Thus, the city began to grow physically. In addition, recreational areas designed for shopping centers and leisure activities were also located in these areas.

This situation caused the 21st-century cities to have a physically sprawled character. As a result, in today's cities, housing, workplaces, recreational and shopping places are increasingly separated in terms of urban form. As a result, the citizens' dependence on vehicles has increased. Urban sprawl brings many negative consequences for these reasons, such as deterioration of the balance in the resource and energy production-consumption chain, damage to nature and ecological structure, transportation difficulties, and infrastructure deficiencies (Doğan, 2002). In sum, the causes of urban sprawl can be explained as:

- Transportation flexibility and convenience provided by private vehicle
- Increasing income level as a result of economic developments,
- Decreased attraction of the city center,

desire to live in distant and more expansive areas due to excessive noise and air pollution in the city center

- Increasing communication opportunities as a result of technological developments (Akseki and Meşhur, 2013)

One of the chief revolutions that technology has created in transportation is the development of motor vehicles. With the entrance of personal cars into people's lives, there has been a significant decrease in transportation distances (Newman and Kenworthy, 1999). For this reason, while urban sprawl showed a limited development depending on the train or tram route in the early periods, it exceeded this limitation with the integration of the automobile into urban life (Gillham and MacLean, 2002).

The phenomenon called urban sprawl has emerged due to many different reasons such as economic developments, increasing income, rising living standards, demand for larger living space, increasing transportation and communication opportunities, and losing the attractiveness of the city center, apart from rapid population growth. The reasons mentioned above cause the continuation of urban sprawl, even in cities with almost no population growth or whose population has increased very limitedly today (European Economic Area Report, 2006).

The effects of urban sprawl cover different dimensions: The first is the emergence of low-density settlements. The second issue is the location of residences, workplaces and trade centers far from each other and with sharp boundaries and adverse effects. The third dimension is the lack of a substantial city center, and the road network is defined by large blocks, reducing accessibility (particularly pedestrian accessibility) and devaluing transportation options. The fourth negative dimension of

urban sprawl is expressed as the relative monotony of residential areas (Ewing, 2019).

In addition to these, increasing infrastructure costs, destruction of green areas in the city periphery, decrease in social relations, decrease in neighborhood quality, increased car dependency, more transportation costs, and more energy consumption, increasing racial and economic inequality are among the negative effects of urban sprawl. In addition, as cities expand, the time spent on daily transportation increases, and the distance between different uses causes more time and energy loss. Various studies consider diffusion a multidimensional phenomenon, emphasizing that each dimension needs an additional measurement and evaluation. In this context, Torrens and Alberti (2000) stated that sprawl should be measured in terms of density, scattering, detached development, and accessibility factors. In studies in which these criteria are further detailed, it is stated that these criteria can be used to measure urban sprawl: the criteria of density, mixed uses (residence, workplace, and services), presence of a strong city center and centrality factor, proximity to public services and accessibility to the road network (Ewing, 1994, p. Liyang, 2011; Cervero, 2000; Frenkel and Ashkenazi, 2005).

**Table 2. Negative Effects of Urban Sprawl from Three Different Directions (Polidoro and Dig., 2011)**

<b>URBAN SPRAWL IN TERMS OF LAND USE STANDARDS</b>	<b>URBAN SPRAWL AS A RESULT OF THE LAND USE STANDARDS</b>	<b>URBAN SPRAWL AS A RESULT OF GOVERNMENT BUILDING ACTS</b>
Development of low-density areas particularly individual/single houses	Loss of agricultural lands / urban gaps	Decentralized planning
Racial discrimination in urban uses and occupation	Residential developments and the formation of secure living areas in dispersed areas; urban gaps	Disconnection between regional administration in making planning decisions
Developing commercial spaces in urban corridors	Dependence on cars for transportation;	Challenges at the metropolitan level
Urban sprawl (Non-contiguous development)	Disagreements between municipalities; Effects on environmental and neighborhood unit	Urban rant

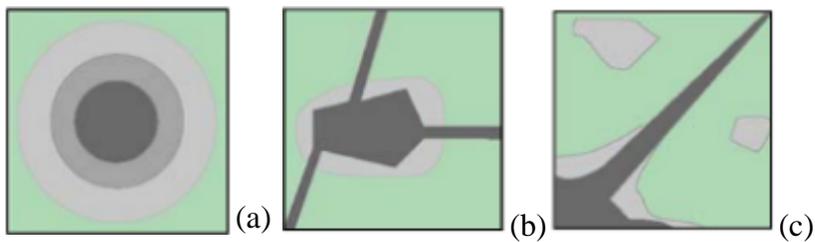
Urban sprawl has become a significant problem in many countries for years after its negative consequences have been realized. Urban sprawl can take place in different ways:

- **Low-density sprawl:** In this urban sprawl model, the land around the existing city is used for urban purposes. In this type of sprawl, urban infrastructure such as water channels, wastewater sewers, and roads are provided in the form of piecemeal extension, leading to increased sprawl as in many American cities.

**Ribbon sprawl:** In this model, sprawl occurs outward from the city center in line with the main transportation corridors and lands close to these corridors. As a result, over time, green lands in the city's

immediate vicinity may be converted to urban uses due to the increase in value.

**Leapfrog Development Sprawl:** This model is a scattered form of urbanization with disconnected patches of urban land uses, scattered with green areas. This model can be considered as the most high-priced form of development. Leapfrog development may be triggered by apparent physical limitations such as inhibitive topography, water resources, and wetlands, or more insolvable reasons such as disparity in development policies and political jurisdictions (Ewing, 1994; Aydemir et al., 2004; Liang, 2011).



**Figure 6. Low-intensity Sprawl(a), Ribbon Sprawl (b), and Leapfrog Development Sprawl (c) (Liyang, 2011)**

### **3. CONCLUSION**

If urbanization takes place in a controlled and planned way, it can be considered a positive phenomenon. When urbanization, which is associated with population growth, is designed, infrastructure and necessary services are provided to the increasing population. Thus, a controlled, continuous, and balanced urbanization can be realized. European cities set a successful example in this regard. On the contrary, after the widespread production and use of cars in American cities, a

private vehicle dependent, single-story, and sprawled urban growth system have been adopted over the suburban city system. In this system, the city center is predominantly defined as a business area and tends to be directed to the suburbs where people live. Considering the danger of energy depletion in the future and realizing the negative aspects of urban sprawl such as damages to the environment and nature, time and energy loss, and the cost of the journey between work and living spaces has made urban planners search for solutions to problems of urban sprawl.

Urbanization experienced today is not only considered in the context of population movements but also includes developments in economy and technology, political and psychosociological dimensions, and industrialization that started the population movement. These four dimensions of urbanization are influenced by the economy, technology, politics, and psychosociological factors and interact with each other (Keleş, 2000). In the pre-industrial (historical city) and post-industrial periods, changes occurred in the cities due to various factors.

Two imperative accelerations are apparent in the historical process of urbanization. The first is the changes that appeared with the Industrial Revolution in the 18th century and the socio-economic changes it brought with it, which greatly affected the urban-rural population balance. The second is acceleration which took place in the post-World War II period. Many cities were destroyed during the war and entered into an economic depression. The rebuilding of the cities and the rapid re-establishment of the factories started the migration flow to the cities.

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## CHAPTER 4

### AN ASSESSMENT ON THE HISTORICAL DEVELOPMENT OF HERITAGE PROTECTION AND ITS IMPORTANCE IN THE CONTEXT OF PLANNING AND DESIGN

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## INTRODUCTION

Protection is a phenomenon that aims to keep the traces of the past alive in order to shed light on the future. Protection has a special importance and value, especially in professional disciplines (such as architecture, landscape architecture, city and regional planning, interior architecture) that have the mission of designing/organizing spaces.

Many civilizations in the past and many countries today have taken various steps and made efforts to protect natural and cultural assets or values. Because both natural and cultural values do not belong only to the region where they are located, they are the common property of all humanity. The ways and methods to be followed in the protection of these values differ according to each country and each period.

Since the 16th century, the concept of "protectionism" has developed in order to transfer concrete evidence of ancient civilizations to the future. However, for many years, conservation was generally handled with the understanding of museology, and the protected structures and areas remained in the appearance of "unlived frozen memories". Today, however, it is agreed that protection is a tool for sustaining life (Türk, 1995). Many natural and cultural assets that were outside the city in the past are now located in the city centers due to the urbanization movements shaped by factors such as population growth, migration, etc. For this reason, there are great problems in the protection of these areas and structures today. The biggest reason for these problems is the pressures brought by urbanization.

Cities have started to become places where environmental values are rapidly consumed, cultural values are neglected, spatial identity begins to disappear, and socio-economic and socio-psychological problems increase (Türk, 1995). Especially since the beginning of the 20th century, as a result of the change experienced with the urbanization process, it has been seen that the city has a complex structure that includes economic and social elements. Changes in life styles, management structure, capital power, population growth-agglomeration, migrations, economic conditions, etc., have led to the differentiation of living spaces over time (Özcan and Yılmaz, 2005). This differentiation affects and changes both the assets and areas to be protected and the approaches of countries to protection.

Protection is a multifaceted phenomenon. There are many different actions it contains and the concepts formed due to these actions. For this reason, it is necessary to know and analyze what these concepts mean in order to better understand the phenomenon of conservation and to produce solutions to the problems that occur.

The dictionary meaning of the word **protection** is “to secure an asset against danger and external influences”. Its meaning in this study is "conservation, maintenance, repair, restoration, function change operations in immovable cultural and natural properties, and preservation, maintenance, repair and restoration works in movable cultural properties" (Resmi Gazete, 1983). Another meaning of the term is "to take the necessary precautions for the survival of structures or parts of the city that have historical or artistic value" (Görünür, 1994).

**Integrated protection** is the reconciliation of conservation requirements and urban planning objectives with other factors in the general planning process, taking into account the importance and value of the existing texture (Yücel, 2004).

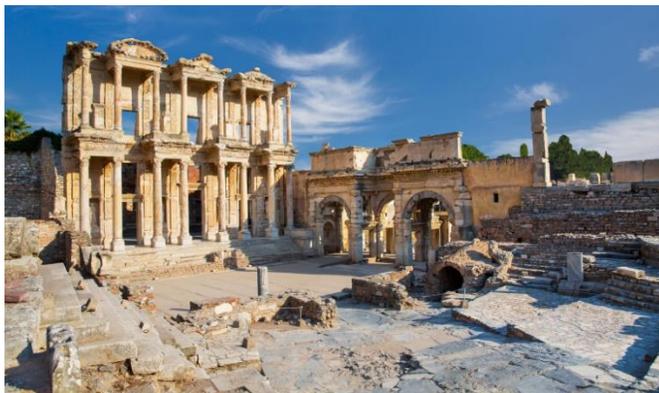
**Nature conservation** covers all encouraging and protective measures that secure wild animals, plant species, their natural habitats and natural landscape (Çolak, 2001). When nature protection is mentioned in a broad sense, it is understood that "to protect the plants and animals living in nature, their habitats and nature elements that are worth protecting in the light of certain criteria for the guarantee of human health and life" (Kurtaslan, 2005). Nature conservation contributes to the continuity of plant and animal populations, the richness of species, and the protection of natural or near-natural ecosystems, and with the elements it protects, it helps both the protection and development of genetic richness and scientific studies (Yücel and Babuş, 2005).

**A protected area** is a piece of land and/or sea designated for the maintenance and conservation of biological diversity, natural and cultural resources and managed by legal or other effective means (IUCN, 1994).

**Urban conservation** is defined as securing buildings and natural beauties with high historical and architectural values in certain parts of cities against all kinds of destructive, aggressive and harmful actions so that future generations can benefit as well as those living in the city today (Türk, 1995; Ömeroğlu, 2006).

**Cultural heritage**, according to the Convention for the Protection of the World Cultural and Natural Heritage, monuments, building complexes and sites are counted as "cultural heritage"(Figure 1). According to this:

- *Monuments*: Architectural works of exceptional universal value in terms of history, art or science are masterpieces in sculpture and painting, elements or structures of an archaeological nature, inscriptions, caves and combinations of elements.
- *Building Groups*: Ensembles of separate or combined structures that have exceptional universal value from the point of view of history, art, or science because of their architecture, their compatibility, or their location on the land.
- *Heritage sites*: Artifacts of man or joint works of nature and man, and areas comprising archaeological sites, which have exceptional universal value from the historical, aesthetic, ethnological or anthropological point of view (Anonymous, 1982).



**Figure 1. A Cultural Heritage – Ephesus (Alkan, 2016)**

**Natural heritage**, the areas to be considered as "natural heritage" (Figure 2) according to the Convention on the Protection of the World Cultural and Natural Heritage are as follows:

- Natural monuments consisting of physical and biological formations or assemblages of such formations, of outstanding universal value from the aesthetic or scientific point of view
- Geological and physiographic formations of exceptional universal value from the point of view of science or conservation, and strictly defined areas where species of animals and plants under threat of extinction grow
- Natural sites or strictly designated natural heritage sites of exceptional universal value for science, conservation or natural beauty (Anonymous, 1982).



**Figure 2. A Natural Heritage – Pamukkale (Alkan, 2016)**

# 1. THE DEVELOPMENT OF PROTECTION IN THE WORLD

## *1.1. Protection of Cultural Heritage*

Although the concept of protection started with the history of humanity, it started to show its importance and effects from the 18th century. In the early days, it is seen that the protection was generally in the form of the protection of materials such as tools, equipment, ornaments, etc. obtained from excavations. After Pius II banned the destruction and damage of historical monuments in Rome in 1462, which is seen as the first legal framework for the protection of cultural heritage areas, the first international initiative is counted as the Architects Congress held in Madrid in 1904 (Vuruşkan and Ortaçesme, 2009).

In the 18th and 19th centuries, although the purpose was mostly limited to the protection of archaeological artifacts, since the second half of the 19th century, protection aimed to protect monuments as well as archeology. In this period when monument preservation was desired to be placed on a theoretical basis, the monuments were restored according to their original styles and made to appear as if they belonged to a single period, during the restoration works carried out by Sir Gilbert Scott in England and Villot le Duc in France with the principle of "reaching a unity of style". On the other hand, it is seen that John Ruskin brings "continuous care" and "protection" to the agenda instead of "restoration" (Şahin, 2004).

Later developments continued and developed on the basis of "continuous maintenance and protection". In particular, Camillo Boito, an Italian engineer and architect, developed various ideas and thus the

first foundations of the concept of protection of today's cultural heritage were formed.

During the I and II World Wars, there was not much development and progress in the protection of cultural heritage. However, during this period, restoration works were carried out for the damaged structures and artifacts. Carta Del Restauro can be counted as one of the first major advances in cultural heritage. Carta Del Restauro is a declaration put forward after the problems experienced in protection in Italy, which is one of the countries with cultural and archaeological richness. In this declaration, which was created by the Supreme Council of Antiquities and Fine Arts in 1931, expectations and suggestions regarding the restoration of movable and immovable cultural properties were expressed.

The Venice Charter, adopted in May 1964, established an international framework for the conservation and restoration of historic buildings. Thanks to this regulation, the concept of monument was given a new dimension, thus it was revealed that an urban or rural settlement (Ahunbay, 1996) that witnessed a certain civilization, an important development, a historical event, also has the feature of a monument and therefore needs to be protected (Vuruşkan and Ortaçesme, 2009).

The Convention on the Protection of the World Cultural and Natural Heritage, signed by Turkey on 14.04.1982, was adopted at the seventeenth session of UNESCO convened in Paris on 17 October 1972. In the Convention, definitions of cultural and natural heritage were made and the precautions to be taken regarding this heritage and

protection measures were emphasized. It has been clearly emphasized that cultural and natural heritage is a heritage of universal value and belongs to the whole of humanity. It has been decided to establish an intergovernmental committee for protection work related to this. In addition, the idea of establishing a hedge fund for all these studies has been developed. With this convention, various areas were designated as world heritage sites and taken under protection by UNESCO and other countries, thus creating a World Heritage List. According to UNESCO records, as of 2022, a total of 1154 sites around the world have been declared as World Heritage Sites. Of these, 897 are cultural, 218 are natural and 39 are mixed (natural and cultural) heritage.

In the year 1975 European Architectural Heritage, the Amsterdam Congress, consisting of delegates from all countries in Europe, envisaged that the unique architecture of Europe is the common heritage of all European peoples and that they should work together to preserve it. The Amsterdam Declaration, which was put into effect by the Committee of Ministers of the Council of Europe, is one of the most important steps taken regarding the protection of architectural heritage. Developing a regional planning policy and adopting an integrated protection approach are among the most important goals (Ahunbay, 1996).

With the idea that cultural assets reflect the identity and distinctive features of a society, a new approach was tried to be brought to the subject of protection with the "World Conference on Cultural Policies" held in Mexico in 1982. After this conference, with the "Convention for

the Protection of the European Architectural Heritage" signed in 1985, the definition of architectural heritage was made and the characteristics of the works that could be included in this heritage were determined. With the "Convention on the Protection of Historical Cities and Urban Areas" made by ICOMOS in 1987, the importance and protection criteria of historical regions were emphasized (ICOMOS, 2008).

The importance of the archaeological heritage was emphasized with the "Regulation for the Protection and Management of the Archaeological Heritage" approved by ICOMOS in 1990. Accordingly, archaeological heritage is a sensitive and non-renewable cultural resource. In order to prevent the destruction of this heritage, land uses should be controlled and developed. Developing national and international policies, ensuring effective participation of the public, providing the necessary financial support for legal protection and research are the main solutions accepted for the protection of archaeological heritage (ICOMOS, 2008).

Nara Certificate of Authenticity is a document authored by the 45 participants of the Nara Authenticity Conference held in Nara, Japan, on 1-6 November 1994. The conference was organized with the cooperation of the Japanese Ministry of Foreign Affairs, UNESCO, ICCROM (International Center for the Research and Conservation of Cultural Heritage) and ICOMOS (ICOMOS, 2008). Nara Certificate of Authenticity has been prepared in accordance with the spirit of the 1964 Venice Charter and has expanded the scope of our contemporary world's understanding and interest in cultural heritage (Asatekin, 2003).

This document emphasizes that the authenticity of cultural heritage should be accepted and with this understanding, it is important for each nation to put forward the protection measures for its own heritage in a unique way.

Apart from all these studies, ICOMOS published the "Regulation on the Protection and Management of Underwater Cultural Heritage" in 1996. According to this regulation, underwater cultural heritage is defined as the archaeological heritage found in or taken from the underwater environment. This includes submerged settlements and structures, sunken areas, shipwrecks and their archaeological contents and natural environments (ICOMOS, 2008). Some decisions have been made to protect these assets by taking necessary precautions.

At the 12th General Assembly of ICOMOS held in Mexico in 1999, another statute named "Traditional Architectural Heritage Charter" was published. According to this charter, traditional architecture has a special place in the eyes of all peoples and is a source of justified pride. It is considered an attractive product that reflects the characteristics of society. It is both the focus of attention of contemporary life and a document of the past of society. It is the work of man and the product of his time. Therefore, it must be protected. Protection should be carried out by respecting the cultural identity of the society, maintenance and repairs should be made, and protection measures should be taken without ignoring the relationship between traditional architecture and cultural landscape (ICOMOS, 2008).

## ***1.2. Protection of Natural Heritage***

The rapid increase in the world population and increasing environmental problems after the Industrial Revolution brought about the loss of natural resources and the pressure of consumption on natural areas (Atik et al. 2005). In parallel with the developments in the world, countries have grasped the importance of preserving natural values as well as historical and cultural values within the integrity of the artificial and natural environment (Görünür, 1994).

Nature protection is the comprehensive protection of the natural environment and its elements in order to secure the living principles and assets of humans, animals and plants in a balanced structure. Nature protection studies, which started with the aim of obtaining economic benefits from nature, are now being carried out to include scientific, aesthetic, moral, spiritual and recreational purposes. In the direction of protecting species and biological diversity, very different national and international protection statuses, international conventions and nature protection networks are tools to achieve these goals (Atik et al., 2005).

The idea of protecting some natural areas goes back to the birth of civilization. In China, Iran, Egypt, India and some European countries, hunting grounds were established for the aristocrats and game animals were raised. However, it is difficult to say that this approach is based on a protection approach. The idea of modern protection of natural areas and the creation of policies in this regard started with the protection of Yellowstone National Park in the USA in 1872. In the years following

this development, nature protection gained a universal dimension (Ortaçşme et al., 1998).

Conservation areas created to cater to the recreational needs of the bourgeois class in the Middle Ages, later changed into natural protected areas that everyone could benefit from, and especially since the end of the 19th century, it has developed towards a national park concept by gaining an international character. This period is expressed as the beginning period in nature protection (Yücel and Babuş, 2005).

The concept of national park, which started with the declaration of Yellowstone National Park in the USA in 1872, later spread to other countries such as Canada, Australia and New Zealand. The first national park in Europe was declared in Sweden in 1909 for scientific study purposes 37 years after the USA, and the second in Switzerland in 1914. Until the First World War, about 40 national parks were declared in the world, 11 of which were in Europe. This number reached 31 in Europe and 300 in the world until the Second World War (Yücel and Babuş, 2005).

The first studies to protect nature monuments were also carried out in the USA. With the "Antiquities Act" approved by the US Congress in 1906, artifacts with historical value were taken under protection. Firstly, 300 m tall volcanic rocks were preserved. In 1916, it took a total of 16 national parks and 21 nature monuments under protection in the USA. This number reached 28 national parks and 86 nature monuments until 1957 (Yücel and Babuş, 2005).

The rapidly expanding conservation area activities led to the development of the idea of establishing an " International Commission for Nature Protection " later on. The commission was established with a conference in 1913, but with the outbreak of the First World War, there was a pause in the work of the commission. Although there was not much progress in nature protection between the First and Second World Wars, the institutionalization period began after the Second World War.

The International Union for Conservation of Nature (IUCN) was established in 1948 under the leadership of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Since its establishment, it has carried out international studies, created international protection statutes in this sense, and the statutes have been shaped over time according to the needs and current situations. There is an internationally accepted six-category classification system, most recently developed by the World Conservation Union (IUCN). With the development of environmental awareness in the public in the 1970s, international studies on the protection of natural resources gained importance (Yücel and Babuş 2005). In this period, environmental protection came to the fore more than protecting nature. However, as some examples are given below, many international conventions were also put into effect during this period.

- Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (Ramsar Convention, 1971)

- Convention for the Protection of the World Cultural and Natural Heritage (1972)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES-Washington Convention, 1973)
- Convention for the Protection of the Marine Environment and Coastal Zone of the Mediterranean (Barcelona Convention 1976)
- European Convention for the Protection of Wildlife and Habitats (Bern Convention, 1979)
- Convention for the Protection of Migratory Species of Wild Animals (Bonn Convention 1983)

In the following period, more importance was given to nature protection activities and as a result, great progress was experienced. At the United Nations Environment Conference held in Rio de Janeiro in 1992, countries stated that climate change, deforestation, desertification and loss of biodiversity play an important role in the reduction or even endangerment of natural resources at the global level. The most important contribution of the Rio Conference in terms of nature protection is the opening of the "International Convention on Biological Diversity", which Turkey also signed in 1996.

Also during this period, the Caracas Declaration was published and the 5th World National Parks Conference was held. Some international studies such as the European Environment Agency, Natura 2000 and Corine Network were also carried out during this period. In addition, the "Global Environment Fund" was established in order to support

developing countries in conservation. Also, in this period, other than the bilateral agreements of many countries, activities such as "Convention to Combat Desertification (1994)" and "Biosphere Reserves Sevilla Strategies (1995)" are important steps taken towards the protection of nature (Yücel and Babuş, 2005). With the European Landscape Convention, which was opened for signature in 2000 and entered into force in our country in 2003, a common language was created on the definition, protection, planning and management of landscape. The European Landscape Convention is a very important contract in this respect.

As of June 2020, 245.210 terrestrial areas with a total surface area of 20.323.301 km<sup>2</sup> are under protection in 244 countries and regions around the world. These areas correspond to 13.2% of the entire land surface. These include all protected areas identified at the national level, protected areas covered by regional agreements (eg Natura 2000 network) and regional and international conventions or agreements (eg World Natural Heritage Sites, Biosphere Reserves) (WWF, 2021).

In terms of marine protected areas, there has been a rapid increase in both number and area, especially in the last two decades. While the total area covered by marine protected areas was approximately 2 million km<sup>2</sup> (0.7% of the oceans) in 2000, this number has reached 26.947.375 km<sup>2</sup> (7.44%) by 2020. There has been a more than 10-fold increase in the last 20 years (WWF, 2021).

## **2. THE DEVELOPMENT OF PROTECTION IN TURKEY**

Turkey is located in a very special geography where cultural and natural assets are concentrated under ground, above ground and underwater. Anatolia is a special area where various civilizations lived together and throughout history for centuries. In our country, where various civilizations were born and developed, there are cultural assets of all types and qualities starting from prehistoric times, and there are also very rich natural assets as well as settlements formed by the coexistence of these assets. Sometimes rare geographical, topographic, geological or geomorphological formations, sometimes the existence of a very special flora or an environment where a special living species lives, and sometimes the beauties arising from the combination of human-made physical environment and natural qualities appear as natural assets (Asatekin, 2004).

### ***2.1. Protection of Cultural Heritage***

Turkey is a rich country in terms of old buildings and monuments with historical value. For this reason, although its value was realized late, provisions for the protection of these values have been included in our laws (Keleş, 2006).

As in the world, the first protection approach in our country is seen as the collection and protection of old movable artifacts. However, this approach developed in the style of "museology", different from the approach in the world for a certain period. The collected movable assets were preserved only within the buildings without being exhibited or

promoted, that is, they were only taken out of inventory with the logic of "ancient artifacts" and closed in warehouses.

1846 is accepted as the starting date of the protection of antiquities in Turkey, when Tophane-i Amire Marshal Ahmet Fethi Pasha collected the antiquities in the Church of St Irene (Görünür, 1994). The first protection efforts were directed towards movable works rather than immovable works. In 1869, Asar-ı Atika Nizamnamesi (Ancient Works Regulation) came into force for the first time. Later, this regulation changed, and in 1906, thanks to Osman Hamdi Bey, it became a modern regulation reflecting the views of its age (Bakır and Kalfaoğlu, 2005). It can be said that the Third and Fourth Asar-ı Atika Regulations, issued by the Ottoman Empire at the end of the 19th century and at the very beginning of the 20th century, were one of the most contemporary and most comprehensive protection laws of the period. The Fourth Asar-ı Atika Regulation, which was enacted in 1906, was used until the Law on Antiquities was enacted in 1973 (Şahin, 2004). But besides this, other laws were also created.

Mustafa Kemal Atatürk, who opened the Grand National Assembly in Ankara at the beginning of the years of the National Struggle, ordered the establishment of a Turkish Artifacts Directorate under the Ministry of National Education in the first government that started work on 9 May 1920. After this development, Atatürk, who enabled many museums to be opened, issued a decree in 1929 for the creation of the Topkapı Palace Museum and the exhibition of important documents and artifacts unearthed there. After the Republic, Atatürk continued to

be interested not only in Istanbul museums, but also in museums with old city ruins and ruins in Anatolia (Önder, 1989). After the awareness of the protection of architectural works through zoning plans became widespread, the idea of a respectful approach to historical and natural values gained importance in urban planning principles, and Ankara Castle was included in the scope of protection as a protocol area for the first time in 1937 (Görünür, 1994).

After the 1950s, as a result of rapid urbanization, ancient artifacts were destroyed, and especially in Istanbul, practices contrary to both historical artifacts and urban texture were made. For this reason, the High Council of Real Estate Antiquities and Monuments was established on July 2, 1951 in order to solve the problems of zoning and antiquities that may arise during the zoning works and to supervise their preservation. This Council is authorized to act as an expert in determining the qualifications of ancient works and monuments. The decisions taken by the Council on the works to be protected and the ways and methods of their protection have been final and binding. Later, regarding the old works, the laws numbered 7463 (1960), 1710 (1973) and 1741 (1973) followed this (Keleş, 2006).

Defining and classifying natural and especially cultural values within a field integrity and taking protection measures accordingly entered the Turkish legislation for the first time in 1973 with the "Antiquities Law" numbered 1710 (Doğanay, 2006). The concept of heritage site was given its contemporary definition and the concepts of monument,

complex, ruins, natural heritage sites and archaeological heritage sites were included in the scope of the law (Türk, 1995).

The provision of the "Zoning Law" numbered 6785, which entered into force in 1956, on "determining the distances of the buildings to be built to ancient monuments and archaeological sites by the regulations to be prepared" is considered to be the first regulation that brings the planning/protection relationship to the agenda (Madran, 2005).

Article 50 of the 1961 Constitution (Article 63 of the 1982 Constitution) states that "The state ensures the protection of historical, cultural and natural assets and values, and takes supportive and encouraging measures for this purpose". With this statement, he gave the state the duty to protect ancient artifacts and monuments with historical and cultural value. This assignment is an important step in the understanding of protection in the country (Kara et al., 2008).

In order to eliminate the deficiencies in the Antiquities Law, the "Law on the Protection of Cultural and Natural Assets" was enacted on 21 July 1983, numbered 2863. The most important purpose of this law is to protect the assets not only individually but also on an areal scale. The law numbered 2863 aims to define the movable and immovable cultural and natural assets that need to be protected, to regulate transactions and activities, and to establish the organization that will take the principles and implementation decisions regarding them (Keleş, 2006). The deficiencies observed in the law are still being tried to be corrected with various amendments and additions. These corrections and additions are available in the laws numbered 3386, which was enacted in 1987, and

5226, which was enacted in 2004. Another law enacted in this context is the Law No. 5226 dated 27.07.2004 on the Amendment of the Law on the Protection of Cultural and Natural Assets and Various Laws. The following concepts regarding cultural and natural assets are included in these legal documents.

**Cultural assets** are all movable and immovable properties above ground, underground or underwater related to science, culture, religion and fine arts belonging to prehistoric and historical periods.

**Natural assets** are values above ground, underground or underwater that belong to geological periods, prehistoric and historical periods and need to be protected in terms of their rarity or their characteristics and beauties.

**The heritage site** is the product of various civilizations from prehistory to the present day, and it is the city and city ruins that reflect the social, economic, architectural and similar characteristics of the periods they lived in, places that have been the subject of social life or important historical events, and areas that need to be protected with their determined natural features.

**Urban heritage sites** are areas where cultural and natural environmental elements (structures, 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.

**Archaeological heritage 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.

**Historical heritage sites** are areas where important historical events took place in terms of our national history and history of military warfare, and which should be protected together with their natural structure.

**Natural heritage sites** are rare areas that need to be protected and immovable natural assets with interesting features and beauties.

In addition to this historical process that took place in the national sense, it has also been a party to many agreements and conventions in the international arena. In 1933, the Athens Treaty, which aimed to preserve the historical and architectural values of the cities, was accepted. In 1954, the UNESCO Convention for the Protection of Cultural Property in Cases of Armed Intervention was ratified. In 1964, the Venice Charter for the protection of historical-architectural rural and urban sites was adopted. Turkey was accepted as a member of ICOMOS, which was established in 1965. Between 1970-1975, studies were carried out within the scope of the European Year of Architectural Heritage. Participation in UNESCO's work on the protection of assets and areas in Istanbul in 1980 and participation in the campaign for the protection of Istanbul and Goreme, which was also initiated by UNESCO in 1983, are important activities carried out by Turkey in the

international arena. Apart from this, the "Convention on the Protection of the World Cultural and Natural Heritage", which was ratified by UNESCO in 1972, was accepted by Turkey in 1982 and entered into force in 1983 after being published in the Resmi Gazete. Within the scope of this contract, as of 2022, a total of 19 of our heritage sites, 17 of which are cultural and 2 of which are mixed (natural and cultural), are protected under the leadership of UNESCO (Figure 3). Apart from this list, there are also candidate areas and properties that are called as Tentative List and applied to be defined as natural or cultural heritage. Turkey's Tentative List has a total of 84 heritage sites, 77 cultural, 4 mixed and 3 natural, as the first one was presented in 1994 and was last updated in 2021 (UNESCO, 2021).



**Figure 3. Heritage List in Turkey (Anonymous, 2022)**

## *2.2. Protection of Natural Heritage*

In parallel with the developments in the world, many developments have occurred in our country regarding nature protection and natural heritage areas. It can be said that these developments started with various laws enacted during the Ottoman Empire. The "Land Code", which was issued by the Ottoman Empire in 1858 on land ownership, is one of the first laws on protection. After that, the "Forest Regulations" was issued in 1870 and thus the natural assets of the Ottoman lands covered with forests were taken under protection.

In today's sense, nature protection areas came to the fore in the 1940s. For the first time in our country, Prof. Dr. Selahattin İnal used the term "National Park" in his work titled "We and Our Forestry Against Nature Conservation" published in 1948. With the 4th and 25th articles of the Forest Law dated 31 August 1956 and numbered 6381, the term "National Park" entered into Turkish legislation and the "National Parks Branch" was established. The first protected area in our country is the "Yozgat amlığı National Park" declared in 1958 (Yücel, 2005).

After the announcement of the Yozgat amlığı National Park, there have been many developments in protection and national parks in our country. Many experts were brought from abroad on this subject and researches were carried out. At this stage, areas that could be national parks were determined and taken under protection. According to Yücel (2005), "National Park Long Term Development Plans" were prepared with Turkish and American experts for some protected areas in the early 1970s.

Since the announcement of the first national parks, the understanding of national parks has changed and renewed itself in accordance with the conditions of the day. The "National Parks Law" enacted in 1983 was created according to this changing understanding. Today, there are 45 national park areas in Turkey and researches are carried out for new areas. In addition to these areas, different national and international protection statuses have been established for areas that need to be protected but do not meet the national park criteria. As of 2022, 45 National Parks (895.955 hectares), 250 Nature Parks (105.611 hectares), 115 Nature Monuments (9.244 hectares), 31 Nature Protection Areas (46.521 hectares) have been declared in Turkey (WWF, 2021). The management of protected areas was carried out by the Ministry of Forestry within the framework of the National Parks Law until 2003. The "National Parks Branch", which was established in 1956, was transformed into the "General Directorate of National Parks and Hunting" in 1976 and the "National Parks Department" in 1982. Protected areas by the Law on the Organization and Duties of the Ministry of Environment and Forestry, dated 1.5.2003 and numbered 4856, uniting the Ministries of Environment and Forestry, have been connected to the "General Directorate of Nature Conservation and National Parks" (Yücel, 2005).

Until 2003, the "Special Environmental Protection Agency" under the "Ministry of Environment" was responsible for the "Special Environmental Protection Areas", the first of which was taken under protection on 12.06.1988. In accordance with the 31st article of the law on the establishment of the "Ministry of Environment and Forestry" on

1.5.2003, the Presidency of the Special Environmental Protection Agency was protected as an "affiliate of the ministry" (Yücel, 2005).

The issue of biodiversity, which has been carried to the international arena with its importance in recent years, is one of the issues that our country emphasizes. According to Atik et al (2005), Turkey has a great potential in terms of biodiversity with more than 9000 flora and more than 80000 fauna species. On the other hand, the fact that one-third of the gene center and flora of many plant species in our country is endemic reveals the necessity and importance of protecting biological diversity. For this reason, Turkey has become a party to international agreements such as Ramsar, Bern, CITES Conventions, as well as various legal regulations such as the National Parks Law, Land Hunting Law, Wetlands Protection Regulation for the protection of biological diversity. In this respect, Turkey's natural and cultural heritage conservation efforts continue both nationally and internationally.

In Turkey, which is one of the richest countries in the Mediterranean belt in terms of species and habitat diversity and known for its high endemism, the total net size of protected areas is 67.773 km<sup>2</sup> as of 2020, according to official data. The ratio of this number to the country's surface area is 8.69%. Two-thirds of the protected areas in our country are Special Environmental Protection Areas (38%) and Natural Sites (26%), currently managed by the Ministry of Environment, Urbanization and Climate Change. These are followed by Wildlife Development Areas (17%) and National Parks (13%) and Wetlands of National Importance (12%) under the authority of the General

Directorate of Nature Conservation and National Parks under the Ministry of Agriculture and Forestry. The fact that their total exceeds 100% (106%) is due to the fact that some areas have more than one status (WWF, 2021).

### **3. CONCLUSION**

A wide variety of applications have been made in the world for the protection of natural and cultural heritage for a long time. Many countries treat the issue as a state policy. Countries show the necessary sensitivity by working at the national and international level to protect the values they have. Turkey is among these countries. Our country, which is a party to almost all international agreements on the protection of natural and cultural assets, also attaches importance to the issue in the national sense.

Professions that have the mission of designing/organizing spaces are among the occupational disciplines that should pay particular attention to the subject of area or object protection. In areas to be designed, planned or managed, special attention should be paid to the assets to be protected or the whole/part of the area, and this issue should be carefully considered. It should never be forgotten that in case of deterioration of the values that need to be protected, irreversible situations will be encountered. For this reason, architects, landscape architects, city planners or other specialists related to these professions should focus on the subject sensitively, and pay special attention to area / object protection in addition to the use of space in their planning and design studies.

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**CHAPTER 5**

**AN INVESTIGATION OF BIOPHILIC DESIGN  
FEATURES IN ANATOLIAN TRADITIONAL RURAL  
SETTLEMENTS**

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## 1. INTRODUCTION

Since their existence, people have been living a life intertwined with nature. However, today, artificialization has increased and natural environments have been replaced by artificial environments. This situation brought with it both physical and mental problems. In order to reduce these emerging problems, designs that strengthen human-nature interaction have been started to be developed. One of them is biophilic design. (Akyıldız and Olğun; 2021; Aykal and Erbaş Özil, 2021).

Biophilic design represents an understanding that proposes solutions for applications closely related to nature at different spatial scales (Öztürk, 2021). The concept of biophilia, which is a combination of the words 'bio (live)' and 'philia (dwell)', was first used by psychologist Erich Fromm in 1964. This concept, which describes the positive emotions that people feel towards certain creatures, entities or actions in their natural environment, has attracted the attention of many disciplines over time and has become a field of study. (Fromm, 1964; Aykal and Erbaş Özil, 2021). Biophilia, which has become an important issue for architecture, has been increasingly detailed in recent years through biophilic design research (Akyıldız and Olğun, 2021).

Many tangible and intangible qualities in today's architecture have emerged by being influenced by the architectural understanding of the past (Akyıldız and Olğun, 2020). In this context, it can be stated that settlements consisting of traditional buildings contain many data for the designs of the future. Anatolian geography in Turkey has a rich traditional settlement stock in this respect (Olğun, 2021). It can be

stated that these settlements, which stand out with the use of original and natural materials, construction system, space layout and details, are also worth examining in terms of biophilic design, which is frequently on the agenda today.

The aim of the study is to contribute to the inspiration of the biophilic design, which has become effective in almost all areas of the architectural discipline today, to the architectural approaches of the future and to emphasize the necessity of conserving traditional rural settlements in this context. Within this scope, many studies on biophilic design were examined by scanning the relevant literature. With the data obtained, the traditional rural settlements in the Anatolian geography, where the elements compatible with nature are densely located, were examined in detail in the context of biophilic design. In Anatolian traditional rural settlements, which stand out with their unique qualities and have a deep-rooted history, the existence of most of the biophilic design criteria has been determined and expressed within the scope of the study. In this way, it is thought that the Anatolian architectural heritage can provide useful references for new biophilic designs, as in many areas, and its importance in terms of conservation can be understood.

## **2. BIOPHILIC DESIGN AND TRADITIONAL RURAL SETTLEMENTS OF ANATOLIA**

Biophilic design is an approach based on the understanding of health and well-being, focusing on the positive effects that an improved human-nature relationship will bring to both the building users and the

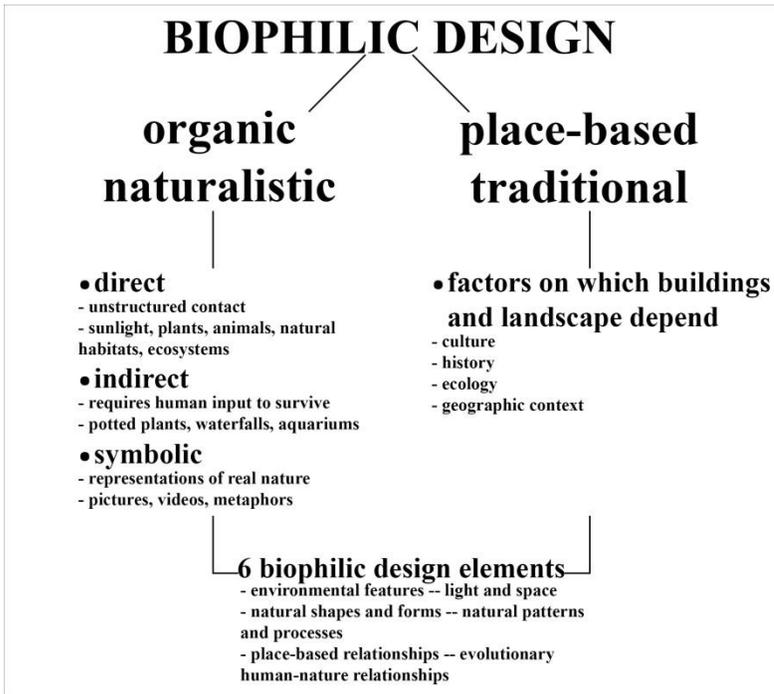
natural environment (Wijesooriya and Brambilla, 2021). Rural settlement areas where the human-nature relationship stands out can be considered as reflections of biophilic design in this sense. Considering the rapid change in rural areas today, the fact that traditional rural settlements are conserved and maintain many of their original characteristics makes it meaningful to examine them in terms of biophilic design (Eyüpgiller and Eres, 2016). From this point of view, the general characteristics of biophilic design and the Anatolian geography, where traditional rural settlements are concentrated, constitute the conceptual framework of the study.

### ***2.1 Biophilic Design Concept and the Process of Reaching Today***

Architecture, since the act of producing buildings, aims to meet the needs and reach the aesthetic and perfection. In this process, architects have used all kinds of forms, shapes, proportions and materials related to nature as a medium or tool in their designs for centuries. In this context, it can be stated that the oldest examples found are the ornaments designed with inspiration from palm trees and lotus plants on the column capitals of the structures found in Ancient Egypt. In the following process, it is possible to see that many civilizations have similarly produced designs inspired by nature (Genç et al., 2018). From this point of view, architecture's close relationship with nature contains many sources of inspiration for architects today, as in the past (Ramzy, 2015).

Biophilic design, which emerged with the reflection of the human-nature relationship in architecture, has a very old history and is increasing in importance today, is an action related to presenting a good living space as a biological entity in the built environment for individuals and societies (Kaya and Arslan Selçuk, 2018). In this sense, it can be defined as *“an approach that aims to improve people's physical and mental health and well-being by re-establishing the relationship between human and nature in the modern urban area”* (Kellert and Calabrese, 2015).

The first use of biophilic design as a term was seen in 2008 (Şenozan, 2018). The term used by the authors from different disciplines making this use, together with the articles collected from a symposium held two years before the specified date; it has been expressed as an approach in the sense of designing the built environment by considering the benefits of nature and by reflecting the natural interest that is inherent in humanity (Kellert, Heerwagen and Mador, 2008). At this point, it is stated that there are two basic dimensions of biophilic design. These are the organic/naturalistic dimension and the place-based/traditional dimension (Figure 1). In the following process, studies on biophilic design have been developed through research called "Economics of Biophilia" and "14 Forms of Biophilic Design" (Browning et al., 2014). According to these studies, biophilic design is shaped on three basic concepts: *"nature in space, similarities with nature, and the nature of space"* (Şenozan, 2018).



**Figure 1. Basic Dimensions and Elements of Biophilic Design (Blair, 2012)**

The 14 patterns determined for biophilic design have provided a systematic expression of this understanding in many details. These can be listed as follows:

- "1. Visual Connection with Nature: A view for the elements of nature, living systems, and natural processes.*
- 2. Non-Visual Connection with Nature: Auditory, haptic, olfactory or sweet stimuli that bring a deliberate and positive reference to nature, living systems or natural processes.*
- 3. Non-Rhythmic Sensory Stimuli: Stochastic and ephemeral connections to nature can be statistically analyzed, but not fully predicted.*

4. *Thermal and Airflow Variability: Minor changes in air temperature, relative humidity, airflow through the skin, and surface temperatures that mimic natural environments.*
5. *Presence of Water: A condition that enhances the experience of a place by seeing, hearing, or touching water.*
6. *Dynamic and Diffuse Light: Increasing the intensities of light and shadow that change over time to create the conditions that occur in nature.*
7. *Connection with Natural Systems: Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.*
8. *Biomorphic Forms and Patterns: Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.*
9. *Material Connection with Nature: Materials and elements in nature that create a distinctive sense of place, reflecting local ecology or geology, through minimal processing.*
10. *Complexity and Order: Rich sensory information that conforms to a spatial hierarchy similar to those encountered in nature.*
11. *Prospect: An unobstructed view over a distance for surveillance and planning.*
12. *Refuge: A place where the individual is protected from the environment and the weather, used to withdraw from the environmental conditions or main stream of activity.*

13. *Mystery: The promise of more information, partly through obscure landscapes or other sensory devices that encourage the individual to travel even deeper into the environment.*

14. *Risk/Peril: An identifiable threat with reliable protection.*” (Figure 2) (Browning et al., 2014; Şenozan, 2018).

Context	14 patterns
NATURE IN THE SPACE	1 Visual Connection with Nature
	2 Non-Visual Connection with nature
	3 Non-Rhythmic Sensory Stimuli
	4 Thermal and Airflow Variability
	5 Presence of Water
	6 Dynamic and Diffuse Light
	7 Connection with Natural Systems
NATURAL ANALOGUES	8 Biomorphic Forms and Patterns
	9 Material Connection with Nature
	10 Complexity and Order
NATURE OF THE SPACE	11 Prospect
	12 Refuge
	13 Mystery
	14 Risk / Peril

**Figure 2. 14 Patterns of Biophilic Design (from Browning et al., 2014 as cited by Downton et al., 2017)**

When the basic dimensions, elements and patterns of biophilic design are considered in general, it is better understood that the history of this approach is quite old. In this context, it can be stated that there are traces of biophilic design in Anatolia, which stands out with its deep-rooted heritage, as in many other geographies.

## ***2.2 Characteristics of Anatolian Traditional Rural Settlements***

Rural settlements are quite comprehensive units that contain many different features. When the definitions of rural settlements are examined in the relevant literature, it is seen that they are generally discussed over the concept of village. But not only villages; areas such as towns and burgs, which have similar characteristics with the village, can also be considered as rural settlements (Olğun, 2021). In this context, some sources include rural settlements; it defines it as places where the work type is mostly based on agriculture, people have close relations with natural resources, generally live in the form of a small community, have a sparse and homogeneous population structure and have low social mobility (Kuper and Kuper, 2016). In some sources, it is expressed as a human union that is located in a separate geographical area and ecological point, has a unique production style, social organization, historical cultural structure, and generally has a low population (Geray, 1968). When all these definitions are considered in general, it can be stated that rural settlements have the following characteristics:

- Mainly expressed as a village, but also including areas with village-like characteristics,
- Known for their unique and mostly agricultural livelihoods,
- Having a unique social culture,
- Displaying a versatile settlement feature with common areas and production areas,

- Having less population than urban areas (Olğun, 2021).

Today, evaluations that the settlements are copies of each other and become standardized by moving away from their original identities are becoming more common (Şenol and Er Akan, 2011). In this sense, traditional settlements continue to conserve their identities to a large extent with their unique characteristics against the said monotony. From this point of view, traditional rural settlements stand out with the following characteristics along with the features of rural settlements listed above:

- Having a local context and a local/cultural identity,
- A firm bond with the past,
- Consisting of structures produced with natural materials and site-specific construction techniques,
- Consisting of indoor and outdoor spaces arising from local needs and traditions (Eyüce, 2005; Çekül, 2012).

Traditional rural settlements can be found in Turkey as well as in many parts of the world. Anatolian geography, where these areas are seen intensely, contains a rich architectural heritage with its deep-rooted history and strategic location. While some of the traditional rural settlements in Anatolia have survived to the present day, largely conserved; some have lost many of their original qualities. In this context, areas such as Bursa/Cumalıkızık, İzmir/Şirince, Karabük/Yörük, Konya/Sille village can be shown as examples of traditional rural settlements that have been largely conserved in

Anatolia (Çetin, 2010; Köşklük Kaya, 2012; Dönmez et al., 2015). ; Üzümcü et al., 2017). On the other hand, examples such as İzmir/Lübbey and Şanlıurfa/Savaşan villages can be expressed as Anatolian traditional rural settlements that were abandoned for various reasons but where various studies were carried out in the context of conservation (Güler, 2016; Akyüz Levi and Baz, 2017).

### ***2.3 Detection of Biophilic Design Traces in Anatolian Traditional Rural Settlements***

Anatolia can be described as a deep-rooted geography that has hosted many civilizations, with the influence of its strategic location and rich resources. Many settlements have been established in this region, where different civilizations have lived throughout history. Anatolia, which stands out in terms of animal diversity and where arable land is dense, has also included many rural areas with the effect of these features. While some of them can reach a great extent from the past to the present; some have been lost.

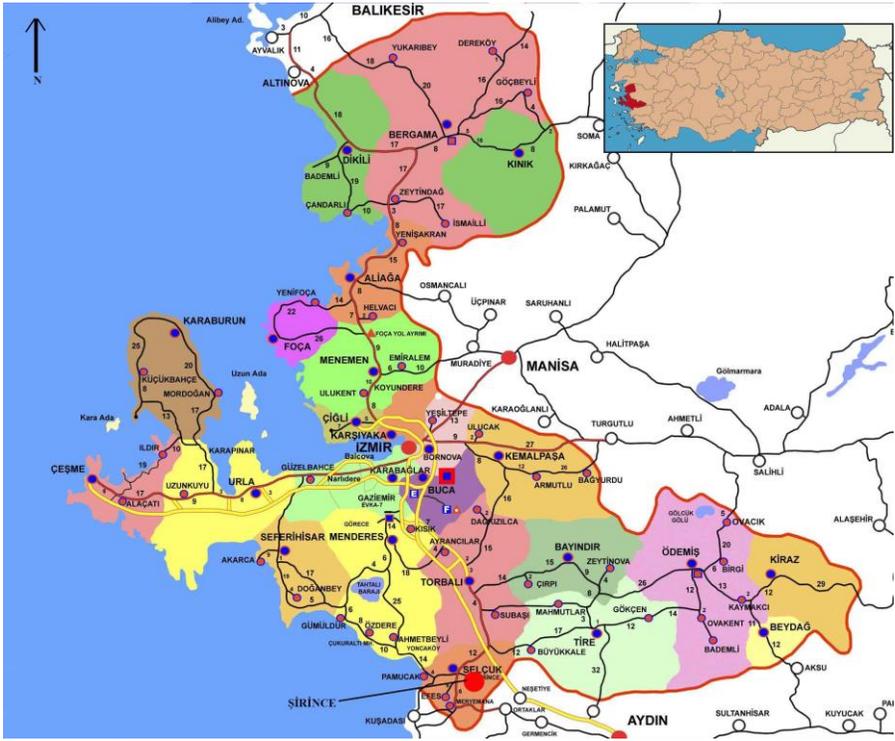
Rural settlements can be defined as units that are known for their unique and mostly agricultural activities, represent a unique culture, have a rich settlement with common areas and production areas, and have less population compared to urban areas (Olğun, 2021). According to this expression, it is possible to come across rural settlements that have their own characteristics and stand out with their traditional structures in almost every part of Anatolia.

Anatolian traditional rural settlements are unique units formed by the combination of many parameters. These parameters can be listed as follows:

- Geographical characteristics and climatic data,
- Traditions and customs, cultural factors,
- Production and consumption patterns,
- The construction of the buildings by hand by people trained with the master-apprentice relationship,
- Considering the harmony between the natural and built environment,
- Enlargement and development of buildings in line with the needs, having sustainable qualities,
- Formation of building sizes and forms according to economic data (Kısa Ovalı and Delibaş, 2016; Muşkara, 2017).

- **Traces of Biophilic Design in Şirince**

The history of Şirince, a mountain village located at an altitude of 400 m, 8 km from the district center and connected to the Selçuk district of İzmir, dates back to A.D. 5th century. The settlement, formerly known as Kırkince-Çirkince, can be described as a unique hillside settlement with its mountainous and defensive geography, arable lands at the bottom of the valley, and its wet and airy nature (Akyüz, 1995; Köşklük Kaya, 2012) (Figure 3).



**Figure 3. Location of Şirince (URL 1, URL 2)**

The characteristics of the architectural elements that make up the unique settlement texture of Şirince; harmony with the topography and minimal intervention to nature can be listed as organic streets and small squares and fragmented construction concepts (Kara Pilehvarian, 1993; Akyüz, 1995; Üstüngel et al., 2002; Düşüt, 2003; Gündüz et al., 2004; Köşklük Kaya, 2012). In this context, it is possible to state that most of the 14 forms that define biophilic design can be seen in Şirince's traditional texture as follows:

- When Şirince settlement is considered in terms of visual connection with nature, it is striking that the buildings and streets are positioned in harmony with the topography. However, the features such as the fact

that the buildings are usually located in small gardens and that their facades oriented towards the slope are designed with open front and plenty of windows make Şirince stand out in terms of visual connection with nature.

- Local production forms and natural foods in terms of non-visual connection with nature; applications such as olive growing, viticulture and winemaking can be considered as important references.

- Thermal and airflow variability in Şirince, especially as a result of geographical conditions; it can emerge with the effect of natural environments and green area density on both the slope and the valley.

- The settlement established on the east and west sides of the Şirince stream bed has biophilic design characteristics in terms of the presence of water. In addition, there are various water sources in the gardens and within the settlement pattern.

- Dynamic and diffused light is a feature that plays a role in the design of the buildings in Şirince. While the facades oriented towards the slope are mostly full, the fact that the facades opening in the valley direction have more and large windows can be considered as a design concept that stands out in terms of the dynamic use of light.

- The connection with natural systems in Şirince can be associated with the production of natural products. The effects of seasonal and temporal changes in the ecosystem can be seen directly in the production of products such as olives and grapes.

- Material connection with nature reflects biophilic design as one of the most important features of Şirince architectural heritage. Traditional buildings, in which wood and stone materials are used extensively, were built with local construction techniques. This has made it easier for building materials to connect with nature at the maximum level.
- Şirince settlement texture and interior arrangements of traditional buildings contain an order within themselves. However, these elements, which have an organic planning, also show a complex feature. These attributes, including natural data are important data where biophilic design can be seen.
- Traditional buildings in Şirince, which are in harmony with nature, are also shelters that provide protection from the harmful factors of nature. Architectural heritage, which allows to stay away from environmental conditions, also includes biophilic design with this aspect. (Figure 4).



**Figure 4. General Views of Şirince and Connection with Biophilic Design  
(Original, 2018)**



Built with traditional texture, natural materials and construction techniques in Bahri; it also consists of structures arranged in harmony with the topographic characteristics and climatic data of the settlement. All these qualities make it possible to consider Bahri in the context of biophilic design. In this context, the traces of the 14 characteristics that define the biophilic design in the Bahri settlement can be expressed as follows:

- Visual connection with nature is one of the prominent features of Bahri settlement. It is possible to state that there is a direct visual connection with nature in the settlement, with its unique topography, elevations and also the natural materials used in the buildings.
- The non-visual connection with nature in Bahri is made not only with natural production methods, but also with local food and beverage productions. Apricot, which is grown intensively in the region, provides local flavors and in this context, it mediates the establishment of an unvisual connection with nature. However, molasses produced with small amounts of grapes can also be considered as a part of the biophilic design.
- Non-rhythmic sensory stimulation can be considered as unpredictable short-term interactions with nature. In this respect, especially the relationship of Bahri settlement with the Euphrates; the drought experienced in the river in recent years and the overflows that occur from time to time due to the decrease in water are the traces of the biophilic design.

- Thermal and air flow variability can be evaluated through the climate zone in which Bahri is located, as well as the organic street texture of the settlement and the open-closed space relations in the buildings. In this sense, the positioning of buildings on a singular scale in Bahri facilitates the air flow in the living spaces. In addition, the natural materials used in the buildings provide surface temperatures that imitate natural environments both indoors and outdoors.
- The Euphrates river and Kapıkaya Turgut Özal dam lake are important water assets close to the Bahri settlement. In this sense, it can be said that the biophilic design stands out in Bahri in terms of the existence of water.
- Dynamic and diffused light in Bahri, both in open areas due to the organic location of the settlement; it can be evaluated as the traces that can be seen in the window spaces created with the unique architecture of the buildings produced with natural materials and construction systems.
- Apricot production is an important product that enables seasonal processes to be experienced clearly in Bahri, as in the rest of Malatya. The fact that the apricot trees, which are started to be taken care of in the spring, bear fruit in the summer months and that these collected fruits are mostly dried until the early autumn and preserved in the winter months can be expressed as an important tool for the local people to be aware of the natural processes.
- In Bahri, the use of adobe material in building production brings with it the natural texture unique to this material. The reflection of the unique

texture of the soil on the structures can be stated as an important indicator in terms of biomorphic forms and patterns in biophilic design.

- In terms of material connection with nature, the intensive use of soil in buildings in Bahri constitutes an important part of the biophilic design. Adobe material consisting of a mixture of soil, straw and water; with minimal processing, it creates qualities that reflect the local ecology and geology, creating a unique sense of place.

- While Bahri countryside has a complex or organic layout as a built area; When we look at the whole rural area, the presence of the built area and the surrounding agricultural areas/natural and unused areas also represent a certain order at the upper scale.

- The adobe structures in Bahri can also be expressed as natural shelters. These structures, which are built with natural materials and the most easily accessible construction techniques, can also be considered as units that protect the individual from the environment and attract them to a different place from the routine flow of life. (Figure 6).

When the traces of the 14 characteristics of biophilic design in Şirince and Bahri settlements located in the eastern and western areas of Anatolia are examined, it is seen that these criteria are largely met in both settlements. Despite having different social, cultural, economic and structural values, the fact that both settlements can provide rich data in the context of biophilic design is important in terms of recognizing and conserving the richness of the Anatolian countryside in this context.



**Figure 6. General Views of Bahri and Connection with Biophilic Design  
(Original, 2017)**

### **3. CONCLUSION**

Although biophilic design includes a number of approaches that have been frequently discussed and developed in recent years; it expresses a deep-rooted understanding that dates back to ancient times and has been used in many traditional settlements. In this context, the Anatolian countryside, where traditional settlements are concentrated, also

contains rich and inspiring qualities in terms of biophilic design qualities.

It has been observed that these characteristics are largely present in Şirince and Bahri, which are traditional rural settlement examples in different parts of Anatolia, which were examined in the context of 14 characteristics of biophilic design. In this sense, when both settlements are viewed in terms of the 6 elements of biophilic design, it is possible to mention the following data:

- From the environmental data point of view, it is seen that the traditional Anatolian rural settlements examined have a direct relationship with the natural environment they live in; it can be stated that life continues within the framework of this relationship.
- When we look at the settlements examined in terms of light and space, it is possible to state that this element is also represented by open, semi-open and closed space arrangements and structural spaces, which are completely tailored to human needs.
- Natural shapes and forms appear as a part of the built environment design in Şirince and Bahri, as in many traditional Anatolian rural settlements.
- Natural patterns and processes are an important aspect of biophilic design. When we look at all the qualities examined in Şirince and Bahri in general, it is possible to talk about the existence of processes and cycles in harmony with nature at many points.

- When examined in terms of place-based/site-specific relationship, it is possible to state that both settlements discussed within the scope of the study are shaped according to the socio-cultural and natural data of the place they are in. Structurally, Şirince has designs predominantly made of stone and wood materials, while the heavy use of adobe in Bahri can be considered as one of the most important indicators of the ground-based relationship.

- The evolutionary human-nature relationship is one of the elements that can be revealed by considering the characteristics studied in Anatolian traditional rural settlements. In these areas, where people keep up with the development and evolution of nature, the human-nature relationship continues in a natural motion.

As a result, it is thought that the importance of all traditional settlements that can be associated with biophilic design, especially the traditional rural settlement patterns in Anatolia, is emphasized and attention is drawn to their protection.

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## CHAPTER 6

### A CLIMATE - SENSITIVE RESIDENTIAL LANDSCAPE DESIGN STUDIO

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## **INTRODUCTION**

Global climate change is steadily increasing its impact with the ongoing urbanization trend of the twenty-first century and poses numerous environmental threats in urban living spaces. Across the world, 80 percent of greenhouse gases, which are among the leading actors causing climate change, are emitted from urban areas. For this reason, cities are the places where intervention first needs to be developed in the struggle against global climate change, and are of great importance in terms of providing sustainable environments. Although managing the processes in urban areas is more complex, it is possible to reduce the potential risks in these areas and transform them towards positive situations (Komeil and Ravi, 2017).

On the other hand, areas where the urban fabric is dense causes difficulties in the context of combating climate change. During the last 40 years, the global surface temperature has gradually increased within each decade period (IPCC, 2021). Whilst the causes of climate change are human-induced, the appropriate management of these processes also depends on human activities. Deteriorations which are characterized as human-induced climate change, and which have increased their impact especially in the past 200 years, are nowadays manifested by problems such as heat waves, extreme precipitation regimes, and drought. The problem of climate change, which was brought to the agenda on a global scale with the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, has continued to be discussed worldwide with the Kyoto Protocol in 1997

and the Intergovernmental Panel on Climate Change (IPCC) in 2001 (UNFCCC, 1992; IPCC, 2001). As of 2009, Turkey has been included in the Kyoto Protocol (REC, 2015). Furthermore, in addition to global protocols, climate change is also tackled with many strategies generated on a local scale in urban areas.

In studies conducted in this context, one of the possible approaches is to develop nature-oriented solutions. The tendency to transform urban open spaces into green areas by designating them as a part of the existing open and green space system in the city is important for alleviating the negative effects of climate change and for creating sustainable urban areas that are resilient to climate change. By planning and designing natural green spaces in cities interactively within a network system, they act as a barrier against the negative effects of climate change. Furthermore, strategies developed to reduce the negative effects of climate change in urban areas include not only people who are the main actors of the city, but also all living things that inhabit all urban areas. In this context, factors such as the protection of water resources and the network of green spaces are also important in terms of developing spaces that are sensitive to climatic changes.

In order to discuss and investigate the negative effects caused by global climate change on cities and to examine the stance held by the discipline of landscape architecture in this regard, the aim was to have the students to design a “climate-sensitive” residential garden within the scope of the third semester project studio of the landscape architecture department. Accordingly, the Project III Studio focused on the concepts

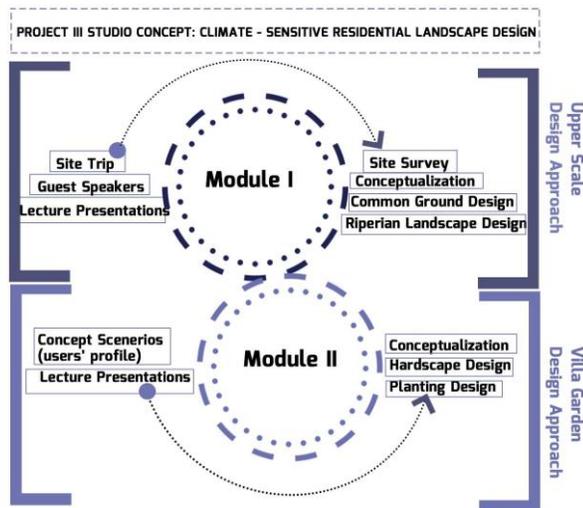
of “climate crisis”, “resilience”, “sustainability”, and “xeric landscape” on the basis of residential gardens by focusing on the residential scale of urban open spaces in cities exposed to the negative effects of global climate change and environmental problems. Based on these concepts, in the design studio, the outputs were determined as examining the context of the residential landscape itself and its relationship with its environment, redesigning the topography of the area in an integrated with the nature, proposing a landscape design for a privately used open space, developing the ability to design for different users, being able to design for common-used open spaces, and creating continuity between design scales in terms of design language and spatial context.

## **1. STUDIO SETUP**

The project process was basically structured in two stages. In the first stage, which continued until the middle of the semester, it was expected that a common area for the residences would be designed and that ecological and recreational solutions would be generated for the stream located near the study area. In the second stage of the project studio, specific user profiles were determined by the studio coordinator and distributed to the students. Within the interaction zone with the common residential area and the stream designed at the beginning of the semester, the aim from the second half of the semester onwards was for the scenario approaches developed for a small community to be considered on the residential garden scale, and for approaches to be generated accordingly. The study area determined within this scope was discussed in terms of the context established with the city at the

beginning of the studio process, and it was advanced with literature research and analyses aimed at examining the study area from different aspects. In the following stages, in addition to the landscape design that established a relationship between the common area, the riparian landscape and the space they surrounded, the residential landscape was also designed on the basis of the determined concept scenarios.

In the studio progression, the students were expected to be competent regarding not only the theoretical foundations and concept approach, but also the applicability and technical details of the project. Students in design studio education need to be able to think pragmatically as well as critically and creatively. This thinking approach enables students to conceptualize the constructability of their projects (Ibrahim and Utaberta, 2012).



**Figure 1. Conceptual Framework**

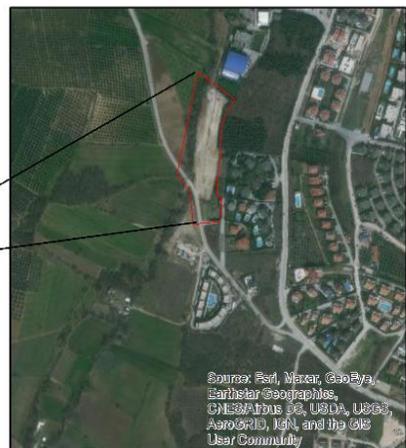


**Figure 2. Sensitive Housing and Landscape Studio Poster**

### ***1.1. Study Area***

The study area of the studio is ten villas, located in the Mürsel neighborhood of Mudanya district in Bursa. The location is on the axis of the Istanbul road, where urban growth is dense. The Mudanya is an area with temperate climate characteristics, while the average temperature is 16.4 °C and the average precipitation is 614 mm. A number of neighborhoods in Mudanya, especially the Balat and

Bademli Neighborhoods, are new residential areas (Mutlu and Varol, 2017). This process, which gained momentum with the first detached housing settlements with gardens built in Bademli village from the 1990s onwards, continues today in the form of gated estates and detached villas for the use of the middle-upper income group in and around the aforementioned neighborhoods (Tumer and Dostoglu, 2008).



**Figure 3. Study Area**

Mürsel Neighborhood, in which the study area is located, is a residential area that has undergone a process of transformation from village fabric to urban fabric. The study area, which includes the villas and their surroundings, is bordered by a dry stream bed and agricultural plots in the west, and by forest area in the east. The estate, which consists of 10 detached houses of the villa type, has an area of 12,193 m<sup>2</sup>. Mürsel Neighborhood is located 22 km from Bursa city center and 8 km from the Mudanya coastal band. Access to the area, which is integrated with Bursa's public transportation systems, is gained by light railway and bus.

The villas in the study area were planned to be situated on two levels of the existing sloping land with a retaining wall approximately 3 meters in height. A design approach that does not take the natural topography of the area into account, together with the intense use of reinforced concrete, increases the heat retention in the area. In the existing architectural project, the residential gardens were situated above the volume at the level revealed by the height of the retaining wall. On the reinforced concrete surface, the required soil depth for plant growth was not left. In this sense, the use of the spaces separated as landscape areas is quite limited.

Within the scope of the project studio, the students were expected to develop a sensitive and sustainable elevation solution that respects the natural structure of the land. To enable the students to find solutions to the problems in the existing situation, the residential garden borders were extended eastwards as far as the wooded area. Furthermore,

contrary to the manner of the retaining wall dividing the area, they were expected to make new arrangements by taking the existing topographical features into account.

### ***Stage 1: Creation of Upper Scale Approach***

As well as being the 3rd semester projects of second-year landscape architecture students, the aim of the Project III Studio was to create a base for developing an upper scale approach and comprehending the changing scale contexts in the projects. Accordingly, at the beginning of the studio process, the lecture presentations process setup was added in order to perceive the site as a whole with the city. Presentations were made with guest lecturers within the scope of “Historical Urban Development of Bursa” and “Housing Development in Bursa”. It was expected that technical trips and site analysis studies would be developed in coordination with the presentations. Site analyses were developed with climatic features, soil structure, existing vegetation, slope, socio-economic structure, permeability status of the area, and SWOT analysis. As a result of the analyses, the students were expected to design a common space for the residential area and to develop rehabilitation proposals and recreational solutions for the stream adjacent to the estate. Furthermore, in the context of topographical solutions, they were expected to develop new proposals for the problematic area that were appropriate for the sculpture of the land by way of terrain models. At this stage, the aim was to create climate-sensitive proposals that also met the recreational needs along the line of the stream by arranging the vehicle road and pavements adjacent to the

project area. At this stage, the students advanced their studies by receiving individual desk critiques and panel critiques on a weekly basis.

### ***Stage 2: Residential Landscape Design***

With the conducting of the jury in mid-semester, the process of designing the common use areas was completed, and the residential landscape design was begun. At this stage, it was expected that climate-sensitive choices would be made in the selection of construction materials and plants. Furthermore, factors to be considered within the scope of combating climate change, such as increasing energy efficiency in residential gardens, reducing carbon emissions, and storing rainwater, were distributed to the students in the form of concept scenarios. While the concept scenarios created by the studio coordinators emphasized the parameters that needed to be discussed for designing the residential garden in the context of global climate change, they also aimed to address the question “In what ways can a residential garden be designed for different user profiles?” to the students with design solutions (Table 1). Each of the 24 different concept scenarios shown in Table 1 was given to a student, and 10 villas located in the study area were distributed to the students by drawing lots.

**Table 1. Concept Scenarios Given to Students in Stage 2**

<b>Concept Scenarios</b>		
A healthy life enthusiast mother, a father, and 1 child	An elderly man and woman who grow tomatoes and cucumbers in their garden	A teacher living with 3 cats and 1 dog
A child living in a wheelchair and his family	A YouTube phenomenon who continually throws parties	An academician who does yoga in his garden every morning
A pilot and volleyball player couple	A white-collar worker who lives alone and minimally, but has frequent visitors.	A permaculture-loving mother and her two daughters
A pianist living alone	A man interested in Far Eastern philosophy	A mother and her two sons who are crazy about football
A barbecue enthusiast family with vegan girls	An abstract painting enthusiast woman and her brother	Two male housemates who are energy engineers
An elderly lady with Alzheimer's disease and her sculptor son	A landscape architect living alone	A doctor couple who are disturbed by noise
Three housemates, one of whom works from home.	A retired architect couple and their architect daughter	A couple with a hyperactive child
A researcher who conducts studies on seed production.	A grandmother who loves roses and her granddaughter	A woman who has adopted the philosophy of zero waste.

## 2. STUDIO FINAL OUTPUTS

As a result of the 14 week studio process, the students were expected to express how they deal with the “sensitive” residential landscape by starting from the upper scale approaches and going down to the detail scale. Accordingly, in addition to submission of the design posters and model, they were asked to explain the design setup with the project portfolio and project report. Different conceptual approaches can be seen in the studies that appeared. Some of the concept approaches

developed by the students are in the form of “biophilia”, “autarky”, “green awareness”, “new green deal”, “bio-village”, “return to nature”, and “eco-art”.



Figure 4. Concept Approach and Technical Drawing Sheets (Vesile Yiğit)

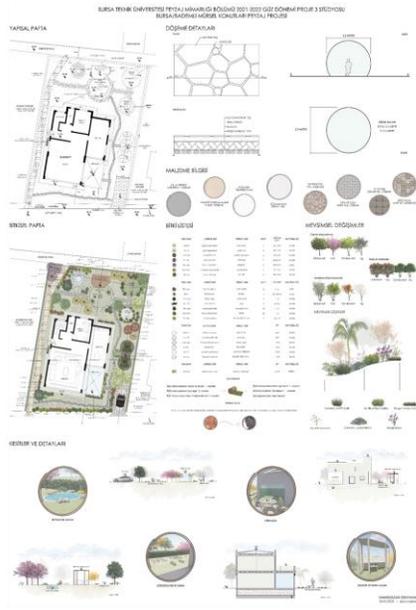
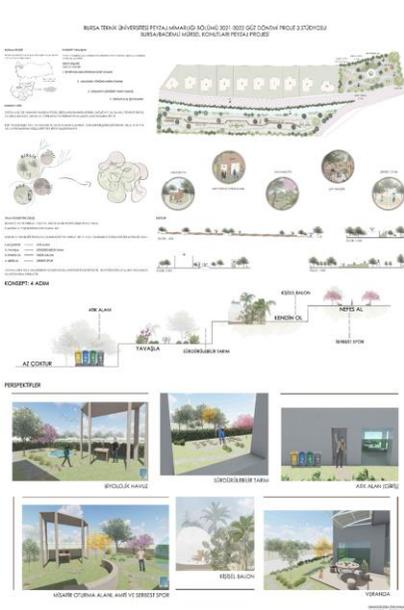


Figure 5. Concept Approach and Technical Drawing Sheets (Ümmügülüm Özkaymak)



Figure 6. Concept Approach and Technical Drawing Sheets (Selenay Yıldırım)

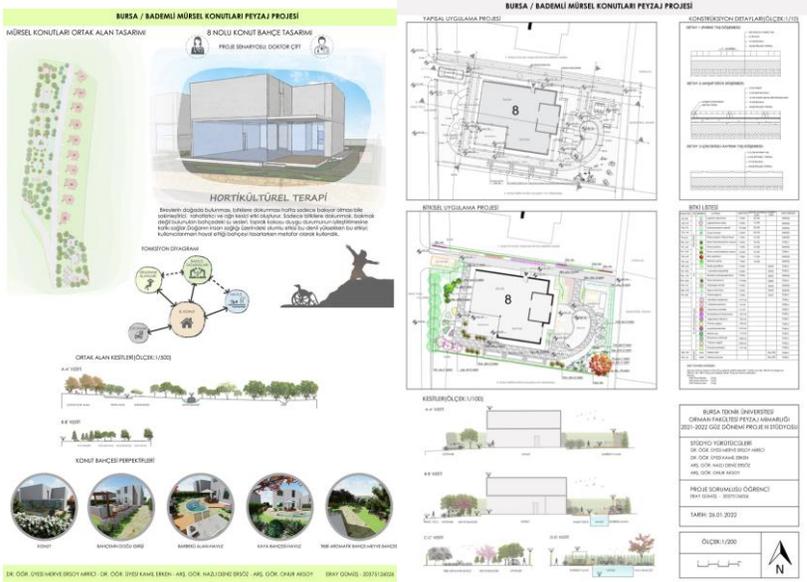


Figure 7. Concept Approach and Technical Drawing Sheets (Eray Gümüş)

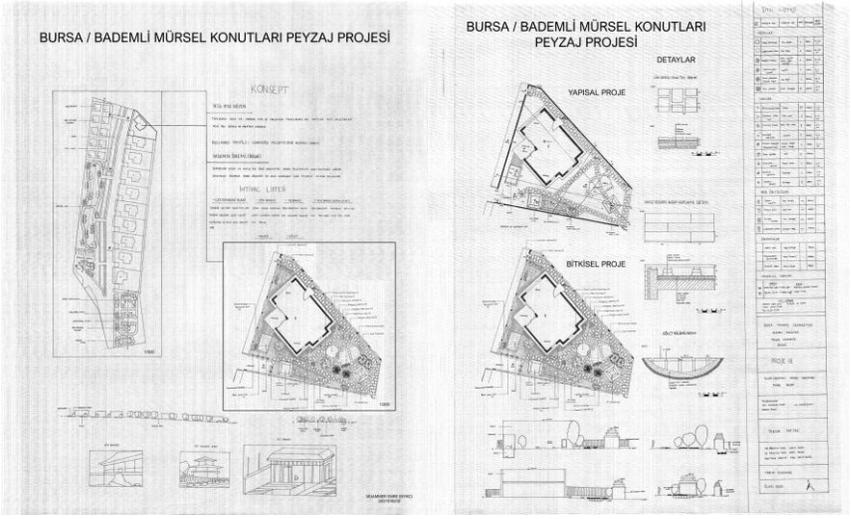
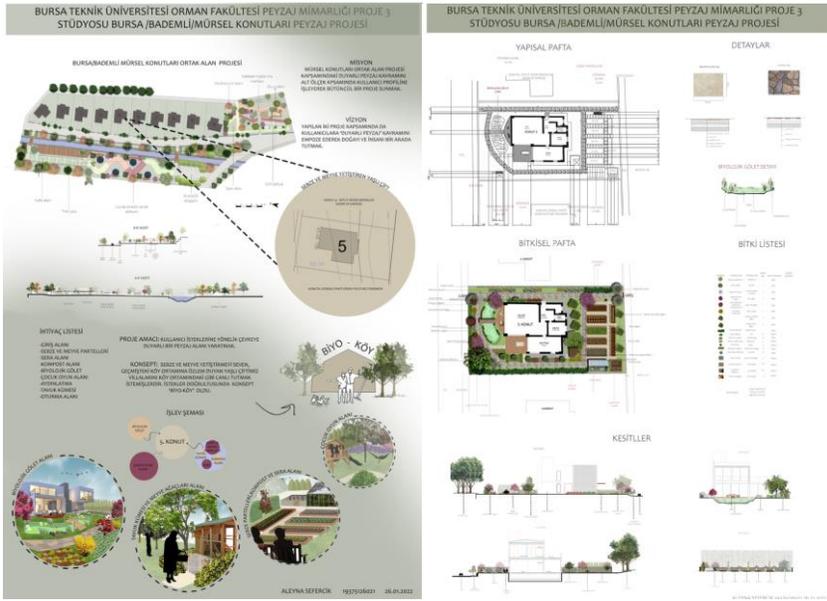


Figure 8. Concept Approach and Technical Drawing Sheets (Muammer Emre Bıyıcı)



**Figure 9. Concept Approach and Technical Drawing Sheets (Aleyna Sefercik)**

The approaches developed by the students generally include nature-oriented solutions to combat climate change. Moreover, by inserting the retaining wall in the existing area into the slope, topographic solutions close to the human scale and respectful to nature were developed. There were students who consider the issue of energy efficiency in their projects, and in this sense, PV garden lighting and water wheels producing electrical energy were included in the projects. In line with the critiques aimed at increasing permeable pavements, which were emphasized during the studio process, students applied hard pavements in structural projects at a minimal level.

Among the projects, in the study which was handled with the “biophilia” concept approach, by emphasizing the ecological

connection function conveyed by the study area between the forest, stream and agricultural areas, the aim was to build the connection established by humans with nature in a sustainable way without damaging it.

### **3. EVALUATION AND CONCLUSION**

The problem of global climate change and the climate crisis is gradually reflected more frequently in studies of landscape architecture discipline. In this sense, the effort of landscape architecture to create sensitive, resilient and sustainable environments by reducing the effects of climate change in urban areas is important. The aim of the Project III Studio was for students to develop their approaches to the current issue of climate change from the perspective of the discipline of landscape architecture, and to shape their design goals as future landscape architect candidates in this context. In the study area, which was problematic in various ways, while the transition between different scales was studied with the studio setup, which was advanced in two stages, an answer was also sought to the question of how a landscape architect can create a climate-sensitive residential landscape in the built environment.

Furthermore, while the creative and critical thinking context of the design process was advanced within the scope of the project studio, in addition, the students were also expected to deal with their projects with a pragmatic thinking style and to think about the applicability of their projects. Although creativity is discussed in many contexts, it is a phenomenon that aims to solve the problem by constructing a

completely new solution and to avoid generally accepted approaches (Ibrahim and Utaberta, 2012). In this sense, the Project III Studio was carried out with a critical and investigative thinking process, in which students interpreted the problem of global climate change with original solutions that they developed from the perspective of a landscape architect.

What was seen in the project final outputs was the inadequate by students in realizing climate-sensitive concept approaches. In this sense, the reflection and development of the interaction between climate change and landscape architecture in the course contents in landscape architecture departments may be an important output. Furthermore, in the project, in which landscape construction material preferences and plant design approaches were expected to be handled in a climate-sensitive manner, it was observed that there were deficiencies in students in these areas as well.

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## CHAPTER 7

# THE RELATIONSHIP OF CONSERVATION AND TOURISM IN CULTURAL HERITAGE AREAS: AN ASSESSMENT ON OLD MARDIN

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## **INTRODUCTION**

Since cultural heritage sites are the focus of both urban conservation and tourism, discussions about maintaining the balance between conservation and tourism continue from the past to the present. Factors such as the form of the cultural heritage, the sense of belonging developed by the society towards the cultural heritage, the forms of use and functions shape the conservation phenomenon; whereas in the implementation phase, Functioning of the procedure is ensured according to the tools defined by the national conservation legislation. Every settlement that has cultural heritage value should be protected by considering its specific characteristics in terms of being unique while making decisions regarding leading sectors in economic development such as tourism, balances regarding conservation should be considered. Especially with the development of technology and transportation systems and tourism coming to the forefront as a fundamental sector, tourism and visitor density has started to increase in cities that step forth with their cultural features under the influence of economic concerns and development goals.

While international developments and new tools are defined in the solution of this and similar problems in the conservation of cultural heritage, the competence of the conservation system and the lack of practices in Turkey are still a matter of debate.

In particular, there are inadequacies in the preparation of visitor management and tourism plans together with heritage management and coordination between these plans. In this study, conservation and tourism are handled and how the relationship between them is established over the Old Mardin settlement by examining the types of plans prepared at different scales (Mardin-Batman-Siirt-Şırnak-Hakkari Environmental Plan, Mardin Tourism Strategic Plan, Mardin Implementary Development Plan for Conservation has been discussed.

## **1.MARDIN WITH IST URBAN TEXTURE AND CUTLTURAL HERITAGE**

Mardin was established in the southeast of Turkey, on the Syrian border and at a location overlooking the Mesopotamian plain. It is located in the Upper Mesopotamian region called the Fertile Crescent (the semicircular area of the Eastern Mediterranean region that includes the Nile, Tigris, and Euphrates rivers and valleys).



**Figure 1. Location and Districts of Mardin (Prepared within the Context of the Study, 2022)**

Mardin has many cultural values thanks to being a city where different languages are spoken, different religions are lived, and the concept of tolerance is emphasized. Since it is a center where the first civilizations emerged in Mesopotamia and Anatolia, the cultural diversity created by the heritage left by civilizations to each other and the transfer of this interaction to the present is the most important factors in the cultural development of Mardin. (Davutoğlu, 2019).

The part called the Old City or Old Mardin<sup>†</sup> consists of the Mardin Castle and the Outer Neighborhood on its skirt. The first settlement was the castle, and later it became a settlement center of the Outer Neighborhood. In this area, where there are monumental structures as well as the traditional urban texture, the slope was used with the terracing method and structures with the majority of stone materials were built, and an urban landscape emerged with the adjacent-compact appearance of these structures (Fusun, 1993; Tunçer, 2013). The relationship between conservation and tourism in Mardin, which has to be protected with its urban texture, street setup, traditional housing texture, and monumental structures, and the consequences of not establishing this relationship are discussed within the limited framework of the study.

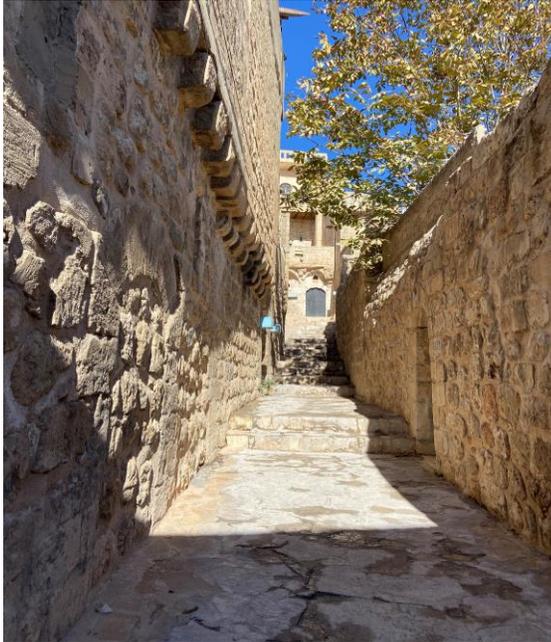
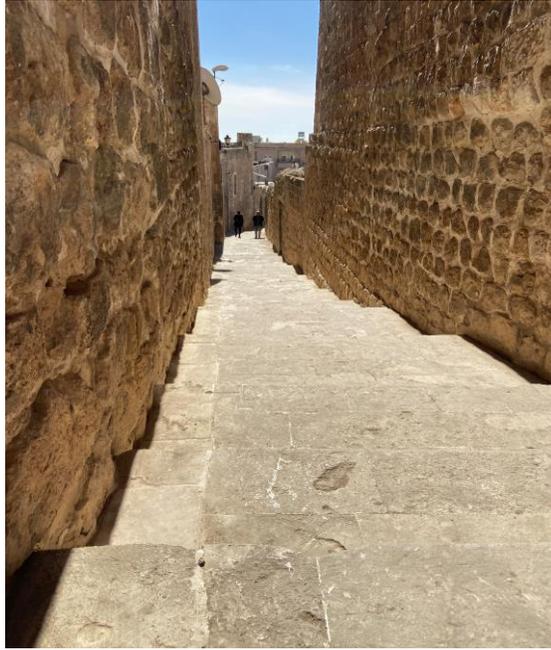
Mardin is a city that hosts various tangible and intangible forms of cultural heritage. In order to make inferences about the balance between conservation and tourism, it is important to understand why Mardin needs the conservation process and also the reasons why it is an

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<sup>†</sup> It is used as Old Mardin within the scope of the study.

important tourism spot with its cultural richness. For this purpose, some constitutive elements that make up the cultural heritage of Mardin are summarized.

Mardin stands out with its urban texture, street design, and stone architecture. Artifacts belonging to religious and traditional structures can be found within the city, which was built with the use of stone materials due to its natural requirements. The city, which developed within the walls, has a gradatory settlement order due to its slopes. The street setup steps forth in the settlement order. Tunçer (2013), it is stated that Mardin's linear streets running parallel to the slope and the wide stepped streets that end with dead-end streets cut them perpendicularly end with dead-end streets, the overhangs and archways give a lively aspect to the streets. Likewise, the commercial centers, inns, and traditional bazaars located in the middle of the Ulu Mosque and the linear axis are surrounded by rich neighborhoods, while the neighborhoods with gradually more modest houses surround the wealthy neighborhoods. It also draws attention to the existence of a planning approach compatible with the slope of the terrain, the way of using terracing and topography, and the fact that the houses are sometimes built on a natural ground, sometimes by arranging the land.



**Figure 1. Street Texture in Mardin's Historical Texture (Eda Koçak's Personal Archive, 2021)**



**Figure 2. Old Mardin City Silhouette (Eda Koçak's Personal Archive, 2021)**

Some of the constitutive elements that generate the cultural heritage in the city, which is shaped by the influence of different civilizations and religions such as castles (Mardin Castle, Maiden's Castle, etc.), mosques, and masjids (Great Mosque, Kale Mosque, etc.), madrasas (Kasimiye Madrasa, Zinciriye Madrasa, etc.), churches (Mor Mihayel Church, Mar Petrus, and Paul Church, etc.), monasteries (Deyrulzafaran Monastery, Mor Yakup Monastery, etc.), Bazaars (Kayseriye Bazaar, Revakli Bazaar, etc.) and traditional housing textures, can be listed.



**Figure 3. Deyrulzafaran Monastery (Eda Koçak's Personal Archive, 2021)**

As of 2022, there are 84 heritage sites in the UNESCO World Heritage Tentative List, including 4 mixed, 3 natural, and 77 cultural sites. Mardin Cultural Landscape Area in 2000, Zeynel Abidin Mosque and Mor Yakup Church in 2014, Late Antique and Medieval Churches and Monasteries in Midyat and its Surroundings (Tur'Abdin) in 2021 with their cultural characteristics were included in the list. The city, which is on the list as a cultural landscape area, comes to the fore with the use of stone in both civil architectural structures and religious buildings. (Ministry of Culture and Tourism, 2022-a & 2022-b). Mor Yakup Church and Zeynel Abidin Mosque, located in Nusaybin, a district of Mardin, are structures that enrich the history of humanity, as they have a common past both in terms of location and history.

In Midyat and its surroundings, there are representative examples of early Christian monastic architecture. Tur Abdin region stands out with its witnessing the emergence of the unique architectural language of the Syriac Orthodox community, cultural landscape, moreover its importance in terms of villages and monasteries belonging to various periods.

Buildings dating back to the 6th-8th centuries and having common features that represent the character of the region, and the candidacy process for the World Heritage List continues with five selected monasteries and four churches. These structures are; Mor Sobo Church, Virgin Mary Church (Yoldath Aloho), Deyrulzafaran Monastery, Mor Gabriel Monastery, Mor Abai Monastery, Mor Loozor Monastery, Mor Yakup Monastery, Mor Quryaqos Church, and Mor Azozo Church. (Ministry of Culture and Toursim, 2022-b).

## **2.MARDİN CASE WITH PLANS AND IMPLEMENTATIONS: THE PROCESS OF NEGLECT/PRESEVERTION OF THE URBAN CULTURAL HERITAGE AND TOURISM**

The Old City, which started from the castle and expanded towards the walls, is an organic texture and part of the city that develops in harmony with the topography, does not close each other's facades with the terracing method; and has an organically developing transportation system. The urban landscape and structures that emerge with the interaction between traditional houses and streets are built with stone, which makes the city of Mardin distinctive. Continuing and preserving these differences as the common heritage of humanity and at the stage

of the place becoming a tourism-oriented center with new functions, the effects or ineffectiveness of the conservation plan is an important subject of discussion. With this approach, the effect of the plans prepared at different scales in the process of protecting the cultural heritage in Mardin has been examined in the axis of the relationship between conservation-neglection and tourism.

Conservation practices in Turkey are developed according to Law No. 2863 on the Protection of Cultural and Natural Assets. In the national conservation legislation, one of the main tools that guide the conservation practices in urban areas is the construction plans for conservation. Construction plans for conservation according to Article 8 of Law No. 2863 on the Protection of Cultural and Natural Assets. These plans are based on field research (such as archaeological, historical, natural, architectural, demographic, cultural, socio-economic structure data), which are prepared on existing maps, adopting the principle of sustainability, and therefore, taking into account the interaction and transition area of the site, moreover they show integrity with the plan note and the report, strategy and planning decisions, equipment, and at the scale required by the implementation zoning plans.

When the planning and conservation studies of Mardin in the historical process are examined, it is observed that the foundations of these studies date back to the 20th century. The historical urban texture was damaged by the widening works on the main streets in the 1920s and 1930s. (Aksu, 2018). It is known that the first master plan work

officially started with the Mardin City Master Plan approved in 1952. When the plan is examined, it points out to the foundations of the linear development in the east-west axis are based on this plan. In the 1960s-1970s, there were some changes in the historical texture due to intense migration and subsequent squatting. One of the important developments after this change was the decision to "Conserve the entire city of Mardin as a cultural asset" in 1979. Following this decision, in 1985, monumental structures and examples of civil architecture were determined within the historical texture of Mardin and the Mardin Urban Conservation Area was drawn with definite boundaries. With these developments, a conservation plan was prepared for the first time in 1985, but the Mardin Conservation Development Plan was prepared in 1993 due to the inability of the Mardin Historical Environmental Protection Development Plan to meet the needs of the city and the problems that arose during the implementation process.

In the Master Plan, which was approved in 1985, the determination of the area called "New Mardin" as the development area today led to the emergence of the current New Mardin-Old Mardin distinction. In 1993, the Conservation Development Plan was approved and regions were formed within the previously determined urban protected area. All these plans brought about functional transformation in the process. The fact that many buildings in the old Mardin became tourism and service sector-oriented is based on these plans (Aksu ve Çırak, 2018: 733-737). As a result of the strategies to reduce the pressure in the historical city center and new legislation being drafted for the new development areas, the historical city center fall into disuse and the remaining businesses

have been concentrated in the direction of the tourism and service sector. While aiming to reduce the density in the historical city center, the lack of strategies for re-functioning the space has caused the historical texture to wear out.

On 25.02.2000, Mardin was included in the UNESCO World Heritage Tentative List as a Cultural Landscape Area, and with this development, the candidacy process for the UNESCO World Heritage List has begun. However, a national management plan has not been established to guide the management of cultural heritage. There is no special plan study regarding neither the visitor management in the city nor the management of the tourism sector.

The "Mardin Historical Transformation Project", which was initiated in 2009 with the aim of inclusion of the city of Mardin on the UNESCO World Cultural Heritage List, is spectacular in terms of not only the protection of cultural heritage and tourism but also the scope and content of the projects. Its main goal is to preserve the historical identity of the city, to use it as an economic value in the tourism sector, to provide social and economic development as one of the important tourism points both in Turkey and in the world, with the fame that will emerge thanks to the recognition of the city as a world heritage. Within the context of the Mardin Historical Transformation Project, steps have been taken to develop the Mardin Sustainable Tourism Project are the demolition of reinforced concrete and add-on structures that disrupt the traditional city structure and silhouette, strengthening the infrastructure and superstructure in the historical region of the city, restoration and re-

functioning of public buildings (such as the restoration and conversion of the historical Mardin Girls Vocational Highschool to an advanced technical school for girls and the conversion of the former Governor's Mansion into the Mardin Governor's Office), improving the street view, strengthening the Mardin Castle, etc. Within the scope of the Mardin Sustainable Tourism Project, it is aimed to develop and promote the tourism identity of Mardin, and to carry out branding studies (Çağlayan, 2017). Within the scope of the Mardin Sustainable Tourism Project, it is aimed to develop and promote the tourism identity of Mardin, and to carry out branding studies (Çağlayan, 2017).

In the Mardin-Batman-Siirt-Şırnak-Hakkari 1/100.000 scale environmental plan explanation report dated 2013, Strategies such as increasing the service quality of the tourism sector, strengthening the technical infrastructure, protecting the resources that will contribute to the history and cultural tourism, increasing the share of the local people from the tourism income, developing promotional activities, providing cooperation networks have been determined. In accordance with these strategies, it was presumed in the plan that the primary sector in Mardin would be tourism. (Ministry of Environment and Urbanization,2013).

The 2014-2023 Mardin Tourism Strategic Plan, which was developed in line with these studies, was prepared with the cooperation of several stakeholders and this plan reflects Mardin's tourism vision with its cultural heritage, multicultural, peaceful, and tolerant identity; with a competitive and sustainable tourism approach; defines it as a world brand that develops socio-economically and culturally by increasing

tourism revenues. 17 of the determined action plans are conservation projects and it has been aimed to protect and develop cultural heritage assets.

When the 2014-2023 Mardin Tourism Strategic Plan is examined, it is a matter of criticism that the objectives and strategies are not associated with the characteristics of Mardin and that more general expressions are included. It is known that in order for a city to come to the fore with its own identity and historical-cultural heritage and to be the subject of tourism, the existence of some local strategies gains importance. Although Mardin has advantages in terms of both identity and cultural heritage at this point, it is seen that their integration into tourism is weak in the strategic plan discussed. In addition, it is seen that contradictory decisions are implemented today regarding the conservation of the cultural texture and its transfer to future generations, which are emphasized in both the strategic plan and the conservation plan. The most striking example of this is the shopping mall, which is currently under construction at the entrance of the Old Mardin.



**Figure 4. A Scene From Shopping Mall Construction and the Texture of Old Mardin (Eda Koçak's Personal Archive, 2022)**

Even though some data on the tourist profile tried to be explained in the Mardin Tourism Strategic Plan, it lacks in explaining the real reasons why tourists prefer Mardin and the factors that attract people to Mardin. Since this situation cannot be expressed clearly, the goals and strategies are far from being specific to the characteristics of the place. Besides, considering the tourism potential of Mardin, it is known that Mardin does not only consist of Old Mardin but also different districts and villages (e.g. Dara Ancient City) outside the center have high tourism potential and potentials that provide tourism-based development. Therefore, in the Tourism Strategic Plan prepared for Mardin, the preparation of comprehensive plans to include both the decisions and plans regarding the protection and management of all these regions will ensure that the potentials of Mardin are directed more accurately.

When the Mardin Implementary Development Plan for Conservation is examined, it is obvious that it is weak in terms of specific decisions and guides for preserving the historical texture of Mardin, similar to the Strategic Plan. Also it is observed that the traditional buildings to be preserved with their original features are focused on the principles of physical structure in the context of the protection principles (such as the location of the building on the parcel, name and billboards, parking lots, street furniture, street flooring), but there are deficiencies in the points that should be considered in the use, function and function change of the space. Considering the tourism potential of Mardin and the fact that tourism is one of the main sectors in development, the protection principles of the physical structure included in the conservation plan are an inadequate perspective. The functions in the city, how to construct

the relations between functions, the establishment of the relationship of the place with the social and social life that is changed or preserved without deteriorating the structural features, and the development of principles for the place to meet the needs while preserving its cultural values should be included in the conservation studies.

### **3.DISCUSSION AND CONCLUSION**

The relationship between cultural heritage and tourism is a topic that has been discussed for a long time in the context of different places. The unique characteristics and unique conditions of each place, heritage site necessitates reconsidering with the context of the place in establishing the balance between conservation and tourism. Mardin is a settlement that has both national protection status and is on the UNESCO World Heritage Tentative List and is a candidate for international protection status. Mardin was built in harmony with the geography and soil structure of Southeastern Anatolia, integrating the use of stone with religious and local architecture, with an urban texture with the terracing method and an organic street texture as this texture allows, where the historical center develops in the castle and its surroundings, and therefore it is a city that is important to preserve as a medieval city.

With these qualities, it is important how the relationship between conservation and tourism is established since it is one of the important focal points of cultural heritage tourism in the region. As a result of the researches on Mardin's cultural heritage values, how the protection process developed, and the way the tourism phenomenon is handled in

the protection process, both general inferences about the conservation-tourism relationship and determinations specific to the city of Mardin were made. In summary, the main points to be considered in ensuring the conservation-tourism balance are:

- Establishing the relationship and balance between cultural heritage and tourism differs for each country and city.

- Factors such as the tools related to the national conservation legislation and the functioning of these tools in the cities, and how tourism is handled in the way they operate are the main determinants of the conservation-tourism balance.

- Due to these reasons, the priority is to reveal the importance of cultural heritage and to determine what kind of protection and tourism system will be developed according to the form of the heritage.

- Instead of using standardized tools, it is necessary to reconsider these tools specific to the place and to determine the strategies according to the place.

- When the conservation plan is examined over the city of Mardin, the problems that arise during the implementation and operation of the plans come to the fore. This indicates that the plan was prepared without considering the applicability criteria.

- Even in the same country, there should be flexibility in determining the conservation and tourism processes due to various factors such as geography, cultural and social structure, and the characteristics of the place should be taken into account.

-Besides conservation plans, heritage sites need to have a management system, as well as visitor management and tourism sector plans. Undoubtedly, ensuring harmony between plans should be a prerequisite.

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## CHAPTER 8

# THE EFFECT OF TEMPORAL VARIATION IN LAND SURFACE TEMPERATURE ON LAND COVER CLASSES AND AGRICULTURAL AREAS

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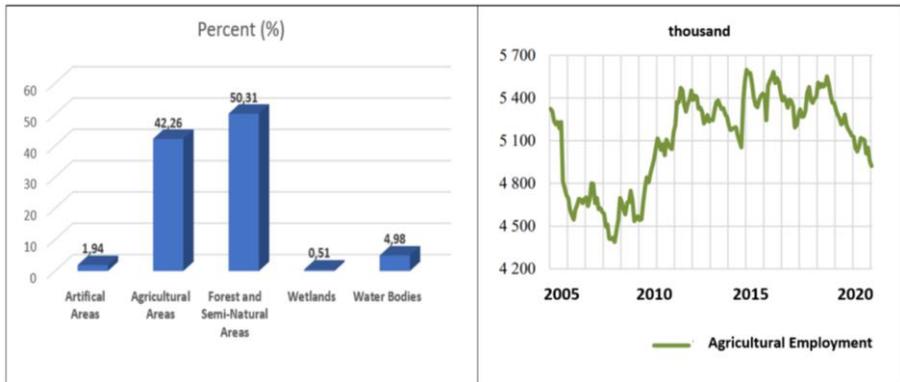
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## INTRODUCTION

Demographic developments, consumption habits, the need for housing and settlement, and the effects of global climate change increase the pressure on soil and agricultural lands, especially in developing countries (FAO, 2011). Existing and potential agricultural land resources are at the center of agricultural production and their sustainable use should be ensured. Therefore, research on agricultural lands should be done comprehensively by considering physical and socio-economic factors (Keesstra et al., 2018). Making agricultural plans, both on a local and regional scale, and evaluating multi-criteria factors together in these plans can provide a better and conscious decision-making (Solomon et al., 2018). In this context, it is known that data related to climate and temperature have a significant weight among all other criteria in the evaluation of agricultural lands, determination of agricultural product pattern, and agricultural planning (Verner et al., 2018). This study is based on the comparative evaluation of the relationship between the seasonal surface temperature change in the land cover, where agricultural activities are intense, and other land uses. Turkey can be counted among the rich countries in terms of agricultural lands and agricultural product diversity. According to 2018 CORINE Level I data of the Ministry of Agriculture and Forestry (TOB, 2022); Approximately 42% of Turkey's land cover consists of agricultural areas including arable land, continuous crops, pastures and mixed agricultural areas (Figure 1). According to seasonally adjusted data, agricultural employment in Turkey was 4 million 922 thousand people

in January 2020 (SBB, 2020). Therefore, planning and effective management of soil resources for agricultural production in Turkey is a fundamental requirement for sustainable development.



**Figure 1: Land Cover Classes (left) and Workforce in Agriculture (right) of Turkey**

Satellite images are often used as the main tool in the planning of land resources, sustainable use and determination of land cover (Li et al., 2020; Ardahanlıoğlu et al., 2020). Satellite images are used to evaluate the landscape structure in agricultural planning (Selim and Demir, 2018), precipitation, soil moisture, temperature, solar radiation, agricultural product pattern determination, agricultural disease symptoms, etc. It is a rapidly developing technological tool that produces practical and accurate results for the measurements of critical environmental factors such as important environmental factors (Herzberg et al., 2019). These images are provided through various satellites and provide a time series data to monitor changes over time. In land cover classification, in determining changes and interactions,

satellite images produce data that the user can interpret through comparative analysis (Mahdianpari et al., 2018; Selim et al., 2022).

Land surface temperature (LST), one of the most important parameters of ground surface and atmosphere interaction, plays an important role in modelling agricultural areas and producing agricultural plans (Li et al., 2013; Çoşlu et al., 2021). LST is one of the most important factors affecting agricultural product pattern and agricultural productivity (Islam and Ma, 2018). Since seasonal and climate-related changes in surface temperature directly affect land cover change, crop yield, harvest time and maintenance programs, it is necessary to know the land surface temperature and plan agricultural plans considering this factor (Hadria et al., 2018; Choudhuri et al., 2019). LST provides useful information about climate and thus can help to understand the effect of climate on agricultural areas (Govind and Ramesh; 2019). Therefore, LST is a good indicator of understanding agricultural areas dependent on climate variability and temperature (Çoşlu et al., 2021).

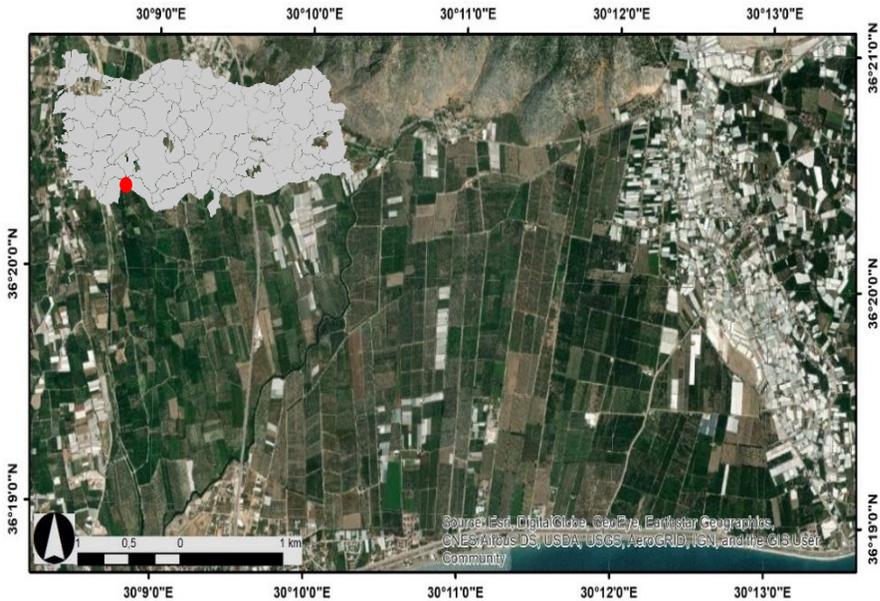
This study evaluates the temporal change in the land surface temperature in the agricultural areas. The motivation of this study is to determine the seasonal surface temperature of the Kumluca/Antalya region, which has an important potential in terms of agricultural areas and agricultural employment, especially in citrus production, and to contribute to agricultural planning by evaluating it within the scope of land cover classes. Algorithms were used to determine the LST from Landsat 8 satellite images, which are freely available, and land surface temperature data for two different periods were produced. The change

in the surface temperature depending on the time in the land cover was evaluated in terms of agricultural lands, and suggestions that could be used in agricultural planning were produced.

## 1. MATERIAL AND METHOD

### 1.1. Study Area

The study was carried out at the coordinates  $36^{\circ}19'43.79''\text{N}$  and  $30^{\circ}10'26.98''\text{E}$ , in Finike / Kumluca district of Antalya province (Figure 2).



**Figure 2: Study Area Location**

Kumluca district is located on the Teke Peninsula between the Gulf of Antalya and the Gulf of Fethiye. The livelihood of more than half of Kumluca people is agriculture and this sector has an important place in the economy of the district. The suitability of the land structure and

meteorological conditions brought quality in the production of vegetables and fruits in the district. The most important income source of the district is greenhouse cultivation and citrus production (Kumluca Municipality, 2022). In our country, there are 40.624 fruit bearing and 11.337 non-fruiting citrus trees according to 2020 data. The total production obtained from fruit bearing trees is 4.348.742 tons. Total agricultural area of Antalya province in 2020 is 3.649.230 decares. Fruit, beverage and spice plants are grown on 821.731 decares of these agricultural areas. In Kumluca district, 61.372 decares of agricultural production areas are fallow in 2020, vegetables are grown in 54.014 decares, cereals and other herbal products are grown in 22.697 decares, ornamental plants are grown in 3.5 decares, and fruit, beverage and spice plants are grown in 43.006 decares (TUIK, 2022).

### ***1.2. Datasets***

Landsat 8 satellite images were used as the basic dataset in the study. The Landsat 8 satellite used in the study provides medium spatial resolution data from 15 meters to 100 meters and this data is freely accessible. Within the scope of this study, 2 (blue), 3 (green), 4 (red), 5 (near infrared) and 10 (thermal) bands of the Landsat 8 satellite dated 25.01.2020 and 20.08.2020 were used. Of these bands 2, 3, 4 and 5 were used to create the composite image of the study area, while 4, 5 and 10 were used to calculate the LST (Table 1).

**Table 1: Landsat 8 Spectral Bands Used in The Study (USGS, 2022)**

<b>Spectral Range</b>	<b>Wavelength</b>	<b>Spatial Resolution</b>
Band 2 - Blue	0.45 - 0.51 $\mu$ m	30 m
Band 3 - Green	0.53 - 0.59 $\mu$ m	30 m
Band 4 - Red	0.64 - 0.67 $\mu$ m	30 m
Band 5 – Near Infrared	0.85 - 0.88 $\mu$ m	30 m
Band 10 - TIRS 1	10.60 - 11.19 $\mu$ m	100 m

According to the data of the General Directorate of Meteorology (MGM) in Table 2, the lowest average air temperature was recorded in January (6 °C) and the highest air temperature in July and August (34.1 °C) in seasonal normal in the measurement periods specified for Antalya province. For this reason, images of the dates when the air temperature was the average coldest (25.01.2020) and the average warmest (20.08.2020) were used in the study.

**Table 2: Antalya Province Seasonal Normal (MGM, 2022)**

Months	1	2	3	4	5	6	7	8	9	10	11	12	Annual
Measurement period ( 1930 - 2020)													
Mean Temp. (°C)	10.0	10.7	12.9	16.4	20.6	25.3	28.5	28.4	25.2	20.5	15.5	11.6	18.8
Mean Highest Temp. (°C)	14.9	15.6	18.0	21.4	25.6	30.7	34.1	34.1	31.2	26.6	21.3	16.7	24.2
Mean Lowest Temp. (°C)	6.0	6.4	8.1	11.2	15.2	19.6	22.7	22.7	19.4	15.3	10.8	7.6	13.8
Mean Sunshine Duration (saat)	5.1	5.8	6.7	8.0	9.8	11.4	11.8	11.3	9.8	7.9	6.3	4.9	8.2
Rainy Day Number	13.2	11.4	10.0	8.1	7.1	3.5	1.0	0.9	2.5	6.5	8.4	12.8	85.4
Average Monthly Total Rainfall Amount (mm)	232.6	153.5	94.5	49.9	32.1	10.8	4.5	4.6	16.8	68.7	131.6	262.1	1061.7
Measurement period ( 1930 - 2020)													
Highest Temperature	23.9	26.7	28.6	36.4	41.7	44.8	45.0	44.6	42.5	38.7	33.0	25.4	45.0
Lowest Temperature	-4.3	-4.6	-1.6	1.4	6.7	11.1	14.8	13.6	10.3	4.9	0.0	-1.9	-4.6

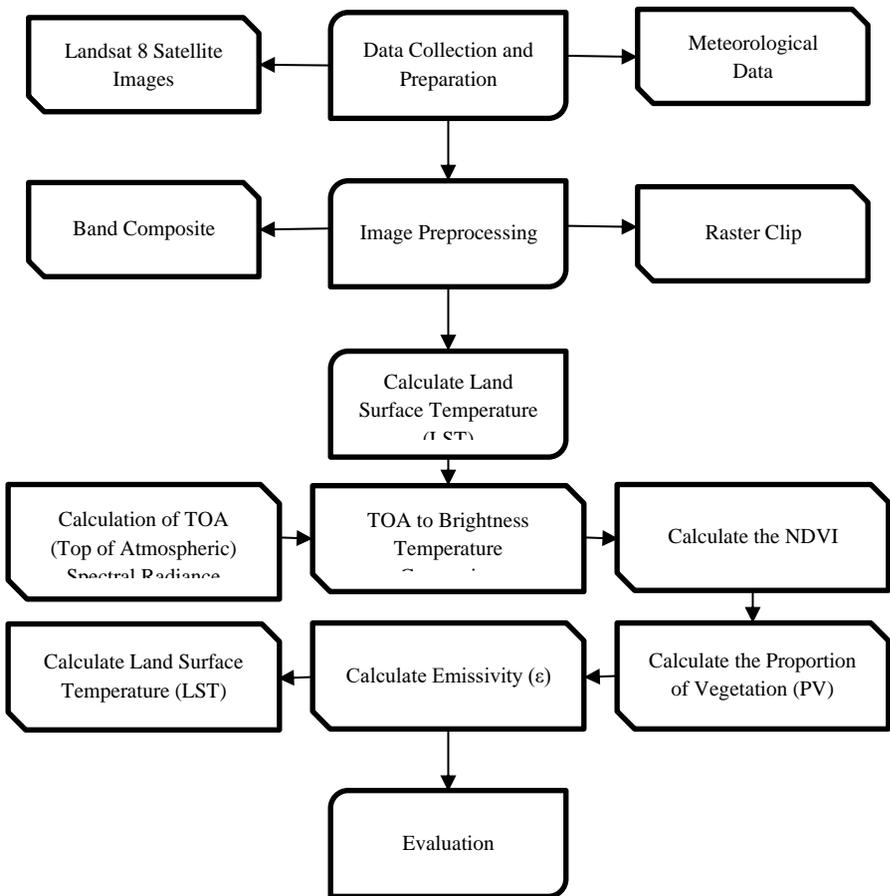
### ***1.3. Method***

The study consists of the basic steps of obtaining Landsat 8 satellite images, image pre-processing, calculating land surface temperatures and evaluating (Figure 2).

In the first stage of the study, the bands of Landsat 8 satellite images of two different dates belonging to the coldest and warmest months of the year were downloaded separately. In the second stage, band composite and raster clipping pre-processes were applied to these downloaded satellite images. In this context, firstly, the 2nd, 3rd, 4th and 5th bands were combined with the tape composite process in order to obtain a four-band data set. After the composite, this composited image of both

dates and the 10th band were clipped according to the working area boundaries.

In the third stage of the study, LST was calculated using the 10th band, which is the thermal band. In addition, while determining the LST at this stage, the normalized difference vegetation index (NDVI) was calculated using red (Band 4) and infrared (Band 5) in order to include emissivity in the calculations.



**Figure 2: Method Flowchart**

The calculation of the land surface temperature was carried out by applying successive sub-processing steps. In this context, firstly, the brightness values of Band 10 were converted to radiance values in order to correct the brightness and contrast in the image. In the second sub process step, the conversion of radiance values to brightness temperature values was carried out. In the third sub process, NDVI was calculated in order to determine the emissivity values, which is defined as the ratio of the total radiation incident to the objects to the absorbed radiation. Then, in the fourth sub process step, using these NDVI values, the proportion of vegetation in the study area was determined. In the fifth sub process step, the emissivity was calculated by using the determined the proportion of vegetation and the constant values in the equation. In the last sub process step, necessary corrections were made and LST maps were created.

The equations and values used in the calculation are given below.

***a. Calculation of TOA (Top of Atmospheric) spectral radiance***

$$TOA(L) = ML * Q_{cal} + AL$$

where:

ML = Band-specific multiplicative rescaling factor from the metadata (RADIANCE\_MULT\_BAND\_10)

$Q_{cal}$  = Corresponds to band 10

AL = Band-specific additive rescaling factor from the metadata (RADIANCE\_ADD\_BAND\_10)

$$TOA_{august} = 0.0003342 * "B10.tif" + 0.1$$

$$TOA_{january} = 0.0003342 * "B10.tif" + 0.1$$

### ***b. TOA to Brightness Temperature conversion***

$$BT = (K_2 / (\ln (K_1 / L) + 1)) - 273.15$$

where:

$K_1$  = Band-specific thermal conversion constant from the metadata (K1\_CONSTANT\_BAND\_10)

$K_2$  = Band-specific thermal conversion constant from the metadata (K2\_CONSTANT\_BAND\_10)

$L$  = TOA

$$BT_{\text{august}} = (1321.0789 / \ln((774.8853 / \text{"TOA"}) + 1)) - 273.15$$

$$BT_{\text{janeury}} = (1321.0789 / \ln((774.8853 / \text{"TOA"}) + 1)) - 273.15$$

### ***c. Calculate the NDVI***

$$NDVI = (NIR - Red) / (NIR + Red)$$

$$NDVI_{\text{august}} = \text{Float}(\text{"B5.tif"} - \text{"B4.tif"}) / \text{Float}(\text{"B5.tif"} + \text{"B4.tif"})$$

$$NDVI_{\text{janeury}} = \text{Float}(\text{"B5.tif"} - \text{"B4.tif"}) / \text{Float}(\text{"B5.tif"} + \text{"B4.tif"})$$

### ***d. Calculate the proportion of vegetation (PV)***

$$PV = \text{Square}((NDVI - NDVI_{\text{min}}) / (NDVI_{\text{max}} - NDVI_{\text{min}}))$$

$$PV_{\text{august}} = \text{Square}(\text{"NDVI"} - 0.0155795) - (0.504319 - 0.0155795))$$

$$PV_{\text{janeury}} = \text{Square}(\text{"NDVI"} - 0.0471844) / (0.485976 - 0.0471844))$$

### ***e. Calculate Emissivity (E)***

$$E_{\text{august}} = 0.004 * PV + 0.986$$

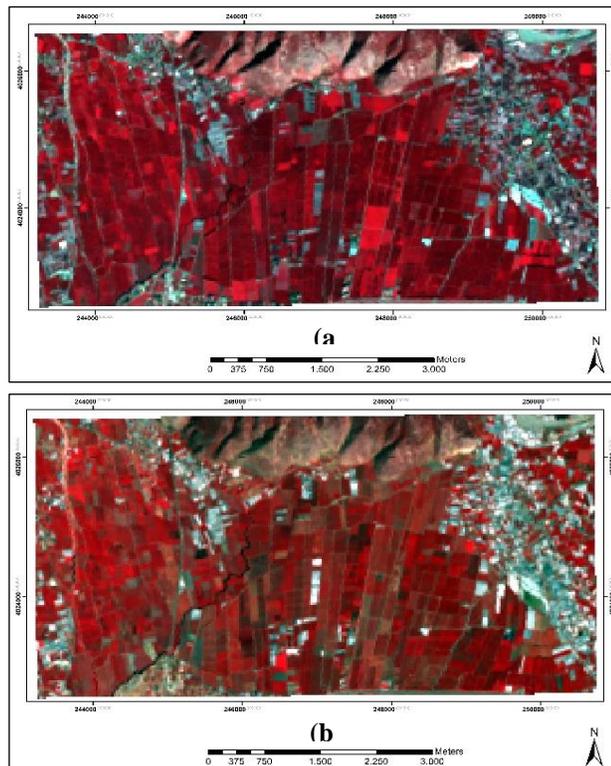
$$E_{\text{janeury}} = 0.004 * PV + 0.986$$

### ***f. Calculate Arazi Yüzey Sıcaklığı (LST)***

$$LST = (\text{"BT"} / (1 + (0.00115 * \text{"BT"} / 1.4388) * \ln(\text{"E"})))$$

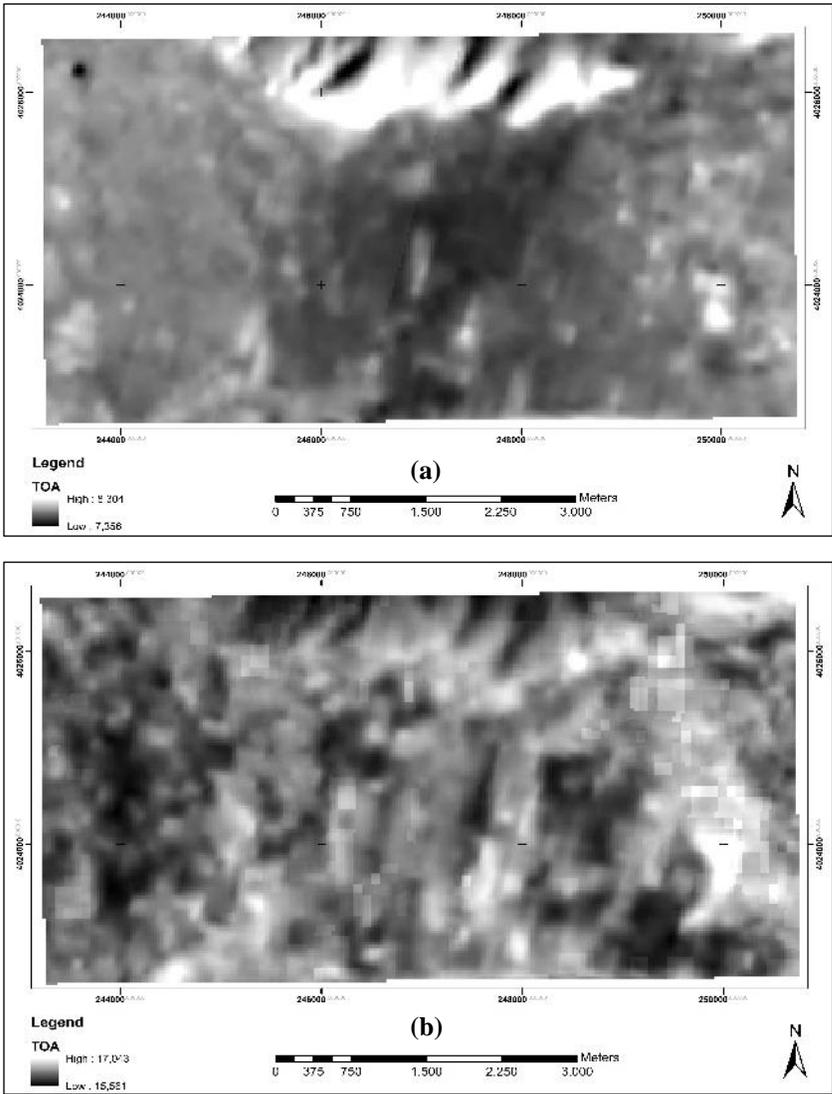
## 2. RESULTS AND DISCUSSION

In the study, firstly, the four-band (Blue-Green-Red-NIR) datasets obtained on different dates were displayed in a false colour combination to be used in the evaluation phase and the vegetation in the area was highlighted (Figure 3).

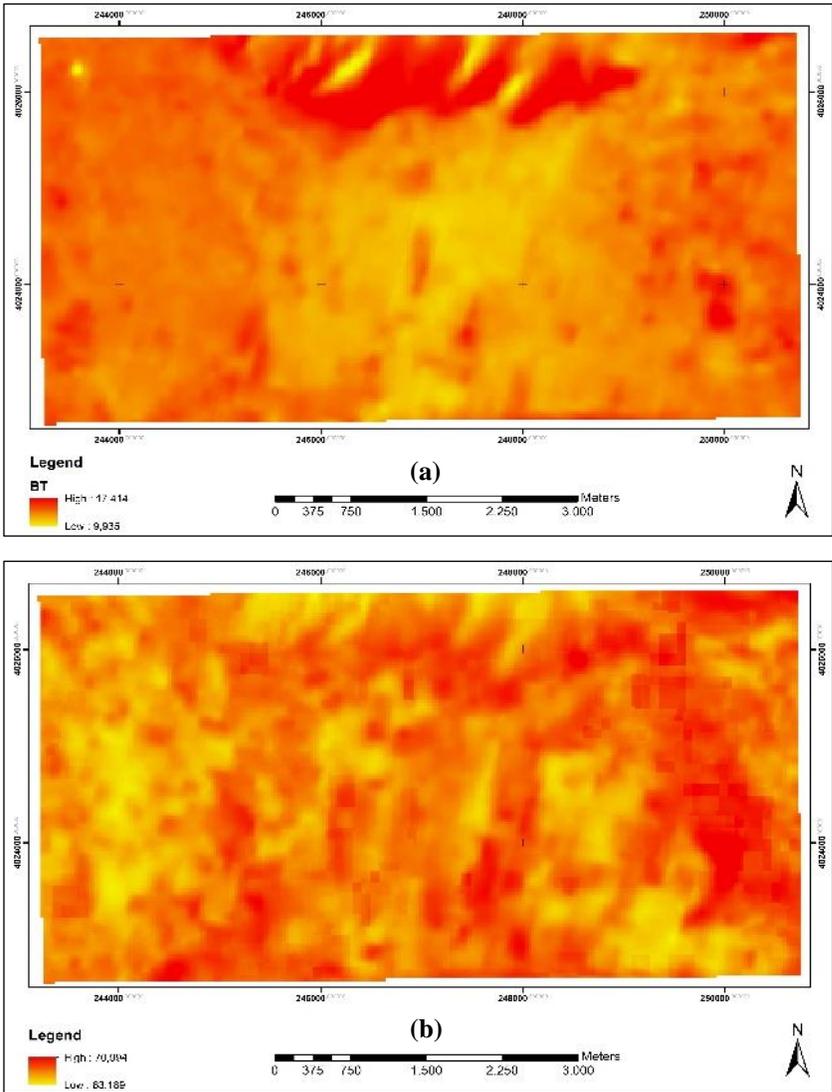


**Figure 3: False colour band combination (5-4-3) January (a); August (b)**

After the calculations carried out in six sub-processing steps for January and August in the study area, TOA, BT, NDVI, PV and E values of the area were determined and these maps are given below.



**Figure 4: TOA January (a); August (b)**



**Figure 5: BT January (a); August (b)**

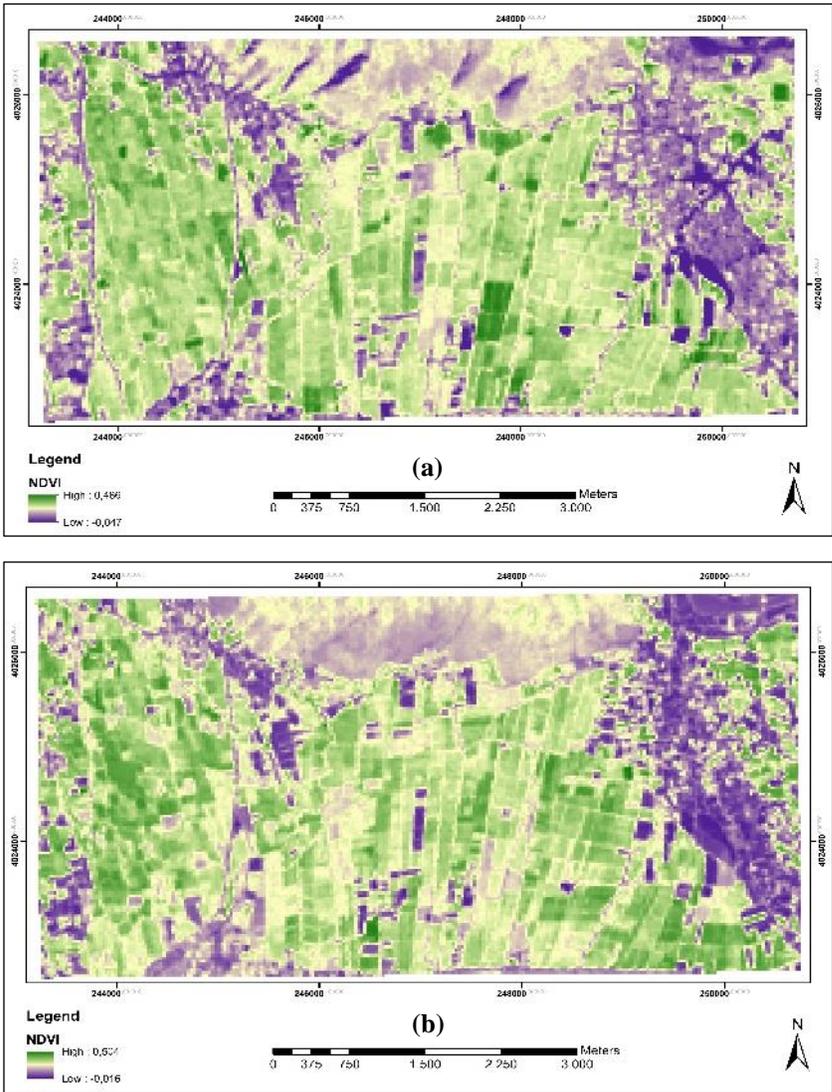


Figure 6: NDVI January (a); August (b)

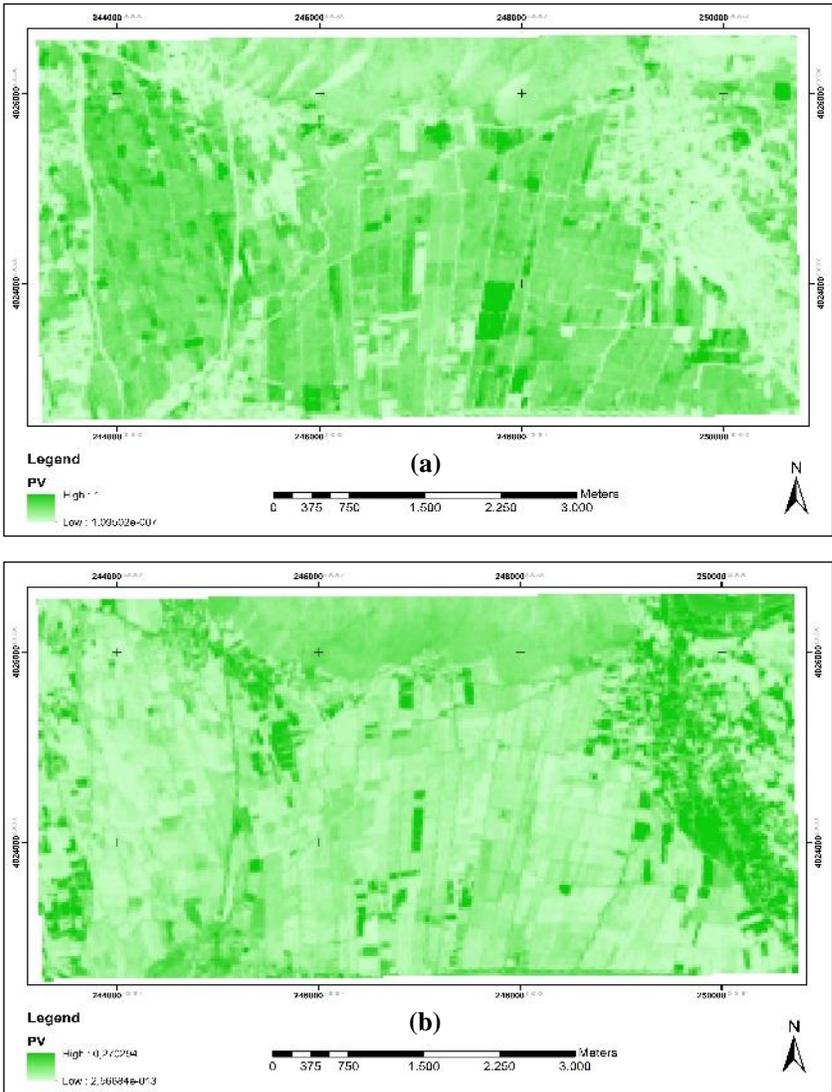
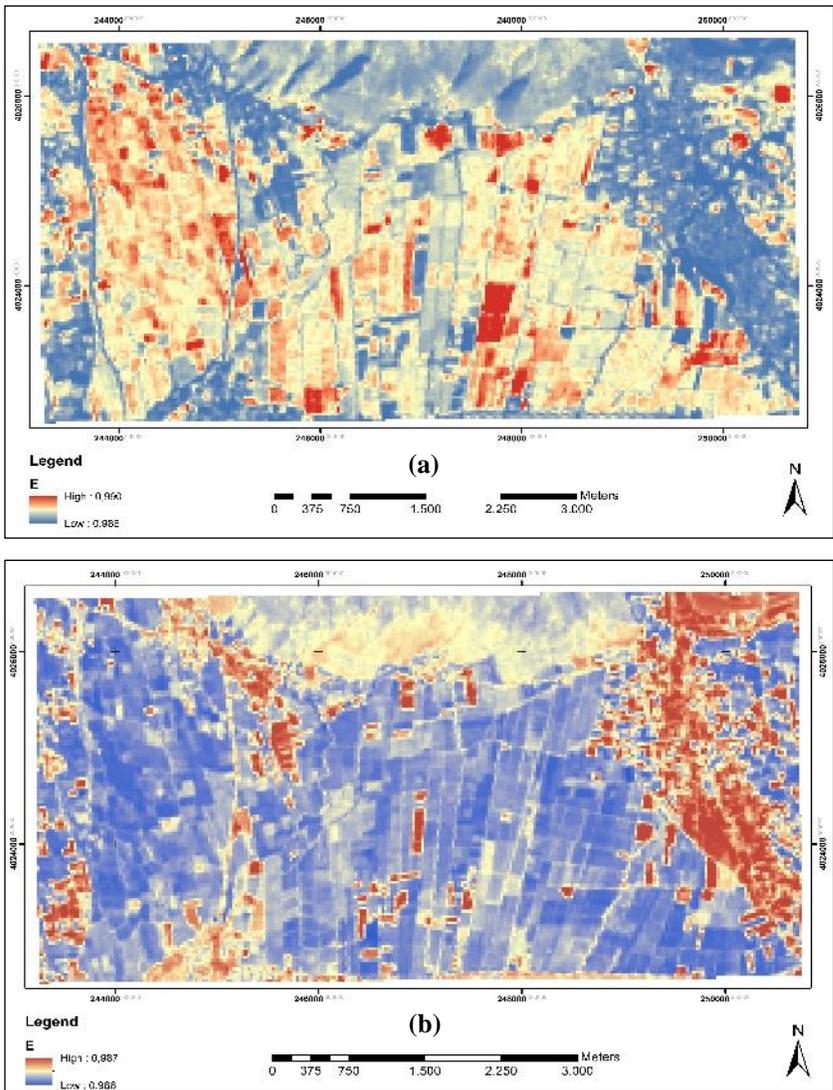
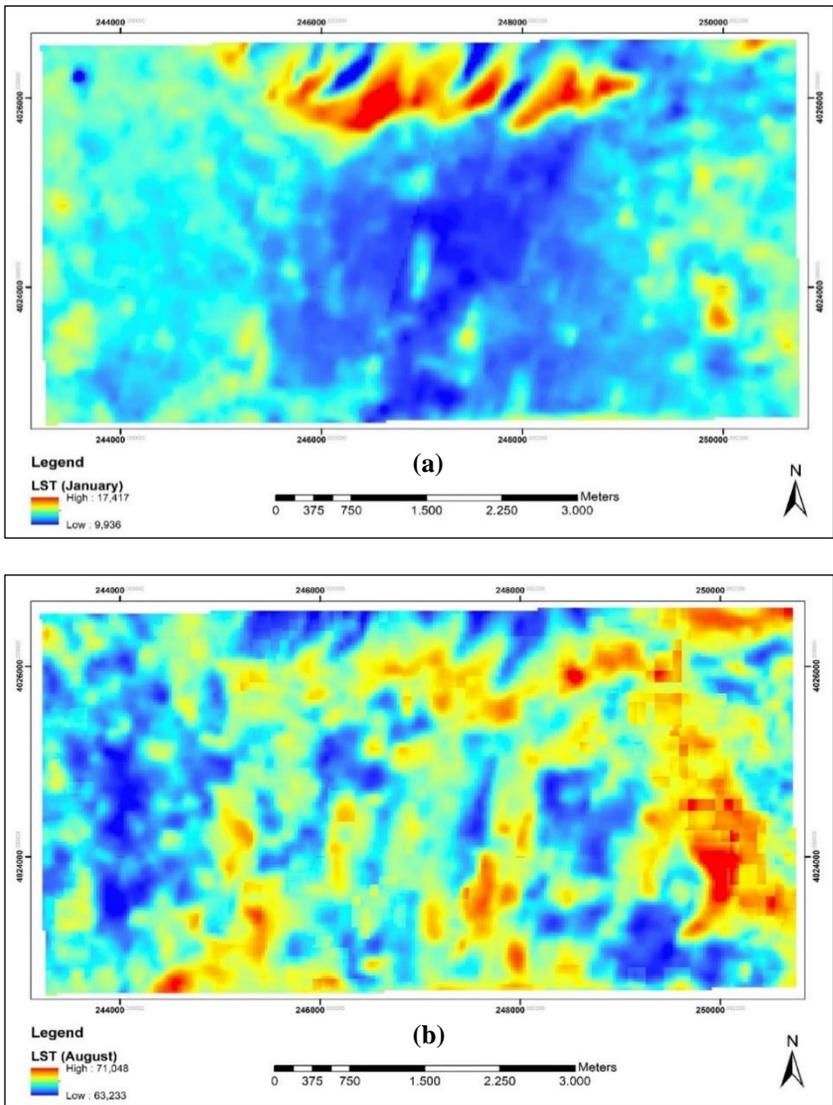


Figure 7: PV January (a); August (b)



**Figure 8: E January (a); August (b)**

After the successive steps of TOA, BT, NDVI, PV and E calculations, respectively, LST maps of the study area were created (Figures 9).



**Figure 9: LST January (a); August (b)**

According to the January LST calculation result, the lowest temperature value for the study area was 9,936 °C, the highest temperature was 17,417 °C, and the average temperature was 12,659 °C (Figure 9a).

According to the August LST results for the study area, the lowest land surface temperature was 63,233 °C, the highest land surface temperature was 71.048 °C, and the average land surface temperature was 66.222 °C (Figure 9b).

As can be seen from the findings, the lowest surface temperature in winter is 9 °C, and it was determined in citrus orchards that are densely distributed in the middle of the study area. In the summer months, it is seen that the highest land surface temperature is generally up to 70 °C. These areas where the surface temperature is quite high are the bare rock-soil complexes in the north of the area, and the residential areas and greenhouse areas located in the east of the area and in some places in the north-south direction. According to these findings, although there is no significant climate problem in citrus cultivation in the region, it is concluded that the increasing greenhouse and settlement pressure in the area in recent years is an important factor that increases the temperature and will cause significant problems in terms of agricultural production.

### **3. CONCLUSION**

Within the framework of sustainable planning, land management is defined as the optimal management and use of land and soil resources within the framework of a development model that does not jeopardize existing opportunities, with the aim of meeting the needs of the present generation and future generations. Within the scope of this definition, the planning required for sustainable resource management is based on the determination of targets and priorities, the transformation of the

determined priority targets into policies and finally the implementation of these policies.

The potential of regional and/or local ecological and socio-economic structures at the national and international level must be taken into account during the determination of priority targets based on time and space among the three main production sectors, agriculture, industry and service sectors, whose contributions to the socio-economic and cultural development of a country are undeniable. From this point of view, in the Kumluca region, where citrus production is intense, especially greenhouse cultivation, agriculture, tourism and trade should be planned according to a sustainable development model.

As it is known, citrus cultivation in the agricultural production model ranks third in total fruit production in our country after grapes and apples. However, it has been in the first place for years with the amount of foreign sales. According to the data announced by the United Nations Agriculture and Food Organization (FAO) in 2016, Turkey ranked 8th in the world in citrus production with a production volume of 4.3 million tons. As in many agricultural production models in our country, classical methods are used in the site selection of citrus orchards, which are not based on scientific criteria and are mostly chosen by trial and error. These classical methods, which have various problems in reaching the right information, have begun to be abandoned in parallel with the development of new techniques and technologies. Among the new techniques and technologies mentioned, the science and technology of remote sensing takes the first place. With this technology,

it provides the opportunity to reach the desired data in a more accurate, easy and more economical way in many fields, especially in agricultural areas, in land use planning studies within the framework of sustainable planning. As a matter of fact, among the many criteria used in planning studies, there is a need to consider the soil, topography, climate and many factors of the area to be planned. Today, with this technology, it is possible to provide the necessary parameters for agricultural planning studies in a healthy way.

In this study, a brief analysis of citrus production areas and other land use models in Antalya province Kumluca district, which is currently an important citrus production area of our country, was made in terms of climate parameter. The findings showed that this region is suitable for site selection in terms of climate parameter. In addition, it has been determined that especially greenhouse agriculture has a significant effect on the increase in the surface temperature of the region in these areas. The results showed that even a single parameter obtained from remote sensing science and technology will give successful results in the monitoring of land management within the framework of sustainable planning in agricultural production environments.

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## CHAPTER 9

### ADDING CULTURAL HERITAGE TO TOURISM: THE CASE OF TILLO (SİİRT)

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## **INTRODUCTION**

Tourism, which was initially viewed as a more developed country-specific activity, is now spread around the world, and particularly developing countries see tourism as an important tool for economic development and sustainable growth (Alkan, 2018). Turkey has many different layers of geography, natural beauty and cultural heritage. This multi-layered structure, combined with the desire to explore new places, has a significant impact on the development of tourism activities. In this sense, alternative types of tourism have been emerging rapidly in recent years. Cultural tourism, one of these alternative tourism variants, is at a key point (Halaç and Benzer, 2019).

Cultural tourism; visits on the desire to recognize and discover the concrete and intangible cultural values of people living in a region mean something. It is the interest in the history, art, science, heritage of people living in a particular region. The action of the visitor to learn, discover, experience and consume concrete and abstract cultural attractions or products in the tourist center is viewed as cultural tourism. (World Tourism Organization [UNWTO], 2020).

The threats posed by rural-to-urban migration, urbanization pressures, energy, developing transportation network, tourism, real estate and industrial sectors make Anatolia's cultural and natural heritage from the past more and more fragile. Considering the difficulties in legal legislation and conservation practices, it is also becoming increasingly difficult for local governments, civil society and local people to preserve this heritage. At this point, cultural routes come across as a

facilitating tool in the field of conservation, especially thanks to their unifying/binding structures on a regional scale. Cultural tourism; Visits on the desire to recognize and discover the concrete and intangible cultural values of people living in a region make sense. It is an interest in the history, art, science, heritage of people living in a particular region. In fact, cultural tourism routes are a type of tourism planned as an alternative to traditional tourism concept (Gül et al., 2020). Tourism routes are an opportunity for economic development of low-developed areas with significant tourist resources. According to (Meyer, 2004); Original tourism routes can be an important economic development tool for less advanced marginal sites in both developed and developing countries. Routes help reduce density in popular areas, market less visited areas in rural areas, and recognize historical values or attractions in the region and assess them for tourist purposes (Lourens, 2007).

Culture tourists around the world are described as educated, researching individuals who are looking for a personal experience, who have a lot of desire to explore, who can use the Internet well. The presence of cultural routes to this tourist typology, which is available from these options, by researching many of the options that are interesting, without being connected to a tour or location, is at an important point in the development of regional and regional tourism (Gül and Yılmaz, 2020).

UNWTO scenarios explain that the number of international tourists grew by 30% to 78% in 2022 due to various factors. With the slowdown of the pandemic process, it states that international tourism has slowly returned to the old figures, and that the domestic tourism sector is

helping to redevelop in a growing number of countries. It is explained that local travel meets the demands of tourists for short distances such as outdoor activities, nature and rural tourism, and for low population density destinations (UNWTO, 2022).

Turkey Tourism Strategy 2023 reported that; By dividing Turkey into tourist regions, it is aimed to support alternative tourism types such as cultural tourism, to contribute to maximum local economic development. The focus of this study is to bring these values to tourism through activities such as creating a cultural route in Tillo district, which has important cultural heritage values. In other words, it is thought that applications such as cultural route will contribute to both regional and local development, provided that these values are social, environmental and economic sustainability. (Kültür ve Turizm Bakanlığı, 2007).

## **1. TILLO (SİİRT) DISTRICT TOURISM VALUES IN THE CONTEXT OF CULTURAL TOURISM**

The Tillo district, the subject of the study, is a district of Siirt, a small Anatolian city set up in the edge curves of Southeast Toros, which creates a natural border between Mesopotamia and Anatolian civilization. The localization date of Tillo's localization date is M.O. it extends back to 3000. With the increase in populations in Mesopotamia, communities passing through the Syrian passages and the Zagros valleys have settled in the areas of the current habitat in the region for their vital activities. Thus, Tillo was established in the area where the Mesopotamia and Anatolian civilizations intersect, and was

therefore influenced by the cultures of civilizations governed in its north and south, and today it is seen to bear traces of these cultures. (Özgen and Karadoğan, 2009).

Tillo is located about 7 km northeast of the city center of Siirt. It is an average of 1160 m above the maritime level of the district and 300 m above Siirt (Mut, 2020). There is a Kaletu'l Ustad hill east of Tillo, a small settlement, and this 1600 hill is cut off by a steep hill and a deep canyon valley, which flows through the valley of Botan Cayi. In the west and north of the district, there are hilly areas with a rise of about 1200 m. The entire circumference of the area where Tillo is located, except for the southwest section, has been permanently eroded by Botan tea and its side arms, so Tillo and its nearby surroundings have remained approximately 600 m above the plateau surface. This geomorphological location is a form of abstraction from the surrounding area of the settlement. This causes impossibilities from time to time (Sönmez, 2012).

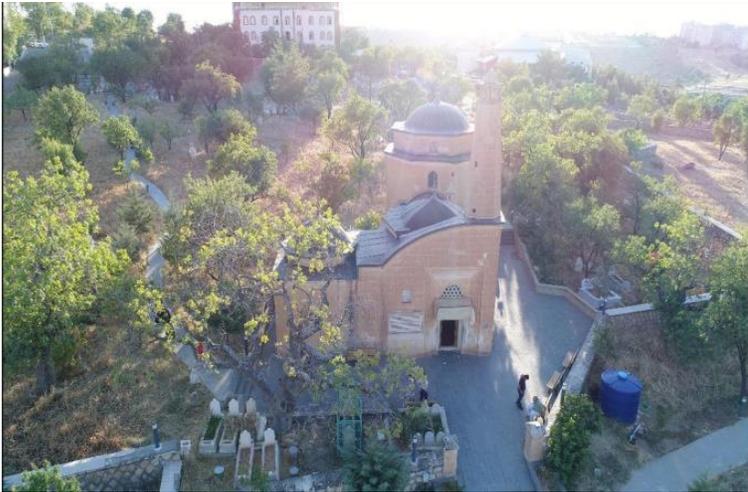
Tillo district has historical and cultural tourism riches as well as natural landscapes. One of these natural landscapes is the Botan valley. There is a castle built by Ibrahim Haki on the slope of the Botan water valley, which forms a deep canyon by breaking the east-west curve zone. There is a steep elevation difference of approximately 800-900 m between the hillside on which the castle is located and the Botan water valley. Botan Valley, which has significant potential in terms of water sports at this point, also has the potential of rafting sports and paragliding with its increasing flow in spring season (Özgen, 2012).

The fact that Tillo's tourism potential has not been converted into economic income on a sectoral basis is seen as a significant loss.

### ***1.1. Ismail Fakirullah Tomb***

The rays of the first sun of the year, which is now described as the "Light Event", which is born on March 21st and September 23rd, when night and day are equal every year, reflect from the castle (wall) window outside the town and illuminate the head of the chest belonging to Ismail Fakirullah (Koç, 2010). This light scheme was unfortunately destroyed during the restoration of the tomb in 1964. As a result of the restoration works initiated in 2010 with the initiatives of the Siirt governorate, the "light event" between the Castle and minaret and the Tomb has been restored (Özgen, 2012).

This tomb, where Ismail Fakirullah and Ibrahim Hakki are located next to each other, is visited by thousands of local and foreign tourists every year (Kılınç, 2019).



**Figure 1. Ismail Fakirullah Tomb (Kılınç, 2019)**

### ***1.2. Kal'et-Ul Ustad (Castle)***

It is a hill located 3 km east of Tillo. It is an important place for the Sun Event that His Holiness Abraham made for his teacher. When he created the Solar System, he built a wall here without mortar and used it as an engagement (Tillo Kaymakamlığı, 2022).



**Figure 2. Castle Where the Light Event Took Place (Kılınç, 2019)**

### ***1.3. Prayer Hill***

This point, about 1 km from the center of Tillo district, is an intriguing place known to be worshipped by Ismail Fakirullah 250 years ago on the upper part of the Hassa Hatun tower and on a high slope overlooking the Botan valley.



**Figure 3. An Image from the Prayer Hill Door**

#### ***1.4. Water Houses (Sultan Memduh Cisterns)***

Located on the high hill behind the Tomb of Sultan Memduh, about 650 m south of the district center, these buildings were registered as Grade I sites by the Diyarbakir Regional Council for the Protection of Cultural Assets in 2018. As a result of the researches, it was determined that this area, where there are about 15 cisterns in the area, was used to collect water and supplies in the past. Although the area has been registered, it has been determined that no arrangements have been made (Alp, Kafadar and Bostan, 2021).



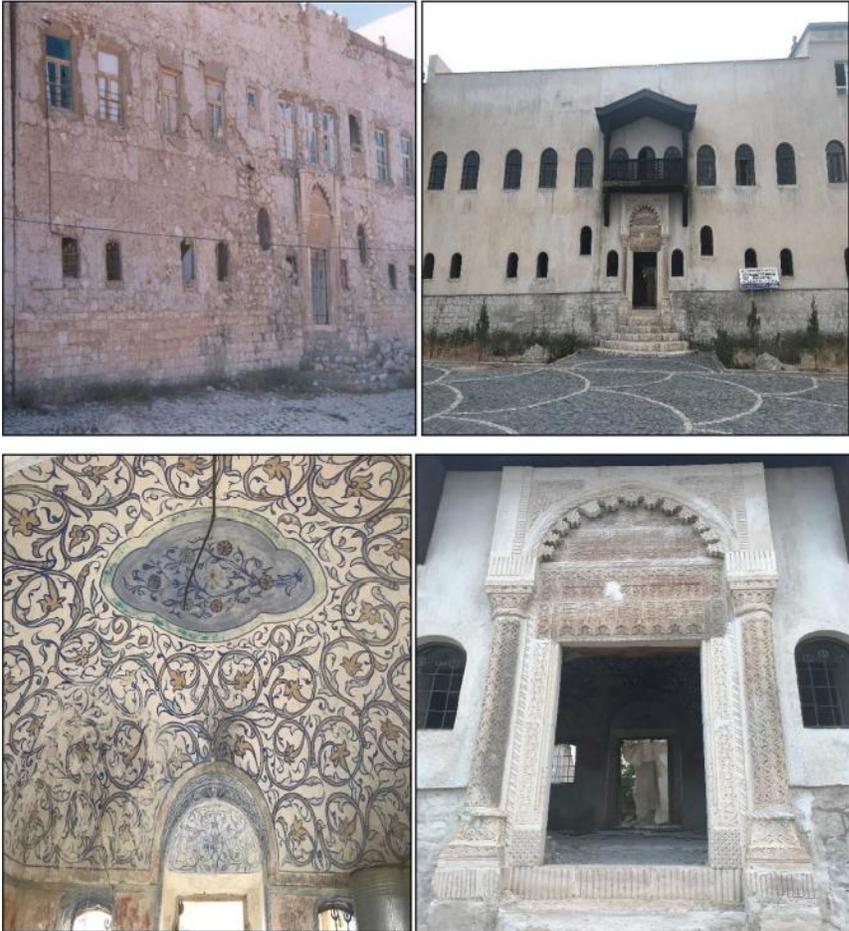
**Figure 4. A General View of the Land Where the Water Houses are Located (Original, 2019)**



**Figure 5. Image of the Entrance Door of the Water House (Original, 2019)**

### ***1.5. Sheikh Nasrettin House***

It is located right next to Sheikh Kamil Mansion in Fakirullah District of Tillo district. Sheikh Nasrettin's house was registered and protected by the 2006 decision of the Diyarbakir Regional Council for the Protection of Cultural and Natural Assets. The plan structure is slightly different from other houses and decoration items are used more.



**Figure 6. Images from the exterior and interior of Sheikh Nasrettin House  
(Kılınç, 2019)**

### ***1.6. Sheikh Kamil Mansion***

Tillo District Fakirullah Neighborhood is located on Halfızzıyare / Sultan street. The house was registered and protected by the 2006 decision of the Diyarbakir Regional Council for the Protection of Cultural and Natural Assets. The structure, which reflects the characteristics of siirt houses, has an inscription.



**Figure 7. Sheikh Kamil Mansion and New Building (Anonymous, 2021)**

### ***1.7. Tomb of Sultan Memduh***

The Tomb of Sultan Memduh is located in a high area in the center of Tillo. It is known that He was the grandson of Ismail Fakirullah Hz., who lived in Tillo district of Sultan Memduh. The embroidered entrance door, which is a rare example of stonework of the mosque, attracts attention with its geometric and writing decorations on the metal door. There are also two spheres on the fence above Sultan Memduh's chest, one representing heaven and the other representing hell.

Commemorative events are held annually in Siirt. It is known that the region is a very important scholar for faith tourism.



**Figure 8. Image of Sultan Memduh Tomb (Kılınc, 2019)**

### ***1.8. Sheikh Mucahid Tomb***

Sheikh Mucahid Hz. Tomb Tillo is located in a cemetery in the center. He is the son of Sheikh Mucahid Sheikh Hamza al-Kebir, whose real name is Ibrahim, and was born in Tillo, although his date of birth is unknown. İbrahim Hakki Hz. In his works, Sheikh Mucahid spoke of many of his conjures. The tomb of Sheikh Mujahid Hz., one of the important scholars who grew up in Tillo, is remarkable in terms of tourism (Anonymous,2022).



**Figure 9.** An Image from the Garden of Sheikh Mucahid Tomb (Kılınç, 2019).

### ***1.9. Tomb of Sheikh Hamza Al-Kebir***

This tomb is located in a cemetery in the center of Tillo. The date of birth is unknown. One of Tillo's most important religious figures, the present tomb of Sheikh Hamza al-Kebir, who died in 1271, is thought to have only been built in the 18th-19th century (Anonymous, 2020).



**Figure 10.** Tomb of Sheikh Hamza Al-Kebir (Kılınç, 2019).

## **2. THE VALLEY OF BOTAN**

Parts of the Botan Valley are canyon-shaped. Located to the east of Siirt city center and 4 km away, the valley is canyon-shaped, this part is called Botan Canyon. Botan Canyon is very remarkable for tourism. Since the layers in these valleys have a different structure litologically, different forms of amenities and accumulations (cornices, semen, etc.) have occurred(Kılınç, 2019).



**Figure 11. An Image from Botan Canyon (Kılınç, 2019)**

### **3. NATURE PARK**

Natural Park has Botan River to the east, Tillo District Center to the west, Tashbalta village road to the north and Castle Recreation Area to the south. In this area, which is about 40.14 ha wide, 29 genera belonging to 18 families of seeded plants and 29 different plant tases belonging to these genera have been identified. There are also animals such as fox, coyote, striped hyena, scorpion, raven, magpie, carrion crow, red vulture, red viper, mountain nightingale, born, falcon, crazy (Anonim, 2022a).



**Figure 12. An Image from the Botan Valley and Natural Park (Original, 2021)**

### **4. RESULTS AND RECOMMENDATIONS**

The cultural and natural heritage of the region contains a whole of history and natural space, which is more extensive than just a historic area or a natural landscape. From this point of view, the Tillo district has the potential for a regional cultural route. The following principles

and recommendations are provided for maintaining, presenting and demonstrating the values of the district.

The following principles should be observed in the planning of a long-lasting cultural tourism in Tillo district.

1. Tourism; take into account the potential for benefits for locals, cultural assets and visitors,
2. Owned by the District; to present architectural, natural, cultural and human values by looking holistically,
3. Manage the quality of visitor mobility in the best way, while providing access, experience, knowledge and learning to the natural and cultural presence of incoming visitors in the district, while minimizing potential adverse effects and optimizing the quality of visitor mobility,
4. To identify the consequences that may pose a threat to the sustainable tourism of the district (such as visitor pressure, vehicle density, wear and tear in the cultural presence, inappropriate visitor behavior in natural and cultural areas) and reduce its effects,
5. To contact the relevant local and international persons and organizations that will uphold the values of the district.

The most notable historical and cultural feature of the region is the light event on the day anniversary on 21 March and 23 September. During this period, visitors from different parts of the country and the world flock to the district. It should be noted that Tillo's value will meet the personal expectations of visitors to the district as well as contribute to

their personal development to the extent that it preserves its other historical and cultural texture holistically. The following recommendations have been developed in line with the above mentioned firsts;

1. Although the area "Water House" specific to the region is defined as a Grade I site, no function has been installed on the area. In the context of this work, the most important work for the point is the development of the concept of "Eco Museum".
2. In recent years, the city's ever-changing dynamic structure has resulted in a rapid divergence in the society structure and the district, with the influence of globalization. This change is a representative structure of the housing CAS houses, as seen in Sheikh Kamil Mansion Figure 7. However, it is observed that the newly built building next to it has been torn apart in the context of the protection of urban historical tissue. A directive must be drafted by local governments to not disrupt the historical fabric of the city in the new structures.
3. The best examples of Cas Houses, which are made with materials and construction techniques of that day and which appear according to the current functions determined by the conditions of the period and the economic and social environment, are located in the district. It should be re-functionalized for those who want to experience the local way of life and culture of the past while preserving the original values of these structures.

4. In the memory of the people belonging to the historical and cultural sites owned by the District; The abstract cultural value behind concrete cultural value should be determined after the memory of the city on conventional oral history, music, literature, fine arts and residential life cultures is collected and sorted. So it belongs to this community; culture, identity, traditions and beliefs will be more visible.

5. Located in the east of Tillo district, botan valley natural landscape landscapes have the potential to meet expectations in terms of photography. Appropriate photo taking points should be determined for this area.

6. Publications of the natural, historical and cultural texture of Tillo should be prepared in a holistic way.

In order to reach the target level in Tillo cultural tourism and to ensure the expectations of visitors, the following topics should be paid attention;

1. To improve the quality of the historical, cultural and natural environment in the district,
2. To improve the quality of the incoming visitor experience,
3. Managing the number and flow of incoming visitors,
4. Taking measures to benefit the local community and the economy
5. Collaborating with other attractions in the region to plan complementary events

6. To provide infrastructure support for the development of the tourism sector in the district.

As a result, what makes Tillo county different is that it has many abstract and concrete values to evaluate as a whole. These values are also the building blocks of county identity. These values are also a prerequisite for the continuity of the identity of the district. When these promoted values are managed correctly, they have numerous opportunities to create a strong synergy between culture, heritage and tourism. Since these opportunities differ in the district, different solutions need to be developed for the district. While different solutions are being developed for the district, it will be important to produce in a consistent and meaningful integrity with each other, rather than unannounced, independent solutions in settlements located in the same geography and culture on the scale of basin and region. In this process, central administrative bodies, local governments, tourism sector and local people should act together and work together for an effective and sustainable cultural tourism in the district.

The natural, historical and cultural assets of Siirt's Tillo region, located in the fertile geography of civilization history, are maintained and reassessed in accordance with the nature of their natural, historical and cultural assets, placing a great responsibility on local governments. These natural historical-cultural assets that are owned will be a more secure-looking, self-identified city that links to the past at the rate it is "protected".

Cultural tourism, which will increase in the district, will increase the international recognition of the region with rational planning and contribute to its economic development. Thus, cultural tourism will be an important part of the district economy and will make important contributions to the protection of the cultural heritage.

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## **CHAPTER 10**

# **SPACE PERCEPTION, SPATIAL BELONGING AND PLACE ATTACHMENT IN DESIGN AND PLANNING**

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## **INTRODUCTION**

Shelter is one of the most basic human needs. In the past, people, who created spaces only to meet this need, now create spaces for both their physical, social and psychological needs. In the simplest sense, space refers to "place". However, for the reasons listed, it is not correct to limit the space only to "place".

The word space is a Latin term derived from the word spatium. While most thinkers in the Middle Ages used the equivalent of this word as a container, Descartes used it in the sense of spreading and dispersion and argued that we better understand the world we live in with this space approach (Kaya 2013). Space is defined by Hasol (1990) in the architectural dictionary as “a space that separates the person from the environment to a certain extent and is suitable for carrying out various actions in it” (Akkaya, 2019).

The human-space relationship is the expression of a partnership that has lasted from the first human to the present. There is a constant interaction between people and places. This interaction is provided by people seeing, interpreting and perceiving places through their senses. The better people perceive places and the more meanings they attach to them, the easier it is for them to integrate with the place and adopt it (Akkaya, 2019).

Planning studies are generally macro-plan-scale studies, and it is a process in which the decisions taken at the upper scale are transferred to the lower scales step by step, and separate plans are made at each scale. The final stage of the planning process is the starting point of the

design process. In design, areas at lower scales are shaped in line with the decisions taken in planning. While shaping the areas, it is tried to reveal the best possible spatial compositions. While the planning process generally produces objective results, the design process develops according to the designer's vision, cultural background, value judgments and aesthetic understanding, and accordingly, an infinite number of solutions emerge (Korkut et al., 2010). The most important instrument of both planning and design studies is undoubtedly the spaces.

In urban design and planning studies, physical needs, expectations and possibilities are taken into account while creating or constructing the space. In addition, the perceptual relations of the individuals who will use the space with each other and with the space, as well as the levels of spatial belonging and place attachment are parameters that must be taken into account. According to Cresswell (2004), the individual starts to search for his own space as soon as he interacts with the community in the social ecosystem. In order to ensure its continuity, it strives to create a place where it can rebuild its existence and identity (Şentürk and Gülersoy, 2019).

It is possible to consider space as urban space and architectural space. There are various definitions of different researchers on this subject. According to İnceoğlu and Aytuğ (2009), urban spaces correspond to every built or natural environment that people can easily access. It includes all streets, squares, roads, residential areas, parks with commercial or public uses for people, open spaces, places where the

public can enter public and private spaces without any restrictions, at least during the day.

Urban spaces are now in a process of change to meet the sociological, physiological, etc. needs of people. Urban spaces have begun to take shape through the concepts of individual perception and collective perception. Today, images and identities of urban spaces are created in line with the perceptual and cognitive needs of people and society (Bayramoğlu 2010). According to Alexander et al. (1977), urban spaces are living organisms that can respond to changing socio-economic conditions and the cultural texture of cities (Akkaya, 2019).

The definition of a 'space' as a 'city' takes place over a long period of time. In this process, the geographical content, cultural level, architecture, lifestyle and historical past of the city are the elements that form and shape the city (Relph, 1976). The way people perceive the urban space is one of the factors that determine their belonging and attachment to the place.

## **1. SPACE PERCEPTION**

Perception is defined as "transferring the objective world to subjective consciousness through the senses". Perception, which is also defined as the process of obtaining various information from the environment, varies according to the person, and the subjective qualities of the person, the culture, the environment and the social group in which he lives affect the perception. In the perception process, the person receives information from his/her environment that is suitable for his/her purposes (Özcan et al. 2003). In other words, perception varies

in people. The main reasons for this change are personal differences such as age, gender, education, etc., which play an active role in the processes of evaluating the information obtained by people through their senses. Lynch (1960), Rapoport (1987) and Lang (1987) stated that the basis of this differentiation is also culture and social memory, and they state that the meanings attributed to places vary due to these differences, and accordingly, the images in people's minds are different from each other (Eraydın, 2016, Akkaya 2019).

Perception can change according to the effective situation in the space and its effect on the sense organs. This sometimes causes the sense of sight, sometimes hearing, sometimes touch, and sometimes smell to take priority. Perception (sometimes confusedly referred to as "cognition") deals with more than just seeing or feeling the urban environment, it also refers to the more complex process and perception of the stimulus (İnceoğlu and Aytuğ 2009).

In the process of perception, objects are not grasped as mere realities. It is also understood as sympathy and antipathy. Perception is a mixture of development with emotional activities. However, with the mental development of human beings, perception gradually begins to purify from this emotional state and turn into an activity of consciousness. In other words, it is important to grasp the semantic whole that exists in the background beyond the objective reality in perception. The comprehension of this semantic whole, of course, belongs only to the perceiving person and expresses a subjective situation (Özcan et al.).

The human-environment relationship occurs as a result of the interaction of cultural, physical and perceptual variables. With this situation, people adapt to their environment in line with their needs and expectations. In Maslow's (1971) pyramid showing the basic needs of man (Figure 1), basic needs are listed as physiological needs, safety needs, social needs, needs for respect, needs for realization, needs for comprehension, aesthetic needs, psychological and socio-psychological needs (Bayramoglu 2010). Tarım (2014) states that Maslow's personality categories are divided into classes among themselves and that people cannot move to another category without fully meeting their needs in one category. This forms the basis of perceptual differences among people. Aesthetic feelings and activities that the person wants to do for pleasure are in the top category. For example, a person whose job, income, emotional needs, etc. needs are fully met, enjoys a landscape with high visual value more than a person whose needs are not met (Akkaya, 2019).

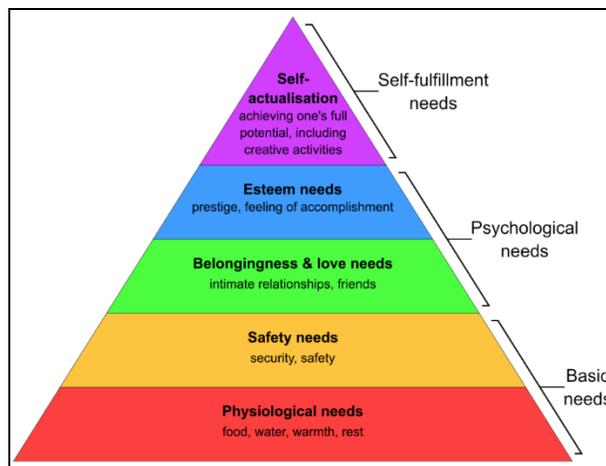


Figure 1. Maslow's Pyramid (Anonymous, 2022)

In the planning and design process, which is also defined as the act of creating a space and making the space livable, perception is the first step in obtaining the right clues. In order to get the right clues, it is necessary to be conscious of the environment first. The stimuli that people receive from the environment are mostly visual. For this reason, it is very important to develop the sense of sight and the ability to comprehend what one sees in order to become conscious of the environment (Özcan et al.).

The environment always emits much more information than we can perceive. Their selection is related to the nature and objectives of the observation. The information received from the environment is actually objective. However, receiving and evaluating it differs according to the perceiver. In other words, an individual's physiological abilities affect his perception of the environment, recognizing it, thinking about it and using it, and personality traits add a subjective quality to the perception process. Social groups also play an active role in the perception process (Özcan et al.).

People cannot always pay attention to everything in the places they are in, they focus on some things while ignoring others. However, those that escape their eyes are also stored somewhere in their memory, even if they are not aware of it. In short, people behave selectively towards places. The first step of this behavior is the perception process (Asar 2013, Akkaya 2019).

## 2. SPATIAL BELONGING

Space is the three-dimensional spatial (comprehensive) environment between people (Altman et al. 1980). Attachment and emotions form the basis of belonging and relationship. According to sociological studies, belonging is related to the geographical location of the place, the environment, the attitudes and behaviors of the people, social relations and being connected to personal opportunities. Spatial belonging is defined as an emotional relationship between people and space, formed through cognitions, judgments and decisions (Riley 1992). At the same time, spatial belonging is defined by Brown et al. (2003) as the positive relationship between people and physical and social environments that contribute to their identity and also provide other psychological benefits (Göregenli 2010, Çay 2011).

Pretty et al (2003) used the concepts of spatial identity, commitment and distinctiveness as a criterion of spatial belonging (Çay 2011). Belonging is a socio-psychological construct consisting of environmental psychology, human geography, and concerns about emotional connections and complex functions developed between people and geographic areas (Low and Altman 1992, Stokols and Shumaker 1981, Tuan 1980, Smith, 2010). Many scientists argue that individuals are attached to places that are special and important to them through various mechanisms. As a result, it is widely thought that belonging is a multidimensional construct. While many discussions about the different dimensions of belonging continue (Kyle et al. 2005, Hammitt et al. 2006, Hammitt et al. 2009), a consensus has been

reached on the importance of spatial attachment and identity on belonging, which are two closely related views (Smith 2010).

There are some factors that are necessary for the formation of belonging. The most important of these is that people can create a sovereignty area as a result of internalizing the space around them. There are three elements required for internalizing the space in the behavior model regarding the sovereignty area discussed: 1. Ownership, 2. Protected Space, 3. Place Belonging (Ilgin and Hacıhasanoğlu 2006).

The sense of belonging, which is an abstract concept, is one of the basic needs of human beings, and when this need is not fulfilled, it is seen that the feeling of loneliness increases or anti-social behaviors develop in individuals (Maslow 1954). The qualities that make up an individual's belonging are defined as effect, sensation, emotion, perception, experience, action and behavior (Altman and Low, 1962). Evaluation of belonging, independent of physical space, only through an individual perception, started to become a point of criticism with the 1970s. It has been emphasized that a place to belong is necessary for the formation of a culture of belonging and the importance of this place in establishing a sense of individual belonging and spatial belongingness (Schulz 1985, Pretty 2003).

### **3. PLACE ATTACHMENT**

Place attachment is defined as individuals' perceiving, associating and feeling themselves in relation to a special and specific place (Moore and Graefe 1994). Various studies reveal that a part of spatial attachment is

related to recreation (Hailu et al. 2005, Smith et al. 2009). According to Göregenli et al (2014), place attachment generally refers to the emotional attachment of people to the physical environment in which they live or interact (Hummon 1992, Low 1992). In this context, “place” is a broad concept that includes both residential areas (home, residence, neighborhood, city, etc.), places visited for recreation or entertainment (nature, summer houses, forests, etc.), natural and structured environments (Lewicka 2010). People feel the spaces they live in beyond perceiving a physical reality, they connect to them and define their sense of self through some spatial variables. Just as an identity independent of the space cannot be thought of, neither can a space without an identity be thought of. People establish relationships with the places they live in, attribute meanings to them and form their identities through this vital environment (Göregenli and Karakuş 2014). There are some environmental variables that differentiate the levels of attachment to the place, and these are the features arising from the physical and architectural structure of the place, such as the architectural distinctiveness of the place (Wilson-Doenges 2000), the amount of aesthetically pleasing buildings, the width of the green areas. The fact that a place has these features and the positive evaluation of these features by the residents of that place causes an increase in the level of attachment to the place in question (Bonaiuto et al. 1999, Göregenli et al. 2014).

#### 4. CONCLUSION

Man is in constant interaction with the space he is in. The physical factors within the space constantly warn the users. The space is tried to be grasped with its features such as its borders, the form, colors, texture and meaning of the surfaces (Aydıntan 2001, Akkaya 2019). In recent years, according to some theorists, there have been discussions (Giddens 1994, Relph 1976) that the globalization process and modernity experienced in economic and political dimensions have destroyed the "sense of place" and "authentic environments" in human and environment interaction. This situation has caused the issue of "connection to place" in social sciences to be met with increasing interest. The subject of "place attachment", which is studied by many different disciplines such as "environmental psychology, geography, architecture, design and planning", is of great importance in terms of questioning the relationship that people establish with space and understanding that they establish a unique relationship with the environment in which they live, just as they establish with other people or objects. (Göregenli 2010, Göregenli et al. 2014). Place attachment generally refers to the emotional attachment of people to the physical environment in which they live or interact (Hummon 1992, Low 1992). Arslan Avar (2009) emphasizes the social feature of space, in line with what Lefebvre said in his work *Dialectic of the Three -Perceived, Designed, Experienced-Space*: "Space is neither a mere abstraction and an object, nor just a concrete, physical thing. In all its dimensions and forms, it is both concept and reality, that is, social. Therefore, it is a set of relations and forms. Again, it is not lifeless, fixed, static, but alive,

changing, and fluid”. Lefebvre (1991) again emphasizes the social side of space with the expression "To change the world, it is necessary to change the space", and states that these changes are meaningless if they are insufficient to change the society or change life, and to realize the production of space. Because new spaces are needed for new social relations and again, new societies exist in new spaces (Gottdiener 2001, Akkaya 2019).

The correct planning and design of urban spaces directly affects the image and identity of the city. This interaction will be ensured correctly by analyzing the cultural relations existing in the city and the originality of the city well and including them in design and planning studies (Akkaya 2019). Based on the research of Gifford et al. (2009), who stated that people are attached to that place to the extent that they feel safe in a place, it is possible to talk about the importance of designing cities where residents feel safe in every region. Therefore, it can be emphasized that urban designs should be sensitive to physical and social arrangements that allow residents living in different parts of the city to belong to spaces of very different scales and at the same time allow a commitment that everyone can feel belonged to (Göregenli et al. 2014). As a result, while creating urban spaces, it should not be forgotten that different professional disciplines work together and jointly, and that the wishes and needs of the users of the space can be met by evaluating them from different perspectives, thus increasing spatial belonging and place attachment.

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**CHAPTER 11**

**CLIMATE CHANGE FROM THE LANDSCAPE  
ARCHITECTURE PERSPECTIVE**

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## **INTRODUCTION**

The concept of climate is defined as the average weather conditions over a long time period in a region on Earth. By common definition, the climate is expressed in terms of expected temperature, precipitation, and wind conditions based on historical observations. “Climate change,” on the other hand, is a change in average climate or climate variability that persists over a long period (Riedy, 2016). Although the climate is a constantly changing notion, the climate is changing more rapidly in modern times due to accelerated industrialization, rapid and unplanned urbanization, and intense population growth, especially after the industrial revolution, and these changes are primarily due to human activities (Gray-DeKraai, 2021). The exponential increase in the human population also causes serious increases in food and energy demands, and natural resources have begun to be consumed uncontrollably, ignoring the supply security to meet this demand. In this process, humans spread rapidly to the world by increasing the emission of other greenhouse gases (GHG), primarily carbon dioxide (CO<sub>2</sub>), increasing their land use for agriculture and development. Every living being has the ability to cope with the physical or mental problems it encounters as an innate feature. When we think of the world as a living organism, the same is true for this fragile and sensitive organism that includes all ecosystems and inter-ecosystem relationships. However, when problems exceed a threshold value, the situation may become unresolved without an external auxiliary source. This is the situation for the world, especially with the industrial revolution. The destruction of forests, intense urbanization, increasing industry and population, the

necessities of modern life have combined to make our world difficult to cope with. This situation has caused global warming along with many different problems such as deterioration of environmental balance, air, water, and soil pollution, habitat fragmentation. The destruction of forests, intense urbanization, increasing industry and population, the necessities of modern life have come together to make our world difficult to cope with. This situation has caused global warming with many different problems such as deterioration of environmental balance, air, water, and soil pollution, habitat fragmentation (Suhrke, 1993; Manisalidis et. al., 2020; OECD, 2020). The accumulation of greenhouse gases that trap heat in the atmosphere as a result of human activities and deforestation are the two most important reasons that trigger global warming, which is a common problem for the whole world. Carbon dioxide, water vapor, methane, nitrous oxide, chlorofluorocarbons are the main greenhouse gases. The anthropogenic ones of these gases come out as a result of the use of fossil fuels, agriculture, animal husbandry, deforestation and biomass degradation, inappropriate waste management, and various industrial activities. All this, according to the 6th Report of the Intergovernmental Panel on Climate Change (IPCC) for policymakers, the human-induced global surface temperature measured in the first half of the 21st century (2001-2021) is 0.99 °C from the measurements between 1850-1900. higher (IPCC, 2021). This situation reveals the increase in the acceleration of global temperature change. Today, the oceans, which are important carbon sinks, are withdrawn, permafrost (frozen soils) and giant glacial masses are melting, precipitation regimes are changing, and as a result

of this situation, problems such as floods and overflows, soil losses, decrease in biodiversity, loss of life and property arise.

The five critical environmental changes caused by global climate change are listed as follows (Public Health Institute, 2016):

- Increase in Earth's surface temperature and ocean temperatures: The Earth has warmed at a rate of  $0.13^{\circ}\text{C}$  per decade since 1957, almost twice the rate of warming in the previous century.
- Changes in the global water cycle: In the last century, annual precipitation has increased in other periods, following severe and prolonged drought in some regions. The distribution and frequency of precipitation have changed. As a result, the frequency and intensity of storms increase as the atmosphere warms up and can hold more water vapor.
- Decrease in glaciers and snow masses: Almost all glaciers around the world are decreasing in area, volume and mass. One billion people living in river basins fed by glaciers and snowmelt are adversely affected. There is a loss of life and property as a result of floods and overflows.
- Rising sea level: Heated water expands, so as the oceans warm, the increased volume of water causes sea level rise. Melting glaciers and snow masses also cause seas to rise.
- Ocean acidification: The oceans absorb about 25% of the  $\text{CO}_2$  emitted from the atmosphere, which causes the pH level of seawater to become increasingly acidic. Coral reefs turn white as a result of increased acidity, which means that sea creatures

with shells with  $\text{CaCO}_3$  character cannot produce shells, which leads to a decrease in aquatic ecosystem diversity.

As a result of these global changes, extremes have started to be seen in weather events. Arid regions are now drier; summers are hotter (Bostan, 2020); winters are colder; longer and more severe forest fires; as a result, extreme conditions such as severe tides and storms are experienced.

The increasing anthropogenic impact on the natural environment over the centuries (Goudie, 2018) has created one of the most recent effects, COVID-19, when looking at the relationship between planet and human health. The COVID-19 crisis shares distinct similarities with the climate crisis in that it has simultaneous global health and economic consequences. Arguments to be used when fighting both the pandemic and climate change are considered common (Klenert et. al., 2020). According to the report prepared by the Harvard University School of Public Health (2021) (Coronavirus and Climate Change - C-CHANGE|Harvard T.H. Chan School of Public Health), while our planet is warming, animals on land and sea are turning to the poles to escape from the heat. This mobility creates a suitable environment for animals that had no previous contact with each other to come into contact with other animals and for pathogens to enter new hosts. Although we do not have sufficient evidence that climate change has a direct impact on the spread of COVID-19, we do know that global warming is changing our relationship with other species on Earth and this is important to our health and risk of infection. In this case, we can

easily say that global warming caused by various human activities, while disrupting the delicate balance of our world, has indirect effects on human health. On the other hand, the increase in global temperature brings along the problem of drought. The consensus of scientists, who came together in climate agreements, is that many countries will experience water scarcity in the next 50 years. The scarcity of water will bring the threat of access to safe food, and the number of people dying of hunger will increase exponentially. It would not be wrong to say that these losses will have much more devastating consequences for poor countries, the disabled, the elderly, and vulnerable groups, which will be the first and most affected by the negative effects of global climate change (UNICEF, 2015). In the face of this global warming and the problems it causes, the contribution of forests and seas to the life of the world, the health of ecosystems, and the restoration of damaged landscapes are too great to be underestimated. Forests provide moisture to the atmosphere through evaporation and transpiration. This atmospheric moisture is carried by the winds and returns as precipitation. In addition, studies show that forests have important contributions to cloud formation (Tueling et al., 2017), therefore they are also effective on sunlight/shade dynamics and rain formation (Ellison et al., 2017). In this way, forests contribute to the cycle of evapotranspiration (evaporation from plants, water, and soil surfaces, and transpiration from plants) and precipitation, which are two important components of the hydrological cycle. Apart from this, they have important contributions in creating a microclimate by keeping the rain and melting snow waters with their roots, adding moisture to the

soil, filtering the polluted air with its carbon retention feature and releasing oxygen, providing shade, and sweating. Seas, lakes, and streams can self-clean through physical, chemical, and biological processes, which is called Assimilative Capacity (auto-épuration) in science. However, the auto-épuration process is interrupted by the increase in pollutants. After all, what we have left is the landscape that cannot renew itself, the natural balance of which is deteriorated, and us and all other living things that suffer from it. Several actions can be taken individually to combat climate change and other related problems and to contribute to the sustainability of natural processes in our world. Adopting adaptation and mitigation measures should be among the priority objectives.

## **1. STRATEGIES TO COPE WITH GLOBAL CLIMATE CHANGE**

In general, solutions to cope with the negative effects of climate change are discussed under two closely related broad headings: “mitigation” and “adaptation”. Government and non-governmental organizations have also begun to take more and more responsibility for measures to increase climate 'resilience', particularly in urban landscapes (US Global Change Research Project, 2014; Public Health Institute, 2016).

*Adaptation:* In natural or anthropogenic systems, it is defined as the capacity to adapt to a new or changing environment that enables to take advantage of opportunities or mitigate the negative effects of climate change.

Living walls that can be integrated into building surfaces and walls, tree planting and air-conditioning practices, restoration of wetlands are strategies to prevent sea level rise.

*Mitigation:* It includes measures to reduce the amount and speed of future climate change by reducing greenhouse gas emissions or removing excess carbon dioxide from the atmosphere.

There are many viable and cost-effective reduction strategies to reduce greenhouse gas emissions. These are the choice of clean and renewable energy for electricity generation; dissemination of walking, encouraging the habit of cycling, using low-carbon or zero-emission renewable energy vehicles, not using air transportation unless necessary; reduce meat consumption; regenerative and sustainable farming practices; It can be exemplified as preventing deforestation and increasing the number of green areas. In addition to these; alternative techniques such as direct air carbon capture and storage, soil carbon sequestration, alternative negative emissions utilization and storage techniques are also used (Fawzy et. al., 2020).

*Resilience:* It is the ability to anticipate multi-hazard threats, be prepared for hazards, respond to changing conditions, and avert negative consequences, while minimizing harm to social welfare, the economy, and the environment.

Emergency preparedness planning that takes climate changes into account is one way of adapting to the increasing frequency of climate resilience. The capacity to anticipate, plan and mitigate the dangers of

environmental and social changes brought about by climate change and seize all opportunities are associated with these changes.

## **2. INDIVIDUAL AND SOCIAL MEASURES THAT CAN BE TAKEN AGAINST CLIMATE CHANGE**

Environmental education is expressed as teaching children and adults to make wise decisions about how to learn and study the environment and how to protect it (North American Association for Environmental Education, 2014; Çabuk, 2019:20). The concepts of awareness and consciousness are also of great importance for the implementation of these strategies and the determination of sustainable environmental solutions. It is essential to provide trainings that will enable individuals to adopt a peaceful approach towards the environment in the pre-school period when environmental awareness begins to settle (Hart, 2008). Generations growing up with this awareness should know that every trace they leave in nature will not be erased even after centuries. Societies should be made aware of both regional and national institutions and organizations in order to reduce their carbon and water footprints. There are a number of measures that can be taken regarding transportation. It is known that air transport, in particular, releases a significant amount of carbon into the atmosphere. Limiting air travel, for example not allowing flights between distances closer than 1000 km, can be an effective measure (Timperley, 2020). For land transportation, hybrid vehicles working with energy should be used instead of fossil fuel vehicles used, and in cases where this situation cannot be realized, public transportation should be encouraged.

Similarly, spreading the use of bicycles in cities can be another solution proposal. In the selection of household appliances such as air conditioners and refrigerators, green certified products should be preferred (OECD, 2008). Energy-saving devices should be preferred (UNEP, 2015). Regulating shopping and eating habits are also effective measures that can be taken. It is known that animal husbandry contributes greatly to the emission of methane gas into the atmosphere. Indirect carbon emissions and environmental pollution caused by resource consumption in the cattle and poultry farming process are noteworthy. Many scientists have discovered that cattle and sheep are key drivers of greenhouse gas (GHG) emissions (Bonhommeau et. al., 2013; Burggraf et. al., 2015; Zhuang and Li, 2017; Shi et. al., 2022). In animal husbandry, where water consumption occurs to a large extent, there are dangers such as clearing forests for grazing, destruction of pasture areas due to uncontrolled grazing, and damage to young forests. In this case, reducing meat consumption can be seen as an effective step. Consuming natural products grown in each region in season can be another solution. When discussing the causes of climate change, the problem usually starts with energy consumption. In addition to the knowledge that many anthropogenic greenhouse gas emissions are caused by the combustion of fossil fuels, it is extremely important to look at the effects of other environmental concerns, such as waste management, on climate change. The discovery of some important non-energy sources of greenhouse gases, including methane emissions from landfills, and the wrong choices and policies in waste management have a surprising impact on the way we use energy (Ackerman, 2000).

Systems that enable the separation of domestic wastes according to their categories and the use of gray water from the kitchen and bathroom in the irrigation of green areas with recycling systems can be expanded. Similarly, the use of domestic waste as a natural fertilizer by making compost is another example.

### **3. LANDSCAPE ARCHITECTURE AND CLIMATE CHANGE**

It is widely accepted that our climate is changing, and that these changes are at least partly the result of human activity and accelerated by anthropogenic interventions. The Climate Change Synthesis Report (Summary for Policy Makers) published in 2007 by the Intergovernmental Panel on Climate Change (IPCC) included the following results (Landscape Institute Position statement, 2008):

- CO<sub>2</sub> emissions have been at their highest in nearly 650,000 years,
- Climate change is an undeniable fact,
- the probability of climate change occurring as a result of human activities is 90%,
- 10-15 years left to start reducing emissions and take the relevant measures.

Many scientists around the world monitor and analyze climate patterns. Climate-related changes will continue, regardless of future greenhouse gas emissions, due to the cumulative effects of gases released since the industrial revolution. Making landscapes adaptable and resilient to these changes should be seen as an urgent imperative for all those involved in the management of the built and natural environment

(Landscape Institute Position statement, 2008). Landscape architects; They have unique qualities that process and synthesize complex challenges that find sustainable and world-changing solutions. Landscape architects have a very important role in the fight against climate change, both in adapting landscapes to the effects of global warming and in making climate-sensitive designs by mitigating the causes of global warming (Conrad, 2017). The most important point that distinguishes landscape architecture from architecture that deals only with the built environment is its ability to cultivate and use the land and soil. Landscapes are traditionally shaped by cultivating the land, so they have the knowledge to retain carbon in the soil, as architecture cannot. Conrad (2017) underlined that landscape architects can do better than the carbon-neutral approach and drew attention to the necessity of determining the contribution limits of the landscape architecture profession in order to be able to take part in the global initiative beyond neutrality to do “net good” to the world and contribute to the fight against climate change.

- With the knowledge that materials such as highly processed plastic, steel and concrete have a high carbon footprint, these materials should be used at the lowest level in designs or alternatives should be developed.
- Natural materials such as reclaimed or sustainably harvested wood should be preferred.
- Afforestation practices should be increased.

- Coastal wetlands such as mangroves, tidal marshes and seagrass meadows can hold up to five times more carbon than tropical rainforests; bamboo, which has the ability to store carbon in the soil for thousands of years, can also be preferred (Hawken, 2017).
- Overgrading and terracing applications should be used to keep the carbon in the soil.
- Applications such as green roof, green way, vertical garden, rain harvesting, creation of natural trenches should be done.
- Permaculture and eco-village planning, in which the weakening relationship of the urban with nature is integrated and strengthened with a more organic bond, can also be concentrated on the city peripheries (Misiaszek et. al., 2019).
- Considering the mass-space balance, increasing the amount of open green space and water surface in areas with high building density can be another effective measure. Preferring the natural vegetation of the region instead of structural elements should be seen as a solution that both reduces the project cost and reduces carbon emissions (Yörüklü, 2021).
- One of the alternative farming techniques, regenerative agriculture can be studied (Hawken, 2017).
- Plant design practices such as Xeriscape, which allow controlled use of water, can be expanded.
- Blue-green infrastructure systems can be integrated, especially in cities.

- Accessibility to neighborhood parks, school gardens and sports fields at the neighborhood level should be facilitated. Designs and plans should be made so that individuals can easily circulate within walking distance and neighborhood scale.
- The total ecological footprint information can be included by calculating the water and carbon footprints calculated for each material used in the project (Conrad, 2017).

Besides these recommendations, sustainable urban drainage systems (SUDs) can be seen as a key prerequisite for water management in new development (Landscape Institute Position statement, 2008). Landscape architects will take a leading role in ensuring that a holistic approach is adopted by taking an active role in all renovation projects, both commercial and public. Interdisciplinary teamwork between the design, planning and construction professions will lay the foundation for the creation of sustainable landscapes that are resilient to global climate change and deliver a range of public benefits. Landscape architects should receive additional training in order to continuously respond effectively to the demands of the changing climate, and they should have a voice by expanding their administrative roles in the legal administrative framework. Finally, we should be able to take part as landscape architects at every stage of the development plans to be prepared, and we should actively participate in all processes from planning to design. In our professional discipline, which acts as a bridge between nature and culture, producing sustainable solutions for climate change adaptation and mitigation policies should be among our primary

goals. In all processes from planning to design; ecological and sustainable practices should be implemented with a peaceful approach towards our world, where public health and natural life are supported, biodiversity is protected, nature and the city are handled in an integrated manner. If these practices are successful, carbon neutral cities will cease to be a utopia and gain a real identity.

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**CHAPTER 12**

**STUDIES ON RURAL SETTLEMENTS: VAN OZALP  
DISTRICT CASE AS THE FIRST VILLAGE-URBAN  
APPLICATION**

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## **INTRODUCTION**

One of the most basic human activities is settlement. Settling in a place is highly important for the continuation of life, resting, eating, drinking, sheltering, etc., starting from hunting and gathering of the nomadic living communities to permanently living people. Ever since people settled down, they have settled individually and/or collectively in small and large places by giving them different names. Although reasons forcing nomadic people to settle down are not clear, the start of cultivation of the soil, agriculture and construction of shelters made up of mud are thought to be very effective. The concept of settlement has a wide scope and different meanings that is related to many fields of science, such as architecture, geography, economics, law, agriculture, etc. Therefore, while it is quite difficult to define the concept, settlements are generally classified as rural or urban settlements. Since these two different types of settlements form the basis of human activities, they cannot be separated from the related population (URL-1). In this context, it is possible to talk about the fact that the settlements are shaped together with the population. In this context, organized settlements with a population of more than 10.000 and where the inhabitants are engaged in non-agricultural activities (industry and service sector, etc.) are called cities. Whereas, rural settlements are areas with a population of <10.000, whose residents engage in agriculture and animal husbandary, settled there organically, and are places where most of the municipal services are not exist which are common in cities (Yılmaz, 2019).

Rural settlements are generally quieter and less transformative than urban settlements. However, it is also known that the population density in rural settlements has decreased in recent years as a result of changes in social life and the policies followed (Güler, 2020). Construction in rural settlements can be defined as processes that occur spontaneously within the financial means and possibilities of the people living in that region. Except for a few recent examples, it is seen that there is illegal, crooked and sloppy construction and generally a serious quality problem. It is also known that the buildings are deficient in terms of major physical properties due to lack of control. Therefore, rural settlements are seriously damaged in natural disasters (earthquake, flood, landslide, etc.), resulting with significant loss of lives and property. It is an important duty and responsibility of the state to propose solutions to these problems. However, it is known that for many reasons, the constructions in rural settlements are not adequately understood and responsible actors do not act correct. Although rural settlements are seen as a subject related to architecture, it is an area where actors such as city planners, landscape architects, local governments etc. have also roles. Rural residential areas are environments that reflect the life character, physical and climatic conditions, cultural structure of the regions where they are located with dominant local architecture. While the structuring of urban spaces is similar to each other day by day, it is easy to see that both the physical environment and the lifestyle in rural settlements are shaped in their own way. Qualified landscape and architectural products can be obtained when settlement and construction are done by using the

experience gained over the centuries (Eminağaoğlu and Çevik, 2007). Unfortunately, rural settlements are under a great threat due to the implemented inappropriate policies, increasing urbanization, misuse of natural environment and resources, illegal constructions unsuitable to the region and culture. The identity and landscape values of rural settlements have started to decrease and planning and design problems have arisen, especially as a result of unconscious construction. In fact, it is a fact that the studies on the planning and design of rural settlements are limited or are suppressed. In this direction, this study briefly touches on the historical process of policy, planning and design studies for rural settlements in Turkey. It also emphasizes the importance of evaluating these studies in integrity with urban-rural, local architecture, natural landscape, social, cultural and economic parameters, etc. On the other hand, a village-urban project, which was developed in Turkey in the 1970s and put into practice in the Özalp district of Van province, is examined. In this context, this village-urban project, which has been developed with the idea of local, social, environmental and economic development on rural settlements, is discussed through social and spatial arrangement tools, policy, principles and planning processes. The sample area in the study is the first village-urban area which was conducted in the Özalp district of Van province. This study can also be considered as a contribution to the planning and design literature and practice of rural settlements in Turkey.

## **1. BRIEF HISTORY OF LEGAL REGULATIONS ON RURAL SETTLEMENTS IN TURKEY**

There exist social, cultural, political and economic dimensions of the implemented policies and planning and design studies on rural settlements in the world. Although rural settlements in Turkey have been hosting a large part of the general population for a very long period of time, the legislation on planning is insufficient and spatial regulation tools for increasing the living standards in rural settlements are lacking (Öğdül et al., 2018). Rural settlement policies have been shaped by agricultural activities, but other opportunities provided by rural conditions, experiences produced and transferred from generation to generation, and the richness occurred by cultural differences have been neglected (Eminağaoğlu and Çevik, 2005). Rural settlements in Turkey have gained an important place in every period. Especially after the establishment of the republic, the proposals produced as the solution to problems of rural settlements prove this reality. In this context, mechanization in agriculture, modernization movement in social and cultural life, renewal of living spaces, prepared development plans, dissemination of education through village institutes, land reform, implementation of villages with ideal plans, etc. are important (Kayın, 2015). Rural settlements reflect the physical, cultural and social characteristics of the regions where they are located. The rural population in the Ottoman Empire had an important place in the country's population. With the establishment of the Republic of Turkey, different studies have been carried out to solve the problems of this population and rural settlements. The first regulation regarding rural

settlements was the Village Law of 1924. The articles in the law regarding the physical texture of rural settlements and spatial arrangements are noteworthy. For example, definition of the village; the determination of its borders; regulations for housing, health, religious, educational, etc. structures; separation of rooms and stables in houses by a wall; and toilet construction are among these. In this context, the construction of "template villages" has begun in line with the ideal village model of the republic (Çetin, 1999). By the 1950s, a period in which significant changes were experienced in the rural-urban population and the urban population began to increase rapidly. After 1960, a planned period was started in which the regulations for rural settlements developed within a certain program. In this period, the five-year development plans prepared for rural settlements were adopted to different government programs under the names of 'central village', 'village-urban, and 'agricultural-city' in line with the same objectives. The 2000s was a period in which Turkey-EU relations developed positively and the negotiation process accelerated. The Rural Development Strategy built in this direction was aimed to increase the physical infrastructure services and quality of life of rural settlements through new job opportunities for economic development, the improvement of human resources, the development of new organizational models and local development (Güler, 2020). When analysed the policies implemented in the period from the proclamation of the republic until present regarding to rural settlements, it is seen that there is an effort to solve the problems. However, the studies carried out are confined to a very general framework and did not penetrate into the

villages. If the conducted development plans and the policies were more specific in line with different data, and the physical, social and economic development of rural settlements were evaluated as a whole concept, then different results could have been emerged.

## **2. VILLAGE-URBAN MODEL IN RURAL DEVELOPMENT**

In Turkey, problems related to rural settlements start from the Ottoman Empire, continue until the early Republic and today. It is possible to evaluate these problems under two main headings. The first is that rural settlements have a very large and irregular settlement due to geographical and cultural reasons. This situation limits the state's ability to invest and provide services in these areas and result with increases in the costs (Koç and Gül, 2006). The second is the decrease in the rural population and the rapid increase in the urban population as a result of the migration movements that started in the 1950s and intensified after the 1960s in Turkey. As a result of this unplanned population movement, 'scattered' and 'distorted' settlements began to emerge in the cities, and on the other hand, pastures and forests were left out of use in the rural settlements. These two situations prevent rural settlements from integrating with urban areas and social life. It was essential to invest with limited resources and provide services to correct the negative conditions in rural settlements and to stop migration. One of the most important steps in this direction is the center-village and village-urban approach, which aimed to determine the priority areas, create central regions and reach as many people as possible. Target was to provide water, electricity, health, education, transportation and

communication services to a settlement in the center of scattered villages with a “central-village” approach in the 3rd five-year development plan (1973-1977). Providing services such as security, agricultural technical assistance, small industry, workshops, medium-level education services, non-formal education activities, land registry-cadastral, cooperative, bank branch, cold storage, commercial establishments, sports and entertainment facilities was planned for the second stage (Doğanay, 1993; Güler, 2020). In this direction, 7 thousand out of 40 thousand villages were determined as central villages and it was planned to put all basic service investments (DPT, 2000). Although the central village model was tried to be implemented at different period of times, the planned goals could not be fully realized, the economic development of the villages was not taken into consideration and the problems could not be solved. However, the central village application, as a rural development model, had a positive effect on the development of the rural structure (Erkul and Esgin, 2012). In the 4th five-year development plan, the concept of village-city was discussed instead of the central village approach. The village-urban approach was considered as an application implemented in different geographies of the world to bring urban services to the villages, reduce urban/rural divide and slow the migration to the cities. In the village-urban approach, a union is formed by proximate villages to deliver basic services to these villages. The aim here was to enable the villagers to reach the opportunities of the cities in a healthy way without abandoning the settlement areas. While the project has the opportunity to organize villages, it also transforms the production, development,

efficiency, economy and social structure in the villages (Çolakoğlu, 2007). The problems experienced in rural areas in Turkey have always been one of the important topics. It is planned to provide the most basic services (health, education, etc.) to cluster settlements formed from villages close to each other, since the unification of villages is not appropriate in terms of socio-cultural, economic, etc. In this direction, center-village, agriculture-village, village-urban approaches have been brought to the agenda by different governments in different periods. While the administrative aspect of the center-village approach predominates, it is seen that the economic and social content also comes to the fore in the village-urban approach (Güler et al., 2014).

### **3. VAN OZALP DISTRICT CASE AS THE FIRST VILLAGE-URBAN APPLICATION**

As the first application area of the village-urban project, which came to the fore in Turkey in the 1960s, Dorutay Village and its surroundings in the Özalp District of Van Province and Taşkesti Village in the Mudurnu District of Bolu Province and its surroundings were selected. In 1978-1979, this project started to be implemented for the first time. It is seen that different factors were taken into consideration in the selection of Özalp District of Van Province for the implementation project of the village-urban project. Some of these major factors are;

- Natural and social conditions were evaluated in detail.
- The centers determined as the Köykent Project area are located outside the mountainous lands.

- Roads between the center and surrounding villages have been considered.
- Settlements with a high population were determined.
- Special care has been taken to ensure that the facilities to be located in and/or near the settlements are located on the governmental lands.
- Care was taken to cooperate with existing cooperatives in the region.

### ***3.1. Project General Information***

The Köykent project can be interpreted as an economic and spatial organization model in general. It is envisaged that people living in rural settlements will be able to compete with people living in urban, especially by the help of the established cooperatives. Village-urban are not only centers where certain services are gathered, but also places where rural settlements become modern, production is regulated and agriculture is industrialized. In the “Köykent Project”, which was implemented in 1978, two main settlement units were determined as the pilot project area. The first one was in the Eastern Anatolia Region, where animal husbandry activities are intense, and the other was in the Southeastern Anatolia Region, which was determined as the irrigation region (Anonymous, 1978).



**Figure 1. Photos from Van Özalp District, 1970s (Anonymous, 1978)**

### ***3.2. The Situation of Özalp District in the 1970s<sup>‡</sup>***

#### ***3.2.1. Geographical condition***

Özalp district is in the east of Van province, on the Iranian border. It is also adjacent to Muradiye, Gürpınar and Başkale districts of Van. Özalp is a mountainous region, has plateaus covered with meadows that are valuable for livestock. The district has a connection to the center of Van both by road and by railway (Anonymous, 1978).

#### ***3.2.2. Population status***

According to the general population census made in 1975 throughout Turkey, 43.177 people live in Özalp district. 10% of the population lives in the district center and the remaining part lives in the villages (Anonymous, 1978).

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<sup>‡</sup> The situation of the Özalp District of Van Province in the 1970s and all the detailed information about the Koykent Project were compiled from the book titled "Development Proposal for the Rural Area: Köykent Van-Özalp 1978 Köykent Bundles Order" published by the Ministry of Rural Affairs and Cooperatives in 1978.

### ***3.2.3. Climate***

Özalp is the area that receives the least rainfall among the city center and districts of Van. Summer and winter average temperature differences are high. The natural plant of the region is meadow (Anonymous, 1978).

### ***3.2.4. Transportation***

While there were a total of 264 km of roads in the county in 1978; 20 villages have no roads. 20% of the population cannot benefit from the stabilized roads. Road construction, as a social service, is one of the important and primary duties of the state. As reach to the basic consumer goods, birth, illness, communication services, etc. for the people of the region is important, building new roads to access to the urban is a priority (Anonymous, 1978).

### ***3.2.5. Health***

Health services in the district are insufficient. There is a health center with 10 beds in the district center. But there is no doctor. There is only one dentist and three nurses. The dissemination of health services in the district is extremely important (Anonymous, 1978).

### ***3.2.6. Education***

Educated population level of the city of Van is above the average compared to other districts. There are 58 primary schools, 2 secondary schools and 1 high school in the district. There is no primary school in 22 of 77 village settlements. Education has become an important problem. Many teacher positions are not filled and there is no

organization providing vocational education in the region (Anonymous, 1978).

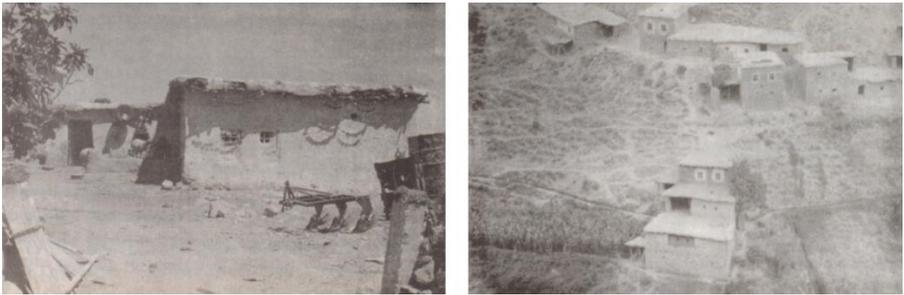
### ***3.2.7. Economical condition***

The main livelihood of the district is agriculture and animal husbandry. Agricultural productivity is low due to the inadequacy of irrigation facilities and harsh winter conditions. Although animal husbandry is intense, high yields are not common. Unemployment is one of the most important problems in the district. Local people generally migrate out of the province as seasonal workers. Technology, tools and equipment used in agriculture and animal husbandry are insufficient. Although the province of Van is defined as a livestock husbandary region, there is a lack of adequate organization number and qualified workforce in this area. Irrigation application is insufficient and water accumulating on the surface after the rains damages the crops. It is seen that the level of technical knowledge of the people dealing with farming and animal husbandry is low, and the agricultural technology applied is not modern. There is no enterprise for the utilisation of the produced animal products in the district. Cooperatives established by the people with their own means show poor performance. There are problems in accessing basic consumer products (sugar, gas, salt, construction materials, etc.) (Anonymous, 1978).

### ***3.2.8. Infrastructure and housing***

Most of the houses in Özalp district include one and/or two-room, flat-roofed, mudbrick structures. There is a tandoori house and a barn next to the houses generally. Since the tandoori house is warm, most of the

daily life is spent in this area. Disaster houses built in the region are not under usage because they are not suitable for the socio-cultural structure and climate and are far from the settlements. Houses in the region are generally unhealthy and not resistant to earthquakes. Although it does not seem possible to renew the entire housing stock, an urgent solution is required. A new zoning plan or road plan should be prepared for the village-urban project. In the interviews, it is seen that the most basic desires of the natives are village mansion, culture house and mosque. Since the summers are dry, there is a lack of drinking water. In the winter season, the distance to the drinkable water source causes different problems. Many of the villages are deprived of electricity. Communication possibilities are low because the roads are closed or not available (Anonymous, 1978).



**Figure 2. Houses in Van Özalp District in 1970s (Anonymous, 1978)**

### **3.3. Köykent Project Proposal and Implementation Process for the District of Özalp in the 1970s**

As a result of the field work in the area and face-to-face meetings with the native people, the Koykent Project was started. In the first stage, the project impact areas were determined and different relation networks

were established starting from the villages to the outside of the district. In this direction, village-urban centers at different levels have been proposed for different services and actions. Cooperatives, which are an important pillar of the Koykent Project, will be accumulated in the center of Özalp.

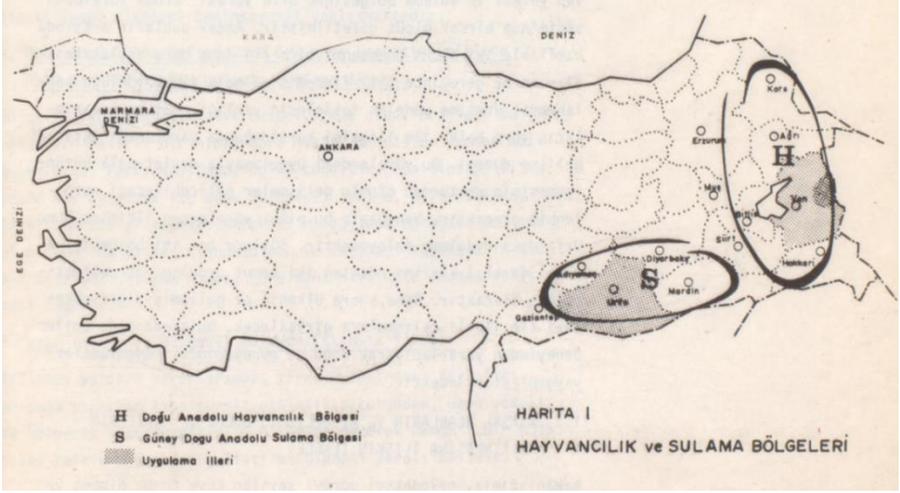
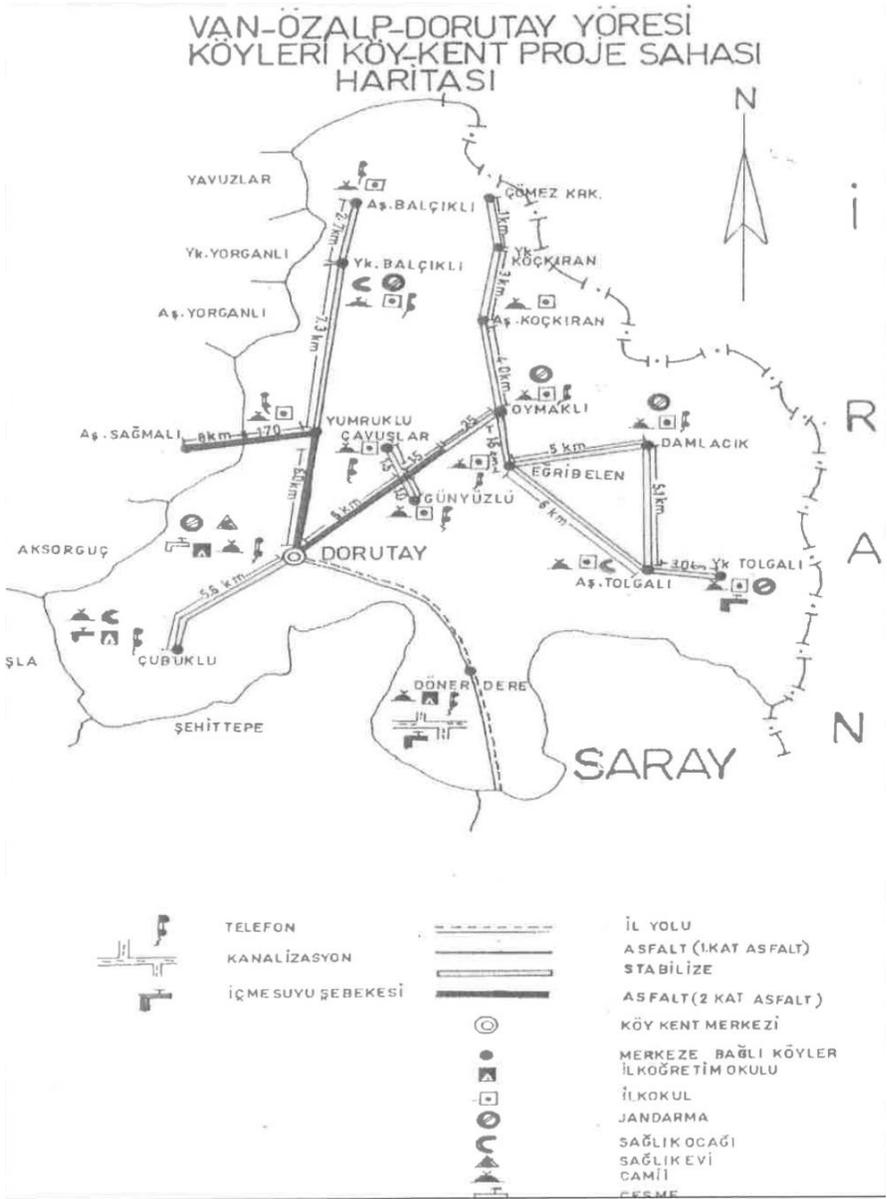


Figure 3. Köykent Project Application Areas in 1970s (Anonymous, 1978)

The proposed investments for the region will be realized in three phases.

- Those whose implementation was started in 1978,
- Those who were finalized to be included in the 1979 program,
- Those will be programmed for after 1979,



**Figure 4. Köykent Project Van-Özalp Application (Koç, B., Gül, A. 2006)**

In this context, it was decided to establish new cooperatives and to make existing cooperatives more functional. In addition, it was decided to build a pond to meet the basic needs of the villagers and to build warehouses for stocking animal feeds. Simultaneous meetings with different ministries are also planned for all these studies to be carried out in rural areas. Within the scope of the Köy Kent Project; economic structure, technical infrastructure and social housing service issues were determined as priority areas (Anonymous, 1978).

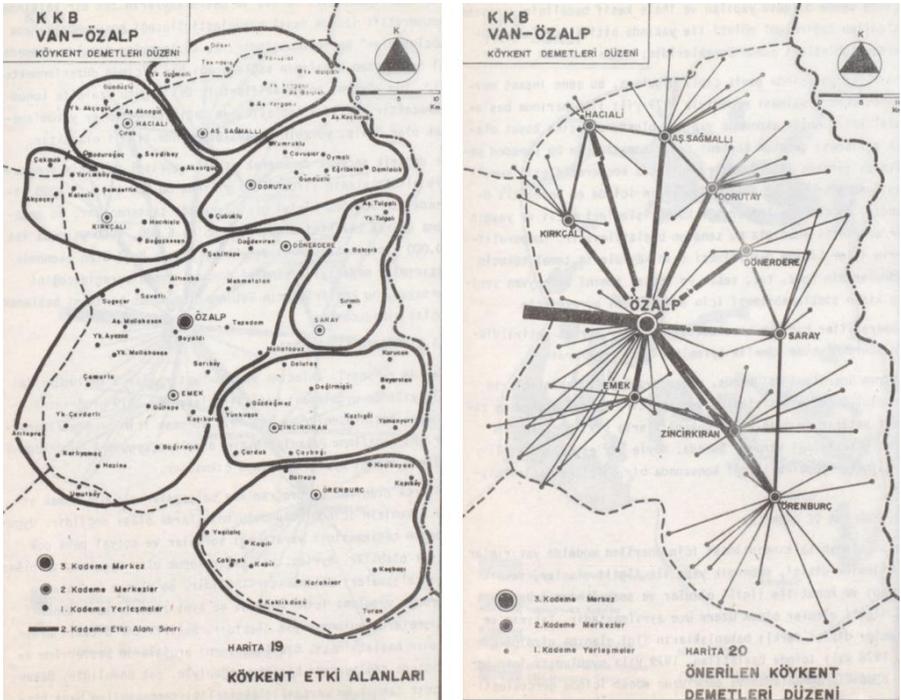


Figure 5. Köy Kent Project Influence Areas and Köy Kent Bundles Order 1970s (Anonymous, 1978)

### ***3.3.1. Applications related to economic structure***

In order to improve the economic structure, it was planned to establish cooperatives in Özalp in the first place. In this way, it was aimed to plan the production, use the local resources correctly and to distribute the resources transferred to the villagers in a balanced way. It is aimed to strengthen the economic conditions of the cooperatives to make able to compete with private sector and to increase participation ratio in cooperatives. The basic consumption items (salt, sugar, kerosene, etc.) that the villagers needed will be delivered and distributed to the district. It is planned that this transaction will be transferred to the cooperatives established later. It is planned to establish a dairy farm in each village-city center in order to make the milk collection and utilisation system more organized in the district. It is aimed to activate the Van Süt Kurumu by transporting the collected milk by trucks to the cold storage established in the center of Özalp in 1979. Since livestock is the main source of livelihood, one of the most important problems is feed supply and storage. It will be ensured that the feed application will be improved, the fattening period will be extended and the animals will be bred only for one season, then sold, new animals will be bought and growed. It is planned to provide special loans for cooperatives to enter the livestock market, to establish animal purchase and sale centers, feeding stations and slaughter centers (Anonymous, 1978).

### ***3.3.2. Applications regarding technical infrastructure***

The lands belonging to the government will be allocated to the use of landless villagers. It is aimed to establish widespread irrigation

networks in the district, to accelerate the use of underground water resources, drilling wells, irrigation and fertilization works. It is aimed to ensure the transition from rainfed agriculture to irrigated agriculture by improving meadows and pastures, making drainage and ponds. In the region, where transportation is an important problem, maintenance and repair of existing roads and road construction for regions without roads have been determined as priority work. With the completion of the infrastructure works and the opening of drinking water channels, it is planned to establish a drinking water system reaching to all villages (Anonymous, 1978).

### ***3.3.3. Practices regarding housing, social services and public buildings***

Van province is in the first degree earthquake zone. For this purpose, ground and building surveys were carried out in the district, and then the project and construction of structures such as village common structures, cooperative management building, feed storages, consumer goods sales unit, etc. were started. The construction of these structures using local materials will pave the way for the public to adopt such structures. To improve the level of education, which is one of the important problems of the region, primary schools should be built in all villages. Increasing the health capacity in the district and the construction of health center and health center structures should be started (Anonymous, 1978).



**Figure 6. Van Province Dorutay Village Village-Urban Studies**  
([www.gap.gov.tr](http://www.gap.gov.tr), Eminağaoğlu and Çevik, 2005)

#### **4. CONCLUSIONS**

While planning, design and socio-cultural and economic policies in the world are in a holistic context without discriminating between urban and rural areas, rural areas are mostly ignored in Turkey. The problems experienced in rural areas in Turkey and the policies and solution proposals developed in every period for the problems are brought to the agenda in different channels. Unfortunately, the proposed solutions are not fully implemented. One of the main reasons for this is that the implemented policies have not gained continuity and were not sufficiently supported. For this reason, rural settlements have many problems, especially physical problems. The Koykent Project, which was proposed as a model in rural development in the 1970s, started to be implemented with great goals in the Özalp district of Van province and was met with excitement and anticipation by the native people. The Koykent Project presented a development proposal for rural settlements. The aim here is to provide a more macro change beyond a physical transformation or the development of infrastructure possibilities. For this purpose, the industrialization of agriculture, the

urbanization of rural settlements and the development of production and division of labor by establishing an intra-village organization model were aimed. It is planned to organize all the works through cooperatives to be established in this direction and to involve the local people in the processes of these organizations. It is aimed to carry out the activities carried out by the villagers in a more organized and efficient way through the village-urban. The Koykent Project laid the groundwork for the establishment of industrial and agricultural facilities in the areas where the establishment of village-cities is planned, in particular Özalp. Cooperatives have been tried to become leading non-governmental organizations to increase productivity, product diversity, marketing and storage capacity. The Van Özalp Köykent Project, which is a pilot project, has brought many positive and negative situations as it is the first. For example:

- To prepare a base for the development of villages according to their unique cultural, economic and social conditions,
- Establishing social and productive facilities and ensuring the equal and fair distribution of services and products,
- Planning the physical development of the areas determined within the scope of the Köykent project,
- Improving the existing building stock of the villages, planning the common cultural and social areas needed by the villagers by considering the local architecture and materials,
- Preparing the base for the employment of the villagers and the development of sectors with livelihoods,

can be considered as positive aspects.

Unfortunately, this village-urban project, which was planned and put into practice in the Özalp district of Van province, was left unfinished in 1979. The main reason for this is the fall of Bülent Ecevit's government, which started the Köykent Project in the elections held at that time, and the drop of new government's financial support from this project. Another important reason is the lack of sufficient interest and support for the project throughout the country. This situation shows the attitudes of the central and local governments and the public towards rural settlements. In summary, although the Van Özalp Köykent Project has not achieved its goals, it is very important in terms of socio-economic consideration of rural settlements. Although the project started its activities approximately 45 years ago, it still maintains its importance in the context of policies developed for rural settlements. As a matter of fact, four pilot regions (Van-Özalp-Dorutay Köykent, Ordu-Mesudiye-Çavdar Köykent, Muş-Yaygın Village, Siirt-Eruh Bağgöze village-urban) were selected within the scope of the Köykent Project, which came to the fore again in 2000, and after about 25 years, a new one was created over the traces of the old where a rural development program was launched.

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## **CHAPTER 13**

# **VARIEGATED PLANTS FOR LANDSCAPE DESIGN**

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## **INTRODUCTION**

Plants perform many physiological and biological functions with their pigment molecules. Because of their pigments, they can perceive light and react differently to the environment. They perform the function of photosynthesis by converting light energy into chemical energy. They produce a wide variety of tempting colors that will attract the attention of many animals in nature. Thus, they ensure the realization of vital functions such as fertilization of flowers and dispersal of seeds. In addition to that, variegated plants make up the majority of plants in the landscape designing. While often the result of a mutation, many variegated plants are bred for their exceptional foliage. These plants are great for adding interest and color to dark corners where it is used in the landscape designing.

### **1. DEFINITION**

Plants' organs such as stems, shoots, leaves, flowers and fruits show seasonal color changes according to the changing climatic conditions throughout the year. Plants, which positively affect the visual values of their environment with these features, also contribute to making the space more functional, dynamic and livable.

The dominant color in the world of plants is green and its tones. However, there is a wide variety of plants with different shades of different colors, mainly white, yellow, red.

The main pigment substance that gives plants their green color is chlorophyll. Carotenoid pigment gives red, orange, yellow colors.

Although both pigments are present in the leaf, the leaves often appear green because the chlorophyll pigment, which gives the green color, is strong enough to mask other colors. As the effect of the chlorophyll pigment decreases and the effect of the carotenoid pigment increases, the colors of the leaves also change.

The most important function of the pigments that give color to the leaf is the production of organic substances, that is, capturing the light energy necessary for photosynthesis. In the leaves where the chloroplasts containing pigments are absent, the growth is slower, which cannot be assimilated, since there is no photosynthesis process, and the plant in this environment develops in a smaller form.

The information of all the pigments that give color to the plant is encoded in the DNA of that plant. Therefore, no matter where a plant species is grown in the world, its color characteristics remain the same.

In some conditions, environmental effects, especially light, in the chloroplasts, which are the source of genetic material in the plant cell, cause permanent differences in the pigment structure of the plant's tissues, known as mutations. As a result, white, cream-colored, golden spots appear on leaves and twigs.

These plants, which show color difference in their leaves as a result of the complete absence or change of plastid pigments due to mutation, are called "variegated plants". Variegated plants are denoted in the Latin spelling as "im" [immutans], meaning "modified".

Variegated plants are rare in nature. However, it is widely used in horticulture as an indoor and outdoor ornamental plant.

The causes of permanent variegation in plants are: Lack of chlorophyll in leaves; differences in leaf surface spaces or air channels under the leaf surface; increase in other pigments, especially anthocyanins.

Variegated coloration in plants occurs in four different ways:

1. On the edges of the leaves, in the form of white fringes.

Example: Variegated Benjamin (*Ficus benjamina* cv. 'Starlight')

2. On the edges of the leaf, in the form of wide stripes.

Example: Adam's-needle tree (*Yucca gloriosa* L.)

3. On the leaf, in the form of irregular spots or patches.

Example: Begonia (*Begonia* sp.), Difenbachia (*Dieffenbachia* sp.)

4. Absence of chlorophyll pigment in the entire leaf, in the form of white leaves.

Example: English ivy (*Hedera helix* L.)

In variegated plants, several of these different forms may appear on the same plant. There are also specimens in which the leaves or twigs are completely green in color. The green leaves of variegated plants develop in larger form than the variegated leaves.

There are also plants whose veins differ from green in color, for example, with leaves of white color. This feature of these plants is due to the absence of cells carrying chlorophyll above or below the conductive tissues of the vessel. Although the leaves of plants such as

zebraflower (*Aphelandra squarrosa* Nees) appear variegated, they are not included in the group of variegated plants.

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## **2. IMPORTANT CONSIDERATIONS IN BREEDING**

In variegated plant varieties, since the white-yellow parts of the leaves cannot photosynthesize, the nutrient requirement is provided from the green parts. For this reason, they grow more slowly than green plants. It is useful to be more sensitive in the nutrition of variegated plants than other plants.

Variegated plants are sensitive to environmental conditions such as light, temperature, disease, pests. The higher the color, the higher the sensitivity. Those with a yellow or gold color are resistant to the sun in hot climates, while those with cream or white patches are usually much more susceptible.

Variegated plants such as ash-leaved maple (*Acer negundo* L. 'Flamingo'), the Japanese barberry (*Berberis thunbergii* DC. 'Atropupurea'), Japanese spindle (*Euonymus japonicas* Thunb. 'Aurea') lose their variegated feature in low light conditions.

Deep pruning of these plants also leads to the loss of variegation and the plant begins to give twigs in its original colors. In order not to lose the feature, deep pruning should be avoided.

Since new twigs develop stronger in plants that lose their variegation feature due to unsuitable conditions, after a while the plant loses this feature and turns completely green. These branches should be cut from the bottom, near its root at an early time.

### **3. IMPORTANT PRACTICAL CONSIDERATIONS IN PLANT DESIGN**

Variegated plants are rarely seen in nature. Variegated plants, which attract attention with their colorful leaves in different tones, have been grown as ornamental plants for a long time and planted in gardens and pots. Although they take place in all kinds of plant groups, they are mostly found in shrubs. There are some points to be considered in the herbal designs to be made with these plants.

To make an effective, eye-catching, accent design with variegated plants, it is useful to use plants with unmixed dark leaves as a background. Planting the variegated plants in front of other plants allows the diversity to be noticed and the design to be perceived better.

Due to planting a large number of variegated plants close to each other will cause visual confusion, it is appropriate to plant them together with other plants.

As a distinctive feature, one should be careful when choosing the color, texture and shape of the variegation. Incorporating these plants into the

overall composition can be difficult, except in a setting with complementary green colours. Otherwise, the desired effect with the plant variety used will be lost. The exception is unique variegated plants that are distinctly different in colour-texture-form.

Different colors can be used to highlight and accentuate the color of the variegated plants. A successful composition can be achieved by combining the variegated leaves in yellow and green color tones, which create a bright-sunny environment effect, with other warm colors or contrasting colors.

The variegated leaves in white and green hues are more neutral. For this reason, plants with more color and texture should be used. Thus, it can add vitality to the garden or brighten a dark corner.

The cold tones of white variegated plants are especially compatible with blue-pink-purple-purplish-red plants.

Variegated plants contribute to the colorful and striking appearance of the area, usually during the periods when the flowers are decreasing. Especially the evergreen species can be a solution to the general appearance by adding differentiation to the uniformity of the area during the winter months.

In partially dark environments with low light, they make the area appear brighter when mild lighting is applied to emphasize the difference in their texture.

With these features, variegated plants gain importance and are preferred as landscape plants.

Below is a list of species that have variegation variety in landscape design, including examples of commonly used ones in recent days.

**Table 1. Commonly used plant list in designs**

<b>Trees</b>	<b>Smaller shrubs</b>
<p><i>Acer negundo</i> L.,  <i>Acer platanoides</i> L.,  <i>Acer pseudoplatanus</i> L.,  <i>Castanea sativa</i> Mill.,  <i>Cornus controversa</i> Hemsl.,  <i>Ligustrum lucidum</i> W.T.Aiton,  <i>Liriodendron tulipifera</i> L.,  <i>Quercus cerris</i> L.,  <i>Zelkova serrata</i> (Thunb.) Makino</p>	<p><i>Abelia</i> × <i>grandiflora</i> (Rovelli ex André) Rehder,  <i>Cistus</i> × <i>hybridus</i>  <i>Coronilla valentina</i> subsp. <i>glauca</i>  <i>Cotoneaster atropurpureus</i> Flinck &amp; B.Hylmö  <i>Daphne</i> × <i>burkwoodii</i>  <i>Euonymus fortune</i> (Turcz.) Hand.-Maz.,  <i>Forsythia</i> Vahl  <i>Fuchsia magellanica</i> var. <i>gracilis</i> (Lindl.) L.H.Bailey,  <i>Hebe andersonii</i> (Lindl. &amp; J. Paxton),  <i>Hypericum</i> × <i>moserianum</i> St. John's wort  <i>Leucothoe fontanesiana</i> (Steud.) Sleumer  <i>Pachysandra terminalis</i> Siebold &amp; Zucc.  <i>Phormium cookianum</i> subsp. <i>hookeri</i>,  <i>Pieris japonica</i> (Thunb.) D. Don ex G. Don  <i>Salvia officinalis</i> L.,  <i>Vinca major</i> L.,  <i>Yucca filamentosa</i> L.,</p>
<b>Larger shrubs</b>	<b>Climbers/wall shrubs</b>
<p><i>Abutilon megapotamicum</i> (Spreng.) St. Hil. &amp; Naudin.  <i>Acer campestre</i> L.,  <i>Acer palmatum</i> Thunb.,  <i>Aralia elata</i> (Miq.) Seem.,  <i>Aristotelia chilensis</i> (Molina) Stuntz,  <i>Aucuba japonica</i> Thunb.,  <i>Azara microphylla</i> Hook.f.  <i>Berberis thunbergii</i> DC.,  <i>Buddleja davidii</i> Franch.  <i>Buxus sempervirens</i> L.,  <i>Camellia</i> × <i>williamsii</i>  <i>Cordylina australis</i> (G.Forst.) Endl.</p>	<p><i>Actinidia kolomikta</i> (Rupr. et Maxim.) Maxim.,  <i>Ampelopsis glandulosa</i> var. <i>brevipedunculata</i> (Maxim.) Momiy.,  <i>Ceanothus thyrsiflorus</i> Eschsch.  <i>Hedera algeriensis</i> Hibberd  <i>Hedera colchica</i> (K.Koch) K.Koch,  <i>Hedera helix</i> Linnaeus  <i>Jasminum nudiflorum</i> Lindl.,  <i>Jasminum officinale</i> L.,  <i>Lonicera</i> × <i>italica</i> Harlequin  <i>Pyracantha coccinea</i> M.Roem.,  <i>Solanum dulcamara</i> L.,</p>

<p> <i>Cornus alba</i> L.,  <i>Cornus alternifolia</i> L.f.,  <i>Cornus florida</i> L.,  <i>Cornus mas</i> L.,  <i>Cornus sericea</i> L.  <i>Elaeagnus</i> × <i>submacrophylla</i> Servett,  <i>Elaeagnus pungens</i> Thunb.,  <i>Euonymus japonicas</i> Thunb.,  <i>Fatsia japonica</i> (Thunb.) Decne. &amp;  Planch.,  <i>Griselinia littoralis</i> Raoul,  <i>Hydrangea macrophylla</i> (Thunb.) Ser.,  <i>Ilex</i> × <i>altaclerensis</i>,  <i>Ilex aquifolium</i> Linnaeus,  <i>Kerria japonica</i> (L.) DC.,  <i>Ligustrum lucidum</i> W.T.Aiton,  <i>Lonicera nitida</i> E.H.Wilson,  <i>Luma apiculata</i> (DC.) Burret,  <i>Myrtus communis</i> L.,  <i>Osmanthus heterophyllus</i> (G.Don)  P.S.Green,  <i>Philadelphus coronaries</i> L.,  <i>Stranvaesia davidiana</i> Decne.,  <i>Pittosporum eugenioides</i> A.Cunn.,  <i>Prunus laurocerasus</i> L.,  <i>Rhamnus alaternus</i> L.,  <i>Rhododendron ponticum</i> L.,  <i>Sambucus nigra</i> L.,  <i>Symphoricarpos orbiculatus</i> Moench,  <i>Syringa emodi</i> Wall.,  <i>Viburnum tinus</i> L.,  <i>Weigela floribunda</i> (Siebold &amp; Zucc.)  K.Koch,  <i>Yucca gloriosa</i> L. </p>	<p> <i>Stachyurus praecox</i> Siebold &amp; Zucc.  <i>Trachelospermum jasminoides</i> (Lindl.)  Lem., </p>
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ISBN: 978-625-8405-94-1