Landscape Research-I

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CONTENTS

	Preface	III
	Reviewers	IX
CHAPTER I:	Re-Thinking Sustainability: Urban Landscape Scenarios for Earthquake Resilience	1
CHAPTER II:	Urban Perception in the Fiction Cities of the Movie Screen	15
CHAPTER III:	Analysis of Visual Landscape and Aesthetical Quality Through Visual Landscape Analysis: The Case Study of İğneada	42
CHAPTER IV:	Urban Landscape Design for Quality of Urban Life	57
CHAPTER V:	Sponge City Within the Scope of Urban Water Management	83
CHAPTER VI:	Design Principles and Spatial Analysis of Italian Renaissance Gardens; Case of Rome	103
CHAPTER VII:	Smellscapes: Imagining and Remembering City	124
CHAPTER VIII:	Methods Used in Monitoring Water Stress in Ornamental Plants	147
CHAPTER IX:	Planning Processes for the Investigation of Visitor Impact Management Model At National Parks (Arizona-U.S.A.)	163
CHAPTER X:	Complexity Theory in the Context of Urban Planning	190
CHAPTER XI:	Green Infrastructure Strategies	209
CHAPTER XII:	Evaluation of Visual Landscape Quality in Integrated Basin Planning: Yanbolu-Santa Basin (Trabzon-Gümüşhane/Turkey) Example	229
CHAPTER XIII:	Importance of Wetlands for Ecosystems in the Context of Draught	248
CHAPTER XIV:	The Evaluation of Cultural Routes in the Frame of Landscape Architecture; the Case of Marmara Sultans Route	266
CHAPTER XV:	A Model Proposal to Read the Memory Stratas Written on the Landscapes	294

CHAPTER XVI:	Shifts – Disconnections – Borders: Changing Factors Between Landscape and Culture During Transformation Process of Beykoz, İstanbul	315
CHAPTER XVII:	Evaluation of Design Approach in Terms of Landscape Architecture in Accordance With Nature	338
CHAPTER XVIII	Landscape Design Process in Face-to-Face and Distance Education	352
CHAPTER XIX:	Human Intervention on Nature: History of Environmental Transformation in Turkey From 1900s to 2000s	373
CHAPTER XX	Studying Educational Function of Protected Environments in Pre-/Primary Education Institutions – Trabzon	396
CHAPTER XXI:	Street Open Spaces as Behavior Setting	418
CHAPTER XXII:	Effects of Covid-19 Pandemic on Preferences of Urban Open Green Space Users	433
CHAPTER XXIII:	Importance of Permaculture Today	459
CHAPTER XXIV:	The Importance of Pedestrianization in Urban Design: Cark Street Sample (Sakarya, Turkey)	470
CHAPTER XXV:	Post-Industrial Landscape in Urban Spaces	483
CHAPTER XXVI:	A Different Approach Pollinator Garden	498
CHAPTER XXVII:	The 'Method' Approach for Academic Studies in the Landscape Architecture Discipline	516
CHAPTER XXVIII:	Examination of Pedestrian Spaces in Urban Main Arteries in Terms of Accessibility and Visual Quality; Atatürk Avenue (Rize) Circulation	534
CHAPTER XXIX:	Squares in Historical Process and Urban Identity	553
CHAPTER XXX:	Some Lessons to Be Taken From a Beautiful, Aesthetic, Livable, Green City Prag	575
CHAPTER XXXI:	The Approaches of Urban Open Spaces During the Covid-19 Pandemic	596

PREFACE

INVALUABLE PROFESSORS AND COLLEAGUES

We are happy to bring to life this book that we have been editing and designing for a long time with your academic contributions and support.

The contributions made to the Turkish Journal of *Landscape Research* (PEYAD), which we have brought to the academic portfolio of Landscape Architecture and which has been going on for 3 years, created a driving and encouraging force for us to prepare this edited book called "Landscape Research-I". In addition to this book, we thought it would be appropriate and meaningful to prepare the Turkish book "Peyzaj Araştırmaları-I" in parallel and simultaneously with the first book. At the same time, we aimed to contribute with this book that we will use as a Turkish source to academic publication life by considering it as a proactive step to address the deficiency in the literature. Our authors, who sent their academic studies/book chapters to both books, sent the book sections by choosing the English book (Landscape Research-I) or the Turkish book (Peyzaj Araştırmaları-I). Both books were published by the publisher "Livre de Lyon" and we shared with you the information transmitted to us by the publisher (indexes in which they are scanned, content and competencies covering academic applications/Associate Professorship Application Criteria and Academic Incentive Applications).

The books "Landscape Research-I" and "Peyzaj Araştırmaları-I", which will be prepared simultaneously in English and Turkish, delivered to you both e-book and colored printed. We initially thought it would be appropriate to limit both books to 30 book chapters. We are in the consistency of reaching these numbers with the contributions and support from you.

We want to continue this process that we have started in the coming years. Thus, we will ensure the continuity of Landscape Research (English) and Peyzaj Araştırmaları (Turkish) books in successive numbers.

I would like to firstly thank the Referee Board, SEKİZGEN Academic Platform and Livre de Lyon Publishing House and its responsible people who contributed greatly to the publication of both books. You as the chapter writers

deserve the highest appreciation for sharing with us the qualified and valuable works you have prepared.

August 16th, 2021

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- He was born in Ardahan in 1964. He graduated from Ege University Faculty of Agriculture, Department of Landscape Architecture in 1985. In 1988, he completed his Master's Degree in Landscape Architecture at Ege University Institute of Science and Sciences. and in 1997, he completed his PhD in Landscape Architecture at K.T.U. Science Institute.
- Between 1987 and 1992, he worked at the T.C Ministry of Forestry. Between 1992 and 2017, he served as an academician at Karadeniz Technical University. He was appointed Assistant Professor in 1998, Associate Professor in 2000 and Professor in 2007.
- Between 1990-91, he received the CIHEAM Scholarship, Montpellier (France) and from 1991-92 he received the CIHEAM Scholarship and the Saragosa (Spain) Scholarship. He was granted three Belgian Government scholarships in 1994, 1996 and 2000. Ağustos Between 2001 and June 2002, he conducted research at Arizona State University. Between August 2011 and February 2012, he conducted research at Northern Arizona University with the support of the Research Abroad project. In 2015, he was granted a 1-year TUBITAK Postdoctoral Research Fellowship (Purdue University/ USA).
- In addition to environmental and nature protection organizations, he also served voluntarily in non-governmental organizations and served as of various non-governmental organizations president (President of Belediyespor Tennis Club, TEMA Provincial Representative, TMMOB Trabzon Chamber of Landscape Architects Provincial Representative, Head of Mountain Protection Platform).
- In addition to the research projects supported by Corporate organizations, TUBITAK, Universities and various research Institutions, which he has

managed and completed with wide participation at home and abroad as director and researcher, there are books and book chapters that he has edited and he also serves on the editorial board in scientific journals published at home and abroad. He has served on the scientific committees of international and national conferences, congresses and symposiums, and has published articles in indexed journals and numerous papers presented abroad and at home.

- Öner Demirel has been serving as head of the Department of Landscape Architecture at The Faculty of Fine Arts, Kırıkkale University since January 2018. He speaks fluent English and French and is married with two children.

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CHAPTER I

RE-THINKING SUSTAINABILITY: URBAN LANDSCAPE SCENARIOS FOR EARTHQUAKE RESILIENCE

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1. Introduction

The notion of "urban resilience" defined as "the ability of an urban system […] to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity" (Meerow et al, 2016) is highly pertinent to population related problems of the current century and fundamental to achieve urban sustainability. Urban sustainability demand a new kind of landscape scenario in which form and function are both coordinated, and the synthesis of form and function of landscape lies at the integration of city infrastructures. But while discussing sustainability, seismic hazards and climate change give shape to the city, ultimately damage but evolve the opportunity. In this sense, post disaster functions of landscape are crucial for future sustainability. That's how resilience will thrive, with its broad process.

For a good future strategy, it is accurate to think of landscape as dynamic, flexible and adaptive to changing status thereby assures its own resilience. A resilient system should be capable of reversing but open to change, thus adaptation. These principles describe future urban landscape scenarios. Now, because more than half of the world population lives in cities and those cities are unfortunately under various disaster threats, resiliency is primary to urban future. Moreover, landscape should be valued more as part of the city infrastructure to function those principles rather than being visual and aesthetic.

In an increasingly disastrous world, urban landscape has to play its role more dominantly, thus be functional.

In developing countries where cities evolve more spontaneously than planned, landscape cannot maintain its necessary functions under the anthropogenic pressure. Changing this trajectory is critical not only for the sustainability topic, but also for the resilience topic, which is a necessity of the current century. To produce alternative scenarios of the urban landscape, this chapter addresses the allocation of new roles to the urban landscape with strategies and principles, where it can play its augmented role in a disastrous world and the importance of its roles in earthquake resiliency. The remainder of this chapter continues with the effects of the earthquake on developing countries and earthquake-resistant landscape thresholds are classified under three headings as neighborhoods, corridors and buildings.

2. Growing Vulnerability of Developing Countries

Today, more than half of the world's population lives in urban areas. It is expected that this rate will increase to 68% by 2050, approximately 2.5 billion people will migrate from rural to urban areas and 90% of this number will be in Asia and Africa (UN DESA, 2018). However, this migration mostly ends in irregular housing and slum settlements. Currently, there are more than one billion people living in slums, and this number is increasing by about 25 million every year (Radford, 2009). Uncontrolled population growth and urbanization cause people to settle in areas under natural hazards such as earthquakes, floods, tsunamis, landslides and droughts, and the natural balance, which is disturbed by the uncontrolled increase in the built environment, causes these settlements to become even more vulnerable to disasters. In the current century alone, approximately 2.6 billion people have been affected by natural disasters, and more than 95% of all these losses have occurred in developing countries (Independent Evaluation Group, 2006; UNDP, 2010).

Especially in the disasters that have occurred since the second half of the twentieth century, even if they are not the worst disasters in history, the loss of life and property has increased exponentially, and economic losses have reached irreparable amounts. The United Nations has stated that the global cost of natural disasters will reach 250-300 billion dollars in 2050 (UNISDR, 2015). The impact of the disaster varies depending on the type of disaster and the economic

situation in the place where it occurred. Statistics indicate that 90% of disasters with high fatality rates are natural disasters and these occur as 40% floods, 20% tropical storms, 15% earthquakes and 15% droughts; in addition, according to the geographical distribution of disasters, the number of deaths in developing countries is higher than in developed countries (McDonald, 2003). Bangladesh, India and China account for 75% of all flood mortality risk, while the number of people living under typhoon hazard is similar in the Philippines and Japan, the probability of death in the Philippines is 17 times higher (Radford, 2009). In the coming years, the difficulty of life in the rural as a result of global warming and ecological destruction will further increase the migration to the cities and make it necessary for the population to live in areas more vulnerable to disasters (Figure 1).



Figure 1: An overview of the disasters threaten the world population (United Nations, 2020).

Today, hydro-meteorological disasters caused by climate change continue to be the biggest disaster category and increase over the years, while the biggest impact of disaster events in terms of human and economic losses is caused by earthquakes (UNDP, 2010). However, when the earthquakes in the world are examined, it has been shown that severe losses are not directly proportional to the magnitude of the earthquake in developing countries. In 2011, approximately 2.5 million people were affected by the 9.1 Mw Tohoku earthquake in Japan, and 18 thousand people died (Takashi, 2014). However, in the earthquake of 7.6 Mw that occurred in Kocaeli in 1999, 18 thousand people lost their lives in the city with a population of approximately 80 thousand. This shows how much settlement quality does play a role in earthquake losses.

Considering the earthquakes that took place in the last century and had the highest number of deaths, it is seen that especially the earthquakes that happened after 2000 occurred in countries that were lower in the Human Development

Index (UNDP, 2020) (Table 1). Although the magnitude of the earthquake is not high, the reason for the high human and economic loss is that these countries are not prepared enough for the earthquake. When the earthquakes that took place in the last century in Turkey are compared, it has been shown that small earthquakes also can cause severe damage. Therefore, besides the magnitude of the earthquake, other components of the cities also play a role in the excess of casualties.

In developing countries, disaster damage leaves much more lasting effects. In order to prevent the earthquake hazard from turning into a disaster, it is necessary to contribute to the sustainability of cities economically, ecologically and socially with planning strategies aimed at reducing earthquake damages. In order to keep disaster damage to a minimum and to predict damage in cities, it is necessary to create physical plans that take into account disaster priorities (İSMEP, 2014). With the drastic increase of disaster-related losses in the twenty-first century, the concepts of preparedness and mitigation have gained importance. The concept of disaster resilience has become an approach used for the development of disaster risk reduction strategies; the biggest goal of these approaches is to increase the resilience of societies against disasters and to ensure sustainable development (Varol and Buluş Kırıkkaya, 2017).

Table 1: List of the 10 largest earthquakes in the last century (USGS, 2021; Wikipedia (2021a); that caused the most deaths (Ritchie, 2018; Wikipedia (2021b) and that took place in Turkey (Wikipedia (2021c).

3. Future Sustainability and the Role of Urban Landscape

Cities have been changing physically, intellectually and politically since they first emerged. One of the important factors triggering this change in the historical process has been disasters. For instance, after an earthquake, the cities, their physical plans and the materials used were developed, and it was the beginning of the search for resistance against earthquakes. Planning and widening the streets in a grid pattern, increasing and arranging urban open spaces and starting to choose structural materials as earthquake and fire resistant are first examples of disaster adaptation. This post-earthquake reconstruction work, which is one of the first examples of disaster management in history, can be seen as an example of mitigation with its forward-looking strategies. These studies are practices that use urban landscape to create sustainable and resilient cities.

The 10 largest earthquakes		**10 deadliest earthquakes**		**The 10 most important earthquakes in Turkey**	
Location, year and mag	**Casualties**	**Location, year and mag**	**Casualties**	**Location, year and mag**	**Casualties**
Valdivia, Chile, 1960, 9.5 Mw	**5700**	Haiti, 2010, 7.0 Mw	**100-316.000**	İzmir, 2020, 6.9 Mw	**119**
Alaska, 1964, 9.2 Mw	**123**	Tangshan, China, 1976, 7.6 Mw	**242-655.000**	Elazığ, 2020, 6.8 Mw	**41**
Sumatra, 2004, 9.1 Mw	**220.000**	Haiyuan, China, 1920, 7.8 Ml	**273.400**	Van, 2011, 7.2 Mw	**604**
Tohoku, Japan, 2011, 9.1 Mw	**18.500**	Indonesia, 2004, 9.1 Mw	**227.898**	Bingöl, 2003, 6.4 Mw	**176**
Kamchatka, Russia, 1952, 9.0 Mw	**2300**	Tokyo, Japan, 1923, 7.9 Mw	**142.807**	Düzce, 1999, 7.2 Mw	**894**
Maule, Chile, 2010, 8.8 Mw	**450**	Messina, Italy, 1908, 7.1 Mw	**123.000**	Kocaeli, 1999, 7.4 Mw	**17-50.000**
Ekvador-Kolombia, 1906, 8.8 Mw	**1000**	Ashgabat, Turkmenistan, 1948, 7.3 Ms	**110.000**	Adana, 1998, 6.2 Ms	**146**
Assam, Tibet, 1950, 8.6 Mw	**1530**	Sichuan, China, 2008, 7.9 Mw	**87.587**	Erzincan, 1992, 6.8 Ms	**653**
Nias, Indonesia, 2005, 8.6 Mw	**1314**	Kashmir, Pakistan, 2005, 7.6 Mw	**87.351**	Erzurum, 1983, 6.9 Ms	**1350**
Sumatra, 2012, 8.6 Mw	**10**	Ancash, Peru, 1970, 7.9 Mw	**70.000**	Çaldıran, 1976, 7.5 Ms	**3840-5000**

The origin of the concept of sustainability can be traced back to ancient times (Bozloğan, 2010), and it clearly shows itself as the search for sustainable urbanization in post-disaster adaptations. With the attempt of the concept of sustainability to define phenomena such as development and urbanization, efforts to improve the negative environmental conditions created especially after the industrial revolution are seen. Subsequently, urbanization ideas enriched with sustainable, green, ecological and landscape prefixes emerged under contemporary urban theories. Sustainable urbanism, which combined smart growth, new urbanism, and the green building movement (Farr, 2007), can answer many questions about how settlements should grow and how people can live more sustainably. However, today, sustainable urbanization cannot be considered independently of disasters. Sustainable urban criteria created at the end of the twentieth century must adapt to the twenty-first century challenges such as poverty and poor quality urbanization. Thus, the landscape within must define new thresholds and assume new roles.

As the results of natural disasters were felt more severely as the 2000s approached, a new question has arisen that the cities where the majority of the world's population now lives should be more resilient. The resilient city is the measurable capacity of any urban system to meet and recover from the impact of any potential disaster and to ensure the continuity of its functions (Lewis, 2020). Established in 1999, the UNDRR office has developed "Ten Essentials for Making Cities Resilient" (UNISDR, 2015) to accelerate local implementation of the Sendai Disaster Risk Reduction Framework (2015-2030). One of these essentials emphasizes resilient urban development and design, where the city can collaborate with new landscape roles.

In order to increase the resilience of cities, it is necessary to accept urban design as a tool (Bruneau et al, 2003). Resilient-urban planning provides flexibility to facilitate post-disaster physical and social recovery (Gerçek and Güven, 2016). Even if an earthquake is an unavoidable natural event, taking precautions against urban components is vital for cities to be more resistant to earthquakes. In this respect, starting from the principles of sustainable urbanization, thresholds should be defined to create more earthquake resistant settlements (Figure 2).

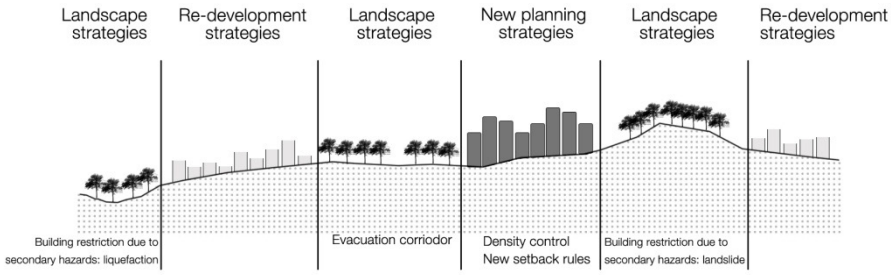


Figure 2: Urban landscape for earthquake resilient land use.

4. Landscape Thresholds for Earthquake Resilience

The factors affecting the destructiveness of an earthquake can be considered in two categories as unchangeable depending on the physical reality of the earthquake or changeable depending on the physical quality of the cities. The magnitude and depth of the earthquake, the distance from the epicenter, the time and season of the earthquake are the factors that cannot be changed (Zielinski, 2011). However, the development level of the country under earthquake risk, the population density in the area, the quality of settlement and infrastructure, and the preparedness of the physical environment for earthquakes are changeable factors. When sustainability, resilience, and urban adaptations after the earthquake in the historical process are taken into account and examined together, it can be ensured that settlements in developing countries can be more resistant to earthquakes with strategies regarding the physical environment. Adapted from the five main thresholds of sustainable urbanism (Farr, 2007), this chapter defines earthquake-resilient urban landscape thresholds under three main headings: neighborhoods, corridors and structures.

4.1. Neighborhood

A sustainable neighborhood is a compact and interconnected traditional form of neighborhood that includes housing, workplaces, and urban functions (Farr, 2007). In order to create earthquake resilient cities, it is necessary to start with earthquake resilient neighborhood units with new landscape roles. The principles defined under the neighborhood threshold are increasing green-blue infrastructure, locating certain functions within walking distance, re-examining evacuation infrastructure and building arrangement layouts.

While the low population and structure that can be damaged in places where the earthquake hazard is high reduces the risk, the high number of damaged elements in places where the hazard is low unfortunately increases the risk. Particularly in developing countries, the excess population living in low building quality is the segment that suffers the most from a possible earthquake. When the neighborhood is considered as the smallest designable unit of the city system, the high population density means that the buildings are compact and high, with lack of landscape. Therefore, it is necessary to keep the neighborhood populations under control in order to provide the necessary street widths and neighborhood parks.

Walkable neighborhoods help achieve sustainability (Glanz et al, 2012). The design of the neighborhood unit on a walkable scale and the strategic locations of new landscape functions such as emergency assembly/evacuation areas or food storages hidden under lawn hills are necessary for the continuation of vital functions after the earthquake. It is important for every person living in the neighborhood to know the location of these functions and to provide the necessities they need after the earthquake for their survival until professional help arrives.

Assembly areas are urban landscapes where people can temporarily shelter after the earthquake. Planning the safe assembly areas from open green areas and green evacuation corridors connections in each neighborhood unit will create a city-scale evacuation infrastructure. This infrastructure is necessary in terms of sheltering the population after the earthquake and providing emergency transportation. These areas should be selected according to relevant criteria.

In settlements under earthquake hazard, certain rules should be defined during the implementation of building block arrangements and landscape should evolve as a building block component. For detached, adjacent and block arrangement, setback distances and building locations need to be reevaluate to create the required street width and safe pockets between structures and assembly areas (Figure 3). Especially the buildings located on adjacent building blocks without a front garden distance will greatly restrict transportation in case of collapse after an earthquake. In order to prevent this situation, front garden setback distances should be increased and safe pockets should be created. These green pockets can have various functions such as shelter, emergency supply distribution center, warehouse during critical periods and can also facilitate transportation.

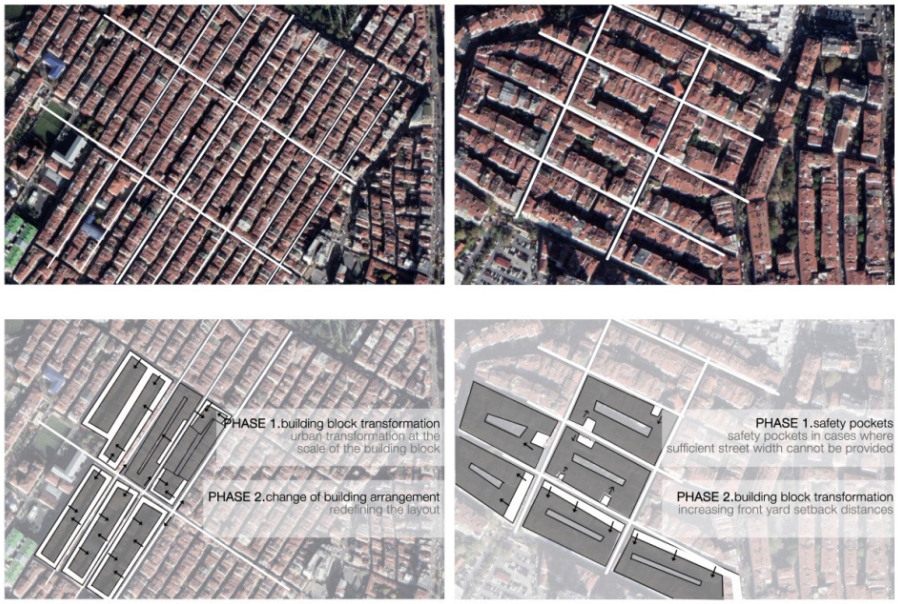


Figure 3. Adjacent building arrangement examples
from Istanbul and redevelopment proposal in different phases.

4.2. Corridor

Sustainable corridors are the building blocks of sustainable regions (Farr, 2007). Corridors connecting neighborhood units can be classified under two headings as gray (transportation and infrastructure landscape) and green (food and water landscape). Gray corridors are the backbone of resilient cities that connect neighborhoods with other regions and are of prime importance for post-earthquake emergency transportation. This particular width of transportation networks has hierarchical continuity from neighborhood to city scale.

The infrastructure landscape needs to be functional and act as a city component. Blue-green corridors are ecological corridors that support biodiversity that will perform emergency food supply and water collection functions. These corridors can be planned adjacent to the gray corridors, or they can be considered as independent corridors with continuity between the building blocks. Food corridors are horizontal or vertical farming systems that support local food production. Water corridors are surface structure and infrastructure systems that will collect rain water and direct it to the water tank to be used during emergency.

4.3. Structures

The smallest unit of earthquake resistant neighborhoods is earthquake resistant buildings. Earthquakes are natural hazards, but their turn into disasters is due to unplanned urbanization, unstable construction, and improper land use. Especially in developing countries, construction standards are mostly not implemented or ignored, and both construction materials and ground conditions remain very weak. The most important factor that will minimize the loss of life and property after an earthquake is the earthquake-resistant construction of the building stock. It can be ensured that the transformed or newly planned building units have urban landscape elements. Green roofs and vertical gardens will make the buildings they integrate more sustainable.

Insufficient infrastructure in developing countries results in the failure of vital infrastructures such as electricity, water, waste and health after the earthquake to function and the failure to provide economic resources for their repair, thus disrupting vital needs. The fact that the buildings have independent energy and water tanks against possible infrastructure damage will allow a part of the daily need to be met at certain times. Energy solutions to be added in line with structural design decisions can be promoted in management plans and thus more sustainable societies can be created at the urban scale (Figure 4).

5. Conclusion: Future is closer

Although economic factors come first in the implementation of sustainable development decisions taken on a global scale, it is imperative that current trends be made ecological and human-oriented rather than economic concerns. Increasing the resilience of societies against disasters and ensuring their sustainability requires being prepared for disasters ecologically, economically and socially. Developing countries, especially those with settlements under earthquake risk, need to invest more in disaster preparedness and mitigation. While earthquake preparedness scenarios prepared at the country level raise awareness of the society, unpreparedness in developing countries causes unconsciousness and wrong decisions. These countries can be made more resistant to earthquakes with physical planning strategies. Urban planning and design should be used as a tool for resilient societies and decisions should be made with certain thresholds from the smallest unit to the large scale.

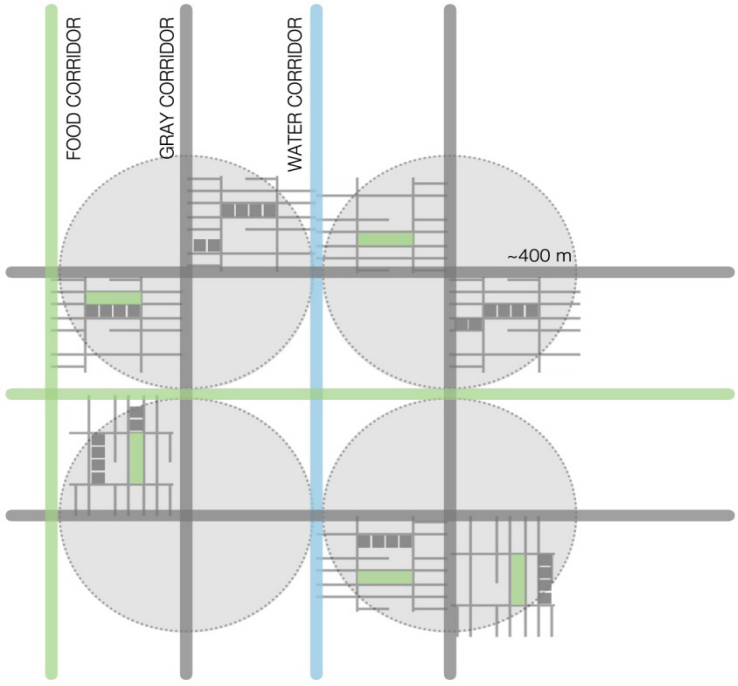


Figure 4. Earthquake-resilient landscape scenarios: neighborhood, corridor and structure.

Sustainability and resilience present important objectives for the century we are in, and different form of landscape can surely move toward a more resilient urban scenario. The probability of an earthquake of 7 or more magnitudes that will affect Istanbul until 2034 is 35-70% (Parsons et al., 2000; Parsons, 2004), and 26-42% until 2045 (Murru et al., 2016). Therefore, earthquake preparedness studies for Istanbul should be carried out in line with holistic strategies that will include not only the transformation in the building focus, but also the adaptation of urban planning decisions with more landscape infrastructural solutions. Integrating urban landscape with post-earthquake use will help achieve sustainability and make the city more resilient.

The necessity of creating more ecological and sustainable cities in order to mitigate the negative effects of industrialization and climate change has become even more critical today. Natural hazards such as earthquakes, floods and sea-level rise force cities to physically change and adapt. In order to spend this process with the least loss, societies must be ready. As a result, planning and

design decisions are an important tool in preparing the physical environment and urban landscape has a vital role. Lessons learned from previous experience will help cities continue to develop more resilient to future challenges and increase sustainability for technology, economy and society.

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CHAPTER II

URBAN PERCEPTION IN THE FICTION CITIES OF THE MOVIE SCREEN

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1. Introduction

The world is a living system that updates itself, changes and improves every passing time. At the same time, it is the most important phenomenon that surrounds all living things with time and space. The world changes over time. Mankind adapts to this change and develops. Basically, even though the world is changing, it is humanity that triggers this change. Humans shape their living spaces in line with their needs, desires and expectations. Humankind's endless desires, renewed needs and ambition to seek the better continue this change. Expectations trigger people to produce, to make new discoveries, to imagine the better and the future. All inventions and developments over time have come to life based on either need or a dream. Imagination, one of the most important skills of human beings, has played an important role in shaping every area of life. Human beings often prefer to reflect their imagination to different phenomena in order to express their wishes and expectations. The best way that human beings can reveal their imagination and express themselves is art. All branches of art such as painting, sculpture, cinema, and literature are tools that reflect the traces of the past and the conditions of today. They are also time machines where they anticipate expectations, hopes, impressions and associations from the future.

Seeing is the best way to understand and express things. Visual experience creates much more effective and lasting memories as it activates all the senses (Eroğlu, 2003; Kale, 2004; Beşışık, 2013; Doma and Eyüce, 2014). Cinema appeals to most of the senses. For this reason, cinema is perhaps the most

remarkable and effective branch of art. It also offers viewers imaginary worlds where dreams are best reflected. In this way, every emotion, every idea, every moment can be conveyed to people as if they were experiencing a dream, anticipation or a utopia. Movies also offer rich perspectives and assessments of people's lifestyles and living spaces. Especially movies that are cleverly edited with imagination create alternatives for human life and living spaces. According to Boyar (2016); Imaginative phenomena, especially in futuristic movies, provide resources for science and technology and lead development.

The movies set the stage for sociologically and culturally critical perspectives for cities and architecture. The structure of movies that allow cultural transfer also paves the way for the marketing of cities (Kale, 2004, Özdel, 2014). When modern architecture in cinema is evaluated; It is seen that American cities are widely featured in Hollywood cinema, which appeals to the widest audience. When we look at the world cinema, it is seen that the same evaluation is made with different perspectives (Erkarslan, 2002). Cinema movies are fictions that compress sections of human life into a few hours of time. Thus, these sections also include facts related to humans. Many different living spaces are presented to the audience within the framework of daily life (Kutucu, 2003). The experimental spaces that emerged with cinematic fiction also allow people to evaluate psychologically. While cinema creates a space suitable for the scenario, architecture shapes the space by setting up scenarios. According to Clarke (1997); cinema enables individuals to see details that they do not realize in urban life. For this reason, it is not possible for cinema to develop without the contribution of the city (Taranç, 2007; Çalğıcı, 2013;). The relationship between human and environment is a common concern based on both cinema and architecture (Tong, 2005). This means that there is a greater relationship between architecture and cinema than noticed. According to Agrest (1993) and Weihsmann (1997), architecture is not a phenomenon that only creates a background for movies, it is a necessity that makes sense and shapes the movie. Because movies describe spatial fiction in a temporal order like those in cities (Babaoğlu, 2004). Another common phenomenon for movie and architecture is that both fields use the subconscious to influence people. Both arts attract attention with their semantic and perceptual details rather than what they directly give (Ersoy, 2010).

Utopian cities of futurist architects connect with the modern architecture of movies, and modern movies turn into utopias of architecture (Yüksekli, 2008,

2013). Cities, architecture, predictions about living space design, extraordinary or alternative ideas are the elements that are featured in movies many times. Movies are also important for revealing perception and expectation in terms of architecture and urban design, which are an important part of imagination. Imaginary cities, urban fragments, architectural and element designs created in the movies open new horizons and set goals for the future. At this point, the critical question is; "Do our expectations from the future shape fictional cities, or do fictional cities shape our future?" happens.

Based on Le Corbusier's definition of "architecture is the masterful, correct and magnificent play of form in light", Glacey (2009) says "this is a magnificent description of the cinema as well as the buildings" (URL 1). Again, according to Glacey; cinema is the most beautiful place where architecture will take flight at full speed. This definition emphasizes that the movies about the city of the future are important in terms of showing the audience how cities can be in the future (Topuz, 2013). At this point, the aim of the study is; In terms of urban design, to determine the future perception revealed by the imagination in movies and to review the goals for the future. In addition, it is another goal to determine how the utopian city phenomenon is reflected, the expectations for urbanization and the needs of this day, based on utopias.

2. Material and Method

The material of the study; It consists of 10 movies in the style of fantasy, science fiction, apocalyptic and futuristic, which were released between 1999 and 2019, with an IMDB score ranging from 6.3 to 8.8, reaching a wide audience and reaching high revenues (Tables 1, 2).

Futuristic, fantastic and science fiction movies were preferred while choosing the movies. Among the styles determined, those with an IMDB score above 6.0 were selected. Due to the large number of movies in this range, movies that have been shown for a long time, have high revenue and have reached a wide audience were selected. Some of the movies with this feature were eliminated because they did not refer to areas of interest such as the city, urban design and architecture, and the remaining movies were taken as study material. Accordingly, the movies selected are mostly those that include urban phenomena and architectural elements on the stage. Following the selection of the movies, the movies that had been watched before were critically re-watched

based on the subject. In this process, scenes suitable for the study were selected from the movies and ".jpg" images were created from the video format. During the watching of the movies, notes were taken and a data sheet was prepared. Categories have been created to ensure that the movies can be evaluated within the integrity of the subject.The movies were evaluated in the following categories; Overview of the city, Circulation, Building masses, Green area/ nature and city relationship, Urban function, Urban furniture, Urbanity, Urban dream and expectation, Urban concerns, Urban perception.

Under each title, the evaluation criteria created for that title were tabulated and evaluated. The criteria in these tables are scored out of 5 points. The total scores of each movie in each category were determined. Thus, the movies were evaluated both in terms of perception and the evaluation of each movie on the urban narrative was presented numerically.

3. indings

Movies are the largest and most comprehensive surveys for people of all ages, genders, cultures and social backgrounds. At the same time, this questionnaire is answered by the participants with their unconscious and real feelings. Because movies are evaluated with likes, expectations and influence. Viewing rates and movie investments are clear indicators that these expectations are met. Movies share important data in reading social and cultural structure and lifestyle. It also creates checklists in determining needs and desires. Movies are phenomena in which dreams about the past, present and future are shaped. They are also worlds where dreams turn into concrete concepts and people experience their utopias. Therefore, movies are effective in shaping life. The movies that have been analyzed are important surveys that have reached very large audience groups around the world. And these polls give us important messages through the director, writer and audience. These messages are important for the urban lifestyle, functions and urban furniture of yesterday, today and the future. In this way, many impressions were obtained from the movies related to the subject of study.

3.1. City Overview

When the movies are examined, different descriptions are encountered on the basis of general urban areas. There are remarkable details about the world's

understanding of city and architecture in the scenes of the “Federation” and “Colonial” cities of the “Total Recall” and “Coruscant” of the “Star Wars”. In these movies, dense, concrete, gloomy cities that await us in the future are depicted if the current construction style and concretion continue. Chaos in the city and anomalies in the urban system are other reflected phenomena. In the movie “Start”, the unsatisfied lifestyle of the future world and the humanity captured by technology are emphasized. In these movies, humanity has begun to live a virtual life with the help of technology in the future. In real life, while people live in piles of containers, their virtual lives are dominated by highly developed cities where every opportunity is offered. At the end of the movie, a restriction is placed on how long people can enter the virtual world. This scenario depicts that humanity is aware of the wrong but even humanity is drifted wrong. All this negative image can be a sign of anxiety about the future, or it can be interpreted as a criticism of today’s urban understanding.

Otherwise, in the movie “Tomorrow’s Land”, extremely futuristic urban structures are encountered. The main city in the movie presents a section of the present-day city. However, the city, which can be seen by touching the mysterious badge, contains technological equipment, unique future urban plans and architectural designs. At the same time, the urban system established and functioning regularly in this city presents a perspective that looks to the future with hope. Similarly, in the movie “Valerian and the Empire of a Thousand Planets,” the “Alpha Station” is an extraterrestrial habitat. This habitat is a man-made planet built in the future as a result of the earth’s inability to meet the increasing demands. Later, alien life forms were added to this structure. The perception of the future drawn in the movie is a technology, civilization and cultural system that has been brought to a very advanced level with the inclusion of other alien beings outside of the world. In addition, the expectation that the world will not be able to meet the increasing population and needs in the future shows that we cannot see the future of the world positively.

Table 1: Cinema movies that make up the study material (URL1, 2, 7).

Poster						
Original name		Star Wars: Episode I - The Phantom Menace	The Lord Of The Rings: The Fellowship of the Ring	Avatar	City of Ember	Total Recall
Director		George Lucas	Peter Jackson	James Cameron	Gil Kenan	Len Wiseman
Release date		1999	2001	2009	2008	2012
Imdb		6.5	8.8	7.9	6.5	6.3
Kind		Science fiction Fantastic	Science fiction Fantastic	Science fiction Fantastic	Fantastic Apocalyptic	Science fiction Apocalyptic Action
	Budget ($)	115 Million	93 Million	237 Million	55 Million	125 Million
World	**Revenue ($)**	1,027 Billion	871,5 Million	2,788 Billion	17,9 Million	198,5 Million
Turkiye	**Revenue (TL)**	843.879	5.902.157	26.636.520	488.256	2.739.572
	Week	32	46	49	10	12
	Audience	488.452	1.757.620	2.482.991	58.495	272.047
Location		Naboo, Tatooine, Coruscant, Gungan	Shire, Rivendell, Lothlorien, Gondor, Moria, Rohan, Dol Guldur, Isengard, Mordor, Fangorn	Pandora, Sacred Tree, Home Tree, Flying Rocks, Forest	Ember City	United Federation of Britain, Colony

Table 2: Cinema movies that make up the study material (URL1, 2, 7).

Poster						
Original name		Ready Player One	Black Panther	Alita: Battle Angel	Tomorrowland	Valerian and the City of a Thousand Planets
Director		Steven Spielberg	Ryan Coogler	Robert Rodriguez	Brad Bird	Luc Besson
Release date		2018	2018	2019	2015	2017
Imdb		7,4	7,3	7,3	6.5	6,5
Kind		Action Adventure Science fiction Futuristic	Action Adventure Science fiction	Action Adventure Science fiction Apocalyptic	Science fiction Futuristic	Action Adventure Fantastic
	Budget ($)	175 Million	200 Million	170 Million	190 Million	177 Million
World	**Revenue ($)**	523,2 Million	1,3 Billion	405 Million	209,2 Million	226 Million
Turkiye	**Revenue (TL)**	2.977.183	10.662.657	4.788.970	1.949.630	2.497.073
	Week	11	18	8	7	7
	Audience	181.482	718.743	258.945	162.651	191.779
Location		The Stacks, Oasis	Wakanda	Earth, Zalem	Tomorrowland	Mul Alfa Station

The cities that are the subject of movies in this category show that our expectations from the future are high. In addition, it provides the impression that our mistakes will be avoided in our understanding of today's cities and architecture, and that more correct and alternative approaches are possible (Figure 1, Table 3).

The understanding of the city encountered in the "Ember" of the "Magic City" in apocalyptic and fantastic style is not much different from today. The movie reflects scenes that emphasize the inability to break with traditions and traditional lifestyle. Cities are integrated with nature in "Planet of Pandora" in "Avatar", "Naboo City" of "Star Wars" and "Lothlorien". " Rivendell" and "Shire" in "Lord of the Rings". In fact, these cities have been built as a part of nature. n the movie "Black Panther", "Wakanda" emphasizes an ideal city and civilization hidden from the whole world. The reason the country is hidden is the concern that the rest of the world will spoil this ideal habitat and culture. "Wakanda" has both a very advanced technology, a future-style construction and urban system, and a very wide and healthy nature. In the movie "Alita", a post-war world scene is presented. Two different communities living in the man-made city on earth and in the sky represent two different social classes. Those on earth are those who work, who have low income and who produce, and those in the sky who rule, who are rich and consuming. This situation is also reflected in the structure of fictional cities. Although the technology is very advanced, the earth city mostly has several floors, old and dense construction. Sky city is the opposite. What is emphasized in these movies is that great world disasters cause great divisions in social structure. And this reflects on urban life more than ever. Cities that emerged with this effect are often shown as symbols of chaos.

When the cities in the movies examined and today's cities are compared, in fact, most of them are different from today's cities. The world has neither such densely built nor natural cities. The movies examined actually reveal two different ends regarding the city. However, the urban diversity in the movies emphasizes the diversity of the cities created with today's cultural richness. Cities such as "Coruscant", "Federation" and "Colony", where technology, development and wealth are at stake, are depicted with skyscrapers, high towers, massive masses and dense construction. Cities such as "Pandora", "Shire", "Rivendell", "Naboo" and "Wakanda" are depicted peacefully. Technology and science, which take place in both perceptions, depict the sparkling path that the

future will open. In the movies, this is sometimes expressed in a hopeful and sometimes gloomy language.

Today, alternative living spaces, which are sought for ways to create, are also found in these fictional cities. The "Navi People" living in trees, the "Gungan People" living in the "Gungan City" they established on different sizes of spheres under the "Paonga Lake", the "Elves" living in the "Rivendell", which is built in harmony with the nature and its magnificent aesthetic structures, and "Wakanda", which is beautiful enough to be hidden from the rest of the world, are examples of alternative urban life.

Table 3: Overview of fictional cities

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Positive example setting	4	5	5	2	1	1	5	3	4	4
Mystery	3	2	5	3	2	4	5	3	4	5
Intelligibility	4	4	5	3	2	3	4	3	3	2
Attractive items	5	4	5	1	1	2	4	2	4	5
Foresight	4	2	5	4	4	5	3	3	4	5
Psychological approach	2	3	5	4	4	5	4	4	5	5
Presence of mandatory components	5	4	4	4	4	3	5	4	5	5
Consistency	5	5	5	5	5	5	5	5	5	5
Use of color	3	2	5	2	2	4	3	3	2	4
Presence of details	4	4	5	4	4	3	4	4	4	5
Total	**39**	**35**	**49**	**32**	**29**	**35**	**42**	**34**	**40**	**45**

3.2. Circulation

Whether for vehicles or pedestrians, roads are undoubtedly one of the most important functions of every city. Movies are the world's largest surveys and a reflection of people's dreams, hopes and expectations. And for this reason, movies show us that we have been thinking of using roads for transportation for many years. There are many examples where traditional methods are used for transportation in movies where the imagination is so powerful and the limits of creativity are strained. This shows that we expect roads to continue to be

the most important and widespread function of our cities for a very long time. Therefore, road systems will continue to challenge humanity as an element of chaos that must always be solved (Figure2, Table4).

The roads imagined in utopias appear as functions on land, on feet, in tunnels and on routes marked in the air, but still roam around the city and require a significant amount of space within the city. However, especially in "Tomorrowland", roads have played a role as architectural and plastic elements that show aesthetic features by adapting to urban forms, structures and urban character, as well as transportation functions. The roads, which have become a part of the silhouette, have given the city movement. The roads that we call dead spaces or hard masses have turned into forms that also contribute to the aesthetics of the city. Circulation systems, whether natural or human-shaped, are the most accurate elements to recognize a city. Roads are an important factor in shaping the urban character. Similarly, circulation adapts to the urban character and takes shape according to the city. Transportation in "Wakanda" of the "Black Panter" is provided by high technology aircraft. Thus, all roads in the city are for pedestrian use. Therefore, a pedestrian-oriented and environmentally friendly city structure was created.

The circulation of the avatar is formed by natural paths and thick branches of huge trees. This system is the most convenient transportation routes for the locals who spend their lives on the trees. Similarly, in the Elven Realm, roads were built on trees, with extremely elegant and aesthetic stairs and railings. A reference is made to the possible solution of living spaces and transportation in harmony with the nature through the movie. This, in fact, is an indication that humana can have alternatives that are compatible with nature and aesthetic while building construction.

In the movie "Star Wars", in addition to the use of land vehicles, the main transportation is air vehicles. For this reason, although there are still roads in the cities, the roads have adapted to the city's fiction. Conversely, it is striking that although the movie "Alita" takes place in the future, the transportation is more pedestrian. In the movie, there are streets used by pedestrians rather than today's wide driveways. These roads are used by both pedestrians and vehicles. In other words, the roads are similar to today's streets, but despite the technological advancement of transportation, its efficiency has decreased. There are bicycles, motorcycles and small vehicles in the extremely crowded pedestrian traffic. There is also a rail system for public transportation. Similarly,

although the movie “Start” is set in the future, it mostly has a pedestrian-based transportation system. The number of vehicles is very few and the ones are electric. Despite this, today’s road and street systems exist, but the roads seem abandoned. It is noteworthy that these two movies in the future draw the same image for the transportation system. The reason for this image may be the idea that classical transportation systems will be replaced by new systems or classical transportation vehicles will be abandoned due to their negative effects on the world.

Considering that the movies analyzed have reached very high number of views, the fact that they have been so popular with the audience can be summarized with the emotions and striking visuals they have experienced in addition to the subject. Emotionally, people are more concerned with what they cannot reach, need, desire, see difference and wonder about. The unique combination of intelligence, design and nature draws attention when it comes to movies with high box office receipts. In the movies examined, the aesthetic features of the roads in developed and prosperous cities are designed by highlighting them. On the other hand, problematic cities are equipped with grayer, bulky and poorly aesthetic roads. This reveals how effective movies are on the viewer’s perception of the city. It is not accidental that the transportation systems in the developed city image are designed to have informal lines both horizontally and vertically by emulating nature. The fact that man feels close to nature and naturalness due to his creation has been used as a design game and trick in movies. In addition, it is noteworthy that in all future movies, transportation is mostly provided by aircraft, roads are used mainly on pedestrians, and land vehicles are very simple and small vehicles. This situation shows the dissatisfaction of the screenwriters, directors and audiences with today’s road circulation and heavy vehicle traffic.

Table 4: Transportation and circulation in fictional cities

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Unusualness	3	1	2	1	4	1	3	4	5	5
Innovation	2	1	1	1	5	1	4	3	5	5
Sample creation	3	4	5	1	3	1	4	3	4	4
Intelligibility	5	4	3	3	4	4	4	4	3	3
Likelihood	5	5	3	4	3	4	4	4	4	3
Variation	4	4	3	2	4	2	4	3	4	5
Consistency	4	4	4	4	4	4	4	4	4	4
Total	**26**	**23**	**21**	**16**	**27**	**17**	**27**	**25**	**29**	**29**

3.3. Building Masses

Building masses are the elements that occupy the largest area in the city. Considering that most of the vital, social, cultural and similar functions and needs are realized in it, building masses are the sine qua non of a city. Building masses are valued at the level that they have aesthetic as well as functional features. At the same time, they turn into elements that add value to the city. The main feature that constitutes the urban character is the architectural character.

Cinema is an art space that discovered the magic of building masses when they were designed correctly and used this magic. Cities designed for movies may not be an element that is primarily followed and evaluated by most viewers. However, it is a first-order factor in terms of perceptual activities. There is a difference between seeing and looking. Movie scenes create images through fictional cities, try to tell something and give messages. The subconscious, on the other hand, receives and understands what is wanted to be given through movie scenes. In this sense, architecture appears as an extremely helpful element to the cinema.

In the City of "Ember", the urban order, the quality of the building masses, the architectural texture and the construction materials draw a traditional image. Due to its apocalyptic style, it depicts a post-destruction world. In addition, since it is a closed society, there is no significant differentiation in the city or architecture. This can be considered as an emphasis on how important the

communication possibilities of our time are on the exchange of knowledge and experience and on development. “Naboo” and “Tatooine” in “Star Wars” stand out with their texture made from local materials and compatible with the topography. One or two-storey buildings and the architecture that complement each other also form the character of cities. With these features, they appear as functional and memorable cities due to their unique, remarkable, aesthetic, and harmony with the environment. After the basic needs are met, these are the aims and desires in the cities. Considering these, the fictional cities of the white screen reflect exactly what should be and what is desired.

In fact, while fictional cities reflect what is desired, they often take inspiration from real life as their base, not always imagination. Two important examples of the reflection of real life are again “Naboo” and “Tatooine”. The plots of the locations are inspired by the real world, as confirmed by Doug Chiang, production coordinator of the movie’s producer company Lucasfilm, and Ralph McQuarrie, the company’s illustrator. The architecture of the Hagia Sophia Museum and the Blue Mosque was the source of inspiration for the construction of “Naboo”. Other structures on the planet are generally influenced by Turkish, Byzantine and Baroque Architecture (URL 3, 4, 5). “Tatooine” structures, on the other hand, are interpreted as a synthesis under the influence of Byzantine architecture and Brutalist movement (URL 6).

“The Elven Realm” of “The Lord of the Rings” has structures that are extremely wise, detailed, aesthetically pleasing and constructed with an elegant architectural style. Actually made in the movie; It is to construct architectural understanding and urban lifestyles that reflect the image of Elves, who are portrayed as intelligent and wise. Extremely sophisticated inferences can be made from the architectural style and understanding of the city and can be identified with intellectual ascriptions. This is an indication that the city has been constructed correctly (Figure 3, Table 5). There are no structures in the “Avatar” that were built by the native creature, other than those that humans have built on the planet. This ensures a life on the planet that is completely in harmony with nature. It also strengthens the statement that the high level of happiness, respect, culture and love of the native creature stems from harmony with nature. Conversely, the people who colonized the planet built large, bulky and ugly-looking structures. Humans have come to the planet for invasion and exploitation. This reveals the confession that humanity exploits the earth and nature and has a lifestyle that is incompatible with nature. In the movie of “Total Recall”, gloomy, mass-like, unplanned and cumbersome structures

draw attention. These structures put the city and the general perception in an extremely gloomy atmosphere. What is wanted in the movie is to create the perception of an already gloomy world, political power and people under difficult conditions. And the movie used the city and buildings to create this perception. In the movie "Ready Player One", it preferred to use stacks of containers and neglected buildings to reveal the problems of humanity and the negative mood of people. Unlike the real world, the structures in the virtual world are modern, well-maintained, aesthetic and bright structures. This image also emphasizes that people turn to the virtual world to escape from reality and find happiness. And again, structures were used to strengthen this image.

Buildings are the most prominent elements used to create the perception of time in movies. It has also been used to express economic, social and cultural structure. Thus, the structures actually create a perception for the movies to convey the message or the idea of the movie.

Table 5: Building masses in fictional cities

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Extraordinary	4	2	2	1	3	2	4	2	4	5
Innovation	4	2	2	1	2	1	4	2	4	5
Sample creation	3	4	5	1	2	1	4	2	4	4
Attractive items	5	5	5	2	1	2	5	3	4	5
Likelihood	4	5	4	5	3	5	4	5	4	3
Consistency	4	5	3	5	4	4	5	4	4	4
Use of color	3	2	4	2	2	4	3	2	2	4
Total	**27**	**25**	**25**	**17**	**17**	**19**	**29**	**20**	**26**	**30**

3.4. Green Area/Nature-City Relationship

It is not possible to think of human beings in a living space disconnected from nature. In the past, nature created a living space for human beings. After people gained the ability to shape their environment according to their needs, nature has

become a part of man-made habitats. Over time, mankind has carried the nature away from it to the cities where it must live. The most correct combinations of this unity not only provide the most positive effect on the preferability of cities, but also increase the quality of life of the city dwellers. The search for the right unity in architecture and urban design has turned into an effort in daily life, and it has also been reflected on the white screen as an expression of longing.

One of the most striking examples in terms of living in harmony with nature, sacred values attributed to nature and the war for nature is the Planet Pandora. The people of Navi live completely in harmony with nature in their villages, which they have formed on the branches and inside of a huge tree. The emphasis in the movie is that the Navi people, who live so harmoniously with nature, are a happy, peaceful, respectful, mature character and adhere to their traditional culture. Emphasizing the opposite of today's urban understanding, the movie also brings a critical perspective to today's lifestyle and ambitions. Similarly, the relationship established between the life of the Elven people in Lothlorien and the very long-lived and wise nature of the Elves is not accidental. In addition to the general urban understanding, the imitation of nature embroidery preferred in details and decorations and the building systems directly related to the exterior are extremely beautiful details. In the same movie, Hobit Village, which has houses that are very compatible with the topography, a livelihood based on agriculture and the surrounding forests, is identified with happy Hobites.

The Star Wars movie has many fictional planets and cities. In the movie, the planets and cities where wealthy and happy people live in peace are depicted architecturally aesthetically and tastefully. In addition, these cities are equipped with green areas and are at peace with nature. In particular, Naboo offers green spaces, wide water surfaces and scenes integrated with nature that support its aesthetic architecture. Despite its highly futuristic city concept, Tomorrowland is exactly as Ebenezer Howard planned in the Gardencity Model. In this city, the urban functions are designed in the center and the agricultural areas in the outer circle surrounding the city. his can be interpreted as both a description of the right idea and conveying the expectations about the city to the relevant people. In Black Panther, Wakanda is shown as a place far above the rest of the world as a civilization. And as Wakanda is a high-tech city, it's a real piece of nature. In the movie, Wakanda is portrayed with its unique natural beauty. In this picture, it is underlined that progress and development are possible without consuming natural resources and without harming nature. In addition, Wakanda contains

both rural and urban settlements. However, it is a settlement that produces, transforms and evaluates its outputs. It is noteworthy that they are classified by the rest of the world as a rural, backward and poor civilization, since their high ability in technology is unknown and they live in a natural settlement. This stands out as an expression that people do not value nature and those who protect it, and that their value judgment is wrong. In the movie Valerian, imitating nature on a human-made planet is an important detail. It is very ironic that different creatures from different parts of the universe copy their nature to this artificial planet.

In future-themed and apocalyptic movies, it is important to have minimal or no green texture in cities. In these movies, cities are depicted as neglected and desolate, and people as troubled. This is the concern of the pessimistic and bad position that the city and people will fall into without nature (Figure 4,Table6).

Table 6: The relationship between nature and city in fictional cities.

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Sample creation	3	4	5	1	1	1	5	2	2	4
Presence of universal feelings	4	4	5	1	1	1	5	1	2	5
Foresight	3	4	5	5	5	5	3	4	3	5
Psychological approach	2	3	5	4	3	3	4	2	3	4
Presence of mandatory components	5	5	5	2	1	2	5	2	3	5
Consistency	5	5	5	5	5	5	5	5	5	5
Total	**22**	**25**	**30**	**18**	**16**	**17**	**27**	**16**	**18**	**28**

3.5. Urban Function and Equipment

Cities are systems consisting of many different functions. Every different function in a city adds usefulness, livability, meaning and equipment to the city. And it enriches it from an urban perspective. Similarly, equipment are indispensable for a city. Equipment is required to transform the city into effective and useful areas. At the same time, the equipment adds attraction to the city with its aesthetic features. Together with urban functions, they bring character and image to the city.

Apart from residential areas and transportation routes; racetrack, markets, trading areas, warehouse areas in “Star Wars”; fairground, farmland and forest in Hobit Village in “The Lord of the Rings”; the town square, market and greenhouses in the “Magic City”; In “Avatar”, nature used as social gathering areas and a track for sports, walking and other activities; terraces, harbor, camellia spaces and forest in the Elven Land in “Lord of the Rings”; In the “World of Tomorrow”, swimming pools in the city center, urban green spaces and city squares are the functions where the scene takes place the most. Functions created with virtual reality in the movies “Ready Player One” and “Valerian” are a reference to today’s world and the future. Because people realize many needs with virtual functions.

Due to the future fiction in “Alita”, “Tomorrowland”, “Total Rcall” and partly “Black Panther” movies, the equipment is quite rich. The time in “Alita” and “Total Recall” movies is closer to the present, and “Tomorrowland” is created with a more distant perception of the future. In the first two movies, the functions and equipment create a more chaotic city. And it still mostly includes today’s functions and uses advanced versions of today’s equipment. However, in the movie “Tomorrowland” and “Black Panther”, the functions and equipment reveal a much brighter city image. And it is much more life facilitating and enjoyable. This creates the perception that a tragic change and transformation in functions and equipment is not expected, at least in the near future.

When urban equipments are examined, the presence of rich equipment elements in all movies is remarkable. This is an indication of how professionally fictional cities are actually prepared and how detailed they are designed. It is also an expression of drawing attention to the deficiencies needed in the real environment and reproaching them. In this way, attention is drawn to the importance of the presence of equipment for both function and aesthetics in urban spaces. In the movies examined, the big city gates at the entrances to the cities, the tarks on the roads are extremely aesthetic details. Lighting elements associated with urban character and structures, indoor and outdoor seating, camellias compatible with the structural quality offer effective urban images. Holograms, which are the result of technology, kiosks and communication devices with many functions, billboards, statues and fountains have helped fictional cities to draw an interesting and livable image (Figure 5, Table 7, 8).

Table 7: Urban functions in fictional cities

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Extraordinary	5	2	2	3	4	2	5	5	5	5
Innovation	3	1	2	2	4	4	5	4	5	5
Sample creation	3	2	4	2	3	2	5	3	4	4
Intelligibility	5	5	5	5	5	5	5	5	5	5
Attractive items	4	4	2	2	3	2	4	3	5	5
Likelihood	4	5	2	4	4	4	3	4	4	3
Variation	4	3	2	2	3	2	4	4	5	5
Clarity of icons	4	4	4	4	4	4	4	4	4	4
Consistency	4	4	4	4	4	4	4	4	4	4
Use of color	4	3	3	2	3	2	3	3	3	5
Presence of details	4	4	3	4	4	2	5	5	5	5
Total	**44**	**37**	**33**	**34**	**41**	**33**	**47**	**44**	**49**	**50**

Table 8: Urban equipment in fictional cities

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Extraordinary	4	2	2	2	4	3	4	3	4	4
Innovation	3	1	1	1	4	2	4	3	4	4
Sample creation	3	4	4	2	2	1	4	2	4	3
Intelligibility	4	4	4	4	4	4	4	4	4	4
Attractive items	4	4	4	2	2	2	4	3	4	4
Likelihood	4	4	4	4	4	4	2	4	4	2
Variation	3	3	2	3	4	2	4	3	4	4
Clarity of icons	5	5	5	5	5	5	5	5	5	5
Consistency	4	4	4	4	4	4	4	4	4	4
Use of color	3	2	4	2	2	3	4	3	3	4
Presence of details	4	4	4	4	4	4	4	4	4	4
Total	**41**	**37**	**38**	**33**	**39**	**34**	**43**	**38**	**44**	**42**

3.6. Urbanity

The inhabitants of the cities in the movies love and own their cities no matter what planet, city or condition they are. In almost all of the movies, there are characters who try to improve the conditions of the city and save the city from bad conditions, or exploit the city and use it for their own interests. The conflict between these characters also increases the perception of urbanity in the movies. There is a great harmony between the city and the citizen in the movies. This harmony affects and shapes the whole life of the citizens. Thus, the city and its inhabitants have literally become a part of it. This harmony and integration is at a dramatic level for some cities. However, it is noteworthy that there are dramatic differences between the cities and the urban profile in the movies. So much so that the citizens of different cities in the same movie have difficulty in adapting to each other's cities and lives. These deep differences draw more attention to the relationship between the city and its inhabitants. Thus, the awareness of belonging and ownership of a city is maximized.

The inhabitants of cities with a high relationship with nature are more gentle, sincere and clean people. Residents of concrete-dense cities are more overbearing, criminal, and filthy. Urbanites of the first type are tasked with protecting their cities, and citizens of the second type are tasked with saving their cities. In addition, as the education, awareness and culture levels of the citizens increase, cities become more beautiful, otherwise the city becomes gloomy and ugly. In the light of all these, the message of the movies is that the city directs the citizens and the citizens shape the city. When this right combination occurs, the city becomes livable, aesthetic and offering opportunities. And the culture, education and character traits of the citizens are increasing (Table 9).

Table 9: Urban dwellers in fictional cities.

(rating from 1-5 1 very weak, 5 very strong)	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Friendly city dwellers	3	3	4	3	2	2	4	3	3	3
Psychological approach	4	4	4	4	4	4	4	4	4	4
Cosmopolitan structure	2	2	2	2	4	4	2	3	2	4
Urban consciousness	3	3	5	4	2	2	4	3	4	4
Human friendly city	3	4	5	2	2	2	4	2	3	3
Total	**14**	**16**	**20**	**15**	**14**	**14**	**18**	**15**	**16**	**18**

4. Discussion

The 10 movies examined cannot generalize all the movies. However, the fact that too many people in the world watch them means that too many people accept them. It also means that they convey the thoughts from the movie to too many people. In the movies examined, the social structure, the city-society relationship, the future of cities, environmental problems, urban cause and effect relationships, the evaluation of today's cities, urban predictions and criticism are the phenomena that are particularly emphasized.

When evaluated in terms of the dream and expectation of the city, it is seen that the current and general expectations of the society are reflected in the movies. The movies reviewed are varied, with fantasy, science fiction, apocalyptic, past, present, future and unknown time. Although the movies differ in terms of fiction, subject and period, they draw attention to common concerns and expectations. In the movies, there are facts that are mentioned from criticism of today's cities and system to dreams and expectations of the future.

Expectations are given at two different levels in different movies. Expectations from today's cities and expectations from the cities of the future. In fact, when looking at both levels, these are the facts that today's urban people, academicians, environmentalists, planners and designers focus on and talk about. However, the movies are instrumental in concentrating attention on this subject by reflecting these already known facts. Thus, social expectations always remain warm and a demanding public opinion can be formed. Moreover, the level of awareness and consciousness is also increasing.

When movies are evaluated in terms of urban concerns, two different levels are encountered again. Anxiety from today's cities and anxiety from the cities of the future. Movies do this by showing good or bad examples. It can be deduced from some movies that "cities will be more livable if precautions are taken and expectations are met". This is a result of the concerns in today's cities and the desire for cities to be more livable. On the other hand, in some movies, the conclusion that "cities will become more problematic and unlivable if this continues" is reflected on the screen. This result is due to the awareness of the consequences of mistakes made today and the uncertainty of the future.

Movies were scored for each evaluation criterion. This scoring made it possible to compare the movies in terms of evaluation criteria and sub-criteria. A collective evaluation of the cities in the movies in terms of all criteria is given in

Table 10. The movies with the highest score in terms of all criteria are “Valerian”, “Black Panther”, “Tomorrowland”, “Avatar” and “Star Wars”, respectively. The movie with the lowest score was “City of Ember”.

Table 10: Total scores by categories

	Star Wars	The Lord Of The Rings	Avatar	City of Ember	Total Recall	Ready Player One	Black Panther	Alita	Tomorrowland	Valerian
Overview of the city	39	35	49	32	29	35	42	34	40	45
Circulation	26	23	21	16	27	17	27	25	29	29
Building masses	27	25	25	17	17	19	29	20	26	30
Green area/ nature and city relationship	22	25	30	18	16	17	27	16	18	28
Urban function	44	37	33	34	41	33	47	44	49	50
Equipment	41	37	38	33	39	34	43	38	44	42
Urbanity	14	16	20	15	14	14	18	15	16	18
Total	**213**	**198**	**216**	**165**	**183**	**169**	**233**	**192**	**222**	**242**

The cities in the examined movies are constructed with detailed elements quite consistently. Most of the functions and equipment that should be in a city have been considered. The cities were established in accordance with the period in which the story takes place. Thus, the effect of realism in cities increased. This effect of reality has also been effective in conveying the urban messages of the movies to the audience. The city setting in the movies is generally as follows; the modern and bright city of the future, high-tech city, plain and simple city without technology, modern day city, the city that accepts nature itself as a living space, a city integrated with nature and respectful to nature, chaotic city after global destruction, gloomy city detached from nature and densely built, fictional city attributed to non-human creatures, utopian city, virtual city with augmented reality.

All of these cities also contain urban messages in accordance with their fictions;

- Mankind is a part of nature
- Cities should be compatible and integrated with nature
- Cities should be sensitive to environmental problems
- Environmental problems threaten the world
- If it continues like this, an environmental disaster is inevitable.
- There is a strong relationship between a happy society and the city
- In cities that are gloomy, dense, concrete, do not contain parts of nature and have environmental problems, crime is high and people are unhappy.
- In cities that are spacious, well-structured, in harmony with nature and do not have environmental problems, crime is low and people are happy.
- Increasing population and depletion of resources brings the end of the world
- If the city does not offer enough opportunities to people and cannot enable them to socialize, people tend to the virtual world.
- Mankind has become addicted to technology and the virtual world
- Highly developed and high-tech cities do not have to break away from nature and harm the environment
- Renewable energy opportunities should increase
- Multiculturalism enriches society and the city
- Every city should have its own and distinctive character
- The buildings in the city should not be ordinary and monotonous, but should have a unique and characteristic architectural understanding
- Urban equipment, building masses, architecture, urban design, culture and environmental factors should be compatible with each other.
- Pure, clean and livable environment is disappearing because of people's greed.

These results, the number of which can be increased even more, draw attention to many important facts about cities. These messages in movies are actually issues that human beings have been discussing for hundreds of years.

5. Conclusion

Movies, which are sometimes a reflection of real life and sometimes a reference to the future, are valuable in terms of revealing many details, tricks, alternatives,

criticisms and due diligence about urban planning and design. It expresses the expectations, desires and grievances of millions of people through a single window (Figure 6). As such, such large-scale surveys need to be considered and studied more. The feedbacks that can be obtained from the movies also bring important gains and information.

Movies that provide material for both planners, designers and educators contain details that can be used for every field. Movies can be watched to have fun, to spend time, to dive into a different world, to live in dreams, to make sociological and cultural analyzes. For this reason, movies are a successful way of reaching, communicating and connecting people from all walks of life. They are extremely efficient tools when properly evaluated.

Movies can be inspired by the real world in terms of urban planning, urban design, architecture, urban furnishings and details from a professional point of view. It can also come up with ideas that can set an example for the real world and inspire designers. The revival of the fascinating Planet Pandora as a park by Walt Disney and the fact that Pandora came to life is one of the most striking examples of this idea. The Park was opened in mid-2017 after six years of work. This is based on the idea that the large number of viewers reflects people's curiosity, enthusiasm and desire to be in it. The fact that a fictional world comes to life exactly and with all its features is extremely important in terms of showing the great impact of movies on large audiences.

Tomorrowland is a city with many different architectural ideas. It is designed to create a perception of the future in the audience with the idea of the world of the future. The strikingly shaped buildings at Tomorrowland are the product of a creative mind. Among all the impressive structures in the city, a few inverted "U"-shaped structures are also important for today. The similarities between these buildings in Tomorrowland and a planned building in New York are interesting. The architect did not make a statement about the source of inspiration and no similarity was established by anyone. Maybe it's pure coincidence. However, the building named The Big Bend, designed to be built in New York, will be the first and only example in the world with its inverted "U" shape. The building, which was designed to be 1230m long from one end to the other, will also have the title of being the tallest skyscraper in the world. This idea, which is perhaps a pure coincidence, is a proof that the cities of the future are perceived and imagined in the same way by both the architects of today's cities and the creators of fictional cities in movies. This evidence leads to the

following philosophy, the answer to which must be sought. Are our fictions of today the future itself? Or is the world's perception of the future common?

Another important example that shows the social impact of movies, their direction of demands, and the magnitude of their social, cultural and economic reflections is the 2016 movie "Batman and Superman: Dawn of Justice". The movie, which is also sponsored by Turkish Airlines, managed to attract attention before and during the screening. The launch of Turkish Airlines' movie-themed ads is a reflection of the already widely accepted and popular influence of movies. In the advertisement, it is mentioned that Turkish Airlines has added Gotham City, where the movie Batman takes place, and Metropolis, where the movie Superman takes place, to its destinations. After the advertisement, those who wanted to fly to both fictional cities made reservation requests. However, those who tried to make reservations were disappointed when they learned that the cities did not actually exist. This is a clear proof of how movies have entered our lives and how much they are a part of our world.

The right movies, with both visual and auditory advantages, are the most effective way to tell the right things in the right way. The effects of movies on people's psychological, emotional and perceptual states have become an undeniable and unmistakable reality. Movies, which present material from which inferences can be made for every profession, reveal an extremely broad perspective in terms of architecture, city and design. With today's technology, movies in which high-realistic visual materials are used intensively and inevitably for designers allow both the search for alternatives and the voting of alternatives by large masses. Creative ideas are features that are supported and encouraged because they both trigger the emergence of different ideas and create a base that can be developed. Based on all these features of the movies, it can be said that;

Movies,

- comprehensive surveys.
- describe the expectations, wishes and dreams of both the author and the audience.
- predictions for the future.
- depicts the point where the cities are going.
- gives direction to architecture and urban design.
- Indicates technological and scientific goals.
- it ensures that the right or targeted urban design, architectural ideas and solutions are noticed by everyone.

- generates new and many design alternatives and ideas.
- creates public opinion for the establishment of the desired lifestyle
- has the effect of advertising in the spread of urban technologies.
- is the embodiment of dreams.
- they are also educational materials.

In the movies examined, cities are shaped to describe the situation of humanity, people's feelings, goals, expectations, predictions, future concerns, mistakes and regrets. In addition, cities in movies are also used to show people the truth, to set goals, to establish cause-effect relationships and to teach.

Movies are a tool for relaxation, daydreaming, having a good time, socializing, learning new things, expanding horizons, living dreams, seeing the difference between reality and fantasy, brainstorming, the competition of creative minds and self-improvement. As long as the right things are used with the right intentions and for the right purposes.

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CHAPTER III

ANALYSIS OF VISUAL LANDSCAPE AND AESTHETICAL QUALITY THROUGH VISUAL LANDSCAPE ANALYSIS: THE CASE STUDY OF İĞNEADA*

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1. Introduction

Before taking a step into the subject of visual quality analysis, it is deemed required to define the term "landscape", as well as explaining certain concepts related to visuality, aesthetics, beauty, pleasantness and aesthetic judgment. This study mainly focuses on this concept and the evaluation of visuality in landscape. Within the borders of a general definition,

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the term “landscape” can be defined as a composition formed by natural and cultural elements that fall into a frame of view. (Koç and Şahin, 1999; Bulut and Acar, 2017).

Visual quality is one of the most important factors that let people feel good in terms of both emotional and physical aspects. What users see in the environment where they spend time or visit affects their sense of belonging and satisfaction with the space. Moreover, images that are incompatible with the natural landscape, which contrast with the aesthetics and natural beauty of the space, negatively affect the sense of belonging and satisfaction of the users within this context (Çelik, 2013).

Forman (1995) defined the term “landscape” as a mosaic of recurring land uses or local ecosystems in similar forms over large areas. According to the European Landscape Convention (2000), as perceived by people, the term landscape can be defined as an area of which characteristics emerge as a result of the action and interaction of natural and/or human factors. Considering all these definitions together, it can be understood that the landscape is, in fact, a set of systems in which natural and cultural elements interact with each other (Kiper et al., 2017).

The Visual Landscape comes in view with the interaction of a series of biotic, abiotic, visual and cultural elements (Bulut and Yılmaz, 2007; Asur and Alphan, 2018). Landscape is not only the visual perception of the structure formed by the land form, vegetation and structures, but it also expresses a more comprehensive structure that includes historical land uses, other cultural features, wildlife and seasonal changes of an area. The combination of these components determines how the landscape will gain value (Anonymous, 2002).

The term “visual quality” plays a crucial role in planning and design studies within the scope of defining the elements that comprise the landscape or the structure they possess. Therefore, identifying the visual quality in an area is of crucial importance in terms of detecting the opportunities on the existing landscape structure, along with detecting the potential that the elements and components of the landscape have in this area (Ak, 2010). According to He et al. (2005), there may be inadequacies in the decision-making process of planning and applications in visual landscape protection areas. These can be summarized as that there are uncertainties in the criteria for defining quality landscapes worth preserving, including the lack of scientific tools to provide sufficient accuracy, efficiency, reliability and validity in order to visualize data relevant to the analyses, accordingly (Asur and Alphan, 2018)

The ever-growing interest in environmental quality within the recent years has also increased the importance of landscape quality. Today, landscape is considered as one of the natural resources that is of crucial importance not only from an environmental point of view, but also from an economic point of view, as well. Landscape quality can be crucial in recreational and residential areas, tourism and even healthcare. Additionally, high-quality landscape usually corresponds to areas rich in water, oxygen, geomorphological formation, animal and plant species and/or related to educational and scientific purposes (Real et al. 2000). The visual landscape character of the area also plays a crucial role amongst the reasons with regards to the preference of recreational areas: for the outdoor recreation areas, in particular. As long as the visual features of a landscape are natural, open, diverse, mysterious, harmonious, perspective, in order and reassuring, the scenic beauty of the area improves, proportionally. Considering the importance of landscape aesthetic quality in environmental management, the visual aesthetic structure of the landscape should be included in the planning decisions, as well (Özhancı and Yılmaz, 2011).

Visual perception can be defined as the act of acquiring information from the environment through the senses (Göler, 2009); It is expressed with concepts such as visuality, beauty, satisfaction, and aesthetics (Daniel, 2001, Kiper et al., 2017). Therefore, it is rather effective in visual perception, taste and recreational preferences, thus having been and being included as a variable in a number of studies such as land use planning and resource management, decision-making, strategy development and management stages (Clay and Daniel, 2000; Tüfekçioğlu Kuğu, 2008; Çağlayan Kaptanoğlu, 2008; Uzun and Müderrisoğlu, 2011; Caf, 2014). As a matter of fact, as stated in the "Association of Chambers of Turkish Engineers and Architects - Chamber of Landscape Architects Free Landscape Architecture Consultancy Services Implementation, Professional Inspection, Registration of Offices and Minimum Wage Regulation," where the jurisdictions of the Landscape Architecture profession are defined, the following expression draws attention to the visual quality of the landscape ""evaluation of visual landscape and aesthetic quality related to life with visual landscape analysis (Peyzaj Mimarları Odası, 2021). Additionally, a number of studies suggest that the perception of visual quality is effective in terms of determining space preferences (Dramstad et al., 2006; Kaplan et al., 2006; Polat and Acar, 2010; Uzun and Müderrisoğlu, 2011; Polat et al., 2012; Çelik, 2013; Kiper and Cengiz, 2016; Kiper et al., 2017; Yakan, 2018). Therefore, a view being

visually superior will increase the frequency of preference for that area, thus guiding the stages of land use planning, decision-making-strategy development and management. However, Özgüç (1999) mentioned that determining and analyzing the visual quality of the region at the planning stage is the most accurate method for the protection of visual resources (Özgeriş and Karahan, 2015). According to Clay and Daniel (2000), visual quality can affect the quality of touristic/recreational experience in areas with tourism potential.

In this study, it is aimed to define the coastal areas of İğneada Town, which is of importance at local and regional level with its natural identity in Demirköy district of Kırklareli province, through the help of visual landscape analysis. Being carried out in the case study of İğneada, it is also aimed to define visually high quality landscapes and to determine the relationships between space preferences along with the related parameters through the help of a group of experts and observers in space preferences.

2. Material and Method

The material of the study comprises of İğneada town in Kırklareli province, Demirköy district within Thrace Region (Figure 1). With a shoreline to Blacksea, İğneada is located in the foothills of Istranca (Yıldız) mountains.

With this study, it is aimed to define the settlement areas of İğneada Town, which is of importance at local and regional level with its natural identity in Demirköy district of Kırklareli province, through the help of visual landscape analysis. Visual quality analysis was carried out with expert evaluations by means of using images of İğneada (Figure 2).

The method of the study consists of seven basic stages.

1. Identifying the objective and the scope,
2. Carrying out a literature review on the area and the subject,
3. Identifying the criteria that define the visual impact value,
4. Taking the photographs to be used in the evaluation and choosing the appropriate ones,
5. Carrying out a questionnaire study by showing photographs to the expert and the group,
6. Statistical analysis of the findings
7. Developing conclusions and recommendations

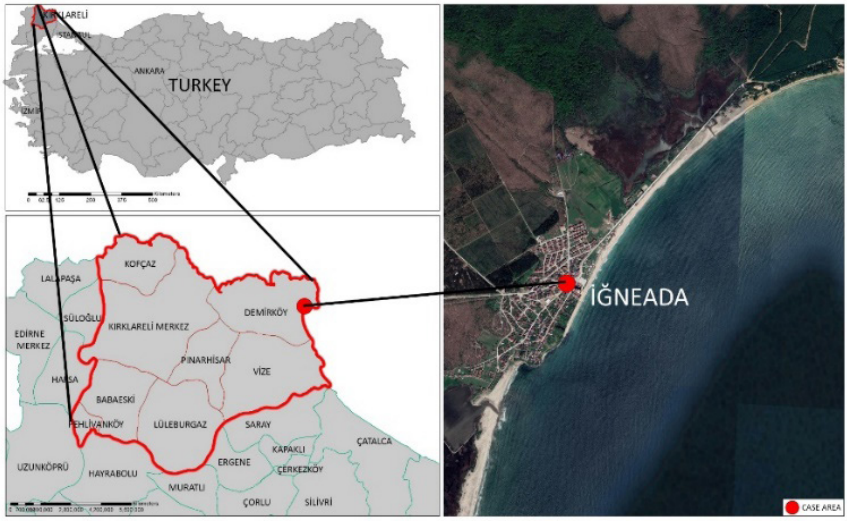


Figure 1. Location of the study area.

The methods by Clay and Daniel, (2000), Arriaza et al. (2004), Cakci, (2007); Tüfekçioğlu Swan, (2008), Özhancı and Yılmaz, (2011), Celik, (2013) and Kiper et al. (2017) have been analyzed with regards to identifying the criteria defining the visual impact value, and the one developed by Kiper et al. (2017), which is the most up-to-date method, has been used.

Being from different elevations in the research area, the 10 most suitable photographs taken from panoramic viewpoints were used in the visual analysis study with the field studies carried out in the fall season of 2020 (Figure 2). A large number of photographs were taken within the scope of the study, and the presence of panoramic points, natural and cultural landscape elements and image quality were the factors in the selection of 10 photographs used in the method, based on the presence of the landscapes that are most likely to be seen by the users.

Consisting of faculty members from Kırklareli University Landscape Architecture, Architecture and Urban and Regional Planning Departments, 11 people were settled in as the expert group. In addition, an evaluation form was presented and they were asked to evaluate 10 photographs related to the area within the specified scoring range. In the evaluations, the main and sub-parameters of each image are in the range of 1, 2, 3, 4, 5 on the Likert scale (5 highest, 4 high, 3 medium, 2 low and 1 lowest), while the opposite adjective

pairs containing spatial characteristics are scored in the range of-2 ,1,0,+1,+2 (-2 lowest, +2 highest, 0 neutral).

In Figure 2, view 1 was taken from İğneada square, view 2 was taken from First enterance of İğneada to city centre, view 3 was taken from İğneada cemetery, view 4 was taken from Mert Lake to secondary residences, view 5 was taken from Mert Lake to İğneada center, view 6 was taken from harbor way to İğneada center, view 7 was taken from harbor to İğneada center, view 8 was taken from harbor, view 9 was taken from Limanyolu Beach to İğneada center and view 9 was taken from Limanyolu to İğneada center.



Figure 2. Images to be analyzed within the scope of the questionnaire study.

In the last stage, a relationship was established between the preferences of the expert group and the parameters based on the research findings obtained through descriptive statistics. The results obtained within the framework of the analyses were compared for both groups and the most and least preferred parameters and images were determined, accordingly.

3. Findings

Examining the expert surveys made on the images of İğneada, the findings in Table 1 were obtained.

Examining the main criteria, it can be seen that the "Landscape Beauty" criterion ranks first with an average of 3.43. The criterion of "Recreational Values" received the lowest value among the 6 criteria.

Examining at the sub-headings of the main criterion of naturality, the second image received the lowest score. Images 7 and 8 received the highest ratings in terms of the presence of natural vegetation. In terms of the presence of other natural elements, the 2nd image got the lowest score, while the 8th image got the highest score (Figure 3).



Figure 3. Images with the lowest and highest scores within the scope of the main criterion of "Naturality".

Examining the sub-headings of the harmony main criterion, the 6th image got the lowest score in terms of topography, vegetative elements and the harmony of the structural elements, while the 8th image got the highest score. In terms of gaining identity (character) with the existing elements of the area, the 6th image received the lowest score, while the 8th image received the highest score. (Figure 4).

Table 1. Findings obtained with the study.

PARAMETERS RELATED TO PREFERENCE CRITERIA		1st image	2nd image	3rd image	4th image	5th image	6th image	7th image	8th image	9th image	10th image	TOTAL	
Naturality	Presence of natural vegetation	1.64	1.18	4.18	3.73	3.45	1.27	4.36	4.36	2.18	2.45	**2.88**	**2.97**
	Presence of water	3.55	1.36	1.00	4.55	4.45	1.00	4.91	4.82	4.09	3.18	**3.29**	
	Presence of other natural elements (soil, rock, terrain type, etc.)	1.27	1.00	2.09	4.00	3.55	1.09	3.73	4.36	3.55	2.82	**2.75**	
Harmony	Compatibility of land use with other elements	1.55	1.55	3.00	3.00	2.82	1.55	2.91	3.91	2.45	2.09	**2.48**	**2.48**
	Harmony of topography, plant elements and structural elements with each other	1.82	1.55	3.27	3.45	2.82	1.36	2.91	3.73	2.18	1.91	**2.50**	
	Gaining identity (character) with existing elements of the field	1.82	1.73	2.82	3.00	2.64	1.64	2.64	4.00	2.36	1.91	**2.45**	
Readability	Perceptibility of the landscape	1.64	1.64	3.64	3.64	3.36	1.09	3.64	4.00	3.36	2.55	**2.85**	**2.64**
	Perceptual orientation	2.18	3.36	3.91	2.73	2.91	2.45	2.82	3.55	3.82	2.55	**3.03**	
	Limited perceptiveness (limitation)	2.55	3.45	3.09	2.00	2.55	2.91	1.64	1.82	2.09	2.18	**2.43**	
	Presence of distinctive elements	2.73	1.82	2.55	3.09	3.18	1.36	2.64	3.55	2.45	2.18	**2.55**	
	Presence of unique items in the area	1.91	1.45	1.73	2.55	3.09	1.18	2.45	3.09	2.00	2.00	**2.15**	
	Presence of a well-maintained clean area	2.27	3.00	3.55	2.73	3.09	1.73	3.00	3.27	3.36	2.09	**2.81**	
Land Form	Variability of terrain topography (flat-slope)	1.91	1.27	1.36	3.27	2.73	1.82	3.27	3.55	2.55	2.45	**2.42**	**2.69**
	Formal diversity in the land (sea, mountain, plain, valley, etc.)	3.27	1.55	1.36	4.00	3.55	1.36	4.45	4.00	3.09	3.00	**2.96**	
Recreational Value	Presence of unique items	2.09	1.00	1.55	2.55	2.91	1.18	3.09	3.55	1.91	1.91	**2.17**	**2.23**
	Presence of elements forming the focal point	2.18	1.27	1.64	2.36	2.73	1.09	3.00	3.82	2.09	1.73	**2.19**	
	Presence of cultural elements	1.64	1.27	1.55	2.18	2.00	1.27	2.36	2.73	1.82	2.00	**1.88**	
	Presence of touristic infrastructure and superstructure (road, motel, restaurant, etc.)	2.82	3.09	1.64	3.18	3.00	1.91	2.82	2.36	3.09	2.91	**2.68**	
Beauty of View	The clarity of the view	3.00	2.91	3.45	3.64	4.00	2.82	3.73	4.18	4.00	3.18	**3.49**	**3.43**
	The size of the visible area	2.91	2.36	3.45	3.55	4.00	2.45	4.45	4.27	3.55	3.55	**3.45**	
	Depth of the view	318	2.91	3.64	3.18	3.82	3.09	3.91	4.09	3.36	3.09	**3.43**	
	Clarity of the view (no obstructions)	2.82	2.91	3.82	3.73	3.64	2.82	3.91	3.55	3.27	2.91	**3.34**	
TOTAL		**2.31**	**1.98**	**2.65**	**3.19**	**3.19**	**1.75**	**3.3**	**3.66**	**2.85**	**2.48**		



Figure 4. Images with the lowest and highest scores within the scope of main criterion of "Harmony".

Examining at the sub-headings of the main readability criterion, the 6th image got the lowest score in terms of the perceptibility of the landscape, while the 8th image got the highest score. Additionally, in terms of the presence of distinctive elements, the 6th image received the lowest score, while the 8th image received the highest score. In terms of the presence of a well-kept clean area, the 6th image got the lowest score, while the 3rd image got the highest score (Figure 5).



Figure 5. Images with the lowest and highest scores in the main criterion of "Readability".

Examining the sub-headings of the landform main criterion, the 2nd image got the lowest score in terms of the variability of the land topography (flatness-slope), while the 8th image got the highest score. In addition, in terms of morphological diversity (sea, mountain, plain, valley, etc.) in the land, the 3rd and 6th images got the lowest score, while the 7th image got the highest score (Figure 6).



Figure 6. Images with the lowest and highest scores under the main criterion of "Land Form".

Examining the sub-headings of the recreational value main criterion, the 2nd image got the lowest score in terms of the presence of unique items, while the 8th image got the highest score. In terms of the presence of focal elements, the 6th image received the lowest score, while the 8th image received the highest score. In terms of the presence of touristic infrastructure and superstructure (road, motel, hotel, restaurant, etc.), the 3rd image got the lowest score, while the 4th image got the highest score (Figure 7).



Figure 7. Images with the lowest and highest scores under the main criterion of "Recreational Value"

Examining at the sub-headings of the main criterion of landscape beauty, the second image received the lowest score in terms of the size of the visible area, while the 7th image received the highest score. Additionally, in terms of the clarity of the image, the 1st and 6th images got the lowest score, while the 7th image got the highest score (Figure 8).



Figure 8. Images with the lowest and highest scores under the main criterion of "Beauty of View"

Examining all the criteria, the 8th image got the highest score, while the 6th image got the lowest score. (Figure 9).



Figure 9. Images with the lowest and highest scores within the scope of all criteria.

4. Discussion and Conclusion

Examining the research carried out, it can be clearly seen that the beauty of the landscape got the highest score in the evaluations made under the headings of naturality, harmony, readability, landform, recreational values and beauty of the view. It can also be seen that the recreational value heading got the lowest score. This result shows that the landscape value of İğneada town is high, while there are inadequacies in terms of recreational activities in this aspect.

Under the heading of naturality, the Water presence parameter has the highest value. This shows the importance of the presence of sea and lake in İğneada in terms of visual landscape quality. Examining the heading "harmony", the parameter of harmony of topography, plant elements and structural elements with each other got the highest score. This parameter is thought to be high due to the undisturbed nature and construction constraints of İğneada. Looking at the heading of "readability", the perceptual orientation parameter has the highest score. Variable landscape structure, protected areas are the factors that increase this effect in this aspect. In the heading of Land Form, the parameter of shape diversity in the land got the highest score. Having quite different landscapes such as forest, agriculture, city, shore and lake, what can be clearly seen is the morphological diversity of İğneada. Under the heading of Recreational Value, the existence of touristic infrastructure and superstructure has the highest score. Although there are a number of accommodation opportunities, İğneada has more boutique hotels or hostel type accommodation than large-scale hotels. This helps to preserve its natural structure. Under the heading of beauty of view, the highest score is on the aperture parameter of the image. The absence of high-rise buildings and sparse construction are the reasons that strengthen this parameter.

The landscape preservation plans should be developed urgently for settlements with sensitive natural areas such as İğneada in line with the above mentioned analyses. Sensitive landscape areas should be determined during the construction phase of spatial plans and spatial planning should be developed accordingly. The use of natural landscape elements should be included in the settlement areas that either have been built or will be built. Making visual landscape quality assessments in landscape planning and design studies will provide a quite crucial infrastructure. To give an example, it will guide the determination of thematic routes for nature tourism, and areas such as viewing terraces, observation points, hiking trails. It can be ensured that a settlement

having the potential to come to the forefront with nature sports such as İğneada (currently canoeing, ATV and trekking) to reach its predicted potential by means of planning and design studies which are projected to be carrid out together through visual landscape analyses.

Within the planning studies, the designers, planners, along with the related instituions and organizations should consider preserving and developing the visual identity of the region considering the visual values of such areas during the landscape planning, design and implementation phases. With this study, it will be possible to develop strategies that reveal expert opinions, as well as the user demands and expectations in the production of tourism and recreational use.

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CHAPTER IV

URBAN LANDSCAPE DESIGN FOR QUALITY OF URBAN LIFE

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1. Introduction

According to the United Nations data, about half of the world's population lives in cities today and it is estimated that by 2050, 68% of the world's population will live in urban areas (Kabisch, Korn, Stadler and Bonn, 2017; UN, 2018). Such a high rate of population growth in urban areas cause to lose the growth of cities. For this reason, it is clearly predicted that it will be difficult to respond to the problems that will arise in the future and the needs of the society.

Healthy housing conditions, health conditions, environmental deterioration, air and water pollution, natural disasters, and inadequate urban infrastructure are the main urban problems that need to be struggled. Especially in the urban environment, unhealthy living environments are formed due to the deterioration of the ecological balance and green areas that are unqualified and devoid of aesthetic values. Due to all these urban problems and deteriorating living environments, studies on quality of life have increased in recent years. Landscape designs to increase the quality of life have became crucial primarily in the urban environment of individuals in a narrow scope and societies in a broader context. In all landscape designs realized in urban areas, it is aimed to create urban environments where the city is healthy, ecological balance is preserved, more greenery is integrated into the city, and aesthetic and economic

value is gained. In order to achieve these goals, the concept of urban quality of life and its components guide the designs.

In order to understand the urban quality of life, first of all, it is necessary to understand and define the quality of life. Quality of life was first discussed in Perloff's (1969) study, and it was emphasized that the quality of life of individuals in urban areas is determined by the interaction of the natural and built environment. In this sense, quality of life is related to both natural and built environment features and includes urban equipment and comfort elements.

In the articles of the United Nations (UN) on the goal of urban sustainability, the definition of sustainability is expressed as meeting the needs of present and future generations and living a good life. In this context, good life is related to the quality of the living environment for individuals (Defila and Di Giulio, 2021). The World Health Organization, also defines a healthy city as a city that gradually increases its physical, social and environmental well-being and uses its resources to improve it for all people in society. In addition, WHO has stated that quality of life is related to the goals and expectations of an individual in the context of the culture and value system in which he lives. Therefore, quality of life is a concept related to people's physical health, psychology, freedom levels, social relations and relations with the environment (Higueras, Román and Fariña, 2021).

While Shookner (1997) defines quality of life as the interaction of social, health, economic and environmental conditions that affect the development of the individual and society", similarly (Shafer, Lee and Turner, 2000) argue that quality of life is formed by an ongoing interaction between social, environmental and economic attributes. In the study by Van Kamp, Leidelmeijer, Marsman and Hollander (Van Kamp and et all, 2003), it was stated that both the environmental quality and quality of life concepts refer to the individual, his environment and the relationship between the these, and the components and layers of the quality of life were determined. According to this approach, the environment includes concepts that take measurable spatial, physical and social components together and evaluate individuals' perceptions not objectively but also subjectively. Accordingly, the concept of quality of life consists of health, physical environment, natural resources, benefits and services, social development, personal development and security (Van Kamp and et all, 2003). This conceptual framework places quality of life in its main focus, taking into account the interaction between humans and the urban environment. In a broad

sense, the environment is considered as the sum of the physical, economic and social conditions of urban areas in which people live. Life, which consists of social, economic, physical and even psychological areas, and the quality of life Wish (1986) that emerges with the interaction of these areas with each other is based on meeting the basic needs in urban environments. In this sense, it is essential to measure the social perception of basic needs, which also vary culturally and geographically, such as health, transportation, sports, shopping, education, cultural services, housing and security (Evcil Türksever, 2001).

From this point of view, within the scope of this study, concepts such as quality of life, urban life quality and their contents were examined, and the relationship between urban life quality and urban landscape was evaluated through landscape design examples.

2. Quality of Urban Life

Quality of life research began in the 1960s (Murgaš and Klobučník, 2018) and the concept according to Tekeli (1992), the urban area where individuals live has come to the fore in determining the quality of life after the 1970s. Therefore, the urban space dimension of the quality of life has also gained importance (Bilgili, 2017). Urban quality of life is the basis of the environment-centered perspective of the concept of quality of life. In the context of taking precautions against the negativities that have become the source of many urban problems such as environmental deterioration, social exclusion, insecurity and traffic that occurred in the urban environment after the industrial revolution in the West (Santos and Martins, 2007), the need for creating a healthy environment has revealed the need to increase the quality of urban life (Dikbıyık, 2020). In the 1890s, ideas were put forward to reveal the urban aesthetics related to the urban environment. Established in 1949, the Council of Europe has also carried out efficient studies on the quality of urban life. In the historical process, studies have been carried out by adopting the European Region and Spatial Planning Charter in 1983, the European Charter of Local Self-Government in 1985, the European Urban Charter in 1992, the European Landscape Convention in 2003 and the European Urban Charter in 2008. In addition, many studies carried out by the European Union on urban development, urban quality of life, urban sustainability and urban development have shaped the quality of life (Elbi, 2019). The concept of urban life quality in Turkey came to the fore with the concept of quality in the urban environment at the Habitat Conference held in Istanbul in 1996.

Urban quality of life; It is defined as the level of facilities such as urban infrastructure, communication, transportation and housing above the predetermined standards in places that fall under the definition of city in terms of social, economic and spatial elements. Urban quality of life is seen as a way of life consisting of all the factors that form the city, along with physical and emotional factors (Van Kamp and et all, 2003). That is, the quality of urban life includes social, cultural, political elements and processes. Everyone should benefit from the opportunities offered by the city equally, in a balanced way and in proportion to their needs; Having the opportunity to participate effectively in educational, artistic, cultural, political activities and processes is evaluated in this context (Geray, 1998). Therefore, cities with a high quality of life have to be places that not only meet the natural and material needs of individuals, but also meet their social, cultural and political demands, and also create some new opportunities for them (Sarı and Kındap, 2018).

According to Santos and Martins (2007), urban quality of life components (Breuste, Haase and Elmqvist, 2013) are divided into four groups. These are environmental conditions including green spaces, air and water quality, infrastructure services; economic conditions such as employment opportunities, economic vitality, housing market and income data of individuals; social conditions including population, education, health, security and civic participation data, and common areas of use such as social, cultural, education, health facilities and transportation facilities in the city. Lanteigne (2005), on the other hand, investigated the most common components/dimensions in 37 quality of life surveys between 1972 and 2004. Accordingly, economy, security, health, housing, education, environment, social relations, transportation, urban amenities and infrastructures are among the most emphasized dimensions (Salihoğlu, 2016) In a study commissioned by UNESCO in 2002, various criteria were put forward to determine the quality of urban life. In the research, urban life quality is revealed by evaluating the political and social environment of the city, urban economy, housing quality, socio-cultural environmental freedom, educational opportunities, infrastructure and transportation, cultural activities, access to food and natural environment features (Nazifoğlu, 2016)

In summary, urban quality of life consists of components related to the physical environment, social and economic environment quality, as well as the quality of life. Economic environmental quality is one of the important criteria that determines the quality of urban life and is defined by features such as cost

of living and purchasing power. It is important for the citizens to meet their needs in the urban environment at an optimum level, but the economic status of individuals or communities is not sufficient for the quality of urban life alone. Sub-indicators such as economic activities in the city, economic vitality and urban service quality also affect the quality of the economic environment. Despite solving the economic problems, there is a need to improve the environmental quality in terms of social aspects due to the existence of a social human. Social environmental quality, lifestyle, access to education and health services, nutritional conditions, cultural development opportunities, social activities based on organization and volunteering, security, sense of belonging to the community, identity, locality, etc. can be defined by features. One of the most important components for the quality of urban life, which is directly dependent on the quality of the environment (Adams, 2013) in which people live, is the quality of the physical environment. In particular, the urban environment with high visual quality and physical comfort conditions increases the quality of life of people.

In particular, the urban environment with high visual quality and physical comfort conditions increases the quality of life of people. Physical environment quality can be defined by features such as open and green spaces, transportation and public transportation, infrastructure and services, communication, socio-cultural activities, housing type and quality, protection of natural and historical values (Kalaycı Önaç and Birişçi, 2019), living environment, reducing the environmental impact of areas and the value of recreation areas (Emür and Onsekiz,2007). In the conditions where all these features are provided, it is possible that the quality of the environment will improve and therefore the quality of urban life will increase in cities that develop physically.

Mazumdar (2007) argues that establishing connection between people and places is an important factor in raising the quality of urban life, and and states that the spaces to be created in the city must have the following characteristics in order to establish this connection:

- People can relate to,
- People can connect and feel belonging,
- People can identify with themselves,
- People can remember,
- People will miss.

In this context, places with these features are probably defined as places with good quality of life for people.

Urban quality of life also includes all living things living in the city together with people. Accordingly, the increase in the quality of urban life affects the people and fauna in the city together. The balance between the quality of life and other living things is achieved by protecting fauna and improving their conditions (Veenhoven, 2000). From this point of view, the quality of urban life is discussed together with the concept of sustainability in contemporary designs in cities.

The physical environment of residents and all other living things living in cities must exist in such a way as to provide an environment that creates a safe, comfortable, aesthetic, healthy and sustainable place. (Shafer, Lee and Turner, 2000). In other words, every urban area to be organized in the city should be planned and designed in a way that provides a balance between the economic, environmental and social characteristics of the area. A city's physical, social, environmental and economic characteristics (Sirgy and Cornwell, 2002) and their presence should contribute to the quality of urban life. Therefore, in order to make a city livable, different aspects (such as regional, metropolitan, city, neighborhood) that arise at different scales should be addressed by planners and designers by following the basic approaches regarding the quality of urban life in urban design and planning (Weziak Bialowolska, 2016).

Smith, Nelischer and Perkins realized a comprehensive study in 1997 and introduces the concept of settlement quality in order to meet the requirements and demands of urban residents or visitors towards urban living environments (Table 1) (Smith, Nelischer and Perkins, 1997). This concept helps to reveal the social, psychological and physical components that determine urban quality and to develop a linked framework between the physical elements (physical forms) of the city (Gülersoy, Özsoy, Tezer, Yiğiter & Günay, 2012).

Table 1. General physical form categories (Smith, Nelischer and Perkins, 1997)

Community	General structure and pattern
Urban block	General structure and pattern
Buildings	General, Civic, Community, Institutional, Commercial, Industrial, Residential
Streets	General, Parking: General,Byways,Main streets, Residential streets, Laneways
Pedestrian ways	General, Sidewalks, Formal trails
Open space	General Primary areas Secondary and tertiary areas Semi-public and private areas
Vegetation	General
Feature areas	Natural resources, Views

As seen in Table 1, physical form categories are grouped under 8 main topics. Communities/settlement are urban physical form categories with a balanced design and distinctive visual character, associated with the street, at human scale, with definable boundaries and oriented according to climatic conditions. Urban blocks are aesthetically pleasing urban areas with small car parking and landscapes in an order that allows pedestrian circulation. Another important physical form is the structures of the city. The buildings should be in architectural diversity, innovative, in harmony with the identity of the city, paying attention to efficiency in energy use and having original designs. Main roads, side roads, boulevards, parking lots, streets with all circulation axes that provide access to various functions are another physical form category. The physical forms that constitute the most important movement area of a city are pedestrian ways. A city's pedestrian ways are areas of ecological and aesthetic value that are accessible to all, encouraging walking. Open spaces are common semi-private or public main spaces in cities where outdoor activities (recreational, sports, playing, recreation etc.) are carried out. The physical form category that adds visual and ecological value to the city and offers a natural living environment to all living things is vegetation(planting areas). It offers a healthy environment to the citizens with the plant species and supports clean air conditions. The last category, featured areas comprises the city's specifical views, silhouette landmark and landscape areas.

In the same study, some criteria that should be considered in the designs to be made for the settlement quality were determined. In determining the

criteria, study of Kevin Lynch's Theory of Good City Form was used. In order to increase the quality of settlements, it is necessary to meet the basic criteria that support livability, have a distinctive and identity-forming character, connect with the environment and within themselves, include mobility, allow individual freedoms and include diversity (Smith, Nelischer and Perkins, 1997).

3. The Relationship of Urban Quality of Life and Urban Landscape

The relationship that the citizen establishes with the city is primarily provided in urban spaces. The quality of the urban space is also the determinant of the quality of life of the person. A quality life is formed by the balanced spatial relationship of the areas that make up the urban pattern.

Urban landscapes reflecting the urban pattern; green spaces at building level such as balconies, green roofs and vertical gardens; They are heterogeneous landscapes consisting of areas such as residential gardens, playgrounds, parks, gardens of institutional buildings, planted areas on streets and roads, cemeteries, sports fields and hobby gardens (Braquinho and et all, 2015). Urban landscape is the composition of the landscape in the city. It expresses a conscious order of the urban environment. It is the relationship of the buildings with each other and unstructured spaces as a whole, not individually, in the urban whole. All urban elements that forms the urban environment are used in the urban landscape (Karaman, 1995). Urban landscape organized to meet the needs of people in urban areas; It is a concept that expresses the composition formed as a result of the projections of the buildings where social activities such as work, accommodation and rest-entertainment take place in the physical space, the natural landscape structure of that city and the cultural landscape structure of the city together with the historical dimension of the city (Erkaya, 2012).

Urban landscape is recognized as "an important part of quality of life for people in the city" in the European Landscape Convention (Grifoni, D'Onofrio and Sargolini, 2018). In this context, all landscape design and urban design studies in the urban environment are basically aimed at increasing the quality of life of people (Özyavuz and Karakaya Aytin, 2016).

In particular, green spaces, which are one of the indicators of urban life quality, are a spatial component of the urban environment and one of the important services. Green areas affect the quality of life in different dimensions

in line with their different functional characteristics and are effective in raising the quality of life in line with the quality of their functional characteristics. The effect of green spaces on the quality of life is realized both through the "use of green space", which we can evaluate in leisure time activities, and the benefit provided by the "existence of green space" (Koromaz, 2010). The role of urban landscape elements, including green spaces, on the quality of urban life can be explained through the functions and benefits of green spaces.

Urban landscape has physical and psychological functions and roles such as creating healthy environments in the urban area and creating positive effects on human psychology. The urban landscape creates natural and wildlife habitat, increases biodiversity, reduces pollution, and regulates the microclimate (environmental functions and roles). It contributes to the formation of urban identity, creates urban image and cultural heritage (cultural functions and roles). It provides social interaction and integration, creates recreational opportunities, creates a democratic interaction area (social functions and roles). Additionally, urban landscapes create job opportunities, stimulate tourism, add economic value to the environment and create brand value (economic functions and roles).

As it is seen, the urban landscape has a great role and importance in achieving high environmental standards and improving the urban environment. As indicated in Table 1, physical form categories consisting of community (settlement), urban blocks, buildings, streets, pedestrian ways, open spaces, vegetation and featured areas help to reveal the quality of the urban environment (Smith, Nelischer and Perkins, 1997). A quality life in urban landscapes is only possible by fictionalizing a balanced spatial relationship of these areas.

3.1. Reading the Physical Components of Urban Life Quality in Urban Landscape Designs

The quality of a place is also a determinant of person's quality of life. Public spaces are of great importance in meeting the needs of the citizens in their daily lives.These areas, where landscape designs are realized, are democratic and meaningful living space parts that respond to the needs of citizens such as comfort, rest, active/passive participation, and exploration and are designed for these needs, appealing to all users. Providing opportunities for urban life quality in these living spaces is possible with landscape designs. In this context, within the scope of the study, concepts such as quality of life, urban life quality and their contents were examined and the relationship between urban life quality

and urban landscape was evaluated through landscape design examples. These landscape design examples are evaluated in the community, urban blocks, buildings, streets, pedestrian ways, open spaces, vegetation and featured areas (Smith, Nelischer and Perkins, 1997).

- **Community:** Community/Settlement which are the places where people settle for shelter or to engage in various economic activities, include houses and urban facilities (park, education, health, recreation, etc.) that meet the basic needs of the residents. An ideal settlement is a place that contains natural features compatible with the physical conditions of the area (topography, climate, water and air) and supports sustainable life integrated with its cultural environment.

Bo01 "City of the Future", Malmö, Sweden

Bo01 is an example of a settlement that proposes solutions to ecological problems with the green-blue infrastructures approach for a sustainable future in Malmö, Sweden (Figure 1). The settlement, which was established on an area of 160 ha in an old industrial and port area, has a residential area of 10,000 people and is provided with 100% renewable energy (Flurin, 2017). The use of recycled water and raw materials, and the use of natural resources such as solar and wind energy are at the forefront in the layout of the site. Despite its high density and urban character, the settlement is also rich in green space and biodiversity. There are at least 50 plant species in residential gardens and there are green roof designs. These areas also constitute a natural habitat for birds. Public spaces, the majority of which are closed to cars, are designed for cycling or walking (Guide for Sustainable Neighbourhoods in Eurupe, 2008).



Figure 1. Bo01 "City of the Future",
Malmö, Sweden (https://www.urbangreenbluegrids.com, 2021)

High-rise buildings are located at the edges of the area, preventing the passage of the harsh effects of the wind to the interior. Recyclable materials that do not harm the environment are used in the construction of all structures. 1000 residences in the area benefit from solar, wind and water energy. Energy is produced by heat pumps that generate heat from sea water and water from aquifers. In addition, the solar panels on the roofs of the houses meet other energy needs. Rainwater in the area is collected on green roofs and reused. Thus, green roofs help reduce the amount of rainwater to be discharged. Each building is surrounded by a rainwater penstock, which is part of the public space design, and these penstocks are part of the sustainable design. In addition, landscape design has been made for the use of clean water around the pond and small water pits in the area and in the gardens, and special gardens have been designed for butterfly gardens, birdhouses, and endemic plant species. The residual materials milled in the settlement are converted into biogas. This biogas is used as heating and electrical energy in cars and buses in public transportation (Yalçıner Erçoşkun, 2018).

- **Urban Blocks:** Urban blocks are one of the important physical form categories of the city in terms of visual perceptibility of cities and revealing the urban identity. Building blocks, which are constructed in many different organisation, are effective in establishing different social relations in the city with their physical diversity. In many current projects for the development planning of cities, it is organized in terms of urban blocks that define the space rather than individual buildings.

Perimeter Urban Blocks, Paris, France

Perimeter blocks, located in the city of Paris, are both connected with the public space in terms of their relationship with the street and have a number of advantageous features such as preserving the private space with their introverted structures. Perimeter blocks have the capacity to accommodate different development densities and act as a public façade that both physically defines an urban area and appeals to them ‘socially’. These urban blocks, with their formal features, give the city an identity both in the bird’s-eye view of Paris and in terms of the townscape while walking around the city (Figure 2).

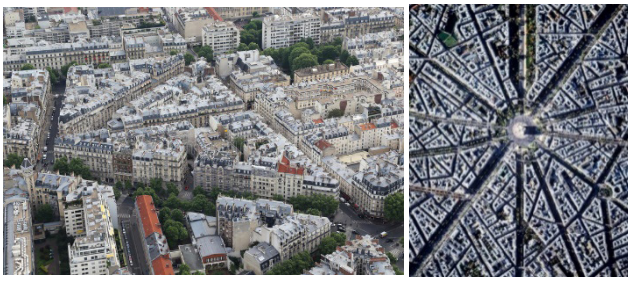


Figure 2. Perimeter Urban Blocks, Paris (https://www.archdaily.com, 2021)

The perimeter blocks are limited to the building depth, which can be naturally illuminable and ventilated. In this respect, as the size of the block increases, the size of the central area also increases. Depending on its size, this area can be used for various purposes such as parking lot for the residents, private or shared gardens, green areas and sports facilities (Carmona, Heath, Oc and Tiesdell, 2003) While the perimeter blocks create space for the residents for housing, work or other uses, they also provide the opportunity to be together with the city and live without breaking away from the urban life.

- **Buildings:** Buildings are the physical elements of the urban environment that reveal the formal characters of cities and help define a city. Today, architectural buildings in which sustainable designs are taken into account are important for increasing the environmental quality for the quality of urban life. Supporting the buildings with sustainable designs is possible by using local materials, good ventilation conditions, energy saving and providing comfortable living environments in which nature is integrated. In this direction, planting designs applied in buildings develop architectural designs by harmonizing them with natural microclimate factors to create a balanced, sustainable and more livable built environment beyond aesthetics (Schröpher, 2016).

Caixa Forum Museum, Green Wall, Madrid

The Caixa Forum Museum was created in 2001 by the renovation of a building that was built as a energy power house in 1899. The building is used as a modern art gallery today. Located in the heart of Madrid's cultural district, the Caixa Forum Museum vertical garden (Figure 3) was designed by Patrick Blanc using the Le Mur Végétal system (https://www.greenroofs.com/, 2021).



Figure 3. Caixa Forum Museum, The Green Wall, Madrid (http://buildipedia.com, 2021)

The vertical gardening system, whose total weight is estimated at 30 kg/m^2, includes a layer of polyurethane, a plastic net, and a non-biodegradable felt-type blanket cover with pockets used to store plants. Plant roots develop extremely well in this cover and at the same time, this cover supports the biodiversity in the city. In the design, plant species were chosen suitable for the ultraheat summer and cold winter climate conditions of Madrid. There are approximately 15,000 plants and 300 different species on the 24 m high wall (Beatley, 2016). These species are *Dianthus deltoidler, Lonicera nitida, Lonicera pileata, Yucca filamentosa, Cistus purpureus, Arenaria montana, Sedum alpestre, Cedrus deodara, Pilosella aurantiaca, Bergenia cordifolia, Cornus sanguinea, Campanula takeimana* and *Garrya elliptica* (https://www.greenroofs.com, 2021).

- **Streets:** They are public spaces that provide the circulation of pedestrians and vehicles in urban life. Streets are places where the citizens can meet their socio-cultural, recreational and commercial needs, provide access and define the character of cities. With the increase in the number of vehicles in developing cities, the widening of the roads and streets creates problems in terms of pedestrian comfort, safety and access. The streets that make up the transportation systems of the cities should not be thought of only as concrete or asphalt floors, but should be considered as parts of the city where bicycle transportation is necessary, complying with the design principles for everyone, and contributing to the urban identity in ecological, functional and aesthetic terms.

Champs Elysees Boulevard, Paris

One of the most beautiful boulevards in the world, the Champs Elysees Boulevard was designed and established in the early 18th century as a prominent urban element of Paris in 1740 AD (Afsary and Ahmadi, 2015). The Champs-Élysées form the most prestigious part of the great historic artery that reachs out from the Louvre to the Grande Arche of La Défense. It traces 350 years of French history, with famous monuments and the grand urban layout that made French urban planning famous (https://www.pca-stream.com, 2021). Looking at the history of the boulevard, it is known that in the early 17th century, French gardener André Le Nôtre was asked by the French Queen Marie de Medici, who loved the Tuileries Garden, to create an avenue with rows of trees. Trees have grown over the years on the street, which was part of the great Tuileries Gardens in the late 17th century and the street was renamed "Avenues des Champs-Elysées" in the early 18th century. Large houses and buildings were built along the street in the 18th century, and the Elysée Palace, today the official residence of the French president, was also built nearby. In 1828, the Champs-Elysées was officially declared the civil property of Paris. At this stage, landscape elements such as fountains, aesthetic large gas lamps (lighting elements) were added to the design. The Arc de Triomphe was built at the western end of the Champs-Elysées in 1836 by Emperor Napoleon Bonaparte to celebrate his victory in the war (https://thegoodlifefrance.com/history, 2021). The boulevard has an even stronger spatial effect with this structure. Stretching from Place de la Concorde to Place Charles de Gaulle, the boulevard is 70 meters wide and 19 km long. Champs-Elysées Street, which currently shops, workplaces, restaurants, cafes, theaters and museums, is the most famous street in Paris, as well as the *Aesculus hippocastanum* trees along the street, contributing to the street in terms of ecological, functional and aesthetics. It also is a street that offers equal opportunities for pedestrians and vehicles (Figure 4). Champs Elysees Boulevard also constitutes the symbol (landmark) and focal point of the city of Paris in terms of urban landscape. In addition, it is one of the important image elements of the city, having an efficient image that is remembered.



Figure 4. Champs-Elysées Street, Paris, Fransa (https://en.wikipedia.org/, 2021)

- **Pedestrian ways:** Pedestrian ways are a starting point in the planning of cities and are urban spaces that allow people to walk, which is the basic need of people. Pedestrian ways are important circulation spaces where the citizens can meet many needs and use them safely. An ideal pedestrian way has useful, comfortable, safe and aesthetic features (Kuntay, 2008).

Green Streets, City of Portland, Oregon

A Stormwater Management Plan was developed by the City's Environmental Services in the 1990s in the city of Portland, which has difficulties in rainwater management due to constantly humid and rainy weather conditions. In the early 2000s, a series of "green streets" were designed throughout the city (Wright, 2007). These green streets include green and permeable pavements, bioswales, vegetative bands and street trees. Many of these practices provide a habitat for natural habitat as well as retain water and promote a greener environment (Figure 5). Planting designs created on the pavements act as a buffer between pedestrians and cars and increase the visual interest in the space for those who drive, cycle and travel by public transport in the city (Triman, 2016; Beatley, 2016).



Figure 5. Green Streets, City of Portland (https://www.portlandoregon.gov/, 2021)

One of the most successful examples is the green steets approach to storm water management, which is a challenging task for the urban landscape in many cities.

According to the City of Portland, a green street is defined as "a street that uses vegetated facilities to manage stormwater runoff at its source." (https://www.biophiliccities.org/,2021) Bioswales, where rain water is collected in designs where local plants and rocks are used in green street initiatives, also have many social effects on society, such as bringing pedestrians together with nature while walking in the city (Kellert, Heerwagen and Mador, 2008)

- **Open spaces:** Open and green spaces, which are one of the most important physical components of urban life quality, are public spaces that positively affect the social, physical and psychological state of the individual. In areas where urban open and green spaces are sufficient, it is expected that the productivity, creativity and quality of life of individuals will be high. In cases where open and green spaces decrease, the individual is negatively affected physically and psychologically, moving away from nature, urban life becomes monotonous and quality of life decreases. For this reason, the existence of open and green spaces, which are a part of urban life and social space, is important in cities.

Lafayette Greens Detroit, Michigan

Lafayette Greens is a green space and urban garden located in the heart of downtown Detroit (https://www.greeningofdetroit.com/, 2021). The area is designed as an urban garden that helps educate the public on health, environmental responsibility and growing food. The site includes private metal raised vegetable beds, garden sheds, a playground and an urban agriculture education space and a designated area for public art (Figure 6). Information and communication tables informs the public about the connections between urban gardening and sustainability (Philips, 2013).



Figure 6. Lafayette Greens Detroit, Michigan (https://www.asla.org/, 2021).

The geometry of this public garden is partly based on the traces of those who passed by when the space was empty. There is a wide main walking way with

Lavandula angustifolia and custom benches at the center of the site. *Lavandula angustifolia* plants were chosen because it has a calming effect on humans. The garden is intricately detailed and includes many reused and repurposed materials. Concrete rubble is used to create gabion borders, while broken pavement pieces serve as paving stones. The garden sheds in the design are made of reused wood and salvaged doors, with an emphasis on recyclable materials in the area. Redesigned food grade steel drums are used to make flower pots in the playground of the garden. In the area where sustainability is tried to be ensured, rainwater is captured, filtered and kept in a bioswale consisting of local plants. In addition, drip irrigation system is used in vegetable beds to adjust water consumption according to the needs of each plant and to minimize waste. Organic urban garden is also very productive in the area with 70% permeable surface. In the area where more than 200 plant species are grown, there is an "orchard meadow" consisting of native fruit trees and an apple orchard. Lafeyette greens are maintained by a team of mostly volunteers, and all produce is donated to local food banks in downtown Detroit (Philips, 2013).

Vegetation: Urban areas are no longer sufficient for the increasing population and cities are spreading by pushing their physical limits. Although this spread is horizontally, it also occurs with vertical rise. It has become imperative to create natural areas within the dense urban environment, where every square meter is important, to integrate green into impermeable surfaces, to protect the natural ecosystem of the city, to support biodiversity, and most importantly to create environments where residents can breathe. This can be achieved in the best way by adding green value to an area, that is, by planting. All vegetations (plant designs) in all open areas of the city, starting from the smallest scale residential garden or balconies, add both ecological and economic value to the quality of urban life.

Burnley Living Roofs Garden, University of Melbourne, Australia

Burnley Living Roofs, is a research and educational facility in the field of sustainable building and green roofs design which is located on the University of Melbourne's Burnley Campus. It is the first example in Australia (Figure 7). The roof garden, which was established on the top of the Burnley Campus

administrative building in cooperation with the University of Melbourne and HASSELL, consists of three separate roofs. (AILA, 2016).



Figure 7. Burnley Living Roofs Garden,
University of Melbourne, Australia (http://landezine.com/, 2021)

The Research Roof is designed as a temporary test facility for the urban horticulture team. It allows multiple experiments to be conducted simultaneously with four trial research areas framed by elevated walkways and drainage points enabling water quality survey. These parcels also create a positive insulation effect for the building. The Biodiversity Roof is designed to provide minimal human intervention to provide a protected area for experiments with Australian native plants as urban habitat that promotes colonization and supports biodiversity. This part of the roof is designed with native plants of Melbourne and recycled materials such as wood logs and roof tiles, creating a comfortable living space and habitat for flora and fauna (https://inhabitat.com/, 2021). The Demonstration Roof is an exhibition space for daily educational activities. Various planting areas have been created suitable for irrigated and non-irrigated agriculture in this garden. There is a circular walkway on the demonstration roof that is in contact with each small plant community. There are small pocket areas formed by seating units on this circular walkway. The red line around the seating units connects different experiences and adds a difference to the design by incorporating parts of other experimental landscape regions (http://landezine.com/, 2021).

- **Feature areas:** It is very important to reveal important landscape points outside the existing urban pattern in urban areas. Because such feature areas add value to the city. The silhouette of the city, which can be evaluated in this context, is the view that provides the perception of the natural and spatial elements that form the city and the relationship of these elements with each

other. In order to protect the urban landscape and ensure its sustainability, it is very important to reveal the silhouette formed by the important image elements of the city and to support the view points where the silhouette is observed. When the development of cities in the historical process is examined, it is seen that especially symbolic/monumental structures are determinant in the formation of the silhouette of the city.

Silhouette of Edirne City- Selimiye Mosque

Every city has a landmark/monumental building and this building is Selimiye Mosque for Edirne. Selimiye Mosque was built by II. Sultan Selim between 1569-1575 and described as "my masterpiece" by Mimar Sinan. It is one of the most successful examples of religious architecture of its time and later times with its technical perfection, dimensions and aesthetic values (Kuban, 2000). Selimiye Mosque is not only the highest point reached by Sinan and Ottoman architectural design, but also the highest level of rationalization in Ottoman culture. It is also the biggest phase of the space structure connected to the dome, before the industry, in the history of world architecture. This determination specifies the place of Ottoman architecture and Sinan in the history of world architecture (Kuban, 2016). Selimiye Mosque and Complex (Figure 8), the most important structure that determines Edirne's urban identity and historical urban landscape, was included in the World Heritage List as a cultural asset by UNESCO in 2011.



Şekil 8. Silhouette of Edirne City- Selimiye Mosque (Original, 2018)

When the current urban pattern of Edirne is examined, Selimiye Mosque is located at the focal point of the roads that enter the city. With its features such as being at a dominant level according to the urban topography around it and the monumental dimensions of the building, it is visible from many points of the city and becomes the determinant of the city silhouette.

4. Result

Cities are living environments which have different functions and diversity that respond to the needs and demands of visitors, especially residents. These needs of individuals and societies are increasing and diversifying in a way similar to the increasing population of the city. Meeting these needs positively affects the increase in the quality of life in cities. Quality of life is affected by both the characteristics of the individual and the natural and built environment in which he lives. The individual's perception of the effects from the outside world changes the level of satisfaction. Urban quality of life directly increases the satisfaction of individuals with the environment in which they live, in order to increase the environmental quality. Urban landscape designs, which are effective in increasing the quality of life and improving the quality of the environment, play an important role. Urban landscape designs provide environments where individuals and societies in the city can benefit under equal opportunity conditions in terms of urban life quality. So that this is only possible with the balanced organization of urban landscape designs in terms of social, ecological, economic and cultural aspects. As seen in the design examples in which the relationship between the quality of urban life and the urban landscape is evaluated through the physical form categories of the city, urban landscape designs support the healthy lifestyle of people in the urban environment by making positive contributions to the physical and psychological health status of the citizens in terms of enabling recreational activities and improving air quality. In particular, public open and green spaces such as parks, squares and pedestrian districts in the city serve many cultural meetings and increase the quality of life of the person and become an intermediary for socializing and coming together. Urban landscape designs, which play an important role in increasing water and air quality, protecting the living environments of all living creature in the city and supporting biological diversity, also have a great contribution on the environmental health of the society. While urban landscape designs provide positive effects on the social and environmental health of the city, they add aesthetic value to the built environment and indirectly increase the economic value. In addition, the designs with energy efficiency, which started at the building scale; Today, it is seen that it is kept in the foreground in current landscape designs and projects that develop innovative ideas are on the agenda every day.

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CHAPTER V

SPONGE CITY WITHIN THE SCOPE OF URBAN WATER MANAGEMENT

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1. Smart Water Management

Cities are affected adversely from extreme weather events. Heavy rainfalls are among extreme weather events and may lead to lack of retention and runoff management as well as floods when they take place in cities that are prone to flooding. Hence, it is necessary to predict the changes that will take place in the future, identify the weaknesses related with the already existing urban water infrastructures and to take the required steps for eliminating these weaknesses (Köster, 2021).

Increased operating and maintenance demands will result from expanding water infrastructure in the urban sponge.However, Artificial Intelligence (AI) revolution will speed up the smart sponge network. AI of Things (AIoT) applications will mostly continue the prediction based operation and maintenance strategies. Today, the operational support for the urban water services is based on online sensor networks that control water quality and facility management. The Internet of Things (IoT) gives up new possibilities for cloud-based data transfer, processing, and analytics, as well as modeling tools and digital twins (Köster, 2021).

Sponge city construction requires sponge facilities and various sponge measures. Moreover, an advanced management plan is also required in order to

ensure that the urban water system is operated without any problems. Intelligent water management system (IWMS) is a monitoring network that uses a variety of advanced tools and approaches to evaluate and assess performance. Information structure, monitoring, data processing, application, and visualization are the five pieces that make it up. The monitoring, gathering, processing, integration, and sharing of huge volumes of data linked to the performance of the urban water system is the main function of IWMS. The use of big data and machine learning can aid in the identification of critical elements of sponge city building in diverse places with varying economic and environmental conditions, as well as the establishment of linkages between governance objectives and construction measures (Ren et al., 2021a).

The sponge city's planning, design, building, operational management, and evaluation of functionality will be accelerated by combining data and technologies. The sponge city can also establish connections with the smart cities that are now being constructed in our country, allowing the sponge city to benefit from clever thinking. It is possible to implement smart drainage and rainfall collection, provide real-time response to pipeline network blockages, and maintain real-time monitoring of urban surface water pollution in the construction of a smart sponge city by combining cloud computing and big data information technology strategies. This integration can also help with storm warnings and smart response water systems to prevent ponding in sub-sections, as well as real-time monitoring and rapid response to surface run-off levels. It is possible to create a cyclical utilization of rainwater and recycled water through smart water pollution control and treatment through integrated concentration and dissemination (Shao et al., 2016).

2. Development of Sponge Cities in the context of Integrated Urban Water Management

Industrialization and urbanization at developed countries in Europe, America and other continents have taken place before China. Thus, they have developed strategies for eliminating urban water problems and utilized them early on. Many strategies were gradually introduced and implemented over time, including best management practices (BMPs), low impact development (LID) in the United States, sustainable urban drainage systems (SUDS) in the United Kingdom, water sensitive urban design (WSUD) in Australia, the low impact urban design

and development program (LIUDD) in New Zealand, and the active, beautiful, clean waters program (ABC) in Singapore. These measures were used by the countries in order to promote integrated urban water management (IUWM) (Wang et al., 2018).

1.1. Best Management Practices (BMPs)

BMPs have been suggested at the United States of America as a water quality management system during the 1970s (Li et al., 2020). BMPs are used in North America (primarily in United States of America and Canada) for identifying an application or a structured approach for the prevention of pollution (Fletcher, 2014).

BMPs utilize natural processes for reducing rainfall flow and water pollution. BMPs include structural, floral or management applications in order to treat, prevent or reduce water pollution (Shojaeizadeh et al., 2021). Bio-retention practices, rain water pools and land utilization may be presented as examples for these measures (Li et al., 2020).

1.2. Low-impact Development (LID)

In the early 1990s, Prince George's County, Maryland devised and executed the first LID techniques. Prince George's County has been a trailblazer in the widespread adoption of LID and other stormwater storage and treatment methods (ALOA, 2001). LID refers to methods and practices that employ or mimic natural processes that result in stormwater infiltration, evapotranspiration, or usage in order to conserve water quality and aquatic habitat (United States Environmental Protection Agency, n.d.) LID employs a variety of cost-effective and ecologically friendly stormwater quality and quantity control strategies (ALOA, 2001). LID is a development philosophy based on the balance between water and pollutants (Davis, 2005). LID is frequently mistakenly referred to as the installation of "green" infrastructure rather than an integrated design approach to land development and stormwater management (Easton et al., 2011).

The aim of LID is to attain land use and management that minimize the adverse environmental impacts (Davis, 2005). The main goals of LID principles and practices, according to Hunt et al. (2010), are runoff reduction (peak and volume), increased infiltration, groundwater recharge, stream protection, and improved water quality through pollutant removal mechanics such as filtration, chemical sorption, and biological processes (Ahiablame et al., 2012). Permeable

pavements, rainwater harvesting, roof gardens, infiltration swales, bioretention zones, disconnected impervious areas, and cluster development are examples of LID technology and practices, according to Coffman (2000), USEPA (2000) (Damodaram et al., 2010).

1.3. Sustainable urban drainage systems (SUDS) or sustainable drainage systems (SuDS)

SUDS are a set of technologies and procedures used in the UK to drain stormwater and surface water in a more sustainable way than traditional methods (Fletcher et al., 2014).

SuDS are approaches to managing surface water that consider water quantity (flooding), water quality (pollution), biodiversity (wildlife and plants), and amenity (SuDS). SuDS are similar to natural systems in that they control rainwater close to its source. SuDS can be used to move (convey) surface water, slow down (attenuate) runoff before it enters watercourses, create spaces to store water in natural contours, and let water to soak (infiltrate) into the ground, evaporate from surface water, and be lost or transpired from plants (known as evapotranspiration) (Susdrain, n.d).

1.4. Water Sensitive Urban Design (WSUD)

Mouritz invented the term WSUD in 1992, and the first guidelines were released in 1994 (Fletcher et al., 2014; Radcliffe, 2018).

WSUD is a framework that provides a common and integrated method for the integration of the interactions between urban structured forms (including urban landscapes) and urban water cycle (Wong, 2006).

Even though floods rarely take place in Australia, states and districts have adopted WSUD principles in their regulations. In 1992, Mouritz coined the term "water sensitive urban design," and the first guidelines were published in 1994 (Radcliffe,2018).

Whelans et al. (1994) outlined the following aims for WSUD (Fletcher et al., 2014): *"1.manage the water balance (considering groundwater and streamflows, along with flood damage and waterway erosion), 2. maintain and where possible enhance water quality (including sediment, protection of riparian vegetation, and minimise the export of pollutants to surface and groundwaters), 3. encourage water conservation (minimizing the import of potable water supply, through the harvesting of stormwater and the recycling of*

wastewater, and reductions in irrigation requirements), and 4. maintain water-related environmental and recreational opportunities".

1.5. Low Impact Urban Design and Development (LIUDD)

From 2003, the New Zealand Foundation for Research, Science and Technology has supported the Low Impact Urban Design and Development (LIUDD) programme, which is part of the Sustainable Cities Portfolio (Van Roon and Van Roon, 2009). LIUDD approach utilizes the ecological carrying capacity as the starting point in a cyclical context. As a starting point, the LIUDD approach leverages ecological carrying capacity in a cyclical framework (Van Roon and Van Roon, 2005).

1.6. Active, Beautiful, Clean Waters (ABC Waters)

Singapore has built a vast drainage system that includes 17 reservoirs and about 8000 kilometers of drains, canals, and rivers. PUB, the National Water Agency, initiated the ABC Waters Program in 2006 to realize the full potential of this water infrastructure (ABC-Waters design guidelines). ABC Waters program aims to improve water quality, control rainfall flow and improve aesthetics of the living environment through the holistic integration of waterways and reservoirs (Goh et al., 2017).

The ABC Waters program aims to create a symbiotic relationship between Singapore's parks, reservoirs, and waterways, as well as recreational infrastructure and services, in order to create a "City of Gardens and Water." New community areas will be built as part of the initiative where people can interact with water and so generate a sense of ownership and value for it ("Active"). Reservoirs and canals will be transformed into dynamic and aesthetically beautiful spaces that blend in with the surrounding terrain, resulting in a city that is "alive and livable" ("Beautiful"). Water quality ("Clean") can be improved by including features such as aquatic plants, retention ponds, and recirculation, as well as reducing pollution through public education (Padawangi et al., 2011)

A sustainable rainwater harvesting scheme must address how to manage the water quality of the captured rainwater. By channeling rainwater runoff through these features to remove contaminants before the water is collected and used for non-potable uses, ABC Waters design features provide a benefit of water quality improvement via natural means (ABC-Waters design guidelines).

3. Sponge City

Climate change, rapid urbanization and improper urban planning policies have led to global urban water problems such as flood disasters, water pollution and water scarcity. Starting from 2013 China has started to utilize the unique water management strategy known as sponge city in order to overcome these problems (Nguyen et al., 2019).

"*A city with good elasticity, like a sponge, in adjusting to environmental changes and responding to natural disasters*," says sponge city (Hu, 2019). A sponge city is one that is meant to absorb, clean, and utilise rainwater in an environmentally acceptable manner, reducing harmful and toxic runoff. Permeable roadways, rooftop gardens, rainwater harvesting, rain gardens, green space, and blue space, such as ponds and lakes, are all examples of related techniques. A sponge city, when properly implemented, can reduce flood frequency and severity, enhance water quality, and allow communities to utilize less water per person. Green space and other related efforts can improve quality of life, improve air quality, and reduce urban heat islands. Overall, a "sponge city" will be able to deal not just with "too much water," but also with "water shortages" by reusing rainwater (Khan and Afroz, 2018).

"The Sponge City concept aims to I adopt and develop LID concepts that improve effective control of urban peak runoff, and to temporarily store, recycle, and purify stormwater; (ii) upgrade traditional drainage systems using more flood-resilient infrastructure", according to Chan et al. (2018).

Cities, like the ecosystems in which they are built, are dynamic systems that change through time. Traditional ways of doing things aren't necessarily the best, as regions who have adopted the sponge city concept have discovered. The management tactics used must evolve as the city expands and evolves. sponge cities, as a result, serve as a form of "test-bed" for novel stormwater management tactics and technologies (Housley, 2019).

The main elements are rainwater harvesting, ecological water management, green infrastructure, and urban permeable pavement sponge city. Green roofs, green areas, artificial rainfall wetlands, infiltration pools and biological retention facilities, as well as water permeable pavements, are all used extensively in the development of sponge city. Green infrastructure has emerged as a viable solution for environmental protection and urban sustainability. Sponge city can be used in a variety of green infrastructures, including detention basins,

infiltration systems, filter drains, filter steeps, swales, and wetlands, using nature-based solutions. Green roofs and bio-retention are the two main types of green infrastructure used in sponge city (Nguyen et al., 2019).

According to Hu (2019), *"Sponge city construction has the following six main goals:*

1. *Comprehensive utilization of rainwater resources*
2. *Source dispersion control, slow down or reduce surface runoff, delay peak*
3. *Tthrough green infrastructure, reduce the pressure on grey infrastructure*
4. *Reduce urban surface source pollution*
5. *Slow down or reduce urban water logging*
6. *Repair and rebuild urban water ecosystems"*

The main associations of sponge city are characterized using the definitions provided below (Wang et al., 2018):

1. The "sponge city" is an IUWM concept for managing urban water through integrated approaches that take into account all parts of the urban water cycle as well as anthropogenic and ecological water demands in cities.
2. The sponge city's scientific foundation is based on physical rules of the urban hydrological cycle and their associated processes.
3. The Sponge City Programme's (SCP) technical measures include gray and green infrastructure that is organized in a methodical way to act as "sponge infrastructure."
4. Both engineering and non-engineering elements are significant in the SCP; for example, green and gray infrastructure.
5. The SCP incorporates quasi-natural designs to try to conserve natural hydrological qualities as much as feasible within urbanized surroundings.
6. The SCP promotes flood and waterlogging control in metropolitan areas, as well as rainwater collecting and usage, water environment conservation, and ecological restoration.
7. The SCP attempts to increase cities' adaptability to changing conditions (urbanization and climate change).

The infrastructure of sponge city methodically coordinates the various issues of water quantity and quality, ecology, and safety. It aims to achieve multiple

objectives such as urban flooding mitigation, runoff pollution control, urban water environment improvement, and urban water ecology restoration, laying a solid foundation for the systematic management of mountains, water systems, forests, lakes, and lands, as well as the promotion of green development and the development of a beautiful China (Wang et al., 2020).

There are numerous advantages to implementing sponge cities. These are some of them (World Future Council, 2016):

- **Provides cleaner water for the city.** Renewal of underground waters thus providing more opportunities for access to water resources.
- **Cleaner underground water** is attained through the increase of filtered rain water volume. This corresponds to a significant decrease in water pollution leading to lower environmental and health costs.
- **Flood risk is reduced** since the retention and filtering of urban water leads to more permeable areas. This results in the ability to cope with high flood risks due to climate change while also making cities more resilient.
- Lower load develops on **drainage systems**, water treatment facilities, artificial channels and natural rivers. This results in lower costs for drainage and treatment costs.
- **Greener, healthier, more joyful urban areas**. These urban areas increase the quality of life by providing a more enjoyable landscape aesthetics as well as attractive recreational areas.
- **Enriched biodiversity** around green open spaces, wetlands, urban gardens and green rooftops.

Sponge cities take into consideration the "design with nature" approach. Sponge cities reflect and support six elements which are Rainwater infiltration, Rainwater stagnation, Rainwater storage, Rainwater purification, Rainwater utilization and Rainwater discharge (Liu, et al., 2017).

Sponge cities primary technical measures are divided into six groups based on their primary functions. Infiltrate, hold, store, cleanse, use, and drain are the six categories (Jia et al., 2018; Wang et al., 2018). They are regarded as the sponge city's "six-word premise," which serves as the foundation for the SCP guidelines. Green roofs, rain gardens, vegetative swales, and permeable pavement are all examples of technical solutions that might be used to execute each objective. Furthermore, each measure has its own set of technical and

economic characteristics, as well as installation limits and various degrees of efficacy (Table 1.) (Wang et al., 2018).

Table 1. The main technical measures of SCP (Wang et al., 2018).

Technical measures	Function and effectiveness						Layout		Cost		Pollutant removal rate (%)	Landscape effect
	Rainwater utilization	Groundwater recharging	Peak-flow reduction	Rainwater purifying	Transfer	Total runoff reduction	Dispersed	Concentrated	Operation	Maintain		
Pervious pavement	○	●	◎	◎	○	●	+	-	low	low	80–90	○
Permeable cement	○	○	◎	◎	○	◎	+	-	high	mid	80–90	○
Permeable asphalt	○	○	◎	◎	○	◎	+	-	high	mid	80–90	○
Green roof	○	○	◎	◎	○	●	+	-	high	mid	70-80	●
Sunken green space	○	●	◎	◎	○	●	+	-	low	low	-	◎
Simple bio-detention	○	●	◎	◎	○	●	+	-	low	low	-	●
Complex bio-detention	○	●	◎	●	○	●	+	-	mid	low	70-95	●
Permeation pond	○	●	◎	◎	○	●	-	+	mid	mid	70-80	◎
Seepage well	○	●	◎	◎	○	●	+	+	low	low	-	○
Wet pond	●	○	●	◎	○	●	-	+	high	mid	50-80	●
Rain garden	●	○	●	●	○	●	+	+	high	mid	50-80	●
Storage space	●	○	◎	◎	○	●	-	+	high	mid	80-90	○
Rainwater tank	●	○	◎	◎	○	●	+	-	low	low	80-90	○
Regulating pond	○	○	○	◎	○	○	-	+	high	mid	-	◎
Regulation pool	○	○	◎	○	○	○	-	+	high	mid	-	○
Transfer vegetative swale	◎	○	○	◎	●	◎	+	-	low	low	35-90	◎
Dry vegetative swale	○	●	○	◎	●	●	+	-	low	low	35-90	●
Wet vegetative swale	○	○	○	●	●	○	+	-	mid	low	-	●
Infiltration pipe	○	◎	○	◎	●	◎	+	-	mid	mid	35-70	○
Vegetation buffer zone	○	○	○	●	-	○	+	-	low	low	50-75	◎
Initial rainwater Discharge	◎	○	○	●	-	○	+	-	low	mid	40-60	○
Artificial soil infiltration	●	○	○	●	-	○	-	+	high	mid	75-95	●

● above average, ◎ average, ○ below average, − no, + yes.

The effective retainment and use of rainwater are of significant importance for sponge cities. Thus, interventions related with the construction of a sponge city such as rain stagnation, purification, infiltration, slow release, and transfusion, such as bio-retention cell, artificial wetland, permeable pavement, existing drainage facilities and the network of rivers and lakes should be well understood. In addition, it may also aid in improving water quality effectively and ensuring that the urban water cycle is more sustainable (Li et al., 2018).

The construction of sponge cities must take into account not only natural precipitation, surface water, and groundwater, but also man-made water systems, such as water supplies, drainage, flood prevention, waterlogging prevention and treatment, water cycle exploitation, and almost every building project in a given urban area (Shao et al., 2016).

"Sponge cities are in accordance with Sustainable Development Goal (SDG) 6: clean water and sanitation, SDG 11: sustainable cities and communities and SDG 13: climate action" (Ulkü et al., 2018). Within the urban land-use planning process, the sponge city concept and related principles and practices will provide several opportunities to incorporate ideas from eco-hydrology, climate change impact assessment and planning, and consideration of long-term social and environmental well-being (Chan et al., 2018).

4. Sponge City and Ecosystem Services

The term "sponge city" defines cities that can flexibly adopt to the changes in the environment much like sponges in addition to absorbing, storing, filtering rain water and using the stored water if necessary. The construction of a sponge city requires complex system engineering incorporating many aspects of hydrology, meteorology, river systems, land use arrangements, pipeline network systems, urban development and ecosystems (Shao et al., 2016).

Sponge cities shape and improve the ongoing urbanization while also encouraging ecosystem preservation and rehabilitation along with water resistant, low impact development for strengthening the urban ecosystem capacity in water management when faced with climate change (Ma et al., 2020).

According to Tsegaye et al. (2019), in order to solve the city's water problem, the research object must be expanded from the water body itself to the water ecosystem, the structure and function of the water ecosystem must be adjusted through ecological means, and the ecosystem's overall service function must be improved: Water supply, monitoring, lifelong service, and cultural spiritual

services are all available (Sun et al., 2020). *"These four types of ecosystem services constitute the complete functional system of the water system."* The essence of constructing a "sponge city" is equivalent to constructing a water ecological infrastructure among scales through the utilization of various special technologies starting from ecosystem services (Sun et al., 2020).

To achieve the rainwater being used in industry, agriculture, making water back to collectivization in urban ecological residential areas, reducing urban rain floods, storm runoff pollution control, and improving the urban ecological environment by taking into account and combining the characteristics of rainwater, economic benefit, and environmental friendly requirements (Yang, 2020).

Sponge city is a novel type of urban development that necessitates the preservation and restoration of the natural environment during urbanization in order to perform ecosystem service functions for water conservation. Furthermore, traditional urban infrastructures have devoted themselves to finding numerous environmentally appropriate alternatives that can beneficially and ecologically retain rain water, as well as transforming them into green infrastructures that can control and reuse the held rain water. During the development of sponge cities, many modern urban rain water usage and management technologies are employed (Liu et al., 2017).

The goal of the sponge city is to establish a nice microclimate. It is strongly sought to reduce the city's heat by developing green spaces such as green rooftops, lakes, and wetland areas. In conclusion, sponge city improves a city's ecosystem in four fundamental ways (Figure 1) (Gómez-Baggethun and Barton, 2013; Nguyen et al., 2019).

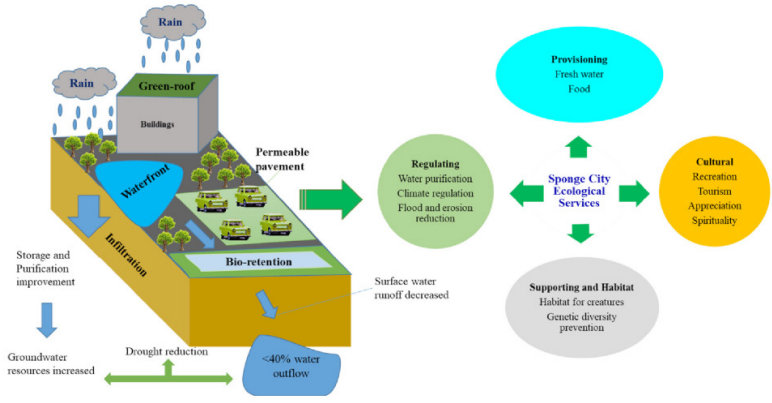


Figure 1. Sponge city and sponge city ecological services (Nguyen et al., 2019).

Sponge city's meaning encompasses not only urban green infrastructure to slow, spread, sink, and store surface runoff, infiltration-by-design to aid recharge of urban aquifers, flood mitigation, and allowing city surfaces to breathe, but also the systematic design of the broader urban area so that a city can be made sponge-like and have good "elasticity" in adapting to changing conditions (Ren et al., 2021b).

5. Sponge City Examples

5.1. Yanweizhou Park

Yanweizhou Park in Jinhua City is one example that fully exemplifies the sponge city concept. Turenscape Landscape Architecture completed the project in 2015, and it is a water-resistant development with vegetation that can adapt to seasonal monsoon flooding. A resilient bridge and path system allows both water currents and pedestrians to pass freely, and both are adjustable as the seasons change. To maintain the local micro-terrain and natural vegetation, the project uses existing riparian sand quarries with minimal intervention. Rather than erecting massive concrete flood walls all around, the idea included flood-resistant pedestrian walkways and pavilions, as well as planting terraces that would be closed to the public during floods. The inland areas of the park, in addition to the terraced river embankment, are all permeable due to the usage of gravel and re-used material throughout the pedestrian sections, as well as permeable asphalt in the parking lot (Ding, n.d.) (Figure 2)



Figure 2. Yanweizhou Park (Landezine, 2015).

5.2. Xinyuexie Park

Wuhan, China, is an excellent example of a modern sponge city. Wuhan is attempting to integrate stormwater management into the overall city design

as part of the sponge city program. Wuhan has imposed storage rules that are generally reviewed on a parcel-by-parcel basis to the entire city, with the goal of retaining 70% of all stormwater by the end of 2020. Xinyuexie Park, for example, has been turned into a lovely green space with rain gardens, permeable pavements, and stormwater storage ponds that will be reused across the city (WieTec, n.d.) (Figure 3).



Figure 3. A render of Xinyuexie Park (Jing, 2019).

5.3. Qunli Stormwater Park

The 34-hectare urban stormwater park in Harbin, northern China, is an example of a successful sponge city solution. The stormwater park performs a variety of ecosystem services, including collecting, cleansing, and storing runoff and allowing it to penetrate into aquifers. At the same time, it protects and restores native natural habitats while also providing a visually pleasing leisure place (WieTec, n.d.).

Turenscape's plan was to turn the dying wetland into a "green sponge," an urban stormwater park that would not only save the wetland but also provide many ecosystem benefits to the new urban settlement (ArchDaily, 2013).

This project proposes a stormwater park that functions as a green sponge, purifying and storing urban stormwater, and that may be linked with other ecosystem services such as native habitat protection, aquifer recharge, recreational use, and aesthetic experience, thereby promoting urban development (Yu, n.d.) (Figure 4).



Figure 4. Qunli Stormwater Park (ArchDaily, 2013).

6. Conclusion

Sponge cities, which is the urban water management strategy that started to be implemented in China in 2013, aims to combat urban floods. In this context, sponge cities goal for sustainable urban development by adopting a holistic approach. In the construction and management of sponge cities, it is necessary to pay attention to ecological, economic and social factors and to ensure their integration with each other.

Advantages of the sponge city concept include improved ecological, reduction of public health hazards, decreasing urban temperatures and moderating urban heat islands, boosting air humidity, managing urban microclimates, and so on. Overall, this notion is environmentally friendly, natural, and long-term. It highlights the ecological priority concept, making cities more ecologically friendly, and it may be the greatest method to achieve a win–win situation for urbanization and environmental conservation, with efficient solutions to urban water problems (Liu et al., 2017).

The term sponge city is associated with urban design concepts that include nature-based solutions in water-sensitive cities. Sponge city infrastructure is a form of struggle against the problems caused by climate change, increasing precipitation and rising sea levels. Sponge cities aim to make urban areas resistant to possible water problems. In addition, sponge cities have significant potential in reducing carbon emissions and combating climate change, as well as creating flood-friendly cities with green infrastructure planning.

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CHAPTER VI

DESIGN PRINCIPLES AND SPATIAL ANALYSIS OF ITALIAN RENAISSANCE GARDENS; CASE OF ROME

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1. Introduction

Most of the time, the art of landscape conveyed the images from the historical ages' point of view. Not only the the changes within the relation between the humankind and the nature, but also the ideas on its place within, always reflected within the spaces created around. In the ancient ages, humankind adored nature, while during the Middle Ages, this feeling was replaced with fear, shame, and humankind did not accept it as being ungodly. During the Renaissance, the humanity recognized itself not only as a part of the nature, but also of supernatural, spiritual creature equipped with the potential to comprehend and create. During the ancient times, the gods appeared as looking like humans, yet then during the Renaissance period, humankind has become god-like. Therefore, the terms "god", "nature" and "man" have drawn to each other closely (Argan 1990).

The ideas of humanism have made a bright and clear appearance within the building process of the villas from the Renaissance period, covering a quite long period of two-hundred-years. Within this period of time, the perspective

has been exposed to certain changes, and thus the ideas of humanism have been transformed in line with the scientific knowledge as accumulated. Changes like these are kept under record within the early, high and late stages of Renaissance. With the exception of the art of gardening, these processes have been documented in the history of all branches of the arts. The study of Renaissance garden compositions, on the other hand, shows a considerable divergence in spatial organization as an intrinsic trait of the era. In the mean time, the garden area's compositional design does not necessarily correspond with the stereotyped compositions of the period when it was built (Dormidontova, 2004).

During Renaissance, the art of Garden Design in Italy had almost the same significance and diversity as in any art in the world history, and if it is not valued as much as painting, sculpture and architecture, this is solely due to limited opportunities, and it was more subject to decay. Yet such gardens exemplify the design principles more plainly than any sister arts; for instance, painting is merely utter abstraction, thus not being required for existence and when architecture is concerned, it can be argued that it does not allow one to penetrate and feel like part of it for a while (Jellicoe, 1953).

In the time of Roman republic and the empire, in living spaces were the gardens and greenspace intentionally integrated. The indoor and outdoor areas were combined meticulously through the houses in a satisfactory manner in terms of aesthetics and practicability. In ancient Rome, utilizing the outdoor space in a proper manner was beneficial for the house all year round, especially in the summer. The domiciles were kept cool during the heated months through cross breezes and shade from plants.

The gardens, promenades and courtyards could have been observed in most palaces and villas in Rome. This was also the period when the number of the villas in the countryside increased since wealthy Romans wanted to escape from the high temperatures in the city during the summer season. In this context, Hadrian's villa is considered as one of the most famous examples. The villa is characterized by an astonishing lineup of not only indoor but also outdoor charateristics, which are mostly intertwined, while also shining in the forefront as one of the most outstanding examples of landscape architecture in Rome. The villa also accommodates diverse range of statues and other relics obtained from various regions conquered by Rome, as a representation of the victories of Hadrian and Rome. The villa of Hadrian had an important effect on the villas and gardens built during the Renaissance since it provided the inspiration for the gardens as well as the designers in their creation process (Newton, 1971).

2. The Classical Influence on the Italian Renaissance Garden

Until the Italian Renaissance, Italian Medieval gardens were surrounded by the walls and assigned to growing vegetables, fruits and medicinal herbs, or for silent meditation and prayer when the monastery gardens were concerned. The Italian Renaissance led to the removal of the wall between the garden, the house, and the landscape outside (Prevot, 2002). The Italian Renaissance Garden, like Renaissance art and architecture, come forth through classical Roman models rediscovered by the Renaissance scholars. Ovid in his Metamorphoses; the letters of Pliny the Younger, Pliny the Elder's Naturalis Historia; and in Rerum Rusticanum by Varro, all of which were describing the gardens of Roman villas in a detailed and lyrical form, provided the inspiration for said scholars (Attlee, 2006).

Pliny the Younger described his life at his villa at Laurentum as follows: "...a good life and a real life, happy and dignified....more rewarding. You should take the first opportunity to get rid of the noise, hustle and bustle of the city and make time to devote yourself to literature or take time for yourself and leisure."

According to Pliny, a garden should serve the purpose of "otium," which could be translated as seclusion, serenity, or relaxation contrary to "negotium" usually meaning busy urban life. A garden was a place providing an ambiance to think, relax, and escape (Attlee, 2006). This movement initiated in Italy as a continuum of the classical Roman Architecture. The early Renaissance architecture emerged primarily in Italy since the heritage of Gothic architecture never had a strong influence. However, the Renaissance architecture was fundamentally different although it led to the recovery of entire classical ideas. The Renaissance architecture can be considered classical when the external expression is concerned, and it was characterized by the re-introduction of Roman classical orders which were avoided for almost a century. These columns were utilized as rational and as decorative elements in the design process such as structural work and sometimes as merely ornamental work on the façade. In brief, the Roman historical precedent was followed with new combinations of classical elements that were progressively developed. Different than the Gothic architectural style, the architectural style of the Renaissance was not based on a structural method, rather it is largely a decorative style evolving from an ancient precedent and thus opening the way to various ecoles and followers in the form periods.

3. Design Principles of Renaissance Garden

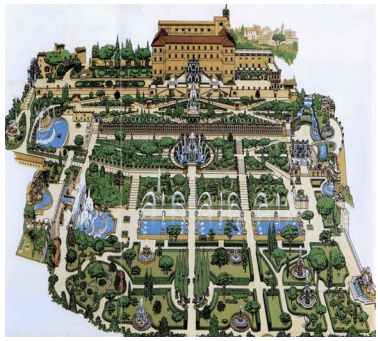
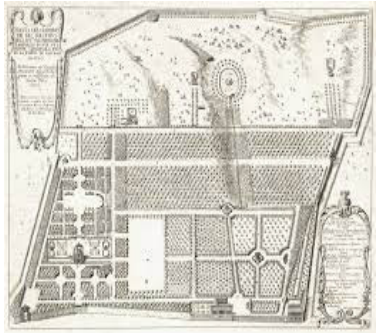
The classic Italian garden, also referred to as the Renaissance Garden, had a new style which emerged in the late 15th century and were usually seen at the wealthy villas in Rome and Florence. Before the emergence of such gardens, Italian Medieval gardens were inward-oriented, surrounded by walls and utilized for growing vegetables, fruits, and medicinal herbs (or for silent meditation and prayer in the case of monastery gardens). The Italian Renaissance Garden led to the removal of the wall between the garden, the house, and the landscape outside to have an outward- orientation, both physically and intellectually, and served primarily to the purpose of pleasure although edibles were still available. Gardens like these have come into forefront as a result of Renaissance scholars' repeated discovery of classical Roman models, as influenced by classical ideals of both system of order and beauty, along with mainly served for pleasure purposes, like enjoying the view of the garden, including the landscape, the sights, sounds, odorurs, not to mention the contemplation, itself. As the elements of design, the Early Renaissance gardens comprised of foliage tunnels, shade trees, and an enclosed giardino segreto.

Following the fall of the Roman Empire, most of the intensively cultivated green lands were abandoned. The Middle Ages were typified by towns totally encircled by walls, with very little green areas. Small gardens were also present, yet they were mostly constructed oriented at reasons rather for enjoyment. The emergence of pleasure gardens, including the places, through the late Middle Ages, where a visitor may roam through fence lined mazes and labyrinths, relax by little ponds, and enjoy topiary trees. However, the gardening has never become significant as in the Roman empire until the Renaissance (Newton, 1971).

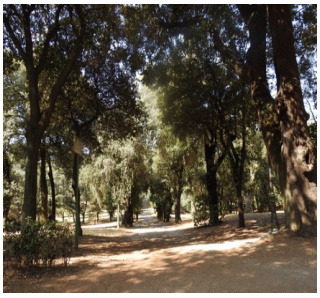
Those interested in the formal style of landscape architecture should primarily visit Italy, where at the time of the Renaissance the great gardens which have ever since served as models of this method of design came into existence, the form they took being the natural out- growth of the architecture and art of the period. Order, symmetry, elegance are the three keywords defining the Italian garden – also referred to as a "formal" garden – which has profoundly had an impact on the history of gardening starting from the ancient times. The Italian style is an outdoor model that has created itself over the centuries through its geometric and linear forms, shaping nature with striking architectural elements

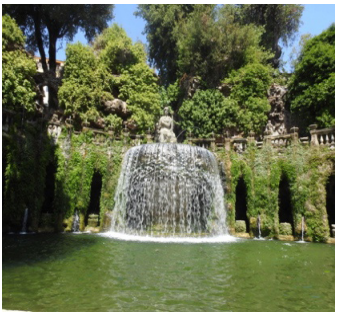
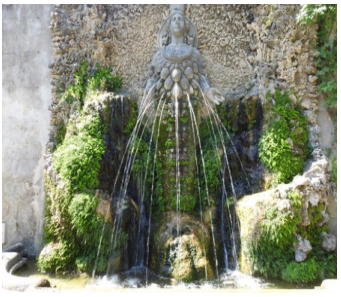
conveying a sense of calm harmony, inspiring contemplation, calmness and reflection.

Table 1. Design Princples of Renaissance Garden

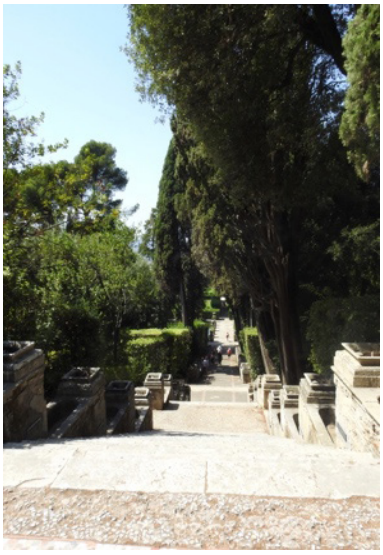
Symmetry and Axial Geometri	 
An Expensive Vista	 

Formal Lines	 
Gometrically Patterend Beds	 

Green in the Dominent Colour	 
Shady Walk Ways	 

	
Water Features	 
Use of Sculture	

	
Steps, Ums and Balustrades	 

4. Italian Renaissance Gardens of Rome

The revitalisation of gardens during the Renaissance was performed for various reasons. The movement from the Middle Ages to the Renaissance had seen a shift away from dread of the divine and toward interactions in between self and the physical world. Furthermore, advances in siege weaponry rendered medieval defenses essentially obsolete, allowing architects to advance beyond Medieval designs of buildings and lands. Eventually, as transportation got safer while explorers started to return from Asia and the Middle East, wealth and education became more prevalent among a burgeoning middle class (Newton, 1971).

The majority of the families in this developing middle class lived in and around modern-day Florence. Like the ancient Romans, they began to move out into the countryside in search of rather fresher air and cooler temps in the late 14th and early 15th centuries. They had become wealthy enough to have luxurious villas constructed which were accomodating large-scale gardens, like the ones that were built by the Medici family. But, Rome would have not been the focus of this development until a series of productive popes take charge. Starting in 1447, Since Rome was considered the capital of Christianity, a number of popes and other priests sought ways to revive it. From the spectacular reconstruction of the Vatican gardens to the erection of various houses in the

countryside around Rome, including Villa d'Este, Rome and the surrounding area underwent substantial restoration (Newton, 1971). Finally, gardens have become means to reflect not only the owner but also the the developers. Gardens were viewed in this sense as bodily expressions of the intellectual and artistic characteristics that the owner intended to emphasize, and they may be depicted in a range of methods (Dix, 2011).

4.1. Villa d'Este

The Villa d'Este, situated twenty miles outside of Rome near Tivoli/Lazio, was erected by Cardinal Ippolito II d'Este after he became the Governor in 1550. The township is constructed on a rock protruding out of the lower slopes of the Sabine hills, facing the Roman countryside, and is encircled by a large loop formed by the Aniene river, which tightens into a steep and broken ravine here (Unesco, 2001). Ippolito deceased before the construction was finished, leaving the work to be carried out by other inheritors. The estate was subsequently purchased by the Italian government in 1920 (Gargaillo,2016). As masterprice of the Giadino all'italiana designed by Pirro Ligorio for Cardinal Ippolito d'Este, Villa d'Este offered something unique in the horizon of 16th century villas (Barisi & Catalano, 2004). In addition, the cardinal purchased additional parcels of land beneath the abbey to be incorporated into the grounds (Barisi & Catalano, 2004). Nevertheless, construction would not commence until 1560, with an aqueduct to deliver water not only to Tivoli but also to the Villa. This spring fed a reservoir beneath the monastery, from which gravity-fed fountains were filled (Coffin, 2004).

By 1566, the renovation works were initiated in the monastery and church, Planting of greenery and construction of a variety of fountains. For the construction of sophisticated features, a large number of experts were recruited. Curzio Maccarone, for example, was in charge of the construction of the Oval Fountain from 1566 to 1567, as well as the Fountain of Rome in 1567. The Fountain of Nature was built in 1568 by the father-son team of Luc LeClerc and Claude Venard. The sculptors were tasked with creating statues along wth the marble and antiques gathered by Ligorio at Hadrian's Villa, which was less than 4 kilometers away. The Dragon Fountain was the final element to be completed, built rapidly due to Pope Gregory XIII's visit, together with his family's inscription depicting a dragon (Coffin, 2004).

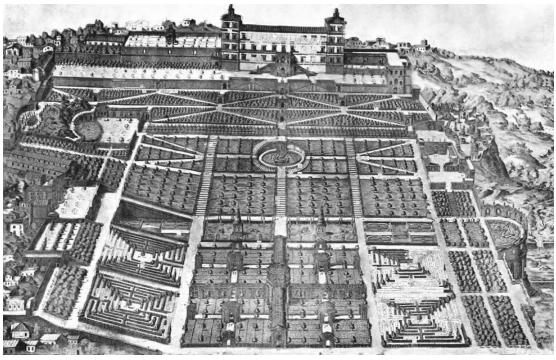


Figure 1. View of Villa d'Este in 1573 (Ashby, 1907)



Figure 2. Settlement plan (Lazzori Roma, 1999)

UNESCO Report of 2001 has indicated that the plan of the complex of Villa d'Este which is consisted of the palace and the adjacent garden is in the form of quadrangular, having non-regular sides, and extendes of about 4.5 ha, which has the depth of 225 meters (extending from the Northwest boundary to the Church of S. Maria Maggiore), has the width of 215 meters in the top and 160 metres in the bottom portion. The difference in total with the in terms of height starting from the entrance towards the palace and to the portal on the Via del Colle is measured as about 50 meters. As for the southeast side, the villa lies beside the church of S. Maria Maggiore, which was constructed in the 19th century, the wall placed on the righ side coinciding with the rear part of the inner courtyard of the palace. As for the southwest side, the garden is partially encompassed with the medieval style city walls, which is still clearly recognizable, notwithstanding that they were involved in the substructures built by Pirro Ligorio to serve as the support elements for the terraces afterwards. The northwest side, which is perfectly straight, abuts the medieval style houses that have been constructed

along the ancient Via Tiburtina, currently referred to as the Via del Colle, in where the narrow access way projects. Northeast perimeter, which is noticeably more irregular in form, presents the difficulties faced by Cardinal Ippolito II during the process of purchasing of the land, based on the fact that the garden encroaches towards the urban Campitelli district, and the apse of the church of S. Pietro alla Cariti, which has its roots going back to the 12th century, obtrudes in the garden. The plan of the villa, drawn up in the 16th century, has been protected until today with the terraces and simple slopes ascending from south-east to north-west and the style of architectural aspect. The whole quarter has been annexed and demolished for the purpose of constructing the garden. Referred to as Valle Gaudente, the area surrounded on the southwester side by the city walls, has vineyards and vegetable gardens, with just a small number of residences placed in the lowest areas towards Porta Romana, and an intensively constructed urban area on the northwest side, towards the the district of Campitelli. Nevertheless, two buildings are available which the Cardinal of Ferrara were not able to purchase or ordered it to be demolished, that are the churches of S. Maria Maggiore and S. Pietro. On one side, their presence limited the size of the palace, and on the other side, had an influence on the symmetry and regularity of the garden, the lowest portion of which was led to be much narrower. Furthermore, the southwest border was constrained by the city wall, resulting in a significant imbalance between the area occupied by the palace and the total complex; the plan had never been able to meet the regular pattern as depicted by Duperac.



Figure 3. Use of Plant Material (Orijinal, 2018)

The Villa d'Este gardens feature various symbolisms, and its construction, statuary, and décor, as with most Renaissance gardens, reflect several stories. Not only Ippolito d'Este but also Ligorio liked classical antiquity and mythology, and such love can easily be observed through the villa design and decoration. Throughout the villa, there are images of Jupiter, Neptune, Hercules, and Venus. Villa d'Este is one of several villas in the town of Tivoli, which is situated on the hills and mountains to the east of Rome. Ippolito d'Este, Cardinal of Ferrara and Governor of Tivoli created it, while being designed by Pierro Ligorio. The villa is well-known for its numerous fountains and fountains that are sustained by natural gravity. When it was first built, artists, aristocrats, and monarchy gathered to witness the hydraulic miracles. Presently, almost all of the fountains have been renovated to their former form, and the villa remains a popular destination in the surrounding area of Rome.



Figure 4. Use of Plant Water in Villa d'Este (Orijinal, 2018)

When the Villa d' Este is examined within the scope of original design principles;

- A formal plan scheme is available in the garden design.
- The design of the garden is based on the topography within sets.
- In the plant material design and the arrangement and scheme of the grass parterres, symmetry is widely utilized.
- Water is used in a variety of ways in the garden. The scala d'acqua water stairway, the artificial cascade, the Hundred Fountains, and so on are examples of "water theatre."
- Within the scope of plant material, it is agreed that high trees, various shades of green, and plants that provide seasonal and color effects are not included.

4.2. Villa Borghese

When the Cardinal Camillo Borghese has been appointed as the Pope Paul V (served for the papacy between 1605–1621), the first thing he has done was to confer the cardinalate upon his nephew Scipione Caffarelli, who was then be known as Cardinal Borghese. The newly appointed cardinal and his relatives have begun to amass the land for the extensive suburban estate, or vigna, located on the Pincian Hill that was just outside of the northern city walls. The factors having influence on the the design of villa thereof in the early years of the seventeenth century were the pride of the family, pleasure of sporting and the aesthetic delight. In today's time, where the maintenance endeavors remain lacking just like in many other Italian public parks, the gardens of the Villa Borghese is still a popular amenity for the contemporary Romans, and the art galleries thereof constitute a museum of international fame. Designed by Flaminio Ponzio (1560–1613) and extensive decoration finalized by the Flemish architect Jan van Santen (Giovanni Vasanzio), the casion was considered as the close cousin of the Villa Medici located in close vicinity in terms of both its plan and the intensive ornamentation of its exterior walls (stripped of their sculpture by Napoleon).

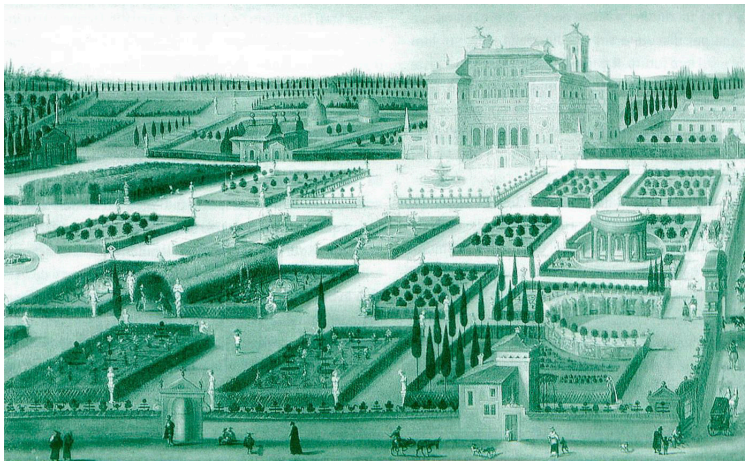


Figure 5. Villa Borghese, Year: 1625 (Azzi-Visentinii, 2004)



Figure 6. Dominique Barrière, elevation of the Villa Borghese, from Manilli's Villa Borghese, 1650. (Eirik Arff Gulseth Bøhn)

In 1903 the city of Rome acquired Villa Borghese from the Borghese family and opened the park to the public. The eighty hectare/148 acre-large park now accomodates wide shady lanes, several temples, beautiful fountains and many statues (Bianchi, 2013).

When approached towards the main gate, the road leads to a grotto fountain positioned face to face with the tall garden wall instead of heading towards the casino. The Fontana dei Cavalli Marini (means the fountain of sea

horses) currently located at the same venue as the old garden since it has been transformed into an English landscape garden. A German painter and garden architect has constructed this fountain in 1770. The narrow road intersects with the sideways to the front side of the casino just half a distance from a major rondel. Other parallel roads just follow the two main roads, and this ensures to enjoy a beautiful scenery of fountains and pavillions. It can be noticed that the casino is not the central focal point of this scenery, and the line of roads are scattered in a fine way based on the layout. Elements of the garden such as pavillions, fountains, aviaries and last but not the least the casino enhance the overall experience equally. The garden hosts a vast number of boskets and encompassed by the clipped hedges. The garden further offers a suitable area for trees such as Pines, Cupresses, Myrtus and Laurus nobilis (Azzi-Visentinii, 2018).







Figure 7. Use of Plant Material and Water Feature in Villa Borghese, Rome (Original, 2020)

4.3. Villa Medici

Scholars disagree on which garden should be considered the first renaissance garden among the ones referred to as Villa Medici at Careggi, La Villa Medicea a Fiesole and the gardens designed in Rome after the popes' return from the "Babylonian Captivity" in Avignon in 1377.

However, since none of such gardens has been fully protected and preserved until today, it would be more appropriate to ask the following question 'Which is the first typical Italian Renaissance Garden?'.

The answer to this question is when we evaluate a Roman Renaissance Period Garden that does not have a traditional order, it is determined that the art of Roman garden design was designed differently from the Florentine gardens, with the emergence of a new understanding.

From this aspect, the garden of Villa Medici located on the Pincian Hill next to Trinità dei which Monti Cardinal Ricci di Montepulciano had it designed along with his new villa in 1544 by Annibale Lippi, a master architect, can be considered the first typical Italian Renaissance Garden.

Villa Medici was bought by Ferdinando de Medici in 1576 after the death of the Cardinal. The architect Ammannati was then asked to renovate the villa in a manner befitting the medici family. Belonging to the family for many years, the villa was taken over by the French in 1803. Today, it is an institute serving under the name of "Villa Medici: Accademia di Francia a Roma".

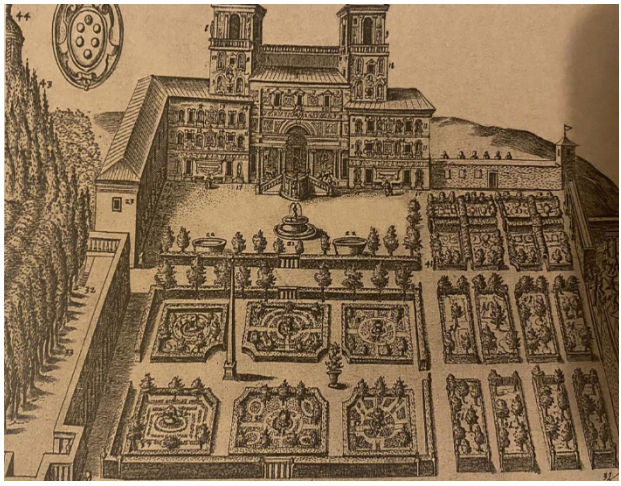


Figure 8. View of Villa Medici (Klckert, 2007)

When the garden plan is examined, it is striking that the main parterre in the garden is surrounded like a box. The patterns on the parterres of the plants here follow parterre designs of Sebastiano Serlio dated 1537. There is a regular plantation area with low fruit trees planted right next to the main parterre.

In the upper part of this plantation area and in the section closer to the villa, there are parterres, possibly consisting of small beds where herbaceous species are grown.

It is clearly distinguished that the garden was planned in two separate stages for aesthetic and functional purposes. The parterre, located on the axis that meets the middle axis of the front of the villa, was probably designed during the planning of the villa. The main parterre, enclosed in the form of a box, and the obelisks and fountains in it are spatially associated with the height of

the facade. The same is true for the parterre decorations, which are intended to reflect the architectural decoration of the façade.

It is aimed to separate the main parterre and the garden area on the right with the long cypress fence starting from the right side of the villa. Probably in the initial stages, the garden on the right was designed as a utility area, and later it was included in the general layout of the villa.

The garden, designed in two stages and in relation to the villa, is not a typical Roman garden, but rather a Florentine garden (Klckert, 2007).

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CHAPTER VII

SMELLSCAPES: IMAGINING AND REMEMBERING CITY

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1. Introduction

Cities could influence and guide the daily practices of the urbanites, the actions and experiences of the visitors with various abstract and concrete images they offer. There is a constant communication between the city and its inhabitants. This communication is perceived through the senses and occurs through behaviors and actions (Rogerson and Rice, 2009). The sensory urbanism is a human-oriented approach and exhibits rich values offered by the environment in planning and design (Howell et al. 2008). The role of sensory experience in the occupation of the urban environment has been increasingly scrutinized and carefully considered by both planners and designers. It was observed that the sensory aspect of urban spaces has more positive effects on the occupants and the latter have sensory expectations from these spaces (Henshaw and Bruce, 2012). In urban studies, it was observed that the most dominant emphasis has been on visual elements. It was determined that visual elements were prominent in the restoration of historical environments, and Sağlık and Kelkit (2016) reported that functional occupation was important in the sustainability of these spaces. Sennet (1996) criticized the priority of visual quality in urban aesthetics and argued that urban sterilization was observed due to visual experiences. Today, studies on urban ecology focus on strategies that emphasize the significance of the sensory dimension in residential areas. Urban spaces are no longer defined only by built structures and spaces, but also by the contribution of sensory environments and climatic events to these spaces (Thibaud, 2014).

Rasmussen (1962) reported that individuals evaluate the quality of space, material and scale with various senses for a multisensory architectural experience in nature (Fernando and Hettiarachchi, 2017). In 1977, R. Murray Schafer started to investigate the role played by the perception of sound in the formation of space. It was reported that in addition to visual effects, the sound was also effective in landscape design, and several environmental elements form the soundscape with sonic images (Hong et al., 2010; Jeon et al., 2011; Liu et al., 2013; Liu et al., 2014; Akkaya, 2014; Rehan, 2016;). Dan (2007) claimed that texture was a permanent element in urban image that included an important clue for urban design. Texture was considered as a symbolic communication tool. Landry (2006) argued that cities evoke emotional reactions with all sensory images, in particular, experiences diversify as well as other sensory perceptions in a broad perspective beyond visuality. Bell (1999), on the other hand, emphasized that the senses were employed holistically as well individually.

Smell, which is a spatial element in sensory dimension, has been neglected due to the difficulties in measuring smell due to its volatile nature. Kramsch (2014) emphasized to the sensory dimension of the spaces and investigated smell as an element that is intertwined with the user in the space based on broader social, linguistic and cultural applications. It was reported that these spaces are not addressed as flat surfaces or the ground, smell is not considered as background, and the smell is an element of orientation in the space as the individual circulates around other activities. Furthermore, smell plays a key role in the association of space and behavior that activates the relations between the occupants and the place, time, and activity (Pennycook and Otsuji, 2015). Smell is a subtle but important component of the culturally normative and aesthetic rituals in expressive and everyday life. As a cultural value, it is employed by the society as an instrument of description and communication, as well as in the investigation of cultural history (Classen et al. 1994). Smell could semiotically describe events, assess previous events, and have the capacity to recall positioned memories (McLean, 2019). Bundy et al. (2002) reported all sensory data are interpreted based on past memories, providing a complete experience and comprehension of the environment. Thus, the sense of smell is different from other senses due to its different anatomical structure that is associated with experiences and remembrance. The direct connection between the anatomical structure of the sense of smell and the limbic system, which is the center of memories and data collection should be noted (Ünver Fidan, 2018). Thus, it

is necessary to scrutinize the correlation between smell and memory and the significance of spatial memory.

1.1. Smell and Memory

It was determined that olfactory memory played a key role in the remembrance of past experiences and the acquisition and accumulation of factual data about the world (Schacter and Tulving, 1994). Individuals could remember smells associated with past experiences, these associations may involuntarily lead to the description of these smells as pleasant, unpleasant, or unusual (Fox, 2009). Good times are associated with good smells; even cow dung may smell good due to the good memories it evokes, while bad experiences are associated with unpleasant smells. This is called the Proust Phenomenon, and stipulates those individual memories associated with a smell are remembered in detail, and more effective in autobiographical memory cues (Herz, 1998; Chu and Downes, 2002; Herz et al. 2004; Buchanan 2007).

It was reported on the other hand that the memory plays the role of an instrument in experiences associated with the built environment in urban spaces, and the perceptual senses were effective in defining and interpreting the urban environment (Degen and Rose 2012). The individuals make sense of the place through occupancy and experiences, and memory is a key in accessing these moments in the future. Thus, memory employed perceptual factors in past experiences (Özbek, 2018). Urban environments grow, develop and change in horizontal and vertical directions based on technological advances and population growth. Chang and Huang (2005) emphasized that there are two urban practices today; "destructive" and "creative", which lead to cultural differences, and along with renewal, these could lead to the loss of cultural assets and memory. Basa (2015) similarly argued that rapid urban transformation pressures the sustainability of spatial memory and urban memory is fed by daily life. Thus, it was observed that memory plays a key role in historical urban environment. Sustained historical sites preserve the real memories along with intangible and tangible elements (Özbek, 2018). Lewicka (2005) argued that the stronger the bond with the past, the greater the knowledge of the past, and stated that the 'urban reminders', the remnants of the previous inhabitants, could be employed directly, as they offer historical information, or indirectly, since they raise curiosity and the motivation to discover the forgotten past of the place. The significance of urban memory in the sustainability of urban history reflects

the significance of historical areas. Thus, the collective memory, which requires preservation and restoration of historical sites, has a strong symbolic link with the space, and this bond is important in preserving the sense of belonging and the relationship with the past (Sayar, 2011).

According to Halbwachs (1980), memory interacts with spatial components. Thus, remembrance and retention are associated with the space (Basa, 2015). The correlation between the smell, a spatial component, and memory is a significant issue associated with the collective memory. The obsession with hygiene in the modern world led to the limitation of smell to the environment and weakened social experiences in the environment. In landscape architecture, this was reflected in the phrase 'art history has no smell'. Smell has been considered as a tool to reclaim the landscape to reduce the disconnection between the experiences and the environment. Thus, Pallasmaa argued that the strongest memory of a place is its smell (Bowring, 2006). McLean (2012) reported that urban coffee shops are effective in remembering the past events; wooden floors reminded the individuals of the past and the smell of urban drainage was effective in remembering objects. Tuan (1977) stated that the sensory elements play a role in the perception of a place as familiar, and the sense of smell ensures the remembrance of places.

Based on the significance of smell in the catalysis of the past and places, Drobnick (2006) argued that the plant smells reminisce the houses with gardens and the good times spent in these gardens based on the recollection of past actions. Bernardino reported that the smells perceived when an individual enters a city reminds the individual of the good and bad events of the past (Emmons, 2014). Emmons (2014) claimed that scent is a subtle base note of urbanism due to its strong connection with memory. Uang (2010) stated that food smells remind street vendors in Asian communities. Tolaas[1] stated that urban smells provide a background for the memories of the cultural history or events that occurred in the home or community. Bouchard (2013) determined that the smells perceived by urban occupants evoked their previous experiences based on the smell atmosphere. Wendy Suzuki[2] (2015) stated the following on the issue: "I

1 The artist produced a smell map project for Berlin, Mexico City, Cape Town and other locations and exhibited a smell-based urban treasure hunt as a game-installation in Grand Arts (Tolaas, 2012)

2 Wendy Suzuki is a neurology and psychology professor at New York University, Center of Neural Sciences.

experienced this a few years ago when I returned to Lake Tahoe, California for a conference. A deep breath of that clear mountain air tinted with that tiny bit of propane immediately took me back to lazy summer camp vacations with my family in the woods around that lake. I could feel the delectable flavor of lying in the sun on big rocks by the water and campfire-roasted marshmallows in the evenings". Thus, this strong association between smell and memory, and the significance of scent images in mental maps are important.

1.2. Mental Maps and Urban Image

To comprehend the correlation between urban image and mental maps, initially, the environmental perception should be analyzed, and to conduct this analysis, the significance of cognitive maps should be recognized. According to Ittelson (1973), we see the environment, hear the sounds in the environment, and sometimes we assess the environment based on the smells and associate these perceptions and memory. We also feel the environment with our bodies when we move around it, reach it or transported to it. In this context, the environment is multimodal. Individuals perceive the environment, adopt a perspective about it or assess the environment. Certain environments are orderly and harmonious, some are interesting, and others are mysterious (Appleton, 1996; Kaplan and Kaplan, 1989). Individuals update the data about the environment as needed and adaptively employ it in daily spatial behavior such as wayfinding, route planning, navigating or map reading (Ishikawa, 2020).

In ensuring the legibility of complex urban environments, mental maps could guide the planners to determine and design spaces that are vividly remembered by urban residents and produce emotions of urban beauty and pleasure. Thus, the sensory images offered by the environment could be externalized. Furthermore, this indicates the significance of analyzing individuals' perceptions based on urban, temporal and complexity scales (Lynch, 1960).

The development of a mental map varies between the individuals, as personal traits, individual differences and the concept of place affect these maps. Individuals have different personal interpretations of objective expressions, and this interpretation could be affected by the symbols included in the objects (Schorr and Ayalon, 2020). Personal interpretation was described as a process that includes a series of psychological transformations where the individual acquires, codes, stores, remembers and deciphers the data on relative position

and attributes of the phenomenon (Down and Stea, 1973). Mental maps, which are the outcome of the data processed actively and passively, are the main elements in spatial orientation of the individual, and it is known that the physical environmental properties are effective as well as behavioral characteristics of the individual (Billinghurst and Weghorst, 1995). American planning theorist Kevin Lynch (1960) described the sensory city as the heart of experience using these maps. In the empirical study on individual perceptions of urban landscape, Lynch determined the images in the minds of urbanites and mapped the urban image with visual images. Lynch reported that the relations with the environment have a strong connection with memories. Montgomery (1998) emphasized the significance of form and harmony in urban design, based on the urban legibility proposed by Lynch, Ewing and Handy (2009) investigated the change in urban street images due to different occupation types, and questioned occupant satisfaction, and Erkan and Yenen (2010) investigated the impact of socio-demographic properties on image analysis. Although the urban image was reflected in mental maps based on the intensity of visual images (Lynch, 1960), it could be observed that the things we smell were effective on collective memory (Engen, 1991).

Based on the above-mentioned studies, the urban smellscapes were based on the strong correlation between smell and memory in the sensory dimension of cities. The aim of the study was to determine the degree of spatial remembrance based on smell after a certain period of time; and thus, to read the spatial smell sources in the mental maps of the individuals who experienced the space one year after their first experience.

2. Study Area

The study was conducted in the urban historical site with the cultural remains of various civilizations in Kastamonu province in western Black Sea region at an altitude of 775 m with a continental climate in Turkey.

The center of the urban historical site includes the Roman castle and the area expanded from the castle during the reigns of Byzantines, Çobanoğulları, Candarogullari and finally the Ottoman Empire through the Karaçomak stream located in a valley between two hills and includes religious, educational, administrative, public buildings and green spaces. The majority of the urban historical site is residential, and the streets are bordered by traditional houses in

the residential areas. The dominant construction material is wood in the mansions due to the presence of large forests in the region. The main administrative quarter is located in the urban historical site and around the Republic Square, the most important urban square. These buildings were constructed with natural stone. Another important square, Nasrullah Square, is surrounded by the urban commercial quarter, occupied by both locals and tourists for trade, visits and food and beverage. Local products are sold in commercial structures in the area, while local dishes are served in food and beverage spaces (Figure 1).

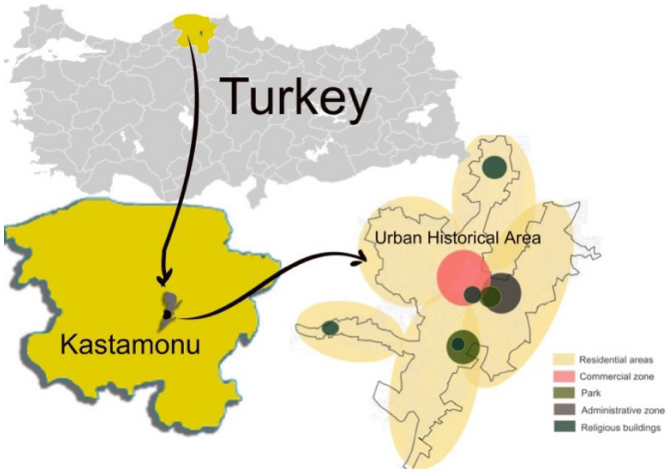


Figure 1. The study area

3. Method

The study was conducted in two stages. In the first stage, an olfactory route was developed based on field observations and a walk was organized for the participants on this route. In the second stage, mental smell maps were requested from the participants via mail.

3.1. First Stage: The Olfactory Route

To determine the route, the authors a total of 82 walked the area at different times of the day (8:30-12:30-18:30) on different days each month during the four seasons between 2018 and 2020. An A3 size map of the urban protected area was prepared for observations and the smells felt during the walks were marked on the map. The scents marked during the walks on different days were then overlapped and the scents that were constantly felt during the observations

were determined depending on the seasons. The consistency of the smell sources determined during the observations were analyzed with face-to-face interviews with the occupants, and historical smell sources were determined. Face-to-face interviews were conducted with individuals over the age of 60 who have lived in the Kastamonu urban site since childhood. These individuals consist of commercial shop owners and local people in traditional living areas, as well as archaeologists working in the city history museum, who are familiar with the history of the city. In these interviews, it was discussed what scents were here in the past, what their daily practices consisted of, and the scents that still exist and do not exist from the past. The study was conducted based on the contributions of sensory walks performed in previous studies on urban experiences and descriptions and the smell sources determined in this stage (Henshaw, 2014; McLean, 2014; Bouchard, 2016).

Then, a map that included touristic areas and spaces with historical significance, and historical smell sources was developed. It was observed that the smells generally varied based on the occupancy of the area in the map. Local food smells and industrial and synthetic smells dispersed from glassware manufacturers were recorded around Nasrullah Square and in the commercial urban zone, food smells and natural smells from the building material were determined in residential areas, natural smells were identified in the green space system parks, while vehicle emissions were determined near the roads along the entire route (Figure 2).

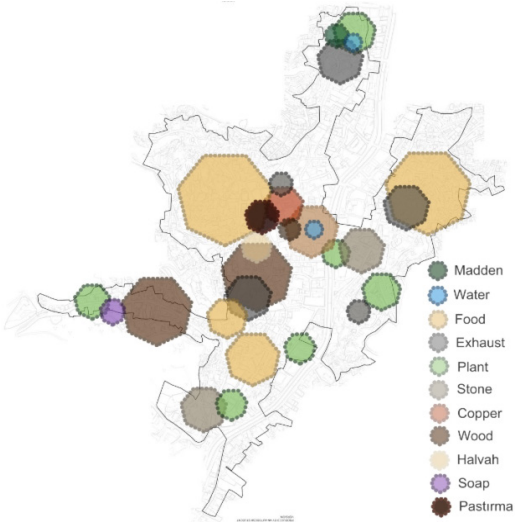


Figure 2. Smell map

As seen in Figure 2, various historical smell sources were determined in historical Republic Square and vicinity, commercial, historical and religious buildings near Yakupağa Complex, and religious and recreation spaces in Sinan Bey Park. The route was determined to accommodate a comfortable walk, based on similar and different smell sources that varied based on different occupancy types. The route was about 2 hours long, and the participants submitted their smell analyses with a form (Figure 3).

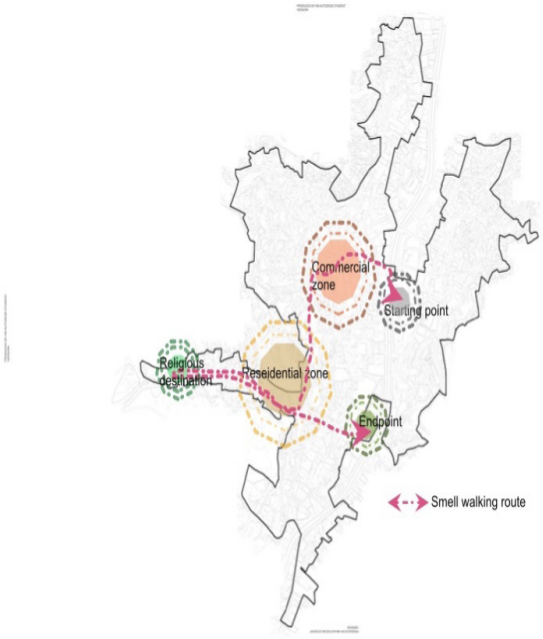


Figure 3. Smell walk route

In this stage, a silent walk was conducted with 3 female and 3 male undergraduate landscape architecture students without any prior knowledge on the city, who never visited the area and focused on the smells in the route. One year after the walk, the participants were contacted via e-mail, and they were asked to remember the memories of the smells on the route, and to mark the smell sources on the route map and return it via e-mail.

3.2. Second Stage: Mental maps via mail

In the second stage, the participants of the olfactory walk in 2020 were contacted via e-mail and they were asked to specify the scents in the route on the map.

The returned maps were analyzed based on the Lynch's (1960) method where the urban images based on the occupants' mental maps are assessed for smells. The urban image, which Lynch (1960) analyzed based on 5 elements, was renamed in terms of smells.

Roads: These are defined as the streets, railways, footpaths and other channels on which individuals move.

With the olfactory image, the linear smell sources in urban spaces could be analyzed based on continuous vegetation and water channels along the. Thus, the roads were defined as scent axes for the olfactory image.

Borders: These were defined as topographic formations, building facades and clean transition zones, and linear boundaries, for example, between water and the city. The analysis of the urban smell sources based on the borders included the building facades that prevented the distribution of smells and defined as olfactory image smell curtains.

Regions: These reflected the neighborhoods, districts and other urban (sub) divisions with a unique character. The smell sources with continuity and distribution specific to the region were analyzed and defined as olfactory image smell regions.

Nodes: These include strategic meeting points such as squares, intersections or train stations. Smell sources include urban squares, commercial zones, food and beverage areas where various smell sources intersect. Nodes were defined as aroma based on various scent mixtures in the olfactory image.

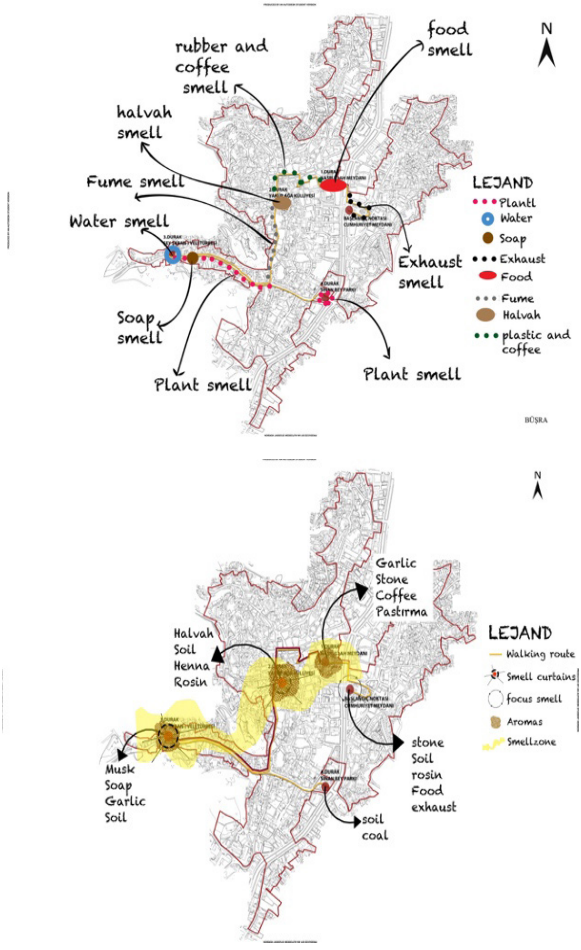
Landmarks: Visual images are defined based on physical objects that serve as general reference points. The focal odors sensed strongly, directly and continuously in the city, which attract the attention to a particular point, are defined as olfactory image.

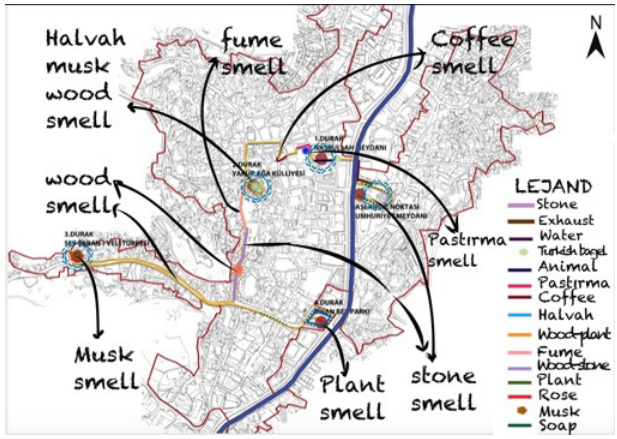
4. Findings

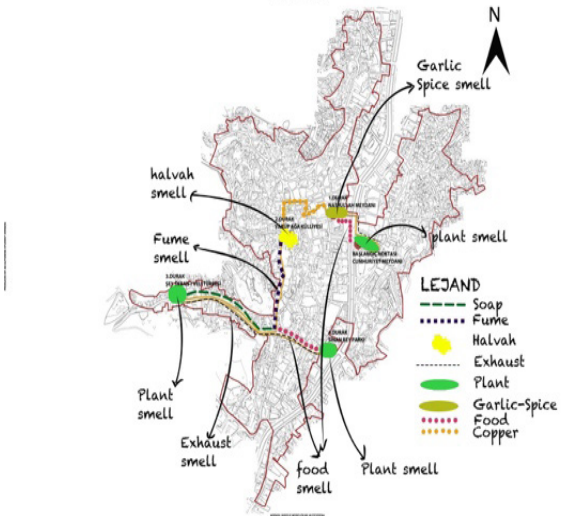
4.1. Participant mental maps

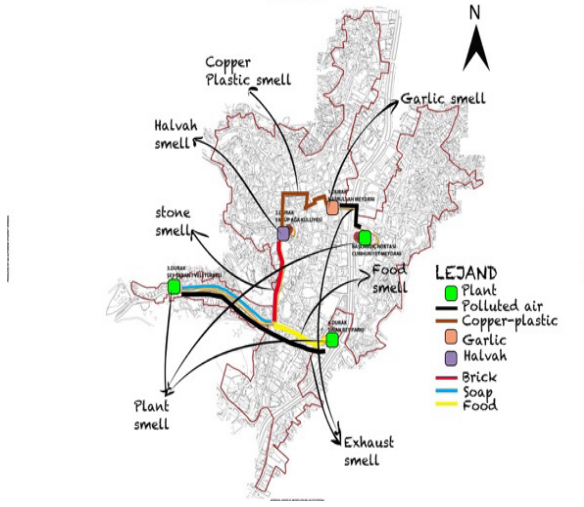
The analysis of the smell notes on the maps collected by mail demonstrated that certain smells were continuous, some smells were sensed at certain points, and others were mixed in certain areas. It was stated that the exhaust smell persisted,

especially on roadways. In the maps, it was observed that students remembered several smells in the commercial zone. They remember the smell of plants and stones at Republic Square, the smell of bagels, garlic, food, pastrami, and stones in Nasrullah Square, the smell of copper in Bakırcılar Street along the route, the smell of halva near Yakup Ağa Complex, and the smell of food and exhaust gas throughout the residential areas. The comparison of the student observations, the data collected in the previous walk and the mental maps revealed that the students' olfactory memories were quite strong. During the walks, students stated that they perceived the smell of stones and herbs in Cumhuriyet Square, the smell of garlic, stone, pastrami and coffee in Nasrullah Square, the smell of halva, wood and exhaust gas around Yakup Ağa Complex, and the smell of herbs, soap and stone at Şeyh Şaban-ı Veli Complex (Figure 4).




Halvah
musk
wood
smell
fume
smell
Coffee
smell
wood
smell
Pastırma
smell
Musk
smell
Plant
smell
stone
smell
N
LEJAND
Stone
Exhaust
Water
Animal
Pastırma
Coffee
Halvah
Fume
Plant
Rose
Musk
Soap


N
Garlic
Spice smell
halvah
smell
Fume
smell
plant smell
Plant
smell
Exhaust
smell
food
smell
Plant smell
LEJAND
Soap
Fume
Halvah
Exhaust
Plant
Garlic-Spice
Food
Copper


N
Copper
Plastic smell
Garlic smell
Halvah
smell
stone
smell
Food
smell
Plant
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LEJAND
Plant
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Copper-plastic
Garlic
Halvah
Brick
Soap
Food

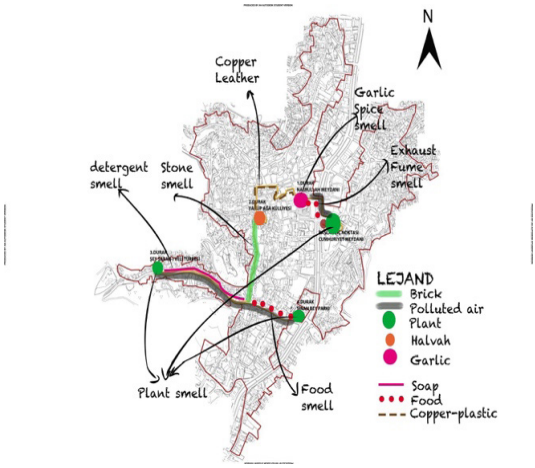


Figure 4. Mental smell maps

The image analysis conducted for the route demonstrated that olfactory axes vehicular and pedestrian roads along the olfactory route,

Smell curtains included building facades, walls that prevented olfactory distribution along the road,

Olfactory zones included various residential areas, meeting points, commercial zones, food and beverage areas along the route,

Aromas included areas where different smell categories were mixed,

Focus smells included the smells sensed by all participants and were specific to an area.

Based on the above-mentioned these image elements, the olfactory axes in the route were the smell of food and exhaust gas, the smell curtains were the buildings, the smell zones were food, stone and wood smells, the aromas were garlic, stone, plant, coffee, soap and water, and the focal odors were coffee, garlic, herb, and halva.

5. Conclusion and recommendations

Both horizontal and vertical urban growth is observed due to the population growth in cities. Urban growth leads to changes in urban character, which in turn lead to transformations in urban identity and daily practices. It is very important for contemporary cities to sustain the culture of the past. Urban images that remain in the memories of urban residents and tourists during the process of change and transformation are significant. Based on functional occupancy, several sensory

images could be transformed from the past to the future. Cities that have been dominated by visual elements for years became increasingly monotonous, and occupant satisfaction has been questioned by several disciplines. The sensory dimension of cities has been analyzed in various studies and it was determined that other perceptions were also important beyond visuality. It was suggested that smells would serve as a bridge between the past and the future, especially due to the revival of memories associated with olfactory perceptions. It could be observed that cities offer several smell sources, and they affect daily practices, touristic experiences, spatial preferences and occupancy although their effects are not taken into account. It was observed that olfactory memory was an important resource for identification and analysis and an important factor in spatial experience. It was observed that the smell, which plays an active role in the revival of memories, also affected spatial occupancy. Thus, it was observed that urban smells provide significant data. In the present study, olfactory images were studied in a historical area to determine the impact of olfactory elements on the character of the space.

Based on the study findings, to strengthen the olfactory images in the olfactory route in Kastamonu historical site and to draw attention to the olfactory dimension in the transfer of these images to the future,

- The prevalence of existing fragrant species such as *Tilia tomentosa* (silver linden), *Elaeagnus angustifolia* (oleaster), *Syringa vulgaris* (common lilac), *Wisteria sinensis* (Chinese wisteria), and *Iris* should be improved and sustained along the olfactory axes, and fragrant ground covers such as *Lavandula* (lavender), *Rosmarinus officinalis* (rosemary), *Thymus* (thyme), *Salvia* (sage) plants, suitable for the ecological demands of the historical urban site should be planted,
- The concentration of focal smells such as coffee, garlic, halva, and root dye should be increased in the areas where these smells are present and these smells should be promoted,
- To ensure the distribution of the smells preferred in smell screens, the high-rise buildings that prevent the distribution of smells in the historical texture should be analyzed, and smell screens should be constructed with evergreen ramous plant species to prevent exhaust gas smell,
- The improvement of the intensity of the preferred and desired smells in squares and commercial zones where several smells coexist with the analysis of smell sources well, ensuring the sustenance of historical smell sources,

- The smell of wood was identified in the residential areas along the olfactory route during all observations. It could be recommended to utilize these regions as olfactory regions in olfactory images and to preserve these areas to sustain this smell, and to increase the smell intensity by employing wood material in new buildings in these areas.

The olfactory images are presented in Figure 5 based on the suggestions about the route and the urban resources that were identified in urban identity throughout the urban historical site.

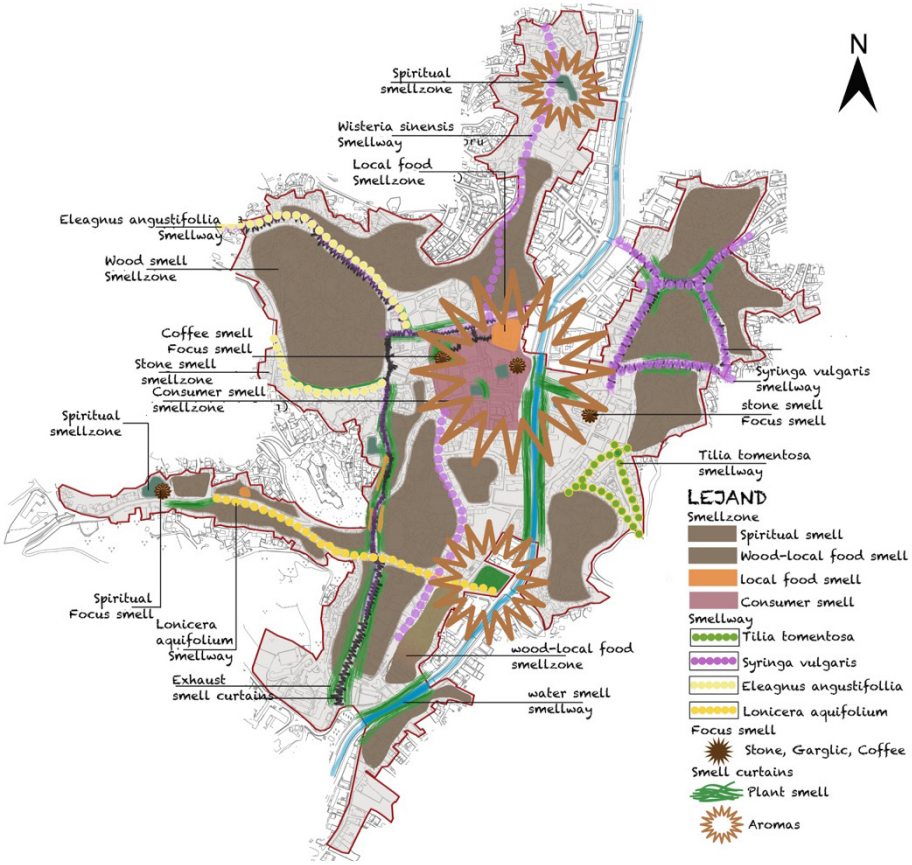


Figure 5. Olfactory images

It could be suggested that if above-mentioned suggestions are implemented, the urban identity would be strengthened, the sustainability of the cultural landscape would be ensured; and thus, the satisfaction based on occupant experiences would increase.

In conclusion, the city offers several experiences to both the residents and visitors due to various urban facilities. Since the revival of the good memories of the past could have positive effects on psychological health in monotonous living conditions, the integration of smells that evocate the memories into urban environment is an important issue. Thus, the planning of the olfactory element should be based on land use and historical assets, the smells in the area should categorized as pleasant and unpleasant, pleasant smells should be prioritized, and the olfactory urban image should be emphasized by the inclusion of living material such as plant elements and especially olfactory sources that would evoke the good memories of the occupants in pedestrian, commercial, religious and historical zones with high resident and visitor occupancy and the green space system based on the design plans.

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CHAPTER VIII

METHODS USED IN MONITORING WATER STRESS IN ORNAMENTAL PLANTS

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1. Introduction

Water resources management in the world will be the most important issue of the future as it is today. Climate change and population growth are putting great pressure on water resources (Tramblay et al., 2020). If the available water potential does not increase, it is foreseen that all water assets will be depleted in the near future due to the increase in population and the associated excessive consumption (Piao et al., 2010).

Although irrigation is done in all seasons in middle latitudes, it is mandatory to do it in summer, when the amount of precipitation is low. Approximately 74% of water potential is used in agricultural irrigation in Turkey (DSİ, 2017). On the

other hand, since the water needs of plants in landscape areas are allocated from water resources allocated for agriculture, industry and domestic use, there is no clear information about the amount of water used in the irrigation of landscape areas. Today, the landscape areas in the settlements are increasing day by day, especially with the increase of the population and human longing for nature. With the increase of landscape areas, the amount of irrigation water used will also increase. The increasing importance of water saving has made it mandatory to use water correctly in landscape areas (Demirel, 2019; Gönül Altay and Demirel, 2019). However, it is extremely important to meet the irrigation water needs of plants as visual quality is at the forefront in landscape areas (Demirel et al., 2018). In the irrigation of ornamental plants used in landscaping areas, the water needs of the plants are not adequately met or more irrigation water is applied than needed. As a result, wrong and unplanned irrigation causes wastage of water contrary to the correct management of water sources. Inadequate irrigation, which adversely affects yield and quality, causes plants to become stressed (Akçal et al., 2017). Therefore, the water demands of the plants for landscape areas should be determined correctly. Plant-specific restriction value of irrigation should be determined to save water and not to lose texture and form properties in areas where limited use of water is mandatory (Tütüncü et al., 2019). Thus, the extent to which plants are resistant to water restriction should be determined. In addition, the most important issue for landscape areas is the determination of drought-tolerant plants, because in severe drought conditions the first restriction of irrigation will be expected in the landscape areas. Therefore, to ensure the continuity of the plant presence of the landscape areas, drought/water stress resistant and less water consuming plants are needed. Plants used in landscape areas; It is divided into different groups such as trees, shrubs, shrub-shaped plants, groundcovers, seasonal flowers, bulbous plants (Gürsan, 2002; Acar et al., 2010). However, grass and shrub species, which are the most important elements of groundcovers, are the most used plants.

In recent years, researchers have been investigating which plants and varieties should be used to use water more effectively in landscape areas. To identify changes in plants that occur against water stress there are numerous plant-based measurement techniques such as photosynthesis, leaf water potential, stomatal conductivity, chlorophyll index, spectral and thermal measurements, leaf pressure etc. can be sorted (Demirel et al., 2014; Ozelkan et al., 2015; Camoglu et al., 2018; Özelkan et al., 2020). Many studies have been carried out

on cultural plants related to these measurements listed above (O'Shaughnessy et al., 2011; Demirel et al., 2014; Camoglu et al., 2018; Banerjee et al., 2020; Camoglu et al., 2021; Li et al., 2021). However, previous studies about plant-based measurement techniques related to plants used in landscape areas (Mugnai et al., 2005; Wang et al., 2014; Gomez-Bellot et al., 2015) are still insufficient.

With the emergence of the concept of xeriscape, which reduces or eliminates the irrigation need in landscaping, the importance of determining the varieties with high resistance to drought conditions is increasing day by day. Before water scarcity occurs, it is necessary to decide which of the plants and varieties in question will be grown. Therefore, it is recommended to use plant-based measurement techniques in ornamental plants to determine resistance of plants to water stress. In this study, prevalent information about the commonly used methods for determining the effects of water stress on ornamental plants and their use are given.

2. Plant-Based Measurement Methods

2.1. Spectral Reflectance Measurements

Spectral reflectance measurements, which is a nondestructive method and allows remote detection of symptoms, present suitable information about plant water content and pigment change due to water stress (Penuelas et al., 1997; Jones and Schofield, 2008; Özelkan et al., 2020). However, reflectance measurements alone may be inadequate in determining water stress. For this purpose, spectral indices have been developed, which vary depending on the pigment and water content in plants and are calculated from reflectance data. These indices can consist of simple band ratios, normalized differences, and more sophisticated mathematical equations. The selection of spectral reflectance bands to be used in index calculations depend on the properties of plants to absorb, reflect, and transmit solar energy. The reflectance of visible region and near-infrared are sensitive to leaf pigments and cell structure, respectively. Moreover, the reflectance of shortwave infrared is sensitive to leaf biochemicals, proteins, lignin, cellulose, water content etc. (Jackson et al., 1980; Özelkan et al., 2015; Roman and Ursu, 2016). For example, The Normalized Difference Vegetation Index (NDVI), which is one of the most commonly used vegetation indices, benefits from the low reflectance in red and high reflectance in near-infared region. In the red and near infrared regions, healthy plants show lower and

higher reflectance than stressed plants, respectively. (Covey, 1999; Jacquemoud and Ustin, 2001). Furthermore, NDVI is sensitive to pigment change in leaf and leaf water potential (Datt, 1998; Köksal et al., 2010; Camoglu et al., 2013). Additionally, there are many spectral indices for plant studies such as Simple Ratio Index (SR) (Jordan, 1969), Green Normalized Difference Vegetation Index (GNDVI) (Gitelson et al., 1996), Water Band Index (WBI) (Penuelas et al., 1997), Photochemical Reflectance Index (PRI) (Gamon et al., 1992), Wide Dynamic Range Vegetation Index (WDRVI) (Gitelson, 2004), Enhanced Vegetation Indices (EVI) (Heute et al., 2002) and Red Edge Normalized Difference Vegetation Index (RENDVI) (Gitelson and Merzlyak, 1994).

Spectral reflectance measurements can be made using spectroradiometer devices that can be passive (Figure 1a) or active (Figure 1b) depends on energy sources for illumination of the target. Additionally, practical measurement sensors specified to limited number of indices such as Normalized Difference Vegetation Index (NDVI) and Photochemical Reflectance Index (PRI) are preferred to obtain quick results (Figure 2).



Figure 1. Spetroradiometer measurements a) Geranium b) Rose



Figure 2. NDVI and PRI measurements in Zinnia

2.2. Thermal Measurements

Infrared thermometer and thermal cameras are used to determine plant temperatures in recent years. The temperature values obtained by infrared thermometers are leaf-level and point-to-point, do not provide information about the entire area (Figure 3a), but the temperatures of all the elements that enter the image can be determined separately in the images taken with the help of cameras (Figure 3b). This gives us important information about the earthly distribution of temperature, so that the temperature of the desired object can be separated from the images (Camoglu and Genc, 2013). Thus, other objects other than the plant can be removed and more accurate results can be obtained. Infrared thermometer or thermal camera measurements are devices that help us to understand whether the plant is stressed or not. As in humans, if plants get sick or get stressed, their temperature increases. Using these devices, the crop water stress index (CWSI) can be calculated. The CWSI value is a value that can vary between 0-1 and approaching 0 is an index that indicates that the plant is not stressed but is stressed as it approaches 1 (Idso et al., 1981).



Figure 3. Leaf temperature measurement
a) via an infrared thermometer in Dahlia and b) via a thermal camera in Rose

2.3. Leaf Water Potential

Leaf water potential (LWP) is a frequently used physiological parameter to determine the water condition of the plant. LWP is a negative value indicating how far the energy state of the water in the leaves is behind the energy state of

pure water at the same temperature (Camacho et al., 1974; Nardali and Ünlü, 2020). It is used to determine the plant water content in ornamental plants as well as in cultivated plants. LWP values are measured as Mpa (bar) with the help of pressure chamber (Figure 4). The value in question is high when the leaf water content is low and low in case of high-water content. Pressure in this device is provided with the help of nitrogen gas. It can be said that for many plants, leaf water potential measurements have the potential to determine irrigation time and water stress level.



Figure 4. Measurement of leaf water potential in Geranium

2.4. Chlorophyll Content

Chlorophyll pigments are one of the most important biological molecules that play a role in photosynthesis (Richardson et al. 2002). Chlorophyll measurements: it is used for many purposes in determining photosynthesis potential, indirectly measuring plant nutrient status, in stress studies, changing it according to environmental factors such as light (Filella et al., 1995; Larcher, 1995; Moran et al., 2000; Demirel et al., 2010; Demiralay et al., 2019; Demirel et al., 2020a). The content of chlorophyll in the leaves was made by only chemical methods in the ancient years (Arnon, 1949). In recent years, in addition to chemical methods, devices have been developed that can measure the content of chlorophyll without the need to pluck leaves (Figure 5). Some of these devices can measure with remote sensing (Figure 5a) without touching the structure, while others can measure by tapping the structure (Figure 5b).



Figure 5. Chlorophyll readings a) Zinnia/FieldScout b) Rose/SPAD

2.5. Stomatal Conductivity

Stomatal conductivity is used as a technique to determine water requirement of the plant, as it is related to the degree of stomatal opening and transpiration. High resistance is a sign that the stomas are significantly closed. This indicates that the rate of sweating has slowed down. Devices called porometers are used to measure stomatal conductivity. With the help of these devices, stomatal conductivity can be measured (Figure 6).



Figure 6. Measurement of stomatal conductivity in Rose

2.6. Leaf Pressure Sensor

The system, which measures based on turgor pressure, has sensors that measure leaf pressure. Their diameter is 11 mm and the area it occupies is 87 mm2 (Figure 7). There is an elastic section on the sensor that measures leaf pressure. The ratio

of this field to the total area is 1:10. This system is based on the principle of measuring pressure through sensors located on the magnet, which is an indicator of turgor pressure and has an inverse linear relationship. After the pressure of the magnets to the leaf reaches a constant value, the leaf pressure values read by the sensors indicate the complete change in turgor pressure. In other words, sensors measure the difference between magnet pressure and proportional turgor values (Çamoğlu et al., 2019). The measurement results of leaf pressure sensors can be monitored instantly in a computer (Figure 7). Using these sensors will allow plants to know the stress they will experience instantly for any reason. It is a new method used in the world and this method is our country has been used only in studies carried out within the scope of Crop Stress Monitoring and Thermography Laboratory (COSMOTLAB) in the Faculty of Agriculture of Canakkale Onsekiz Mart University (Camoglu et al. 2021; Demirel et al. 2021) It is thought that this method will become widespread in the world and in our country in the future.

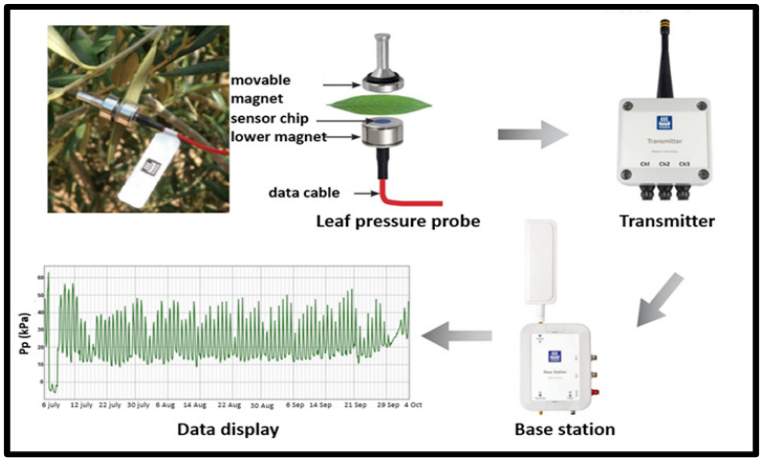


Figure 7. Leaf pressure sensor operating principle and data flow

2.7. Leaf Relative Water Content

Leaf relative water content (LWC) is considered an important indicator in drought stress. The LWC value, which is in a tight relationship with cell volume, is also considered as a value that indicates the balance between the transpiration rate and the water provided to the leaf. Due to this effect, the more water the plant can provide, the more it can relieve itself from stress (Dhanda and Sethi, 2002).

The samples taken are weighed with the help of precision scales, fresh weight (FW), turgor weight (TW) by keeping them in distilled water for 24 hours and then keeping them in an oven at 70°C for 24 hours and dry weight (DW) values are obtained. Using these values, LWC is calculated according to Bowman (1989). LWC measurements are frequently made in water stress studies, and it has been emphasized in many studies that plants will be used to distinguish stress conditions (Tütüncü et al. 2019; Demirel et al. 2020b; Doğan et al. 2020).



Figure 8. LWC measurement stages in Primrose (Demirel et al. 2020b)

3. Result

Drought, which has been increasing its effect over the years as a result of climate change and overuse of water resources due to population growth negatively affects the presence of water. Accordingly, for arid and semi-arid climatic conditions, it is extremely important to use water resources more efficiently in irrigation and to identify suitable plants being resistant to water stress. While water use in agriculture, industry and domestic areas can be determined, there are great uncertainties and unrecorded situations regarding amount of irrigation water used in landscapes. Moreover, irrigation in landscape areas is often excessive to keep plants green, especially if plants that need a lot of water are preferred. This situation is a major obstacle to combating water scarcity caused by drought. Therefore, low water and drought-tolerant plants should be preferred to minimize irrigation of landscapes.

For this reason, it will be important to use plant-based measurement methods in ornamental plants used in landscape areas, as in cultivated plants grown in agricultural areas, as it will provide an understanding of water stress without damaging the plant. The use of the mentioned methods in this study in ornamental plants will become more inevitable day by day, if we consider the possibility that the severity of the drought will increase in the near future.

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CHAPTER IX

PLANNING PROCESSES FOR THE INVESTIGATION OF VISITOR IMPACT MANAGEMENT MODEL AT NATIONAL PARKS (ARIZONA-U.S.A.)

There is no landscape on earth that is more astonishing than the Grand Canyon of Arizona. When a man first stands on its rim and images of the Canyon flash through his nerves to his mind, the mind reacts like a badly programmed computer signaling "input not acceptable" or "reject". Or so at least do the minds of most people except Southwestern Indians, who have been looking at the Grand Canyon for a long time. However, most Americans are of European ancestry and have acquired from their forebears a far different idea of what a landscape should and should not be. It ought to have relatively modest colors and contours. It ought to have some restraint. It ought not to have purple abysses, vermillion cliffs and stone rainbows flinching under a sun that clangs across the sky like a cymbal.

Robert WALLACE/THE GRAND CANYON
THE AMERICAN WILDERNESS

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1. Introduction



Protected areas have gained importance as important conservation structures and systems designed to protect natural resources for many years in the geographies where different societies live on the earth. The basic idea behind the creation of protected area systems is the existence of human-induced threats to these values and the need to take measures against those threats, as well as the determination of the conservation value of natural and cultural resource values of protected areas.

There are more than 238,563 protected areas in the world covering an area of 26 million km2. In the World Database of Protected Areas 2018 Report, jointly managed by UNEP-WCMC and IUCN, approximately 14.9% of the world's terrestrial lands and Inland waters and just over 7.3% of the global ocean are protected. Within the protected area statutes, national parks cover the largest part with a size over 30% of total protected area surface.

National parks are very important elements of global ecological network and economic activity in terms of conservation-economic value and social benefit and are accepted as an indispensable tool for protection and resource utilization policies of countries. When, national parks and protected areas all over the world are evaluated economically, all the expenditures made by the visitors from the entrance to the exit of the park with the flow of products based on the goods and services offered, prove how the protection value of the national parks is transformed into income in terms of tourism.

Today, the reasons for conservation of natural areas and their purposes are highlighted with the following headings; carrying out scientific research, importance as a food and gene source, as a basic element of climate regime

and hydrological balance, as a powerful means of renewal and restoration of nature, offering recreational and touristic opportunities, functioning as educational islands where consciousness for nature can be gained, protection of cultural richness (traditional, symbolic, etnographical, historical, archeological etc.), sustainable use of natural resources in a way to allow flow of products economically, developing international resources as well as protecting the aesthetical side of the country (Demirel, 2005).

Increasing number and intensity of visitors for touristic and recreational purposes poses a threat to the natural ecosystem, while also contradicting the rationale for protection of the area. The environmental consequences of uncontrolled activities on non-renewable natural resource values suggest that a visitor-oriented complementary management model and planning is needed for the Long-term Development Plans that are being prepared.

The arrangement of this relationship in the protected natural areas with sensitive and privileged qualities, namely the balance of tourism supply and demand and the minimization of adverse effects, can only be possible by making the visitor management plans, knowing the visitor capacity, determining and monitoring them in a regular way.

This situation does not change even if protection measures are taken with the tourist mobility (Figure 1), which reaches large sizes with ever-increasing traffic network. The Grand Canyon National Park, which was declared a National Park in 1908 in the United States, is becoming a park site experiencing increasingly negative impacts and deteriorations (flooding of the river rising erosion and increasing number of buildings contrasting with nature and hard surfaces, destruction of natural values.



Figure 1. Increasing Visitor Use at Grand Canyon National Park

In recent years, the necessity of implementing ecosystem-based planning and management approach has been frequently emphasized in order to prevent negative effects of the biological diversity / key elements and the natural-cultural values of parks after tourism / recreational use in protected areas with vulnerable and sensitive ecosystems.

In particular, the Long-term Development Plans made National Parks in our country do not yet include the implementation of comprehensive, participatory and applicable "Management Plans".

In the above-mentioned scope, the purpose of this project is to implement the Visitor Based Planning Approaches, which are applied in the example of the Grand Canyon National Park in the USA, in the National Park Planning in our country, Turkey within the framework of "defining a process focusing on the main issues related to visitor impact".

1.1. Grand Canyon's Legislative History

President Theodore Roosevelt, by presidential proclamation, reserved land in the Grand Canyon of Arizona as the Grand Canyon National Monument on January 11, 1908. President Roosevelt stated in the proclamation that the Grand Canyon of Arizona "is an object of unusual scientific interest, being the greatest eroded canyon in the United States, and it appears that the public interest would be promoted by reserving it as a National Monument (Proclamation No.794) "(Arnberger and Albright, 1995).

1882 First unsuccessful attempt to establish a Grand Canyon National Park

1893 Designated a "forest reserve" by President Benjamin Harrison (Presidential Proclamation#45)

1908 Established as Grand Canyon National Monument by President Theodore Roosevelt (Presidential Proclamation#794)

1919 Designated Grand Canyon National Park by an act of Congress on February 26 (40 Stat 1175)

1975 Grand Canyon National Park Enlargement Act, an act of Congress on January 3 (88 Stat 2089) (Public Law 93-620)

1979 Designated a World Heritage Site on October 26

1.2. Park Location

Grand Canyon National Park lies on the Colorado Plateau in northwestern Arizona. The area is a vast, semiarid land of raised plateaus and structural basins typical of the southwestern United States. The higher elevations of the plateau are forested; the lower elevations are a series of desert basins (Haskell and Arnberger, 1997).

Fifty-five percent of the Colorado Plateau is Federally owned, including 27 units administered by the National Park Service, 17 national forests administered by the United States Forest Service, 26 designated wilderness areas, 32 million acres administered by the Bureau of Land Management, numerous state parks and countless Roadless and remote areas. American Indian reservations occupy 24% of the land and state governments control 6%, leaving 15% of the region's lands in private ownership (Hecox and Ack, 1996).

Grand Canyon National Park today encompasses approximately 1,218,375 acres of public land on the southern end of the Colorado Plateau and is the largest single protected area within the Colorado Plateau region (Arnberger and Albright, 1995) (Figure 2). The Park is bounded on the north by the Kaibab National Forest and the Arizona Strip District of the BLM, on the east by the Navajo Reservation, on the south by Kaibab National Forest and Hualapai and Havasupai reservations, and on the west by the upper reaches of Lake Mead National Recreation Area.

1.3. Conservation Management

All of the Grand Canyon is within areas now administered by the Federal Government through the National Park Service, the Bureau of Indian Affairs, the Fish and Wildlife Service, the Bureau of Reclamation, and the Bureau of Land Management, all in the Department of the Interior, and the Forest Service of the Department of Agriculture.

The first development plan was compiled for the South Rim Development Areas in 1924 and implemented during the 1930s as Park visitation expanded. The direction for future park management was based on the laws establishing the National Park Service and the Park, its purpose and its main resources. A 15-year General Management Plan was completed in 1995 replacing the first plan. The environmental impacts of implementing the plan were analyzed in a Draft General Management Plan and Environmental Impacts Assessment. This

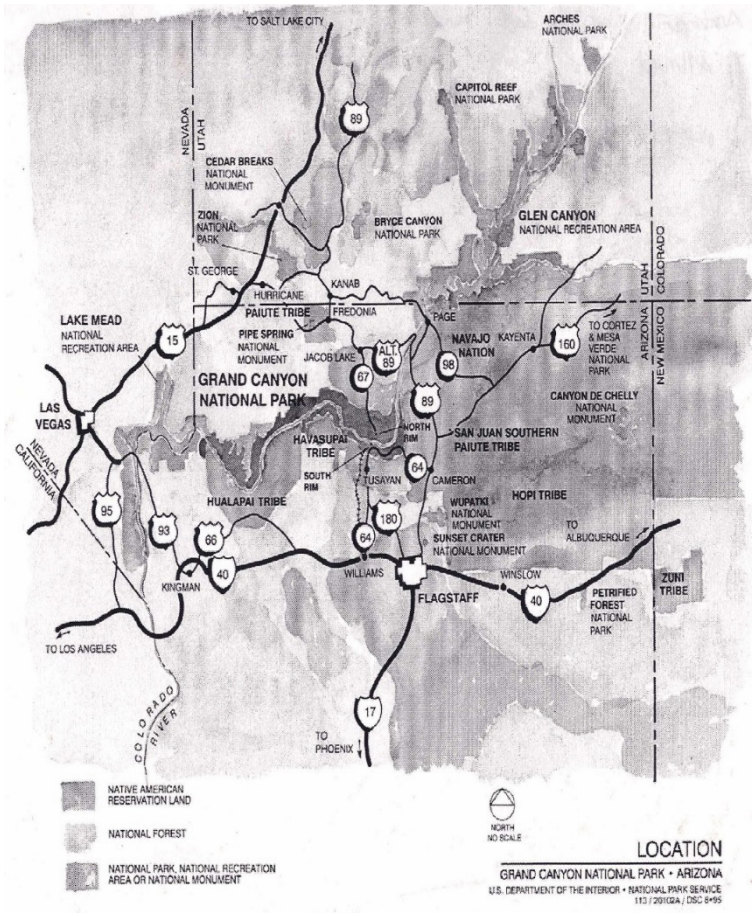


Figure 2. Location-Grand Canyon
National Park-Arizona (Arnberger and Albright, 1995)

was the culmination of a four year process that involved local citizens, American Indian tribes and public and private agencies. In 2006 plans were initiated to improve management of the North Rim and visitor use on the Colorado River. The Park has been zoned for management purposes. These comprise a natural zone including proposed Wilderness area (over 90%); Havasupai Uselands and non-wilderness areas and corridors; and a Development zone. Studies of potential boundary adjustments may result in recommendations to revise park boundaries (NPS, 1995).

1.4. Park Purposes

The purpose of Grand Canyon National Park is based on the legislation establishing the park and the legislation governing the National Park Service.

As a place of national and global importance, Grand Canyon National Park is to be managed to

- Preserve and protect its natural and cultural resources and ecological processes, as well as its scenic, aesthetic, and scientific values
- Provide opportunities for visitors to experience and understand the environmental interrelationships, resources, and values of the Grand Canyon without impairing the resources

1.5. Park Significance

Grand Canyon National Park is nationally or internationally significant for the following reasons (Arnberger and Albright, 1995; Haskell and Arnberger, 1997).

World Heritage Site

As a World Heritage Site, the Grand Canyon is recognized as a place of universal value, containing superlative natural and cultural features that should be preserved as part of the heritage of all people. The Grand Canyon is unusual in meeting both natural and cultural resource criteria for designation as a world heritage site.

Natural Resources/Natural Ecosystem Processes

- The ***great biological diversity of the park*** includes examples of five of the seven life zones and elements of three of the four deserts in North America *(the Great Basin, Sonoran, and Mojave)*.
- The park serves as ***an ecological refuge***, with relatively undisturbed remnants of dwindling ecosystems (such as boreal forest and desert riparian communities), and numerous rare, endemic, or specially protected (threatened/endangered) plant and animal species. As stated in the establishing legislation, the Grand Canyon is the "greatest eroded canyon in the United States." It is considered one of the finest examples in the world of arid-land erosion.
- The Grand Canyon is neither the world's longest nor deepest canyon, but its volume is immense, averaging 4,000 feet deep for its entire length of 277 miles, 6,000 feet deep at its deepest point, and 15 miles wide at its widest.
- The geologic record of the Grand Canyon is particularly well-exposed and includes a rich and diverse fossil record. The canyon also contains a great diversity of geological features and rock types.

- Numerous caves in the park contain extensive and significant geological, archeological, paleontological and biological resources.
- Over 1,500 plant species, 287 bird species, 88 mammalian species, 58 reptile and amphibian species, and 26 native fish species are found in the park
- Six research natural areas have been designated in the park (8,845 acres total) to provide opportunities for nondestructive research in areas relatively uninfluenced by humans
- A national natural landmark occurs partially within the park, which encourages recognition and protection of the ponderosa pine habitat of the Kaibab squirrel-a classic example of the process of variation through geographic isolation
- The park is known for nationally significant research in a number of fields (e.g., geology, geomorphology, paleontology, ecology, air quality, aircraft effects, and noise
- The park serves as a natural gene pool, because of its biological diversity and unique conditions.

Cultural Resources

- Six American Indians Groups, represented by eight tribal governments, have close and sacred cultural ties to the Grand Canyon, with some considering the canyon their original homeland and place of origin
- Over 4,500 years of human occupation have resulted in an extensive archeological record
- The park contains a large number historic and prehistoric properties and districts that are nationally and internationally significant. Many are eligible for or listed on the National Register of Historic Places; many are also designated as national historic landmarks
- The Grand Canyon contains nationally significant examples of rustic architecture
- The park has hundreds of miles of established prehistoric and historic routes and trails.

Scenic Qualities and Values

- The Grand Canyon has internationally recognized scenic vistas, qualities, and values. With ever-changing and colorful scenery of enormous proportions, it is widely considered one of the world's most beautiful natural areas

- The great variety of scenery includes forests, deserts, canyons, plains, plateaus, volcanic features, and streams and waterfalls
- The Grand Canyon is an excellent place for night sky viewing
- The Grand Canyon‘s class 1 air quality is extremely important to its scenic quality (i.e., visibility, colors, details).

Natural Quiet and Solitude

The Grand Canyon is recognized as a place with unusual and noticeable natural quiet and direct access to numerous opportunities for solitude.

Spiritual/Inspirational Qualities

All of the natural, cultural, and scenic qualities of the Grand Canyon, coupled with the canyon’s vast size, give rise to inspirational/spiritual values and a sense of timelessness.

Recreational Opportunities

- A wide diversity of resource-based recreational opportunities and support services help visitors experience, enjoy, and appreciate the park
- The vast majority of the park provides opportunities for wilderness experiences. Hundreds of miles of trails and routes provide access to park resources and diverse recreational opportunities and experiences. The Bright Angel Trail, Kaibab Trail, and River Trail are designated national recreation trails as part of the national trails system. The Arizona Trail also passes through the park
- The Colorado River, as it flows through the park, provides opportunities for one of the world’s premier river experiences, including one of the longest stretches of navigable white water on earth

Potential Designations

- Over 1 million acres in the park meet the criteria for wilderness designation as part of the national wilderness preservation system. If combined with over 400,000 additional acres of proposed or designated wilderness contiguous to the park boundary, this area could become one of the largest, primarily desert wilderness areas in the United States
- The Colorado River and most of its tributaries in the park meet the criteria for wild river designation as part of the national wild and scenic rivers system.

2. The Structure of Management Plan for Grand Canyon National Park

The Grand Canyon Management Plan is one of the most important examples of national park management in the United States. In the United States, the national parks management system is governed by federal laws, the National Park Service (NPS, 2004) policy, and park-managed management plans. It consist four main principles.

- *Conceptual Framework:* A comprehensive approach has been adopted for such issues as national park service, management of natural and cultural resources, linking of management activities, ensuring visitor satisfaction and ensuring park development for a long period of 15-20 years. It follows a sustainable and adaptable planning method which is non-static adaptive, dynamic and open to new developments.
- *Scientific Based Analyzes:* The decisions made in the planning process are based on analyzes made as a result of scientifically based studies. There are many analyses in 65 different subjects and they are used in different plans such as general management plan, business plan, implementation plan developed in the planning process. Analyzes made are primarily directed to the park. Other important and indispensable resources of the park are defined on a regional, national and, if separable, global scale. These analysis stages make it easy to determine the degree of importance of the assets and to make decisions accordingly.
- *Partners and People's Participation:* National parks with symbolic value are of great interest to the American public. All stakeholders can share legal and professional responsibilities and receive information on issues such as national heritage and cultural tradition. The task of the NPS is to design the participation of the partners and the people in the decision-making process in the planning, and to negotiate with the participants, taking this issue into account.
- *Decision-making Responsibility: Identification of resources - definition:* The administrator of the park is responsible for achieving yearly strategic goals. Planning is critical and necessary for NPS performance management. The performance management system is based on an applicable management process. Managers are responsible for the decisions they make, and as a result of these decisions, the effective use of the funds received from the people

is ensured (Figure). Logical and rational decisions are made as a result of planning steps. Park planning and decision-making process is created with "why / what / how" questions. A logical framework is created by finding out the reasons for the establishment of the park, what its objectives are and how to make the necessary actions. The actions to be carried out are divided into three periods; long, medium and short term.

2.1. The National Park Service Management

The NPS Management Policies require that general management plans prescribe a system of management zoning for park lands and waters to designate where various strategies for management and use will best fulfill management objectives and achieve the purpose of the park. The delineation of management zones will be based on an evaluation of the congressionally established purposes of the park; the nature of the park's natural and cultural resources; all past, existing, and anticipated uses; and park management objectives. This prescriptive zoning will consider the capability of lands to support identified uses and will be used as a framework for specific planning and management decisions on use and development of the park.

- ***Natural Zone:*** The natural zone includes lands and waters that will be managed to conserve natural resources and ecological processes and to provide for their use and enjoyment by the public in ways that do not adversely affect these resources and processes. Development in the natural zone will be limited to dispersed recreational and essential management facilities that have no adverse effect on scenic quality and natural processes and that are essential for management, use, and appreciation of natural resources.
- ***Cultural Zone:*** This zone includes lands that will be managed for the preservation, protection, and interpretation of cultural resources and their settings and to provide for their use and enjoyment by the public. Cultural resources that are key the purposes of the park will be included in this zone.
- ***Development Zone:*** The development zone, includes lands that will be managed to provide and maintain facilities serving park managers and visitors. It will include areas where park development or intensive use may substantially alter the natural environment or the setting for culturally significant resources. The development zone will encompass the facilities

themselves and all associated lands directly modified as a result of their continuing management and use. Development zones will be restricted to the smallest area necessary to accommodate required development and use.

The following seven distinct developed areas are included in the development zone. These are; South Rim, Grand Canyon Village, Tusayan Museum, Desert View, North Rim, Tuweep, Coridor Trails. Actions are also proposed for lees ferry, which is an existing development zone of Glen Canyon National Recreation Area.

Phasing for the General Management Plan

Under General Management Plan proposed facilities will be constructed in existing disturbed areas, and existing structures will be adaptively reused. Two phases are proposed:

- *Phase 1*-1995-2002: Actions primarily related to improving transportation, or initial actions in a series of adaptive uses.
- *Phase 2*-2003-2010: Actions that are lower priority or must wait for phase 1 items to be completed before they can be started (NPS, 1995).

The following additional information is provided with each action item.

Transportation Subzones

Transportation subzones connect development zones and include primarily paved road corridors and rail corridors to a width appropriate for safe travel. The following areas are designated transportation subzones: (NPS, 1995).

- *West Rim Drive*- West Rim Drive extends from Grand Canyon Village to Hermits Rest, plus existing overlooks, parking areas, and areas immediately adjacent to west Drive that would be suitable for a bike/pedestrian trail.
- *East Rim Drive*-East Rim Drive extends from Grand Canyon Village to the east entrance (excluding the Desert View developed area), plus existing overlooks, access roads to overlooks, picnic areas, parking areas, and areas adjacent to East Rim Drive, particularly on the north side, that would be suitable for a bike/pedestrian trail.
- *South Entrance Road*-The south entrance road links the south entrance and the Grand Canyon Village developed area, plus the following corridors: Rowe Well Road, the old entrance roadbed west of the existing entrance road, and the existing railroad corridor along Bright Angel Wash.

- *North Entrance Road*-The north entrance road links the north entrance and the North Rim developed area.
- *Walhalla Plateau Scenic Drives (North Rim)*-Scenic roadways extend from the north entrance road to Point Imperial and Cape Royal, including existing overlooks and parking areas, plus areas adjacent to these roads (and outside recommended wilderness areas) that would be suitable for bike/pedestrian trails.

2.2. Park Vision Statement

The vision statement for Grand Canyon National Park convey the essence of the park's qualities and desired future conditions. The visions affirm what must be preserved, as well as what types of experiences visitors should be able to expect. The visions and management objectives, along with the purpose and significance statements, provide the basis for the plan, and they set the direction for future management decisions that are not specifically addressed in the plan (NPS, 2011).

South Rim

The South Rim presents opportunities for visitors that are different from those available in other park areas. The South Rim should remain the focus for most park visitors, with diverse opportunities to view the canyon. It should also provide access to areas that allow people to have solitary experiences.

The South Rim should accommodate large numbers of visitors, but dense crowds and related conflicts and resource impacts should be minimized. Visitors should be able to experience solitude in natural settings as well as social exchange in developed areas. For access to such areas, the West Rim and East Rim Drives should be meandering, rural roads that lead to overlooks where visitors can get away from the more urbanized areas of the Grand Canyon Village. The South Rim should be a model of excellence in planning and management. Alternative means of transportation-walking, biking, or using convenient public transit-should be encouraged.

North Rim

The serene and beautiful natural environment, the sweeping canyon views, and a relaxed, uncrowded feeling are the prime qualities of the North Rim. To ensure that these qualities are preserved, the North Rim's natural, scenic, and cultural resources should be preserved. The North Rim and the adjacent national forest

lands should maintain a low-key and uncrowded atmosphere that offers visitors opportunities to be intimately involved with the environment.

Any visitor support and administrative facilities and services should be sited to maintain desired visitor experiences and to preserve the largely undisturbed setting. Park roads should be maintained as meandering, scenic drives planned for visitors to view the park environment at a slow pace.

Visitors should be able to experience natural sights and sounds with little or no intrusion from other people in many areas of the North Rim. Day hiking opportunities should be provided, and trails should be maintained through forested and developed areas.

Tuweep

Tuweep is unique within the Grand Canyon because it is remote yet still accessible by car. It has spectacular views of Lava Falls, and its highly sensitive natural resources require protection. Even though Tuweep is accessible by car, this area should continue to provide uncrowded, semi-primitive experiences that are dominated by nature and solitude. Visitor facilities should remain minimal, and the ranger station should retain its historic character but also reflect sustainable design principles.

The park should work cooperatively with the state of Arizona, Mohave County, the Bureau of Land Management, Lake Mead National Recreation Area, and other regional entities to ensure that lands outside the park remain uncrowded, that roads and facilities are semiprimitive, and that mining, grazing, and other land uses do not adversely affect Tuweep.

Corridor Trails

The corridor trails are the main transportation routes for most visitors into the inner canyon. Rustic facilities have historically been provided along the trails to meet visitor needs. For over a hundred years mules have carried visitors into the canyon, hauled supplies, and helped with trail maintenance.

The traditional character of the trails should be maintained, and mule use should be allowed to continue. However, crowding, visitor use conflicts, and resource impacts should be minimized.

Undeveloped Areas

Over 90% of the park is proposed for wilderness. These areas offer visitors opportunities for solitude and primitive recreation. The management of these areas should preserve the wilderness values and character. Nonwilderness

undeveloped areas should continue to serve primarily as primitive thresholds to wilderness.

Visitors traveling through the canyon on the Colorado River should have the opportunity for a variety of personal outdoor experiences, ranging from solitary to social. Visitors should be able to continue to experience the river corridor with as little influence from the modern world as possible.

Management Objectives

The management objectives for Grand Canyon National Park, which are based on the park visions, set the direction for future park management. The objectives describe desired conditions to be achieved.

Visitor Experience

The visitor experience within and adjacent to the park will be defined by the unique qualities of each area. To ensure a quality experience, the number of visitors admitted to certain areas will be limited during peak visitation periods based on the desired visitor experience and the need to protect resources. The process for determining use limitations will be the same throughout all developed areas of the park; however, visitor levels in specific areas will vary considerably, and use will be limited sooner in some areas than in others.

- Provide access that is appropriate and consistent with the character and nature of each landscape unit and the desired visitor experience.
- Provide equal access to programs, activities, experiences, and recreational opportunities for individuals with disabilities, as appropriate and consistent with the levels of development and inherent levels of access in areas within the park.
- Provide a safe, efficient, and environmentally sensitive transportation system for visitors, employees, and residents, consistent with management zoning and resource considerations. Emphasize non-motorized modes of transportation wherever feasible.

Facility Design

- Consistent with its purpose, strive to make Grand Canyon National Park a model of excellence in sustainable design and management through such means as energy efficiency, conservation, compatibility with historic setting and architecture, recycling, accessibility, and the use of alternative energy sources.

- Ensure that park developments and operations do not adversely affect park resources and environments, except where absolutely necessary to provide reasonable visitor access and experiences.

2.2.1. South Rim Management Objectives

The South Rim is considered to be bounded on the west by Hermits Rest, on the east by Desert View, on the north by the canyon rim, and on the south by the park boundary. The following objectives for the South Rim are in addition to the overall park objectives (NPS, 2007).

Visitor Experience

- Identify and develop an appropriate range of visitor experiences, opportunities, and Access that will accommodate a variety of visitor expectations, abilities, and commitment levels.
- Provide viewing opportunities of the canyon, access to views and trails, and interpretation and information, recognizing that these are the most important elements of the visitor experience on the South Rim.
- Maintain the South Rim from Hermits Rest to Desert View as the focus for the majority of visitor use in the park, including major visitor facilities and accommodations.

Development

- Develop and promote the use of foot trails, bicycle paths, and public transportation to provide convenient and efficient movement of visitors, employees, and residents within Grand Canyon Village and between major points of interest.

Summary of South Rim Actions

The vision for the South Rim is to allow visitors direct access to canyon panoramas and to offer a range of visitor experiences — from more social experiences in Grand Canyon Village to solitary experiences elsewhere along the rim.

To achieve this vision, the number of private vehicles parking on the South Rim at any one time will be limited. During peak seasons private vehicles will not be allowed in the village, along the West Rim, or at East Rim overlooks. These areas will become pedestrian spaces where visitors can enjoy the views, learn about the park's interpretive themes, use visitor services, and find secluded

spots. A public transit system, along with bike and pedestrian paths, will provide access along the South Rim.

South Rim Planning Issues

Region

The South Rim lacks a coordinated regional transportation system, and most visitors rely on private vehicles for access to the park; a few visitors arrive by tour bus. High visitor use, particularly in summer, causes traffic congestion outside the park.

There is no information or orientation for visitors before they enter the park. Visitors often arrive at the South Rim without reservations for accommodations, not realizing that facilities are usually full year-round.

Visitor Experience

The South Rim is too crowded during summer. The road system is heavily congested; confusing traffic routing and signs further confound visitors. Parking for automobiles and buses is inadequate.

The shuttle system is crowded, and there are too few buses. Routes are inadequate, and the operating season is too short. The small visitor center is hard for visitors to find. Orientation is inadequate, and outdated exhibits are in overcrowded spaces.

Biking is dangerous because no lanes, paths, or trails have been designated.

How Visitors Arrive on the South Rim

- Visitors will receive information packets at home that describe transportation alternatives, visitor services, lodging, etc.
- Visitors may stop at regional gateway information centers at Las Vegas, Phoenix, Williams, and Flagstaff.
- Electronic message signs south of Tusayan and in Cameron will advise travelers about the status of parking on the South Rim.
- Visitors will be encouraged to stop at the gateway orientation center at Tusayan. If the Mather Point parking area is full, visitors may choose to park and ride an NPS or private transit bus into the park.
- Visitors may stop at the Mather Point orientation/transit center (by private vehicle if the lot is open, otherwise by tour or transit bus).
- Visitors parking at Mather Point will ride an NPS shuttle into the village and on West Rim Drive. If parking is not available, visitors will have to park their private vehicles in Tusayan and take a transit service into the park.

- Private vehicles and tour buses will be allowed to access East Rim Drive at all times.
- Overnight guests will be allowed to drive to the designated parking area for their particular lodging unit. Tour buses with overnight guests will be allowed direct access to lodging units to drop off passengers.

Access for People With Disabilities

All parking lots will conform to federal accessibility standards. Parking with adjoining Access aisles will be located next to accessible routes.Accessible transit vehicles will be made available in transit-only areas, and visitors with disabilities who cannot be adequately accommodated by public transportation will be allowed access by private vehicle.

All trails above the rim will be made as accessible as physical conditions allow, given the fact that the terrain at Grand Canyon is rugged and steep. Actual trail conditions will range from wide paved trails with level grades to narrow unpaved trails with steep grades. Wherever possible, slopes will not exceed 5% and cross slopes will not exceed 2%. A trail rating system based on the ease of accessibility will be developed. Trails will be rated so that visitors with disabilities know what to expect.

All nonhistoric buildings will be made fully accessible for persons with disabilities. Every effort will be made to ensure that providing accessibility to historic buildings is balanced with maintaining the historical integrity of each structure. All visitor services will be adapted for visitors with special needs. **EXPE**

Visitor Use Patterns

To continue providing a quality visitor experience while protecting park resources, and in keeping with the visions and management objectives established for the South Rim, limits will be placed on the number of people who can visit the South Rim at any one time. However, if the visitation assumptions made in this document are reasonably accurate, and if the proposed transportation changes are implemented, then limits are not expected to be necessary until approximately 2015. The transportation changes will improve visitor distribution while still providing opportunities along the South Rim for solitude. The point at which limits will be imposed, once these changes are made, will be when approximately 22,500 visitors are on the South Rim at any one time.

It is important to note that if the transportation and other facility changes proposed in this plan are not put in place, then the limit on the number of people who can visit the South Rim at any one time will be significantly reduced. Also, if visitation substantially exceeds forecasts, or if crucial transportation and other changes are significantly delayed, then that limit will need to be imposed much sooner. In fact, if the proposed changes cannot be put in place, day visitor limits and a reservation system will have to be imposed

Access / Transportation

Regional Access

The Park Service will encourage alternatives to private automobile travel to Grand Canyon. These alternatives should complement the transportation and orientation proposals. Current examples include the Grand Canyon Railway from Williams, Nava-Hopi Tours from Flagstaff, and various shuttles from Tusayan and the Grand Canyon Airport in Tusayan. Additional alternatives in the future, besides the shuttle from the gateway information center in Tusayan, could include a canyon area shuttle service from a staging area in Valle, or proposals stemming from a regional transportation plan currently being developed under the auspices of the Arizona Department of Transportation.

North of Tusayan, at a site to be determined in cooperation with the U.S. Forest Service, a large parking facility will be constructed. It will be closely associated with the gateway information center and will be the starting point for various alternatives to automobile travel into the park, as described below.

- A bicycle/pedestrian trail will connect this facility with Mather Point and a network of similar trails along the South Rim.
- A rail shuttle between Tusayan and the Maswik Transportation Center, pending further environmental review, could be relocated from the airport to this north Tusayan site and provide transportation service into the park for up to 20% of park visitors. The Maswik Transportation Center would be the northern terminus for this shuttle route because the railroad track and the Maswik facility already exist. It is estimated that only up to 20% of visitors would use this service for the following reasons: (1) the landscape and other constraints, as well as the need to quickly distribute visitors, do not allow a larger facility at Maswik, (2) orientation provided at the Maswik facility would be less comprehensive than at the Mather Point orientation center,

and (3) access from Maswik to the rim is less direct than from the Mather Point site.

- A shuttle service to the Mather Point orientation center will be provided for the remaining day visitors who do not use the trail or the train. This shuttle could use either rubber-tired buses on the existing road or a fixed guideway system (e.g., rail, light rail, monorail); such a system would likely be privately financed and operated if economically feasible and costs for riders disturbances, and (2) visitors must be well served by the routing. Existing disturbed corridors will be evaluated, including the original entrance road alignment (just west of the existing south entrance road) and the utility where reasonable.

Alternative analyses for providing these transit services will fully evaluate site-specific planning, design, and environmental factors. Two primary criteria will be used in selecting transit corridors (in addition to the required environmental review): (1) existing disturbed areas will be favored over new powerline corridor leading to Grand Canyon Village.

The capacity of the Tusayan parking facility is estimated at a maximum of 2,600 vehicles by the year 2010. If other mass transit options are effective at reducing the number of cars arriving at the park's gate — such as buses from Flagstaff, the train from Williams, or other options to be developed — the size of the lot may be reduced.

USFS Road 302/307 will remain unchanged as a dirt/gravel road, assuming that visitation estimates are correct and that funding is obtained for the major transportation system components. If these conditions cannot be met, the discussion of paving USFS 302/307 (in part or in whole) as an alternative to the park's East Rim Drive may be reopened. The possibility of straightening Rowe Well Road to avoid some of the rail crossings could be considered, but neither this road nor USFS Road 328 will be paved or graveled.

Roads, Parking, and Transit

Overview: South Rim roads will be resurfaced, minor parking lot redesigns and improvements will be undertaken, and trails will be added in conjunction with road improvements.

Transit service, biking, and hiking will be the primary means for park visitors and residents to travel year-round along the South Rim. A convenient,

attractive, and energy-efficient transit system will serve the developed areas from Hermits Rest to Yaki Point and from Desert View to the Tusayan Museum. Each bus will have a bike rack. Automobiles will be restricted from Hermits Rest to Yaki Point year-round by 2010. Grand Canyon Village will only be accessible by transit, hiking, or biking.

2.3. Grand Canyon Village Area (NPS, 2011):

The Mather Point orientation/transit center will be the central transit center for the South Rim. This will be the primary point for visitors to make direct transit connections to the village and West Rim Drive, the Yaki Point trailhead, or the gateway information center in Tusayan. This center will include a transit pick-up/drop-off area, covered shelter and seating, information and display panels, and restrooms. Transit routes along the South Rim, with different bus sizes and schedules, will provide convenient visitor access to South Rim areas.

A well-screened, heavily landscaped parking area for up to 1,225 private vehicles (including RVs) and 60 tour buses will be constructed back from the rim at Mather Point. Visitors will have to walk a short distance (up to 1,000 feet) from the parking lot, past the orientation/transit center, to get to the rim, or they will be able to board transit or tour buses at this location to all South Rim destinations. Walking trails and bike paths (and bike rentals) will also be available. The parking area has been sized to allow a limited number of visitors to drive to within walking distance of the rim all year long, while still making an eight- or nine-month shuttle season from Tusayan viable. Visitors who cannot park at Mather Point because the lot is full will have to use alternative means of transportation to visit the park.

The parking area near Mather Point is scheduled to be built in two phases and will not be larger in capacity than 1,225 cars. If other transportation means are effective in reducing the number of cars arriving at the park (buses from Flagstaff, the train from Williams, or others that may be developed), the size of the parking lot may be reduced, making the second phase unnecessary. It is important to note that when this parking area is built and vehicle restrictions in Grand Canyon Village put in place, there will be an overflow parking demand. This overflow will not be accommodated inside the park. If the proposed parking area north of Tusayan is not in place at that time or the proposed shuttles are not available, other options through private entrepreneurs will be the only means for handling this overflow.

The South Rim entrance road from Mather Point to the village loop drive will be restricted to public transit vehicles only. Overnight private tour buses dropping passengers off at lodges along the rim will be able to use this portion of road only to drop off and pick up guests staying in lodges along the rim. If this additional use causes problems, then overnight tour buses will be directed to park at the Maswik Transportation Center, and shuttle service will be provided to rim lodging.

Day tour buses will be allowed to drive directly to the Mather Point orientation center, where they can park. The parking area at the Maswik Transportation Center will provide both day and overnight bus parking.

Local bus companies that demonstrate and maintain a good record of performance in the park, that operate clean-burning fleets, and that obtain training for drivers or guides from park interpreters may be provided broader access (at the discretion of the superintendent).

Hikers will continue to be permitted to park at or near East Rim Drive trailheads, as they do currently. However, they may be required to obtain special parking permits. If such use becomes a problem because of volume, a transit/ taxi service will be established for access to these trailheads. Long-term parking for hikers on the corridor trails or on the Hermit Trail will be provided at the Mather Point orientation/transit center. Transit connections will provide access to these trailheads, and telephones will be available for 24-hour taxi service back to the parking lot (at a reasonable price and response time).

All overnight visitors will be given identification for their cars. These vehicles will have Access to the same roads and parking lots as day users; however, overnight visitors will be allowed to park their vehicles at lodging away from the rim or at their campsites. Visitors staying on the rim will have to park at the Maswik Transportation Center and lodge area, with shuttle service to the rim. The Maswik Transportation Center will also serve as the in-park staging area for the railroad spur when that system becomes operational.

Mail delivery by the U.S. Postal Service will be encouraged to reduce daily resident traffic to and from the business center.

A few new road sections will be constructed so private vehicles will not have to use public transit routes from Mather Point to the village. The new road sections, which will be built on disturbed lands wherever possible, include;

- a 0.4-mile access road to link the RV campground and the existing south entrance road
- a 1.4-mile road to connect the Maswik Transportation Center and Maswik Lodge to Center Road
- a 0.25-mile section of road back from the rim to provide access to the Mather Point orientation/transit center (the existing road section closer to the rim will be converted to a bike path)
- a 0.4-mile link connecting residential areas to the business center

2.4. Visitor Use Analysis

In 1919, the year Grand Canyon became a national park, 44,173 people visited (Figure 3). Since that time, visitation has steadily increased. By 1956, over one million people visited annually. In 1969, the two million mark was topped. In 1976, the Bicentennial year, the Park received 3,026,235 visitors, and hit four million in 1991. In 1996, visitation reached 4.877 million (Haskell and Arnberger, 1997; Url-1, 2021).



Figure 3. Mother Point

Reasons for increased visitation have never been carefully studied. However, population growth, increased mobility, expanded communication/ media networks, a growth in discretionary income and time, and an increase in the number of available lodging units/campground spaces have all been contributing factors.

Visitation fluctuates seasonally: 22 percent of visitation occurs during spring, 48 percent during summer, 22 percent in fall, and eight percent in winter. Visitation surges during Easter week, Christmas week, and the first two weeks in August. As with all parks, spring and fall seasons are experiencing rapid growth.

In 1991, 4,222,397 visitors entered Grand Canyon National Park (a 12 percent increase over 1990); backcountry users spent 87,384 nights in the backcountry (although an exact figure is not known, the park estimates that approximately 800,000 visitors per year hike below the rims); river runners spent 163,262 user days on the Colorado River. Approximately 20,801 visitors rode mules into the Canyon, while the air-tour industry estimates that 650,000 visitors participated in air tours (Url-2, 2021).

In 2006 this was the second most visited National Park in the U.S.A. after the Great Smoky Mountains, with 4.4 million visitors. Many attractions and accommodations must be pre-booked, some by four months ahead, overnight stays need permits and the payment of fees and there are limits on group size. The South Rim is the most accessible, open year round and is well serviced. The much larger North Rim section is 346 km away by road, accessible by NPS Trans canyon shuttle, is less well serviced and is closed between mid October and mid May when snow may block access roads. Services include lodging for 1,135, 469 campground and 70 camper places, visitor centers, restaurants, shops, museum, medical clinic, interpretive programs, guided hikes, mule trips, horse rides, whitewater and smooth water rafting, air trips and shuttle bus tours; in winter snow skiing and snowshoe hiking but no snowmobiling. 82 km of maintained tracks and 946 km of trails run through the backcountry. There are further hotels at Tusayan village 11 km south. The main access to the Park is from the south or from the Grand Canyon National Park Airport, just outside the southern boundary (NPS, 2007).

A thorough analysis of existing data, as well as new data-collection efforts, are needed to develop comprehensive visitor profiles, visitor-use patterns, and data gaps for Grand Canyon National Park.

A yearlong visitor survey was conducted in 1991 for the General Management Plan. This survey revealed:

- Almost 20 percent of the Park's visitors venture below the rim
- A large percentage of the Park's visitors (about 40 percent) come from other countries
- A majority of Park visitors spend the night in lodges, motels, and campgrounds in, and adjacent to, the Park.
- Most visitors are not traveling as a part of an organized tour group, but rather, are traveling with two or three other people, usually members of the same family, and arrive via privately owned vehicles.
- Most Park visitors are well educated with a median annual income over 40,000 Dollars (Binkley et. al., 2005).

3. Conclusion

3.1. Grand Canyon National Park: A Vision for the Future

Grand Canyon National Park is a place of tremendous beauty, peace, and scenic grandeur, as well as a place of vast natural and cultural interest. The canyon is one of the world's most spectacular products of the combined natural forces of uplift and erosion, and as a world heritage site, it has been identified as a place of universal value to all people.

In order to protect this magnificent place, the park should be managed to ensure the preservation of its ecological processes and its historical and archeological resources. Proposed wilderness areas both in and adjacent to the park should be managed as wilderness, and appropriate adaptive reuse of historic resources should be encouraged, while the historical integrity of the cultural landscape is preserved.

Visitor use should be carefully managed in ways that ensure diverse opportunities are provided from solitary wilderness experiences where one feels far from development, to social experiences where a variety of visitor services and conveniences are offered. The unique qualities of each area of the park and its immediate surroundings should be preserved and enhanced to heighten the distinctly different visitor opportunities. All interpretive/educational themes should be represented in the most appropriate locations and manner to educate visitors who have diverse interests and backgrounds.

Any development should be a model of excellence in planning and management and it should reflect the preservation of park resources and values. New development should be compatible with the historic setting and architecture, as well as being energy efficient, including the use of alternative energy sources and ***transportation methods.***

The park should work cooperatively with surrounding entities to encourage planning and management actions outside the park's boundaries that are compatible with those inside the park. Planning should be done regionally so concepts developed in the park can be linked to adjacent surrounding areas. The defined visitor experience for particular park areas should be carried over to adjacent lands. Information concerning the entire region should be provided and should explain visitor use management strategies, resource sensitivity, and interpretation, as well as help respond to general visitor needs.

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CHAPTER X

COMPLEXITY THEORY IN THE CONTEXT OF URBAN PLANNING

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1. Introduction

1.1. Overview of Complexity Theory

Complexity theory in the urban context covers a wide range of topics and; therefore, it is not possible to pay attention to all the subjects involved under the study of complexity theory in detail. Particular topics are selected to give a deeper understanding and, other subjects related to complexity theory are also discussed to provide a broader view. Complexity theory has been studied in different fields such as mathematics, physics, chemistry, biology, ecology, medicine, economics, and social sciences. Because of its interdisciplinary field of research, it is an important subject to study and discuss.

Scientists have believed that the earth is like a machine, and it is not possible to understand this machine as a whole without understanding each part of it. They also thought that if they made each part work well, then the whole would work better. However, the earth consists of systems like weather systems, social systems, immune systems, etc., which are unpredictable and constantly change (Thomas et al., 2016). There is no linear cause-effect relationship in these systems. It means that even little changes may lead to a significant impact. These unpredictable phenomena have been discussed in different disciplines such as biology, physics, and business, etc., since the 19th century. Complexity theory emerged as a study of these complex systems and has gained importance in many disciplines during the last 20 years. This theory is an alternative to linear thinking, which has been valid since Newton (Dodder and Dare, 2000).

The word complexity comes from Latin, and it refers to the quality or state of not being simple, the quality or state of being complex. From the philosophical aspect, Chan (2001) states that complexity can be defined as the connections of elements in a system or between systems or its environment. There is still an uncertainty between the meaning of complexity and complicated. If each part of a system is accurately described, then the system is complicated. For example, a computer is assembled from thousands of well-understood parts. On the other hand, if a system cannot be explained from its parts, then the system is complex (Chan, 2001). Complexity Theory (CT) appeared in the 1980s in the Santa Fe Institute. Researchers collaboratively studied complexity theory and complex adaptive systems in the institute. Scientists in a variety of disciplines focused on the new research field of complexity theory and related systems. The participants tried to understand how complex adaptive systems worked (Dodder, 2000). This theory could explain complex systems such as ecosystems or human consciousness.

Based on Waldrop (1992), Belgian Nobel laureate Ilya Prigogine had worked on self-organizing structures before Santa Fee Institute. They observed that systems could spontaneously organize into complex structures. This observation enabled Santa Fe Institute's participants to think about these complex structures, and then CT emerged (Waldrop, 1992). CT first arose in the field of physics and mathematics, then spread to other disciplines. Researchers observed that the act of tiny sub-nuclear particles did not follow the pattern expected. Then, investigators from various disciplines explored this phenomenon in greater depth. Sherman and Shultz (1998) stated:

"Complexity refers to the condition of the universe which is integrated and yet too rich and varied for us to understand in simple mechanistic or linear ways. We can understand many parts of the universe in these ways but the larger and more intricately related phenomena can only be understood by principles and patterns-not in detail. Complexity deals with the nature of emergence, innovation, learning and adaptation" (p. 63).

To provide knowledge to complexity theory studies, it is important to recognize the differences between simple, chaos and complex systems.

1.2. Differences Between Simple and Complex Systems

The major difference between simple or complicated and complex systems is that simple and complicated systems can be described by breaking them

up and examining their parts (Gleick, 1987). However, the researcher cannot understand complex systems using such a reductionist methodology. According to Mithchell (2009), although there is an inconsistency in the definition of complexity, researchers who study complexity commonly agree that a complex system includes plenty of elements that connect dynamically to each other. On the other hand, a simple system may also have elements that interact with each other, but this interaction will be linear and predictable. However, recently, studies revealed that even a simple system could act chaotically (Grabowski and Strzalka, 2008). This finding implies that if there is a complex behavior in a system, it can be a complex system, but it is also possible that the system can be a simple system that shows complex behavior. Table 1. shows the differences between simple or complicated systems and complex systems.

Characteristics of Systems

Simple or Complicated Systems	Complex Systems
Homogeneous	Heterogeneous
Linear	Nonlinear
Deterministic	Stochastic
Static	Dynamic
Independent	Interdependent
No feedback	Feedback
Not adaptive or self-organizing	Adaptive and self organizing
No connection between levels or subsystems	Emergence

Tablo 1. Differences Between Simple or Complicated and Complex systems

Resource: Finegood, 2011.

1.3. Relationship to Chaos Theory

Although some similarities exist between chaos theory and complexity theory, they are not the same. According to Reitsma (2001), while chaos theory is more about a "simple, deterministic, non-linear dynamic, closed system", complexity theory is related to "complex, non-linear, open systems". Open systems mean that new agents or elements can take place in the system to change it. On the other hand, closed systems are completely separated from their environment. In his article, Reitsme (2001) states:

"Manson references Zimmer (1999) to state that fewer systems than anticipated are in fact deterministically chaotic (2001, p. 408). However on closer reading of Zimmer (1999), and with the difference between Complexity Theory and Chaos Theory in mind, it is evident that chaos has only been found in models, not natural systems. In Chaos Theory disorder arises from simple ordered states, in Complexity Theory large scale order arises from complex apparent disorder at the local scale" (p.14).

According to Olmeda (2010), while chaos theory considers homogenous agent diversity, external change, emergence, pattern prediction, and decision making, complexity theory considers heterogeneous agent diversity, internal change, evolve emergence, unpredictability, and irrational decision making. Besides this, *chaotic* related to chaos theory has a different meaning from *complexity* although they seem similar. A diagram in Figure 1. shows the difference between these words:

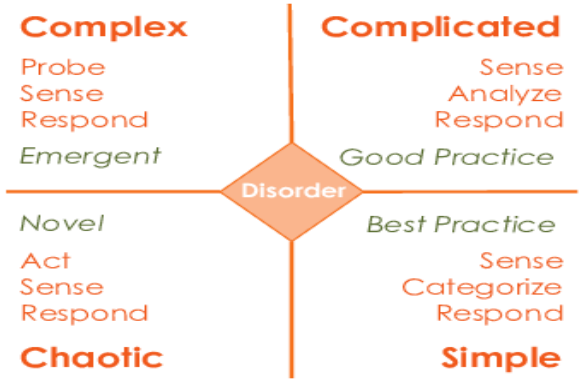


Figure 1. Difference between Complex,
Chaotic, Simple and Complicated systems (Snowden, 2000).

Based on Schneider (1982)'s article, although chaos theory and complexity theory are different, they both study a "non-linear system" that is a system in which no proportional causal relationship.

1.4. Relationship to General Systems Theory (GST)

General systems theory (GST) emerged in the 1940s Ludwig von Bertalanffy. According to Von Bertalanffy (1968), this theory suggested that different entities, which interact with each other within an environment, may have common patterns and orders. GST criticized the dominant way of thinking that studies an element

of a system in isolation to understand the whole and emphasized the importance of interconnections among elements in the system. The movement first began in biology, then spread to engineering in the 1950s, and management and social science disciplines, particularly sociology and political science in the 1960s. GST was adopted as a city planning approach in the 1960s as an analytical framework challenging our understanding of traditional urban planning that mostly ignored the complexity of urban life (Niger, 1998). Both complexity theory and GST seek to explain how individuals sustain themselves in their environment, but there are some differences. According to Reitsma (2001), while GST is related to problem-solving under an interpretivist approach, complexity theory is related to exploratory research, and shares some similarities with positivism. Positivists believe community influences the individual and employ quantitative methods. In contrast to positivists, interpretivists believe that individuals influence the community and employ qualitative methods. It means that complexity theory would like to explain complexity by using scientific methods.

Reitsma (2001) also points out that in comparison to GST, the development of complexity theory is "more evolutionary than revolutionary" because it does not reject all previous science. According to Goldstein et al. (2010), there are some overlaps between general system theory and complexity theory; however, still maintain the idea that complexity theory is different from GST and other system approaches (Figure 2.) The connections within systems are complex and can be understood better through the perspective of complexity theory.

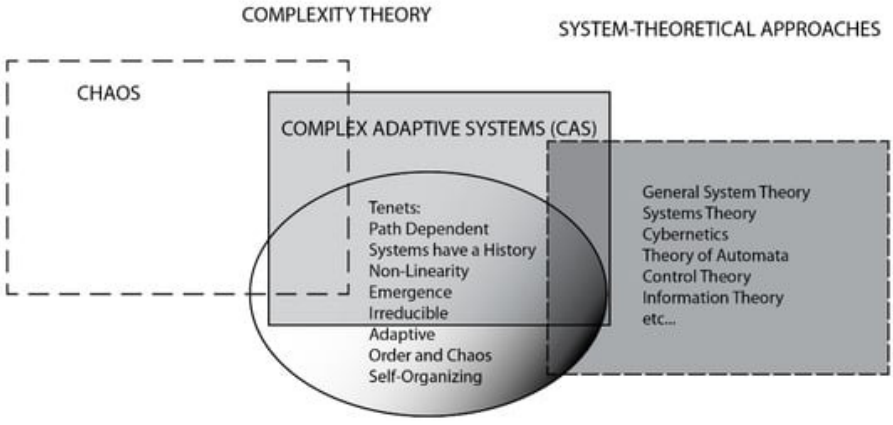


Figure 2. Complexity theory and theoretical system approaches

(Goldstein et al., 2010)

1.5. Properties of Complex Adaptive Systems

Complexity science focuses on complex adaptive systems to understand and explain their behavior. According to Chan (2001), many natural systems and artificial systems can show complex behaviors as a result of non-linear interactions at different levels of organizations. These systems are called Complex Adaptive Systems (CAS). Scientific communities, ecosystems, cities, traffic patterns, global climate change patterns, etc., are also an example of these systems since they are dynamic and not predictable with a simple cause and effect relationship. Chan (2001) states:

"CAS are dynamic systems able to adapt in and evolve with a changing environment. It is important to realize that there is no separation between a system and its environment in the idea that a system always adapts to a changing environment. Rather, the concept to be examined is that of a system closely linked with all other related systems making up an ecosystem. Within such a context, change needs to be seen in terms of co-evolution with all other related systems, rather than as adaptation to a separate and distinct environment" (p.2).

A CAS is composed of three main elements: (1) heterogeneous interconnected elements or agents, (2) interactions, and (3) the environment (Dooley 1997). Agents in the system are related to each other independently in unplanned ways. These complex interactions and interdependencies emerge within CAS and cannot be predicted simply by examining each component of the system. (Ellis and Herbert, 2011). Agents can be individuals, private companies, associations, etc. An example of agent interaction might be the interaction between plants and animals in an ecosystem. As a result of this unpredictable interaction, regularities emerge in the system, and those regularities led to the creation of patterns that provide feedbacks. The feedback influences the interaction of the agents (Figure 3.)

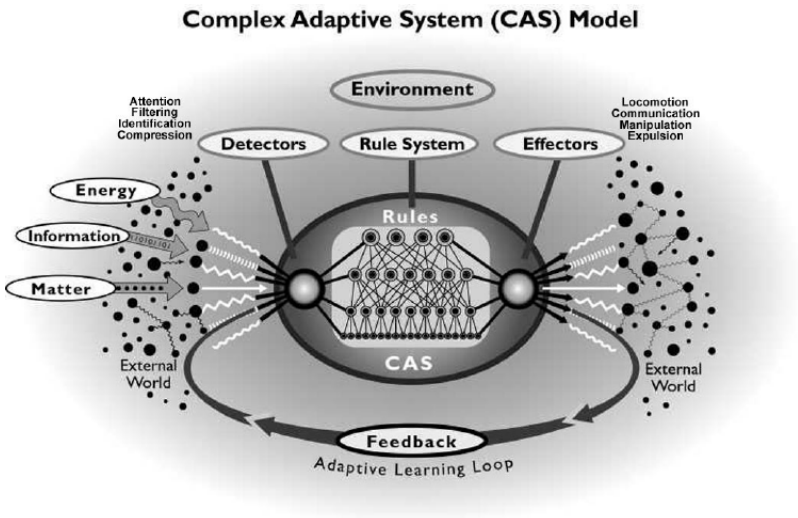


Figure 3. Complex adaptive system model (McElroy, 2000)

According to Chan (2001), complex adaptive systems present the following attributes:

a. **Non-linearity**: Non-linearity refers to being not estimated of outputs based on well-known inputs. If a system is not linear, a change in the size of input does not lead to a proportional change in the size of the output (Chan, 2001). For example, a small change in the input may result in greater than or less than proportional changes in output. Numerous disciplines employ a nonlinear systems approach such as physics, ecology etc. Urban studies also have become an important field for non-linear research since cities are complex systems and do not produce expected outcomes.

b. **Emergence:** In the systems, agents do not act in a planned and controlled way but in random ways. As a result of this randomness, patterns emerge that give information about the agent's behavior in the system (Christen and Franklin, 2010). In the context of urban planning, this process can be observable in multiple, small subunits leading to a single, large unit as an example of congestion resulting from the increasing numbers of cars in cities (Sengupta, 2017).

c. **Co-evolution:** All systems are a part of an environment and exist in the environment. When the environment changes, a component needs to change to adapt to the new conditions. Moreover, when a component changes, the environment changes as well. They move together toward new forms of

development by leading to further changes in the system. This goes as a constant process (Onix et al, 2017).

d. **Connectivity:** Connection and interaction between agents are important for the system since the pattern emerges and the feedback is disseminated based on this connection and interaction (Onix et al, 2017). Because of that, the inter-connectivity between agents is more crucial than the agents.
e. **Iteration:** Even small changes within system could make significant and unpredictable effects (Lorenz, 1963). This is often called the butterfly effect.
f. **Self-Organizing**: In the complex adaptive system, there is no devising or controlling. However, there is a continual re-organizing to adapt to the conditions in the greatest way. This self-organization of the system is possible through changing their pattern of behavior based on feedback (Anderson et al. 1999).
g. **Edge of Chaos:** Complexity theory and chaos theory, which come from mathematics, are different. However, chaos can be in a complexity theory. Systems is found on a scale from balance to disorder. When it is in equilibrium, there are no internal dynamics that could respond to its environment, and the system could die (Dodder, 2000). A system in chaos could stop this process. Based on this, there is maximum variety and creativity, leading to new possibilities when the system is at the edge of chaos. According to Dodder (2000):

"…frozen systems can always do better by loosening up a bit, and turbulent systems can always do better by getting themselves a little more organized. So if a system isn't on the edge of chaos already, you'd expect learning and evolution to push it in that direction…to make the edge of chaos stable, the natural place for complex, adaptive systems to be" (p.2).

1.6. Complexity Theory Application Tools

The study of complexity theory requires computational methods to understand and solve complex problems. Traditional theories and models are based on linear approaches and employ traditional techniques which were not effective to describe and understand complex systems such as cities etc. In this chapter, some of these techniques which have been using in urban planning will be discussed.

1.6.1. Cellular Automata

Cellular automata (CA) is one of the modeling tools of Complexity theory. CA is an important technique in studying complex systems and can be applied to different fields such as physics, biology, and social sciences. It is also used for spatial-temporal modeling in the field of urban planning. MadhanMohan (2012) states that this modeling technique provides a better understanding of the urbanization process. Cellular automata technique was introduced by Stanisław Ulam and John von Neumann. They were both scientists at the Los Alamos National Laboratory in New Mexico in the 1940s (Young, 2006). CA is about the chancing of one cell after interacted with neighborhood cells (Batty, 2005). According to Shiffman (2012), it is a system of cells and specialized in terms of rules that define how it changes and evolves in time. This model consists of cells that have a finite number of states. The simplest set of states would be 0 and 1. It also could be referred to as "on" and "off" or "alive" and dead" (Figure 4.) Each cell lives in a regular grid and has a neighborhood to interact with. Like space, time is also discrete. At each time, cells interact with their neighbors to change their state based on the new rule determined by the previous states of cells (Shiffman, 2012).

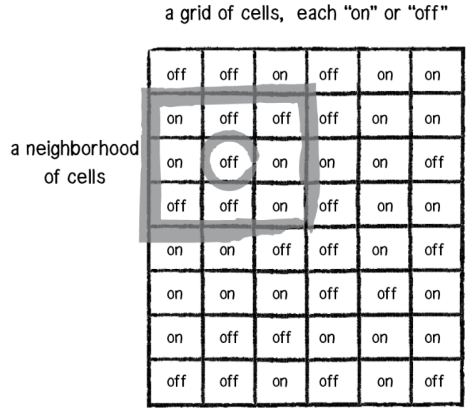


Figure 4. A grid of cells and a neighborhood of cells in Cellular automata (Shiffman, 2012)

Most simply, the cells change from state to state based on cellular automata rules. When it is time to change the state, cells look at their neighbors and get the information from their neighbors' states (MadhanMohan, 2012). Based on the

information gathered from the neighbors' state, the cell decides its new state. All of the states change at the same time. CA can produce complex patterns based on simple rules and simulate variety of real-world systems. Mavroudi (2007) states:

*"*In an urban context the cell state can be made to represent any attribute of the urban environment, e.g., land use (residential or commercial), density (high density or low density), land cover (forested or concrete), etc. Neighborhoods in urban CA represent spheres of influence or activity within the city, e.g., market catchment areas, the walking radius of individual pedestrians, the commuting watershed, etc. The rules of a CA drive the dynamics of change in the model. CA rules can be devised to mirror how phenomena in the real world operate, and can then be coded as algorithms within the simulation" (p.18).

The characteristics of CAs can be listed as: (1) the connection between physical and numerical procedure is understandable, (2) CA models are easier to understand than many mathematical calculations; however, results of CA model are more complex, (3) CA models can be created by computers with perfect accuracy, (4) CA can imitate the movement of physical system, and (5) CA models cannot be simplified (Wolfram (1994).

1.6.2. Agent Based Modeling

Agent-based modeling is derived from cellular automata. The rules of CA provide a basis to determine the characteristics of agents in agent-based modeling. Agent-based modeling (ABM) focused on simulating complex systems that consist of agents and their interactions within their environment. The primary purpose of ABM is to create new rules not programmed into the model by observing the behaviors of agents within an environment. Agents could be companies, organizations, or individuals. Each agent has a set of behaviors and, the interaction between agents influences their behaviors. Modeling each agent provides information about differences of agents that exist in their behaviors. This also allows observing the impacts of these differences on the system. Based on this, self-organization, which is one of the characteristics of complex systems, can be detected and, new behaviors and patterns emerge from the agent interactions. According to Macal and North (2010), agent-based model has three elements:

"(1) A set of agents, their attributes and behaviours, (2) A set of agent relationships and methods of interaction: An underlying topology of

connectedness defines how and with whom agents interact, (3) The agents' environment: Agents interact with their environment in addition to other agents" (p.152).

Figure 6 represents some of the elements in agent-based modeling. Here, two diverse agents are located in their own definite places. Through the interactions between agents, they share data that can result in the occurrence of new information or ideas. This newly "emerged" information may bring about following a new figure of "behavior/decision-making" to achieve its goal (Crooks et al., 2017).

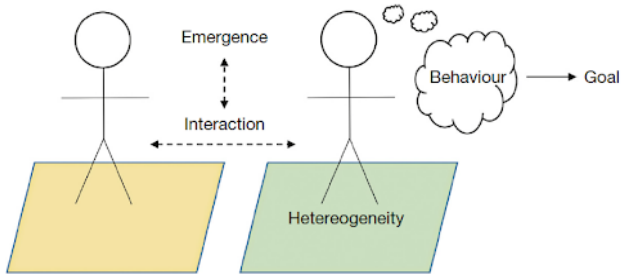


Fig. 3 Schematic illustrating of some of the main components of an agent.

Figure 5. Schematic illustrating of some
of the main conponents of agent (Crooks et al., 2017)

ABM has now gained importance and accepted as a research tool by various journal articles and boks in the field of the geographical and social sciences. Brown and Ferreire (2013) listed the advantages of ABM as: "*(1) Explain spatial dynamics, (2) Supplying spatial knowledge, (3) Providing diverse project/ site properties, (4) Comparative investigation in neighborhood and beyond neighborhood, (5) Employing a cell generally in harmony with ""ultra-urban setting (city blocks)"", (6) Authoritizing for the combination of "decision-makers (investors) in the modeling (agents)".*

1.6.3. Fractal Geometry

Urban areas are self-developed settlements and include structures that are complex, open-ended, and dynamic. Inter-connectivity between structures shows non-linearity. Traditional mathematical methods use a typical scale based on characteristics length to describe cities that show non-linear developments. However, spatial patterns of cities cannot be succesfully defined by a measure such as "length and an area" (Chen, 2013). Fractal geometry is an important

technique for analyzing of the physical characteristics and extension of urban area. It is also one of the computational complexity models, which is used to discover the behavioral structure of these complex systems and determine their level of complexity. According to Man and Chen (2020), an urban form can be documented through remote sensing images and show irregular patterns and self-similarity at different scales. Traditional techniques are not efficient enough to describe urban growth. Fractals define systems that show self-similarity across scales such as urban form and create symmetries that can extend, not limited to one scale.

The word 'fractal' comes from the Latin adjective "fractus" meaning broken and was first pronounced by Beneoit B. Mandelbrot in 1975 (Dogan and Cagdas, 2007). Mandelbrot stated that shape of any object in nature could not be described by Euclid geometry, which is limited to simple and basic geometric forms (Figure 7). Instead, they can be defined through fractal geometry (Dogan and Cagdas, 2007). Since the 1980s, studies related to physical characteristics and extension of urban areas have employed fractal geometry. Those studies used different forms of fractal dimensions such as the box-counting method, area-radius scaling, or perimeter-area scaling. Then, they estimated the similarity or dissimilarity between the fractal dimension values of different time series that simultaneously acquired in the same area or other areas to analyze the urban form and growth (Man and Chen, 2020).

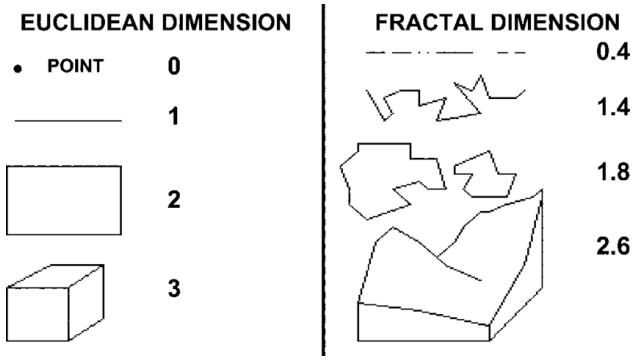


Figure 7. Euclid geometry and fractal geometry (Provenza et al., 2007)

2. Complexity Theory In Cities

Cities have been developing over the years in many ways. Cities create new opportunities such as jobs, education, etc., that attract hundreds of people.

According to Richie and Roser (2018), 55% of the world's population lives in urban areas, and it is envisioned that this amount will increase to 68% by 2050. Urbanization leads to many problems, and cities will face more problems in the future. Urban planning gained importance in the late 19th century after environmental problems emerged because of rapid urban development. Recently, technology has been developing rapidly, and this enables more tools or data to investigate cities in multidisciplinary ways. These studies demonstrated that cities have been changing in unexpected ways. For example, conventional stormwater management systems were planned in the 19th century to overcome the typical 100-year and 150-year climate events. However, climate change and increased impervious surfaces were disregarded while designing tradional stormwater management systems(Rosenburg et al., 2010).

These unexpected changes in climate conditions and the amount of impervious cover have resulted in environmental problems such as loss of habitat, water pollution, sewer overflows, etc. Based on this notion, cities could not be explained only by a simple linear relationship. Cities are complex systems, and many challenges will face cities in the future. Paul Romer (2013) has argued:

"The urban environment that humans are so busily creating is many things: a biological environment, a social environment, a built environment, a market environment, a business environment, and a political environment. It includes not only the versions of these environments that exist inside a single city, but also those that are emerging from the interaction between cities. Our understanding of the urban environment will draw on existing academic disciplines, but it will also develop its own abstractions and insights".

Moreover, according to Ortman et al. (2020), cities are complex because they consist of people and communities interacting with each other, and these interactions are unpredictable and not easy to analyze. Based on this, urban planning should contribute to urban development to create a nice environment for these human activities and to deal with problems caused by unpredictable interactions. Cities have been increasingly aware of the need for a new approach to analyzing the changes and to meeting the challenges facing cities. Since cities are complex systems where causes and effects are not related linearly, complexity theory, which focuses on such systems, was introduced to the urban planning field as a new phenomenon. Complexity theory has been applied to urban studies

to understand how cities evolve. Before complex systems approaches, multiple scientific methods were used to control the city's rapid growth.

Complexity theory dates back 50 years but it has been in use in the urban planning fields for the last 15 years. The first book that introduced CT to urban fields was Fractal Cities by Michael Batty and Paul Longley (Batty and Longley, 1995). In the book, they discussed the connection between the urban geography and complexity theory. The initial purpose of urban planning was to create more attractive and equitable places to live but it was not effective in managing unexpected problems such as climate change, urbanization, etc. (Batty, 2008). Even if complexity theory is a new perspective in urban planning, this concept could change the perceptions of urban phenomena. The application of this theory uses mathematical methods such as cellular automata, agent-based modeling, etc. The result of research employing these methods gives us certain implications about the study. Since it is a kind of mathematical study, there is no influence between the researcher and the study. Based on that, it could be said that this theory offers another view on the cities from a mathematical aspect and in this way, could make the relationship between elements in the cities clear. We can get a deeper understanding of how elements affect each other by observing in a different way and seeing concrete results.

2.1. Review of studies

Authors from different disciplines adapted complexity theory as a conceptual framework in their studies. Recently, studies related to complexity theory in the field of urban planning have increased. There are numerous studies in the literature, and some of them will be discussed in this chapter. In the article of Silva and Clarke, the authors simulated urban growth by employing complex systems theory and cellular automata (CA). Two metropolitan areas in Portugal were chosen to conduct this study. This analysis of two case study areas displayed how important SLEUTH's self-modification in designing emergent urban forms. SLEUTH is a CA model, specialized in anticipating urban growth and change in pattern. SLEUTH is an acronym for Slope, Land Use, Excluded Areas, Urbanization, Transportation, and Hill shade.

According to the authors, cities have been growing and, these may lead to some problems. Traditional modeling methods based on demographic trends are not an efficient tool to deal with these problems. Urban growth has been

happening in a non-linear way, and understanding this non-linearity requires a complex systems method. Based on this, complexity theory has become a powerful approach to explain this complexity in the cities. In this study, the database for Lisbon and Porto was formed. The urban-built upland, including buildings, asphalt, concrete, suburban gardens, and roadways, was classified, extracted, and represented as binary files (urban/non-urban) for this study. Then, this classified data was geo-referenced by using a transportation layer, resampled to a 100x100 m grid, and clipped to the metropolitan area. In both case studies, based on the information was gained through Municipal Master Plans, two classes were defined by law: Ecological Reserve and Agricultural Reserve.

After all those, the Landsat urbanized areas with the first map of Agricultural Reserve (RAN) and Ecological Reserve (REN) were compared. There were three steps left to run the model. The first one is to ensure that all the files have the same numbers of rows and columns; the second one is to export all GIS files as GIF, and the final one is that all files have a naming that the model could read. Finally, the model runs after fulfilling all requirements. In the end, the model displayed that SLEUTH was an effective tool to discover the region's own characteristics and to reveal new emergent characteristics.

Another study, conducted by Mitsova et al. (2011), employed a cellular automata Markov chain model of land cover to incorporate green infrastructure conservation scenarios into urban growth projections. Preservation of green spaces is very crucial to manage storm water and provide ecosystem services. In this study, the spatial structure of constant urban growth was examined with and without green infrastructure conversation. Markov chains model allowed to model the change in five land cover classes simultaneously as a result of urban growth and supplied a basis for investigation of the landscape fluctuations under different schemes. Moreover, Brown and Ferreira (2013)'s study examined the dynamics of a green infrastructure (GI) project in tropical urban areas. Agent-based Modeling (ABM) was employed to duplicate a tropical urban environment and to examine the emergent patterns of GI investment at the local level. Modeling exemplifies conditions to create a sustainable tropical urban environment using the Green City metric. Overall, the study suggested investment GI improve air and water quality and prevent the damage of uncontrolled stormwater runoff.

3. Main concerns with complexity theory

One of the main concerns with complexity theory is its application. Portugali (2009) states that complexity is everywhere; so, complexity theory can be applied to different fields, but what about its practical applications? Pumain (2008) points out that modeling complexity by using mathematic is a little bit painful to understand and to define. Because of that, pragmatic researchers did not accept it. Tosey (2002) agrees with this statement by stating that Complexity theory is compelling, but its application to the real world is difficult. According to MadhanMohan (2012), although cellular automata has many advantages, there are disadvantages too. One of the disadvantages is that there could be errors during modeling and simulation, and these errors could affect the results of the study in an unexpected way. Another concern is that while many authors call it a science, others believe that it is not a science yet, still needs time to be a field of science (Portugali, 2012). On the other hand, some thinks that it will never be a science because of its incomprehensible nature. Based on this concern, a question could arise: Is complexity science or just a method to explain complexity? There are many questions related to complexity theory in the literature. To find an answer to all these questions, further research is needed.

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CHAPTER XI

GREEN INFRASTRUCTURE STRATEGIES

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1. Introduction

The migration of people from rural to urban causes urbanization. Because of different reasons such as finding a good job, attending good quality colleges, etc. people have been moving to urban areas. This migration led to social, physical, and environmental changes in urban areas in both negative and positive ways. Recently, the impervious surface has been significantly increasing because of urban growth around the world. Impervious surfaces are concrete surfaces that do not let water infiltrate into the ground such as pedestrian ways, parking lots, structures etc. In contrast to impervious surfaces, rain could be soaked up by soil and vegetation. In urban areas, rainwater falls on impervious surfaces which do not allow water infiltration, and this results in creating more stormwater than vegetated areas do. The increased amount of stormwater leads to sewer overflows and water pollution by decreasing the quality of aquatic biodiversity (Urbonas & Jones, 2002). Andjelkovic (2001) provides a visual summary of problems caused by urbanization (Figure 1):

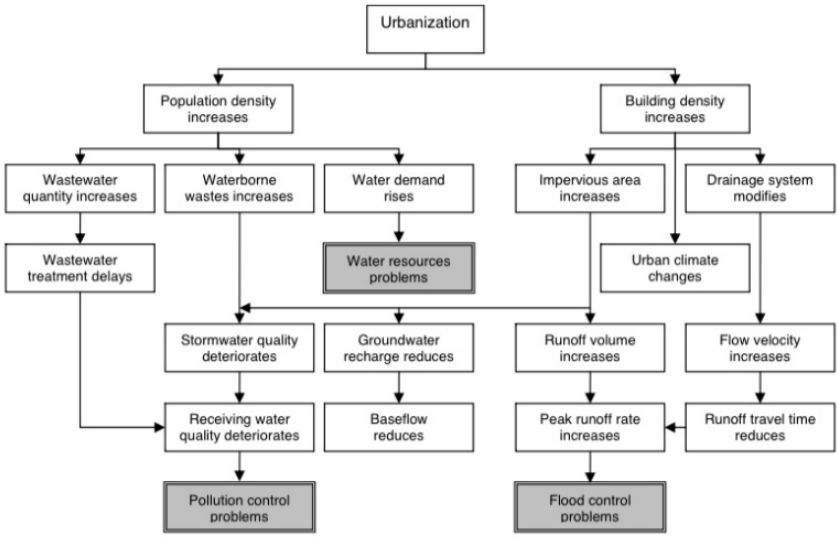


Figure 1. Impacts of urbanization on stormwater runoff (Andjelkovic, 2001)

Gray infrastructures are systems which include complex under-ground pipes and tunnels, are not successful in dealing with stormwater since these infrastructure systems were designed to carry stormwater away as quickly as possible without treating it (Rosenberg et al. 2010). This untreated stormwater flows into water bodies and is the largest source of water pollution in cities.

Since gray infrastructures are not efficient in stormwater management, city officials have been searching for environmentally friendly and sustainable techniques to manage stormwater effectively. The main purpose of green infrastructure strategies is to provide good health and quality of life to communities by reducing the amount and the volume of the runoff before it reaches to the water bodies (Barclay, 2006). Using gray infrastructure in combination with green infrastructure reduces sewer overflows, urban flooding and provides efficient land use (EPA, 2015). Green infrastructure strategies such as rain gardens, green roofs, permeable pavement, street trees, rain barrels, etc. mimic water cycle processes to penetrate, absorb, and recapture stormwater where it falls to decrease the damaging affects of urban stormwater runoff on the environment. Although green infrastructure strategies have such great benefits, their implementation is not very common. To successfully carry out a green infrastructure plan, all stakeholders should be involved in the projects (Keeley et al. 2013).

1.1. Effects of impervious surfaces on storm systems

Increasing urbanization has resulted in more impervious surfaces. Because of urban growth, more green areas are taken over by impervious surfaces in the form of pedestrian ways, roads, and highways. This change from natural areas to impervious surfaces has caused environmental problems by affecting the quality and quantity of stormwater runoff. Since these surfaces are not permeable, they can intensify the volume of urban stormwater runoff, resulting in urban flooding (Brun & Band, 2000; Weng, 2001). According to Clar (2011), in natural areas, half of the rainwater infiltrates into the ground, about 40% of its goes back to the atmosphere through evapotranspiration, and the other 10% discharges through impervious surfaces into streams, rivers, or lakes. In contrast to vegetated areas, in densely urban areas, the amount of stormwater that is removed through impervious cover is about 45% (Figure 2).

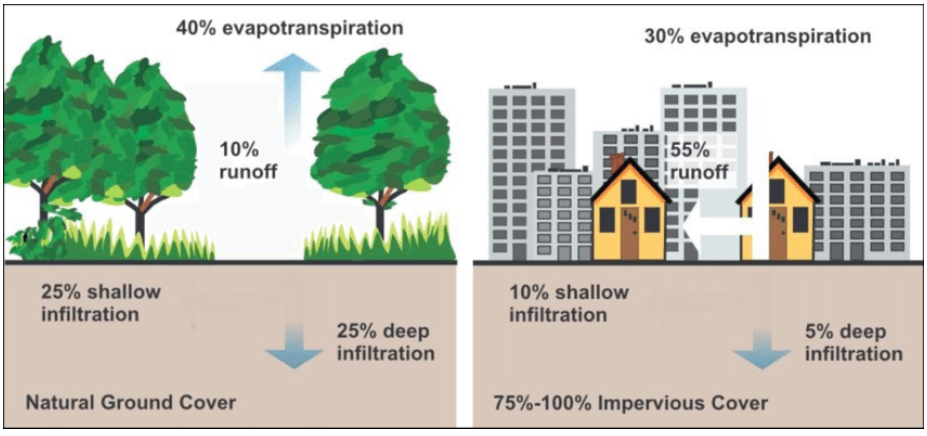


Figure 2. Relationship between imperivous cover and surface runoff (EPA, 2003)

Stormwater runoff created by impervious surfaces often transfers unsafe chemicals such as oil, grease, fertilizers, pesticides, heavy metals, and other contaminants (EPA, 2010). This risky stormwater capturing from concrete surfaces flows into water bodies. In addition to conveying dangerous pollutants into waterways, increased impervious surface damages aquatic habitats and decreases the water quality by chancing the chemical and biological conditions of waters (Horner et al. 1995).

1.2. Limitations of Gray Inrastrustures and The Emerge of Green Infrastructure

Traditional stormwater infrastructures have been used as an urban stormwater management strategy for centuries. The only purpose of these systems is to remove stormwater from the site through gutters, sewers and tunnels into the wastewater treatment plants sewer system where it is treated. Most sewer systems were designed to gather both sewage and stormwater runoff in the same pipe system during the 19th and early to mid 20th century (Barclay, 2016). These systems are called combined sewer systems. Combined sewer systems are created to carry sewage, wastewater, and rainwater in the same pipe into a treatment plant. EPA (2011) states that combined sewer systems can transfer all of the wastewater to a treatment plant and then release into a water body. However, after heavy storms, combined sewers can become overloaded with a large amount of rain, causing stormwater to flow into water bodies before it can be treated by wastewater treatment plants (Thurston et al. 2012).

Seybert (2006) states that conventional stormwater systems were designed in an engineering way to decrease the risk of flooding, without considering negative environmental consequences. Because of that, gray infrastructures are not efficient in preventing important problems such as sewer overflows, water pollution, and threats to human health. In the 1990s, pollution problems and environmental concerns became of importance around the world especially because of climate change and the increased amount of impervious cover (Sinasas, 2007). Conventional infrastructure is not planned to deal with this increased runoff due to impervious cover and runoff from extreme weather events. Besides gray infrastructures' negative environmental impacts, maintaining gray infrastructures is also expensive. Heavy rain can lead to a broken pipe due to placing stress on drainage systems and pipes (Seybert, 2016). Pipes and drains can also become blocked because of the leaves, dirt, and debris after a large rainfall, causing urban flooding and sewer overflow. Municipalities have been spending lots of money on gray infrastructures to maintain them in a good shape or to repair them when they are needed.

Stormwater management is an important subject for all cities because effective stormwater management helps to deal with environmental problems caused by the increased impervious cover and climate change. Traditional stormwater management plans and approaches solely focus on technical aspects

of flood management and ignore environmental, ecological, social aspects of it. Recently, stormwater management issues caused by the increased impervious cover and climate change have demonstrated that these problems could be dealt with not just from an engineering viewpoint, but also by employing an multidisciplinary perspective to increase the resilience of the urban environment to the urban flood events (Seybert, 2006). According to Barclay (2016), *"these engineered systems were usually the result of decisions made by engineers themselves without collaboration from the public and other indirect stakeholders, especially since they are highly technical, underground systems"* (p. 16-17).

A interdisciplinary and sustainable approach is required to deal with the problems related to stormwater runoff (Biddle, 2012). Cities have been realized that there is a need to change the current stormwater management systems in order to face future challenges and provide healtier environments to communities (Barclay, 2016). There is a paradigm shift from the idea of keeping floodwater out to *"mitigating flood risk, adaptation, and increase resilience to flooding events"* (Benedict & McMahon, 2006). This new idea emphasizes that cities would like to deal with water where it falls, not moving it quickly from the site. This new approach is called Green Infrastructure (GI). Davies et al. (2006) categorized infrastructure elements using a continuum from green infrastructures to gray infrastructures (Figure 3). This is a valuable approach to define what is green infrastructure and what is gray infrastructure.



Figure 3. Gray and green infrastructure continuum (Davies et al., 2006)

According to EPA (2008), many natural systems play an important role in decreasing the negative effects of urban storm runoff on environment. In this

context, GI could be particularly effective to reduce the amount and velocity of urban stormwater runoff and its negative impacts on environment, people and water quality since these strategies absorb more rainwater than impervious areas do. Conventional stormwater management can move stormwater moving away from the built environment in cities, but it does not help sustain the ecological baseflow in waterbodies that is needed for health and quality of aquatic ecosystems (Thurston et al. 2003). In contrast to conventional stormwater management, the main purpose of green infrastructure strategies is to sustain the hydrologic functions of waterbodies and also, maintain the volume and frequency of discharges (EPA, 2012). Moreover, green infrastructure can act as an additional system to conventional stormwater systems and decrease the pressure on pipes and storm drains through filtering pollutants.

2. Overview of Green Infrastructure

2.1. History of Green Infrastructure

The term of green infrastructure was first released in the 1990s, but concepts related to green infrastructure were born in the 19th century in the context of urban planning and landscape architecture. Urbanization and increased demand for natural resources has been a worry in the 19th century, and accordingly, a wide range of environmental problems emerged during this time (Ahern, 2007). Many authors such as Frederick Law Olmsted, Ebenezer Howard created worldwide awareness of environmental pollution, land-use change, habitat loss, and deforestation. Fredrick Law Olmsted believed that developing urban environment through park and parkway systems could decrease the negative consequences of urbanization. Olmsted suggested connecting green structures in cities as a method of mitigating urban growth. (Ahern, 2002).

Olmsted and his partner, Calvert Vaux, developed the first system of interconnected parks in the 19th century. In 1870, Frederick Law Olmsted came up with the idea that a park can provide the same benefits as nature and connecting parks in the context of a park system can be more useful than a single one (Benedict and Mahon, 2002). During industrialization, these interconnected urban parks provided not only recreational activities but also, many functions. Emerald Necklace (1878-1896) in Massachusetts, one of the greatest examples of these systems, is a linear network of parks and open spaces that offer citizens a chance to enjoy nature and connect socially (Mell, 2010). Ahern (2007) states

that the third part of this park system (Figure 4) was planned as a *"flood control and water quality project*", not just for recreational activities or aesthetics beauty. The focus of creating park sytems is also an underlying basis of the green infrastructure strategies. (Benedict and McMahon, 2006).



Figure 4. Emerald Necklace Park Systems

Although the green infrastructure term was not used in the 19th century, Olmsted's idea of interconnected park systems clearly shows the existence of this notion. The primary goal of Green infrastructure was to maintain and connect networks of natural areas at the landscape or regional scale (Center for Leadership in Global Sustainability [CLiGS], 2013). For the six to seven years that followed after its formal mention in 1999, green infrastructure was still defined as a strategy to connect natural areas (CLiGS, 2013). Today, green infrastructure strategies deliver many services and perform several functions.

2.2. Definition of Green Infrastructure

In order to effectively research green infrastructure, the first step is to find out the meaning of green infrastructure. Although green infrastructure research has gained more and more importance, there is still an inconsistency of what it meant by green infrastructure. The studies of green infrastructure cover a

wide range of topics and authors differently define it depend on the context in which it is studied. The term green infrastructure was officialy first pronounced by President Bill Clinton's Council on Sustainable Development (CLiGS, 2013). The council defined green infrastructure as *"a network of open space, airsheds, watersheds, woodlands, wildlife habitat, parks and other natural areas that provide many vital services that sustain life and enrich the quality of life"* (President Council on Sustainable Development [PCSD], 1999). In this definition, green infrastructure's ecological importance and the role in connectivity and promoting sustainability are highlighted. In the 2000s, green infrastructure was discussed in academic literature and, researchers in the fields of urban planning ad landscape architecture revealed new definitions. Benedict and Mahon (2002) indicated that green infrastructure provided benefits through long-term planning. Their definition was also used by different agencies, including the United States Department of Agriculture Cooperative Forestry.

McDonald et al. (2005) highligted the importance of green infrastructure design on incorporating nature into the built environment and defined it as *"interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks, and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life"* (McDonald et al., 2005, p.7). Adding to Benedict and Mahon (2002) definition that implies ecological functions and benefits to communities, McDonald et al. (2005) the term "health" was used for the first time, and the addition of this new term brought a different aspect to green infrastructure studies.

In 2006, Davies et al. described GI as: *"Green infrastructure is the physical environment within and between our cities, towns, and villages. It is a network of multi-functional open spaces, including formal parks, gardens, woodlands, green corridors, waterways, street trees, and open countryside. It comprises all environmental resources, and thus a green infrastructure approach also contributes to sustainable resource management"* (p. 2). This definition describes green infrastructure as a sustainable approach which promotes multi-functionality and connects natural areas but it does not emphasize the benefits of green infrastructure to communities.

In 2007, EPA provided a different perspective to green infrastructure by defining it as *"technologies engineered to manage stormwater onsite, which can*

include both vegetated installations (e.g. green roofs, rain gardens) and non-vegetated techniques (e.g. permeable pavement, rain catchment barrels); these technologies help developers, homeowners, and cities achieve 'low-impact development,' or lessen the environmental impacts of their infrastructure". Although employing green spaces as a strategy to deal with stormwater management problems dates back to mid-19th century (Olmsted's Emerald Necklace park system), therole of green spaces in stormwater management was emphasized again.

Ahern (2007) also defined GI as *"a concept that is principally structured by a hybrid hydrological/drainage network that complements and links relic green areas with built infrastructure that provides ecological functions. It is the principles of landscape ecology applied to urban environments."* Ahern (2007) discussed GI in more detailed way by defining it not only as a network of green areas, but also, a planning approach which provides an effective stormwater management, as well as ecological functions. In the following year, EPA (2008) came up with a new definition even more specifically*: "GI is an approach to wet weather management that uses soils and vegetation to utilize, enhance and/or mimic the natural hydrological cycle processes of infiltration, evapotranspiration, and reuse."* In their definition, they concentrated on the role of green infrastructure in stormwater management, similar to that of Ahern (2007), but more focused on its importance in natural water cycle process.

Based on these definitions, Dunn (2010) and Clean Water America Alliance [CWAA] (2011) defined GI as an approach of employin natural water cycle to gather and infiltrate stormwater where it falls to decrease the negative environmental impacts on urban or suburban development. While there are different definitions of green infrastructure in the literature, the authors generally display more interest in definitions related to stormwater management area (EPA, 2007; Chau, 2009; Novotny et al, 2010; Brown et al., 2011) by defining it as an enviromental friendly approach to stormwater management that provided multi-functionality and connected natural areas(Allen, 2012). The American Society of Landscape Architects (2011) defined GI as an strategy for sustainable development and climate change mitigation. In 2013, Roe et al. highligted the social benefits of green Infrastructure. They emphasized that green infrastructure provides not only water quality improvements, but also, social benefits that provides opportunity for physical activity, increases mental health and improves a sense of community. The European Environment Agency

(2014) published a report called, *Exploring nature-based solutions: The role of green infrastructure in mitigating the impacts of weather—and climate change-related natural hazards*, which highlighted the importance of green infrastructure and ecosystem services in increasing effects of climate change and improving stormwater management capacity. Moreover, Santamouris (2015) pointed out that the role of green infrastructure in increasing air quality, alleviating urban heat island effects, and reducing the environmental pollution.

In 2017, the United States Agency for International Development [USAID] published a broad definition: *"Green infrastructure (GI) is an engineered intervention that uses vegetation, soils, and natural processes to manage water and create healthier built environments for people and the natural resources that sustain them. GI can range in scale from small-scale technologies such as rain gardens and green roofs to regional planning strategies targeting conservation or restoration of natural landscapes and watersheds. GI approaches may be interconnected with existing and planned grey infrastructure networks to create a sustainable infrastructure that can enhance community resilience to disasters and climate change as a result of increased water retention and groundwater recharge, flood mitigation, erosion control, shoreline stabilization, combatting [sic] urban heat island effect, improving water quality, conserving energy for buildings"*. Overall, different interpretations of green infrastructure strategies have been argued in the existing literature and practice. Some authors think that since there is no clear definition of green infrastructure, this negatively affects its succesful implementation (Matthews et al.,2015). On the other hand, some authors discuss that it is not possible to come up with a perfect definition to define green infrastructure because it has been embraced by various disciplines from ecology to civil engineering (Mell, 2012). However, they both agree that the important thing is to define it within specific contexts and, investigate the idea of green infrastructure where it was originated from to get a better understanding. The two concepts which green infrastructure strategies originated from are: *"(1) linking parks and other green spaces for the benefit of people, and (2) preserving and linking natural areas to benefit biodiversity and counter habitat fragmentation"* (Benedict and MacMahon, 2007). The table below shows definitions of green infrastructure by different authors (Table 1):

Table 1. Green Infrastructure definitions in the literature by different authors

Source	Components
President Council on Sustainable Development, 1999	Connectivity, ecological components
Benedict&Mahon, 2002	Connectivity, Ecological components, multi-functionality
Mc.Donald, 2005	Connectivity, Ecological components, multi-functionality, sustainability, community health
Davies et al., 2006	Connectivity, ecological components, multi-functionality, sustainability
EPA, 2007	Stormwater management
Ahern, 2007	Hydrological/drainage network, connectivity, ecological components
EPA, 2008	An approach to wet water management, captain and infiltrate water
Dunn, 2010 CWAA, 2011	Cost effective approach to water management, multi-functionality, effects on urbanization
The American Society of Landscape Architecture, 2011	Sustainability, climate change mitigation, stormwater management, habitat restoration
Roe, 2013	Sense of community, public health
European Environment Agency, 2014	Climate change mitigation
Santamorius, 2015	Ecological components
United States Agency, 2017	Climate change mitigation, urban flooding mitigation, environmental health, stormwater management

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2.3. Green Infrastructure Implementation Scales

Green infrastructure firstly initiated as a broad planning scale which connected open spaces and ecological systems. Its implementation has been expanded since the emerge of it. Green Infrastructure can be implemented at different scales from regional-scale strategies, which connect green space network such

as river corrdors and greenways to site-scale strategies such as rain barrels, rain gardens, and permeable pavement. Chicago Metropolitan Agency for Planning [CMAP] (2005) classified these scales as *"regional, community-level, and site scales"*. At a regional scale, green infrastructure connects natural areas; at the community level, green infrastructure can be defined as smaller parks, open spaces and constructured wetlands; at site scale, green infrastructure captures rainwater before it reaches to water bodies. Allen (2012) divided green infrastructure scales into three different categorizes: Landscape-Scale Green Infrastructure, Region-Scale Green Infrastructure, and Site-Scale Green Infrastructure (Figure 5).

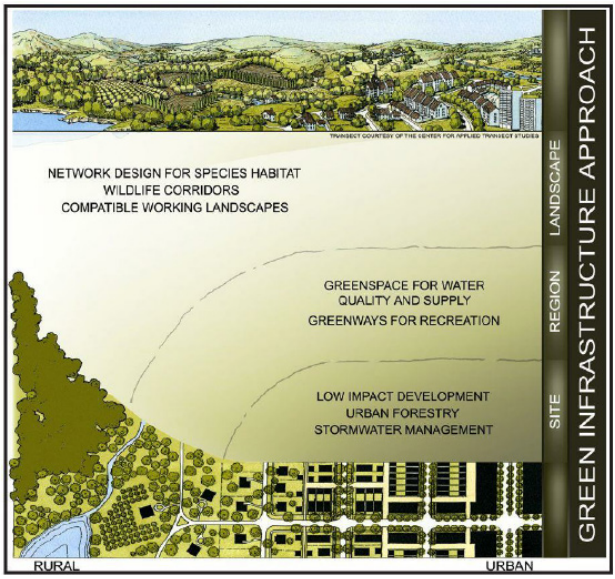


Figure 5. Green Infrastructure Implementation Scales (Allen, 2012).

Landscape-scale implementations consist of networks and corridors that increases functional links between habitats and quality of natural areas (Forman & Godron, 1986; MacArthur & Wilson, 1967; Odum, 1983). The green infrastructure network at landscape scale consists of core areas, corridors, and hubs (Allen, 2012) (Figure 2-3). Core areas, the main component of the green infrastructure network, contains important habitats which have high conversation and ecological value (Wolf et al.,2006). Hubs are lands that protect significant ecological sites and include one or more core areas and large protected areas, such as state and regional parks; corridors are linear areas that connect core areas such as river and stream valley corridors and provide recreational opportunities

(Allen, 2012). According to Allen (2012), *"Implementation at landscape scale usually involves conservation land acquisition and adaptive land management by public and private landowners to support the preservation of high-quality wildlife habitat, ecological process and functions, and protection of migration corridors. Maintaining compatible working landscapes also plays a critical role in landscape-scale green infrastructure planning."* (p. 21).

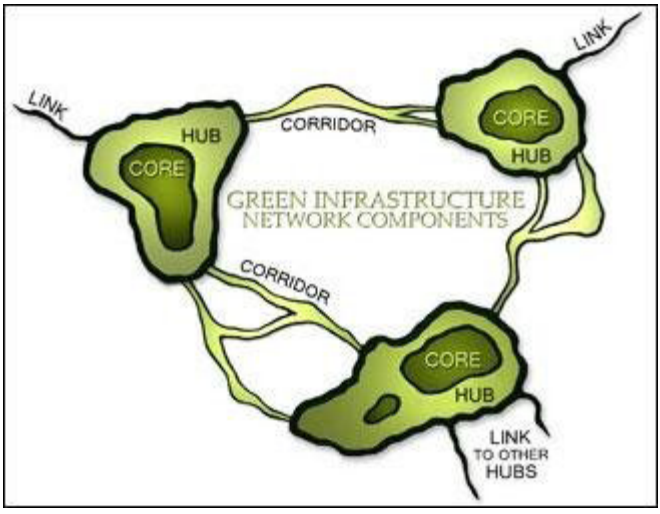


Figure 6. Landscape elements of green infrastructure network design (Allen, 2012).

Green infrastructure at regional scale such as working farms and forests, regional parks and natural preserves etc. targets land conservation and provides important landscapes for high-quality (Amundsen et al. 2009). Region-scale green infrastructure acts as a bridge between landscape-scale green infrastructure, which provides broader implementation, and site-scale green infrastructure, which help treat stormwater on its source(Allen, 2012). Moreover, site-scale green infrastructure was defined by American Rivers (2010) as *"a network of decentralized stormwater management practices, such as green roofs, trees, rain gardens, and permeable pavement, that can capture and infiltrate rain where it falls, thus reducing stormwater runoff and improving the health of surrounding waterways."* Site-scale green infrastructure imitates water cycle and infiltrate stormwater into the ground and also, provide ecological services.

Green infrastructure strategies are eco-friendly and long-lasting solutions to environmental problems. To overcome these problems, it is important to implement green infrastructure strategies at all scales from landscape to site

scale. Together, green infrastructure strategies can create places for recreational activities, provide habitats for wildlife, reduce air and water pollution and increase resilience to flood events. Moreover, according to Turner (2014), implementing green infrastructure at all scales can interrupt the connections between impervious surfaces, and this interruption can improve water quality in waterbodies that collect untreated stormwater runoff.

2.4. Benefits of Green Infrastructure

Green infrastructure can providea wide range of benefits to individuals and the wider population (Benedict & McMahon, 2006). These strategies can not only provide environmental benefits but also, ecological, social, and economic benefits. Valuing green infrastructure's monetary benefits is still a developing field since different forms of green infrastructure strategies require different types of measurement (European Commission [EC], 2013). Quantifying benefits of green infrastructure help stakeholders easily understand the benefits of green infrastructure strategies, and also, deals with the issue of *"incommensurability"* (Vandermeulen et al., 2011; EPA, 2015). Although the benefits provided by green infrastructure are not easy to quantify in *"monetary units"* (Vandermeulen et. al., 2011), recently, a large number of strategies have been developed to measure the benefits provided by GI strategies. In the existing literature, green infrastructure benefits can be grouped into four categories: social, environmental, ecological, and economic benefits. Various literature confirms that green infrastructure provides social benefits by increasing the level of physical activity, providing community cohesion, and promoting mental well-being (Mass et al.,2015; Wodarczyk, 2007). Green areas created by green infrastructure provide opportunities for recreation and outdoor activities. Most studies confirm that outdoor activities can reduce stress and the risk of obesity, hypertension, diabetes, stroke, and certain kinds of cancer, and thus, improves mental health and well-being (Mass et al.,2015). Moreover, green areas also have been linked to reduced crime levels (Bell et al., 2008).

Besides social benefits, green infrastructure also provides environmental benefits. Green infrastructure emerged to reduce the negative impacts of urban development on water bodies. Based on this context, Beauchamp and Adamowski (2013) emphasizes that the environmental benefits of green infrastructure can be listed as alleviating flood events, improving water quality, reducing the amount of stormwater runoff and providing efficient land use.

Some studies compared two sites with green infrastructure and with traiditonal development by measuring quality and quantity of stormwater runoff between them. Yang and Li (2003) conducted a study in Texas, the USA to compare a site with green infrastructure and a conventional site that includes conventional gray infrastructure and lawns. The study concluded that even if the site with green infrastructure includes more impervious cover (32,3%), the site created less stormwater runoff than the traditionally designed site.

The ecological benefits of green infrastructure include maintaining biodiversity and increasing improved habitats for wildlife ("Forest Research", 2010, Patel, 2014). A study demonstrated that green spaces help to maintain biodiversity that may otherwise vanish because of man-made environments (Haq,2011). Another study by Okunlola (2013) shows that preserving green spaces including the combination of mowed turf and tress increases the environmental quality of the entire community by providing a diverse environment for people and wildlife. The implementation of GI has also an important role in creating wildlife corridors in order to prevent habitat degradation and/or reduce the effect of habitat fragmentation by increasing connectivity in fragmented landscapes (Forest Research, 2010).

Lastly, the economic benefits of green infrastructure include an increase in land value, a decrease in the cost and maintainance of traditional infrastructure and heating and cooling demands, and positive impacts on economic development (EPA, 2014). Metropolitan Sewer District of Greater Cincinnati developed a plan to control sewer overflows in the area of Lower Mill Creek. This approach is expected to save more money than the city's original plan which constructs a *"deep tunnel stormwater storage area"* (EPA, 2013). Green infrastructure can also increase nearby property and land values (Plant, 2006; Bolitzer and Netusil, 2000). For example, a study conducted by CTLA (2003) demonstrated that trees increase the total value of a property by 15% to 25%. Moreover, numerous studies have demonstrated that green roofs, street trees, and increased urban green spaces reduce heating demands by 10-15% and cooling demands by 20-50% (Banking on Green, 2012). Similarly, Haq (2011) studied the impact of tree cover in the city of Chicago and found out that increasing tree cover by 10% may decrease the total energy for heating and cooling by 5—10% (Haq, 2011). Overall, these studies show good evidence of the benefits of green infrastructure but further research is required to improve the quality and quantity of the findings. Benefits of green infrastructure are listed in the table below (Table 2):

Table 2. Benefits of Green Infrastructure

Environmental	• Improve air quality • Efficient land use • Improve human health • Flood protection • Drinking water source protection • Reduce sewer overflow events • Reduce stormwater runoff amount
Economic	• Reduce gray infrastructure construction costs • Increase land values • Reduce heating and cooling demands • Encourage economic development
Social	• Enhance livability through attractive streetscapes • Provide health benefits • Provide opportunities for recreation • Improves safety • Promotes community identity
Ecological	• Protect and restore wildlife habitat • Provide connectivity act as wildlife corridors • Maintain population of species

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3. Green Infrastructure Implementation Challenges

City officials and planners are increasingly aware of the importance of green infrastructure strategies in urban planning. However, the shift from gray infrastructures to green infrastructure strategies are not easy since these strategies require participation from stakeholders. There are also several challenges to implementation of green infrastructure strategies. These barriers can be installed at different levels such as government, public or private land-owners levels. Overall, green infrastructure strategies are long-lasting solutions to environmental problems caused by urbanization and provide many benefits. To achieve green infrastructure goals, it is important to implement green infrastructure strategies at all scales and barriers to implementation should be discussed in detail.

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CHAPTER XII

EVALUATION OF VISUAL LANDSCAPE QUALITY IN INTEGRATED BASIN PLANNING: YANBOLU-SANTA BASIN (TRABZON-GÜMÜŞHANE/TURKEY) EXAMPLE

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1. Introduction

Basin is a landform composed of large sunken or depressed areas surrounded by mountains or elevated hills due to tectonic movements, or areas between the water parting and disembogue points; where natural resource values are in interaction with water within their natural borders, which procure added value to economy, and which are in constant change in terms of resource values over time (İzbırak, 1992; Ardos and Pekcan, 1997; Brooks et al., 2003; Biricik, 2009; UHYS, 2015). Even if water basins are the first to come to one's mind, there are also others, like mining basins or agricultural basins. These areas are important land pieces that must be protected in the light of environmental, social and economic indicators. In other words, they can

be defined as economic and social sub-systems that are operated with human beings, capital, businesses and technology (Tarhan, 1998; Baycan Levent, 1999; Atik and Altan, 2000).

Basins play a crucial role in preventing environmental damages on natural resources. They have numerous benefits for the ecosystems such as maintaining hydrologic cycle, climate control, prevention of erosion and loss of soil. Moreover, well-planned basins offer products with added value including fishery, timber and other forest byproducts (Postel and Thompson, 2005). However, any slight change taking place in the climatic conditions, geology, topography, soil, flora or fauna in its natural borders can change the entire basin (Yavuz, 2011). Therefore, it is very important to plan and evaluate all the resource values of a given basin with a holistic approach, rather than addressing them individually. While conceptual approaches with simple inventory phases were adopted in the past (Garipoğlu, 2012), more improved, multiple evaluation methods and techniques are now employed.

When basins in Turkey are scrutinized, we see them in the form of structures that embrace settlements, as well as industrial and trade facilities and agriculture and stock raising areas in varied land patterns. As a result of this complexity, and taking into account the geomorphology of Turkey, interaction among all ecological elements within a basin and destruction caused by mankind, it is obvious that an integrated basin planning is fairly important. Apart from the problems of proprietorship, observation of human activities, identifying socio-economic structure, topographic characteristics, analysis of land utilizations, wildlife, flora and fauna (Anonymous, 2020), visual landscape quality of the basin should be assessed as well, because assessment of visual impacts of changes taking place in the environment as the result of ever-increasing attention to outstanding landscape structures in terms of aesthetics has gained particular importance in recent years.

Visual landscape is the outcome of interaction of human perception and his psychology, which creates mental and spiritual structures against natural and cultural landscape (Kaplan and Kaplan, 1989; Müderrisoğlu and Eroğlu, 2006). Visual landscape quality, on the other hand, is questioning of visual landscape characteristics that are in close interaction with a person's perceptional and psychological processes with certain aesthetic criteria of individuals and other components (Lothian, 1999; Daniel, 2001; Parsons and Daniel, 2002; Palmer,

2003; Kalın, 2004; Fuente de Val et al., 2006; Kaptanoğlu, 2006; Kıroğlu, 2007). According to Jessel (2006), the landscape perception, which is the outcome of interaction between the objective and subjective perspectives, is presented in Fig 1.

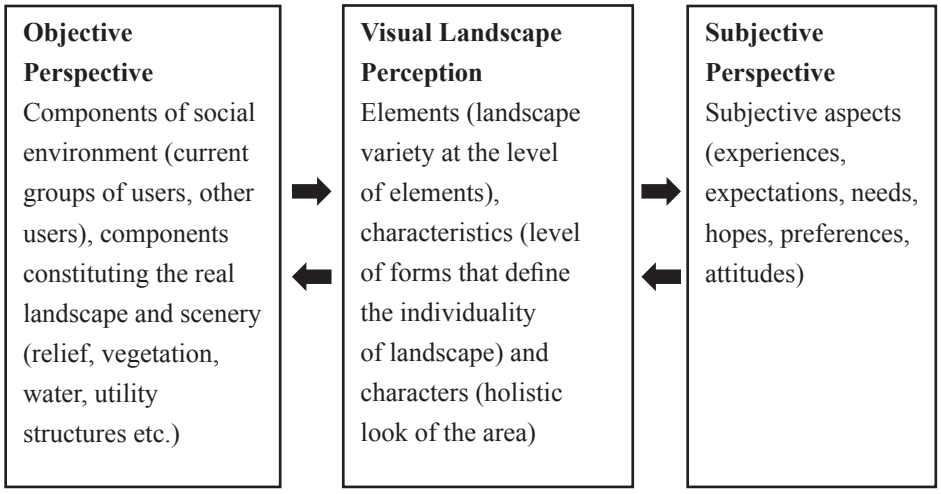


Fig 1. The Visual Landscape Perception - Outcome of Interaction Between the Objective and Subjective Perspectives

The visual landscape, which has been systematically portrayed and developed since 1950s, is the result of interaction between abiotic, biotic, cultural and visual components (Kane, 1981; Bulut and Yılmaz, 2007; Gruehn and Roth, 2008) (Table 1).

Biophysical factors that are used to determine the value of quality of visual landscape include inclination, exposure, elevation, vegetation, water, neighboring scenery, rarity, natural elements, historical venues and cultural changes (BCMF, 1997; Çakcı, 2007; Uzun and Müderrisoğlu, 2011; Jahany et al., 2012; SNH, 2013; BLM, 2016).

Table 1. Main Components of Landscape Characteristics

COMPONENTS GENERATING LANDSCAPE CHARACTERISTICS				
Abiotic /Physical components	**Biotic components**	**Cultural components**	**Visual Components**	
			Objective	**Subjective**
Topography	Vegetation	Archeology	Topography	Traditional Culture
Soil	Biodiversity	Area use	Vegetation	Local identity
Climate	Wildlife	Landscape history	Water	Feeling of space
Hydrology		Traditional culture	Archeology	Sound
		Local identity	Man-made elements	Smell
		Feeling of space	Naturality	Taste
			Texture	Color

In accordance with European Landscape Convention, which was originally declared on 20 October 2000, but came into effect in 2003 in Turkey, stressed the relation between ecological approaches and environmental components (Table 2). Consequently, it is very important to make sure that resourceful landscape forms and components in aesthetic terms should be protected and transferred to future generations, as well as preserving natural and cultural resource values.

Studies revealed that the environmental perception of landscape is based on "visual perception" by 87%, which stresses the essentiality of "visual analysis" in making space utilization decisions (Anonymous, 1994). It is also stated that more than 80% of sensory input received by human beings comes from sense of sight (Porteous, 1996). As a result of this, visual quality must also be protected so as to be able to protect the landscape variety in basins. The causes necessitating a visual quality analysis in planning an integrated basin are as follows:

- Spotting areas that require proper protection,
- Monitoring negative impacts and changes on the basin and resource values, taking precautions,
- Identifying significant areas in terms of visual landscape and prioritizing based on effect levels,

Table 3. According to Litton (1977)
Environmental Components that Affect Visual Quality (Kalın 2004)

IMPORTANT COMPONENTS AFFECTING DEVELOPMENT OF VISUAL QUALITY			
Characteristics of the object with effect	**Characteristics of the Area and Surrounding Landscape**	**Characteristics of the Observer**	**Characteristics of Viewpoint and Other Variables**
• Color • Form • Texture • Quality and Grouping • Movement • Other effects (noise, odor etc.) • Scale (based on environment)	• Color • Texture • Water • Topography • Vegetation -Relict and endemic -Unique combinations -Interfaces of vegetation types -Groundcover • Architecture Form -Historical Significance -Uniqueness of area • Visual Character -Panoramic -Object-oriented -Framed -Focused -Shaded -Perceived with atmospheric conditions	• Numbers • Sensitivity • Attitude • Expectations • Preference	• Viewpoint -Object-oriented -Quality (i.e. Scenic road/trail, historical space, wild area, industrial zone, dump, avenue etc.) • Other variables -Viewing time -Atmospheric conditions -Season -Light

- Determining user-oriented effects,
- Maintaining re-visits by visitors,
- Collecting data about socio-demographic structures and visual perceptions, and
- Ensuring that the basin sticks in the minds of users.

The main purpose of this study is to maintain the protection and sustainability of landscapes of priority, which are resourceful in terms of visual criteria, taking into consideration the advantages brought about by visual landscape in planning basins. In this respect, the relation between the general landscape characteristics and visual landscape quality of Yanbolu-Santa Basin, located within the provinces of Trabzon and Gümüşhane, has been examined, and visual landscape has been assessed. Precautions and other measures of protection are proposed in the light of the findings. If the proposed measures are taken, it is presumed that the basin has the potential to contribute to economic development strategies as it can be utilized for tourism and recreational activities by public administrators, who are responsible for management of the basin with a holistic understanding.

2. Material And Method

Yanbolu-Santa Basin, which is located within the larger basin of Eastern Black Sea (one of the water basins scattered around Turkey), comprises the study area. Flowing in the center of the basin, Yanbolu Stream rises on the outskirts of Deveboynu Hill, which has an ultimate elevation of 3081m, lying 54 km south to Arsin district of Trabzon, and empties into Black Sea around Yanbolu, to the east of Arsin district. The amount of water is very high as the basin is located in the region of Turkey that receives the highest amount of rain. The basin, whose 130 km^2 of area is located within Trabzon and 142 km^2 of area in Gümüşhane, lies in a 68 km-long valley with an elevation reaching up to 3081 m above sea level. The basin partially covers two provinces and three districts, namely Trabzon, Gümüşhane (central district), Arsin, Yomra and Araklı. 20% of the land within the basin is privately owned (agricultural lands, settlements, industrial zones etc.), while 21% of it is composed of pastures and 59% public lands (meadows, steppes, rocky fields and forests). 33% of Public lands, on the other hand, is made up of forests. Besides, Yanbolu-Santa Basin hosts Dumanlı

Neighborhood, where Santa archeological site and *Dipsiz Göl [literally: bottomless lake]* (1st and 3rd Grade Natural Protected sites, respectively) are located. 7 neighborhoods located in and around Santa archeological site are also protected as cultural sites (Fig 2).

Physically-Based Approach/Model (expert model or Objective Model), which is one of the models generally used in visual landscape quality assessments, has been employed in the study.

Accordingly, Yanbolu-Santa Basin was divided into 9 different landscape types based on the key resource values, which are:

- **General Silhouette:** indicates the scenery and landscape that is framed as a whole
- **Natural Landscape:** the vegetation scenery and landscape that covers the area
- **Mountain Landscape:** scenery and landscape composed of land masses located at higher elevations compared to surrounding land areas
- **Water Landscape:** streams and other water sources that flow in valley floors and penstocks,
- **Rural Road Landscape:** the scenery and landscape of main roads and trails that enable access to plateaus and other activity areas
- **Cultural Landscape:** the scenery and landscape that host residences and settlements founded in plateaus located within the area
- **Valley Landscape:** the texture and landscape composed of deep depressions between two mountain masses
- **Geo-Landscape:** the texture and landscape created by seismic and volcanic activities
- **Historical Landscape:** historical structures and surrounding landscape located within the area

In the field studies conducted in the summer and fall of 2019, a total of 36 images (4 representing images for each landscape type) among 1687 shots of Yanbolu-Santa Basin were picked, and the selected 4 images were shown to a group of specialists comprising 30 members (landscape architect, forestry engineer, forestry industrial engineer, wildlife expert, architect, ecologist, ornithologist, botanist, urban planner, hydrologist, biologist, geologist, artist, historian and archeologist) along with the questionnaire so as to investigate which one of

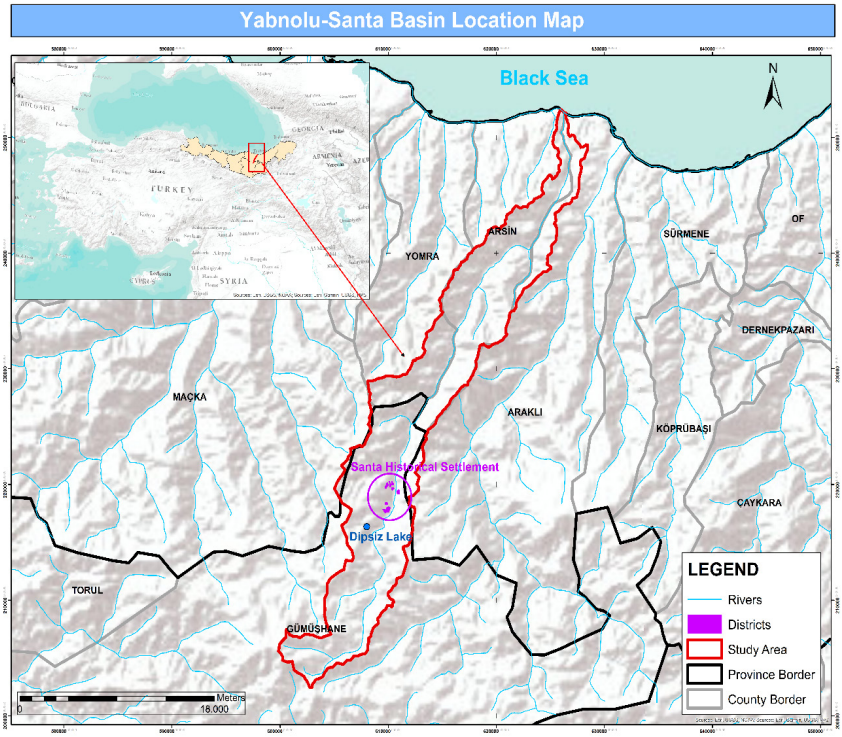


Fig 2. Yanbolu-Santa Basin

the 4 images best represented the given landscape type. In this way, a single image was determined for each and every landscape type. While determining the images, it was kept in mind that each shot should depict the main qualities of the relevant type.

In the next phase, the images selected for each landscape type were evaluated according to pre-determined parameters (naturality, liveliness, landscape diversity, impressiveness, harmony, and mysteriousness) through a scale ranging between "-2 and +2" by the specialists. Studies of Daniel (2001), Arriaza et al. (2004), Bulut and Yılmaz (2007) were referred to in determining these parameters. In this way, average visual quality value of each landscape type was revealed. With this assessment, average visual quality value of the landscape types and accompanying effective visual evaluation parameter were identified.

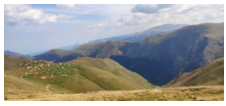
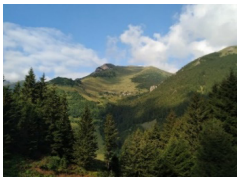
Finally, components of each landscape type (vegetation, topography, naturality, water sources, presence of man-made elements and color) were

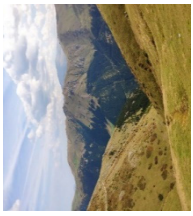
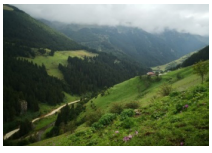
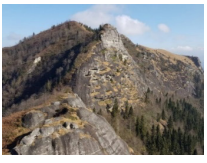
weighed through a 4-point Likert Scale (1-4). In this way, the values of visual landscape quality of Yanbolu-Santa Basin were sorted in a descending scale. Landscape types of similar characteristics revealed through the analyses performed were later digitalized in GIS environment running ArcGIS 10.5 software. Overlapping all the gathered data, a final "Visual Landscape Map" was created.

3. Findings

The group of specialists made up of various disciplines were asked to identify which of the 4 images best represents each of the 9 different landscape types. The selected images and the accompanying percentages of preference are presented in Table 3.

Table 3. Images Selected for Each Landscape Type and Percentages of Preference

YANBOLU-SANTA BASIN									
Landscape Type	**Number of Image**	**Image**	**Number of People Preferring**	**Percentage of Preference**	**Landscape Type**	**Number of Image**	**Image**	**Number of People Preferring**	**Percentage of Preference**
General Silhouette	3		12	40	**Water Landscape**	1		14	46.67
Natural Landscape	3		17	56.66	**Rural Road Landscape**	1		24	80

YANBOLU-SANTA BASIN									
Landscape Type	**Number of Image**	**Image**	**Number of People Preferring**	**Percentage of Preference**	**Landscape Type**	**Number of Image**	**Image**	**Number of People Preferring**	**Percentage of Preference**
Mountain Landscape	3		16	53.33	**Cultural Landscape**	1		13	43.33
Valley Landscape	2		22	7.33	**Historical Landscape**	4		20	6.67
Geo-Landscape	1		19	63.33					

In the following phase, the same group of specialists scored the selected images of all landscape types as per predefined parameters on a scale ranging between -2 and +2, and average landscape quality value was calculated by first adding up the scores and later dividing the outcome by the number of total participants. At the end of this assessment, effective visual evaluation parameters of all landscape types were determined (Table 4).

Table 4. Visual Quality Values of Landscape Types and Evaluation Parameters

Visual Quality Rank	Landscape Type	Total Score	Average Visual Quaity Value	Effective Visual Evaluation Parameters
1	Water Landscape-1	285	9.5000	Liveliness
2	Natural Landscape-3	278	9.2667	Naturality
3	Geo-Landscape-1	252	8.4000	Naturality
4	Valley Landscape-2	249	8.3000	Landscape Diversty
5	Rural Road Landscape-1	242	8.0667	Liveliness
6	Cultural Landscape-1	198	6.6000	Liveliness
7	Historical Landscape-4	183	6.1000	Harmony
8	Mountain Landscape-3	156	5.2000	Naturality
9	General Silhouette-3	145	4.8333	Naturality

According to Table 4, the landscape type with the highest average visual quality value is “water landscape”, whereas “general silhouette” is the lowest ranking landscape type. The parameters that turned out to be most effective in determining the average visual quality values of landscape types are “liveliness” and “naturality”. According to these results, the 9 different landscape types of Yanbolu-Santa Basin were classified into 3 groups in respect to visual quality. The groups were formed based on the maximum score a given landscape type can get.

1-Very High Visual Quality Value:

- Water Landscape-1 (9.5000)
- Natural Landscape-3 (9.2667)
- Geo-Landscape-1 (8.4000)
- Valley Landscape-2 (8.3000)
- Rural Road Landscape -1 (8.0667)

2- High Visual Quality Value:

- Cultural Landscape -1 (6.6000)
- Historical Landscape-4 (6.1000)

3- Mediocre Visual Quality Value:

- Mountain Landscape-1 (5.2000)
- General Silhouette-3 (4.8333)

Then, components of each landscape type (vegetation, topography, naturality, water sources, presence of man-made elements and color) were weighed between “1” and “4” as per the scale indicated in Table 5 (Table 6).

Table 5. Main Components Comprising the Landscape Characteristics

LANDSCAPE COMPONENT	MEASUREMENT SCALE			
	1	2	3	4
Vegetation				
Area covered with vegetation	%0-25	%25-50	%50-75	%75-100
Type of vegetation	Barren area	Grass and Bush	Mixed (Trees and Bush)	Forest
Topography				
Type of topography	Flat	Rugged	Mountainous	Very Mountainous
Naturality				
Amount of naturality	Not natural	Semi-natural	Nearly natural	Natural
Water Source				
Water existence	None	Channel	Stream	Sea
Man-Made Elements				
Positive man-made elements	%0-25	%25-50	%50-75	%75-100
Negative man-made elements	%0-25	%25-50	%50-75	%75-100
Color				
Color diversity	1 color	2 colors	3-5 colors	Very colorful

Table 6. Evaluation Results of Main Components Comprising the Landscape Characteristics

LANDSCAPE COMPONENT	LANDSCAPE TYPES DETERMINED IN TERMS OF VISUAL QUALITY								
	Water Landscape-1	Natural Landscape-3	Geo- Landscape-1	Valley Landscape-2	Rural Road Landscape-1	Cultural Landscape-1	Historical Landscape-4	Mountain Landscape-3	General Silhouette-3
Vegetation									
Area covered with vegetation	4	4	3	4	4	4	3	4	4

Type of vegetation	3	4	3	3	3	2	2	2	2
Topography									
Type of topography	3	3	3	3	2	2	2	3	3
Naturality									
Amount of naturality	4	4	4	4	4	3	2	4	3
Water Source									
Water existence	3	1	1	1	3	1	1	1	1
Man-Made Elements									
Positive man-made elements	1	1	1	1	1	1	1	1	1
Negative man-made elements	1	1	1	1	1	2	1	1	1
Color									
Color diversity	3	3	3	3	3	3	3	3	2

The visual landscape map of the area, which was generated by overlapping the landscape types with similar characteristics revealed in GIS environment in the light of theoretical foundations, is presented in Fig 3.

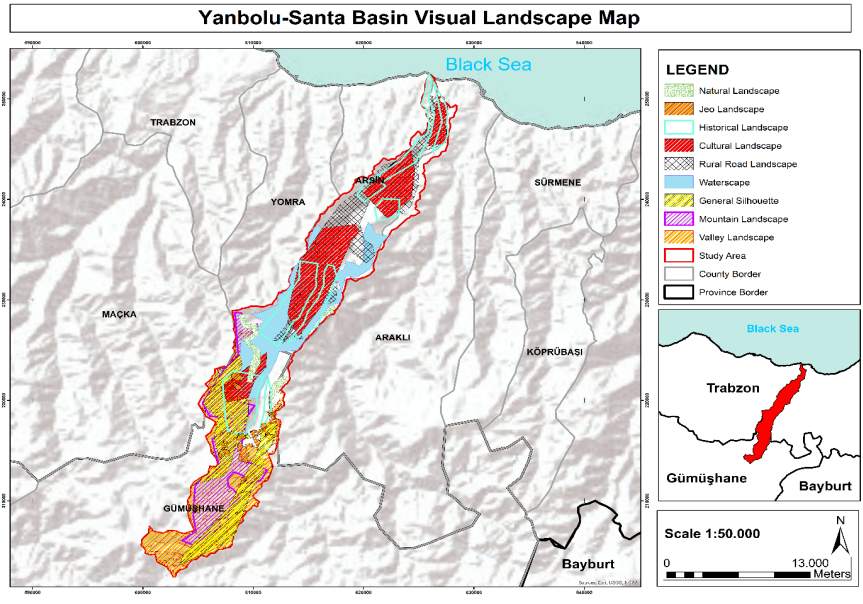


Fig 3. Visual Landscape Map of Yanbolu-Santa Basin

4. Discussion and Conclusions

The main purpose of visual quality assessment studies is to generate an environmental data array in mathematical expressions for planners (Bozhüyük, 2007), and in this way, to help them compare between similar areas. The greatest advantage of the method lies in making sub-groupings among different landscape types and enabling us to determine which landscape types should be addressed first. However, the method has some drawbacks as well. The most important of these is that visual perception changes from person to person and from society to society one lives in. Moreover, as the psychological status of any person may differ across time, evaluation of landscape types may differ accordingly. Besides, such external factors as the point and time of shooting of the images of the area, seasonal differences, daylight etc. can affect perceptions of subjects either positively or negatively.

Areas with significant landscape value within a basin make important economic contributions both to local people and the entire region. Therefore, the bridge between economic goals and aesthetic values must be laid (Kiracıoğlu, 2007). In this respect, landscape quality evaluations should be used as a means to maintain preservation and sustainability of natural and cultural resource values in planning basins.

The 9 different landscape types determined as the result of field studies were divided into three groups in respect to visual quality values: very high, high and mediocre. The first group consists of "water landscape", "natural landscape", "geo-landscape", "valley landscape" and "rural road landscape"; the second group includes "cultural landscape" and "historical landscape", and the third group includes "mountain landscape" and "general silhouette".

The findings of the research indicate that the visual landscape quality of Yanbolu-Santa Basin is linked with liveliness, naturality, landscape variety and harmony. It was also spotted that, among the landscape components, vegetation, topography, naturality, water sources, color, positive and negative human effects are effective on each and every landscape component. According to Table 6, the most influential elements that ensure preference of selected landscape types in terms visuality are the level of naturality, being covered with vegetation and the type of vegetation. Visual quality value increases along with increasing naturality levels, and decreasing man-made elements. The findings of the current study are in parallel with earlier studies (Kaplan et al., 1972; Purcell and Lamb, 1998; Van

den Berg et al., 1998), where water landscape, natural landscape, geo-landscape, valley landscape and rural road landscape attained very high scores in terms of visual landscape quality. Besides, it was found out that forest and areas covered with mixed vegetation types enrich the visual landscape (Arriaza et al., 2004; Daniel, 2001). The effect of the presence of water sources within the selected landscape types increases the visual quality as well. Despite the fact that rural road landscape is perceived in the scope of negative man-made elements, the color, vegetation and presence of water resources had a positive effect in visual landscape quality.

Such positive man-made elements as historical and archeological areas, traditional houses, traditional culture and local identity also increase the visual landscape quality. Similarly, historical and cultural structures that are in harmony with topography positively affect the landscape quality. Therefore, the visual quality scores of cultural landscape and historical landscape turned out to be high in the study (McAndrew et al., 1998).

The reason why the visual quality scores of mountain landscape and general silhouette are mediocre is that they have a limited variety of colors and lack water sources (Anderson and Paul, 1979; BCMF,1997; Anonymous, 2002).

Even if the basin hosts preserved structures, natural and historical resource values of good quality, limited local and international publicity played a crucial role in its being in the shades. Thanks to this, the basin does not have any landscape types with low and very low average visual quality. Still, the level of naturality of the landscapes that attained mediocre visual quality scores should be increased, and they should be protected from human impacts as much as possible. The first two landscape types that needs to be considered in this sense are the mountain landscape and general silhouette, which will, later, be followed by historical landscape and cultural landscape.

In the light of the findings attained in this study, special attention should be paid to preventing the recreational and touristic activities planned and the facilities, fittings or structures to be built in the area from effecting the visual qualities of the mentioned landscape types negatively. The materials to be used in such endeavors should be natural, and the structures, fittings and activities should be suitable with the topography of the area. Applicable landscape components of the landscape types with mediocre and high visual quality should be kept free of negative human effects, and variety of vegetation and naturality of these landscapes should be further enhanced. If needed, the legal and administrative

basis should be revised and preventive measures should be introduced. It is assumed that the findings of the current study will serve an essential basis for institutions responsible for management of the basin, and therefore, this effort will light the way of further studies.

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CHAPTER XIII

IMPORTANCE OF WETLANDS FOR ECOSYSTEMS IN THE CONTEXT OF DRAUGHT

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1. Introduction

Within the period of the last three hundred years, which is called the "Anthropocene", when the human impact on the environment ascended to unprecedent levels, serious pressure and destruction have been witnessed especially on the hydrological cycle. Today, water, the main source of life for all living beings, is rapidly diminishing due to a diverse set of causes including population explosion, fast and unplanned urbanization, technological developments, global warming, uncontrolled consumption of resource values, which were trivialized by the violent capitalism aiming at attaining economic success no matter what, inefficient management of water resources in agriculture, other sectors and individual consumptions. This, in turn, brings about loss of critical underground water, as well as uncontrollable floods and draught. Visible effects of the water shortage caused by climate change in the global scale, once again, underline the vital significance of

water. Although two thirds of the planet Earth is covered with water (about 70%), usable and drinkable water comprises a mere 2.5% of it, and 70% of the fresh water is captured in glaciers and snow masses (WWF, 2020). Therefore, accessible fresh water is actually less than 1%. Around one third (2.4 billion) of the entire world population of 7.5 billion can only access to an insufficient amount of water with poor quality (Altundağ and Canlı, 2019). Presently, water is used intensively for drinking, cleaning, aesthetic purposes in, agricultural sites, industrial facilities and households. Scrutinizing the global distribution of water usage across sectors shows us that the agricultural usage ranks first (71%), followed by industrial (18%) and household (11%) usages. The distribution in Turkey is no different: agriculture (73%), industry (16%) and household usage (16%) (URL-1, 2021).

Water, which is among the key prerequisites for existence of life, forms the basis for both terrestrial and aquatic ecosystems. One of such ecosystems are wetlands. Being a key figure of natural cycle, wetlands are very rich ecosystems in ecological and biological terms. Wetland ecosystems, which ensure the highest rate of biological production apart from the tropical forests (Williams, 1990; Görmez, 1997; Keddy, 2010), provide habitat and reproduction means for many animal species (mammals, birds, fish and invertebrates). Besides, they play a crucial role in production of oxygen. However, they are now facing deterioration, and even total destruction, thanks to not only human-induced but also natural impacts.

Wetlands have always been under economic-oriented human interference; very first settlements were founded, agricultural activities and animal herding started in and around wetlands (Ün, 1995). Most of the great civilizations of history (i.e. Ancient Egyptians, Chinese, Aztecs, Mesopotamians etc.) also lived near such wetlands. However, as they were seen as the main cause of malaria, they suffered human pressure to a considerable extend. They were drained in many cases, and most of the time, their ecological structures were changed for good by transforming them into farmlands or settlements. However, wetlands have unique benefits for the natural ecosystems. Among such benefits are regulating the water regime, regulating the climatic conditions, controlling floods, filtrating water, increasing soil fertility, absorbing carbon, producing and recycling food (WWF, 2008; Muluk et al., 2013).

Wetlands, the protection of which has become of utmost importance due to such vital troubles as global warming, carbon accumulation and draught, are

one of the primary ecosystems that regulate climate (Millennium Ecosystem Assessment, 2005). In this respect, they play a key role in eliminating the greenhouse gases and preventing abrupt increases in temperature. In the current study, we discuss the importance and functions of wetlands in the context of draught brought about by global warming, impacts of human oriented destruction on wetlands, and suggestions that may shed light for the solution of these problems.

2. Wetlands

Similar to other precious structures, wetlands have been regarded as places that are worth protection, especially since the 1960s, and legal regulations were introduced to prevent pressure and destruction on wetlands. The most important of such legal action was the Ramsar Convention (Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat), which was signed in the city of Ramsar, Iran, on 02.02.1971 by 18 states. According to the *Convention, wetlands "are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does* not exceed six metres" (Anonymous, 1994). According to the Turkish Regulation on Protection of Wetlands, th*e same is defined as "all waters, marshlands, fen and peatland, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres, and all areas that are deemed ecologically as wetlands starting from the coastline, which are significant as the natural habitat of living beings, especia*lly for the waterfowl " (Official Gazette of Turkey, 2014).

As of 2021, 171 countries have acceded to the Convention, and a total of 2418 wetlands around the world (2,545,637.91 km2) were taken under protection (URL-2). This figure makes up 5% of the surface of the Earth. The wetlands scattered around the world are shown in Figure 1.

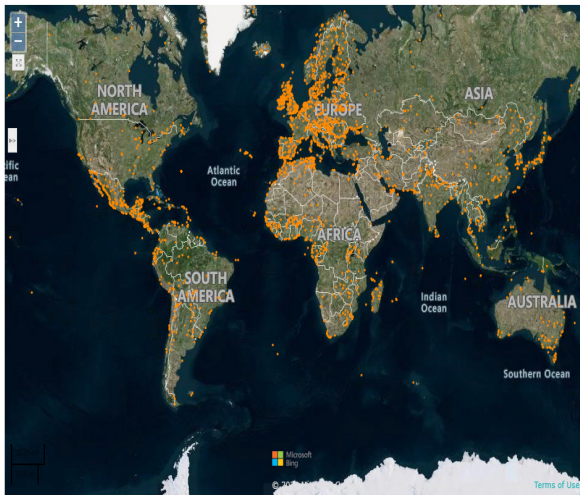


Figure 1. Wetlands Worldwide (URL-2)

Scrutinizing the distribution across continents shows that the highest number of wetlands are located in Europe, while the Oceania hosts the smallest number of such (Figure 2).

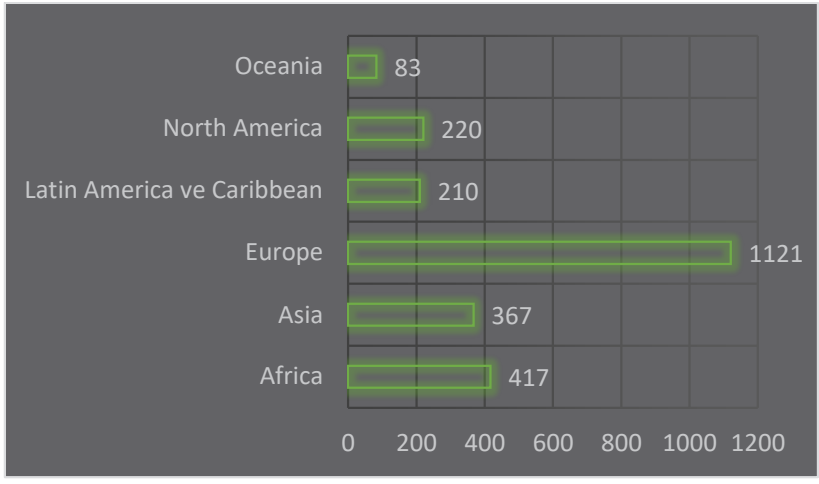


Figure 2. Numerical Distribution of Wetlands by Continent
(*created with data from the https://rsis.ramsar.org/ris-search/ page)

Turkey, on the other hand, became a party to the convention on 13 November 1994, and as of 2021, Turkey has 14 Wetlands, 59 Wetlands of National Importance and 13 Wetlands of Local Importance (URL-3). A total of 86

wetlands combined cover an area of 15.463,55 km^2 (URL-4), which makes up 1.97% of the surface area of Turkey (Figure 3).

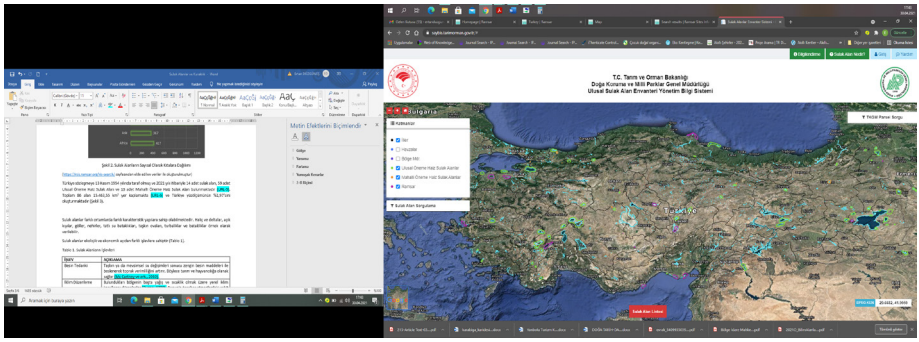


Figure 3. Wetlands in Turkey (URL-4)

The protected wetlands in Turkey announced in the scope of Ramsar Convention are presented in Table 1.

Table 1. Wetlands in Turkey (URL-5)

	Name	**Covered Area (ha)**	**Province**	**Registration Date**
1	Burdur Gölü	24800	Burdur	28.05.1994
2	Manyas (Kuş) Gölü	20400	Balıkesir	28.05.1994
3	Göksu Deltası	15000	Mersin	28.05.1994
4	Sultan Sazlığı	17200	Kayseri	28.05.1994
5	Seyfe Gölü	10700	Kırşehir	28.05.1994
6	Gediz Deltası	14900	İzmir	14.04.1998
7	Akyatan Gölü	14700	Adana	15.04.1998
8	Uluabat Gölü	19900	Bursa	15.04.1998
9	Kızılırmak Deltası	21700	Samsun	15.04.1998
10	Yumurtalık Lagünü	19853	Adana	21.07.2005
11	Meke Maarı	202	Konya	21.07.2005
12	Kızören Obruğu	127	Konya	02.05.2006
13	Kuyucuk Gölü	416	Kars	28.08.2009
14	Nemrut Gölü	4589	Bitlis	17.04.2013

Wetlands could have varying characteristics in different locations. Estuaries, deltas, open coasts, lakes, rivers, marshlands, flood plains, peatlands, swamps, sinkholes (dolines), bottomless lake are all examples of wetlands. According to EU Habitats Directive, 80% of the species that need protection live in the

Mediterranean, and most of those species live in wetlands and/or in habitats that are interrelated with wetlands (Altundağ and Canlı, 2019). Freshwaters, again, host 40% of all species and 12% of the animal species (Aslan, 2020).

Wetlands have various functions in ecological and economic terms (Table 2).

Table 2. Functions of Wetlands

FUNCTION	BENEFIT	EXPLANATION
Biological Function	**Food Supply**	Being fed with nutrients as the result of floods or seasonal water cycles, they improve soil fertility. In this way, they enable farming and animal herding. (Mc Cartney et al., 2010).
Environmental Functions	**Climate regulation**	They regulate the local climatic conditions (especially precipitation and temperature) of the area they are located in (Dugan, 1990). Apart from that, they prevent global warming by capturing the constant carbon in the atmosphere (URL-6).
	Flood Control	They act as a physical barrage by capturing the excess water not absorbed in the ground (URL-6). In this way, they ease the impacts of floods, making indirect economic contributions (Dugan, 1990).
	Water treatment and purification from contaminants &toxins	Serving as a filter, they purify the dumped water off its organic, inorganic and other harmful contaminants (URL-2). Besides, they preserve the quality of water by capturing the sediments brought in surface flows (Özer 2005). They increase water quality with the help of reeds through some biological decomposition cycles (Güney, 1995).
	Feeding underground water sources (Recharge)	In the seasons of precipitation, surface water feeds the sources downwards just to recharge the aquifers. This, in return, provides an advantage during dry seasons (URL-7).
	Discharge of underground water	They discharge the water reserved underground by surfacing it.
	Biological productivity	They enable reproduction and survival of plant and animal species by creating natural habitats for them.
	Water Transport	They ensure economic savings by enabling human and cargo shipment routes apart from other means of logistics (Özdemir, 2005).

Socio-Economic Functions	**Recreational and Tourism opportunities**	They offer touristic and recreational opportunities to local and foreign tourists thanks to their resource values. They are precious areas in terms of natural heritage.
	Wetland Products	They supply such products as fruit, seafood, rice, cane and sedge (Özdemir, 2005).

2.1. Environmental Problems and Threats in Wetlands

Being among the most prolific ecosystems of the planet, wetlands have got their share from the destruction caused by human interferences, many of them became endangered, and some unfortunately, do not exist anymore. The main reason for this is the fact that wetlands were perceived as mere swamps and the habitat of the poisonous anopheles variant of mosquitos (cause of malaria malaria). However, the threats on wetlands increased even further due to more recent versions of this perception. In the light of recent studies, those threats are classified under 11 titles. The existing threats and cumulative data relating the areas that they are posed are shown in Figure 4. According to Figure 4, while pollution, biological resource utilizations and changes in their natural cycles are each an element of threat for most wetlands around the world, transportation, climate change and extreme weather events, and activities of energy production and mining are forms of threats that are witnessed in a smaller number of wetlands.

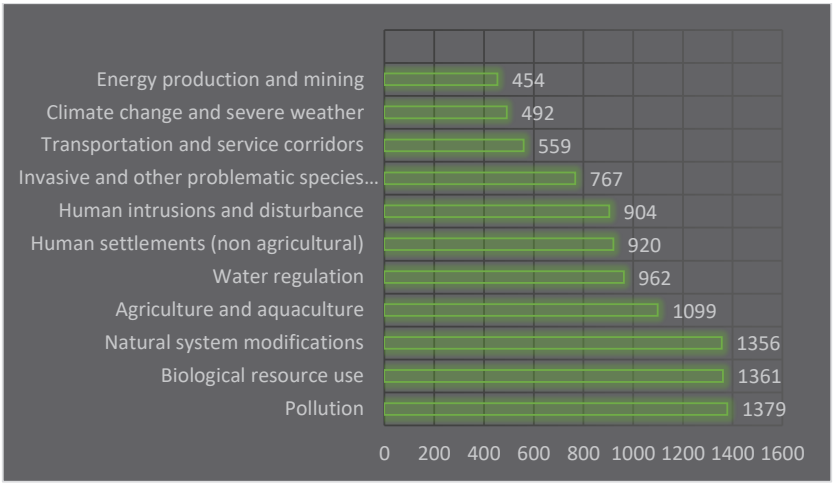


Figure 4. Existing Threats in Wetlands
(*created with data from the https://rsis.ramsar.org/ris-search/ page)

To illustrate the case in different countries, 60% of the wetlands in Spain and Greece has been drained due to the above-mentioned destructions, whereas Portugal is now facing the threat of losing a colossal 80% of its wetlands (Kence, 2005). As in other parts of the world, wetlands in Turkey suffered significant damages as well; more than half of them were drained by human interference (Özesmi, 1999). In the last 40 years, a total area of 1.3 million ha was destroyed as a result of interventions like draining, pollution, rehabilitation etc. (Demircan, 2000). However, thanks to the revisions made in the Regulation on Wetlands in 2005, any wetland larger than 8 ha can no longer be drained (Gürer and Yıldız, 2008). The types of threats witnessed in Turkey, and number of wetlands where such threats exist are presented in Figure 5. According to the findings, 11 areas are suffering from threats deriving from pollution while 7 of them are affected by changes in natural water patterns and bio-resource use, and 1 by energy production and mining activities.

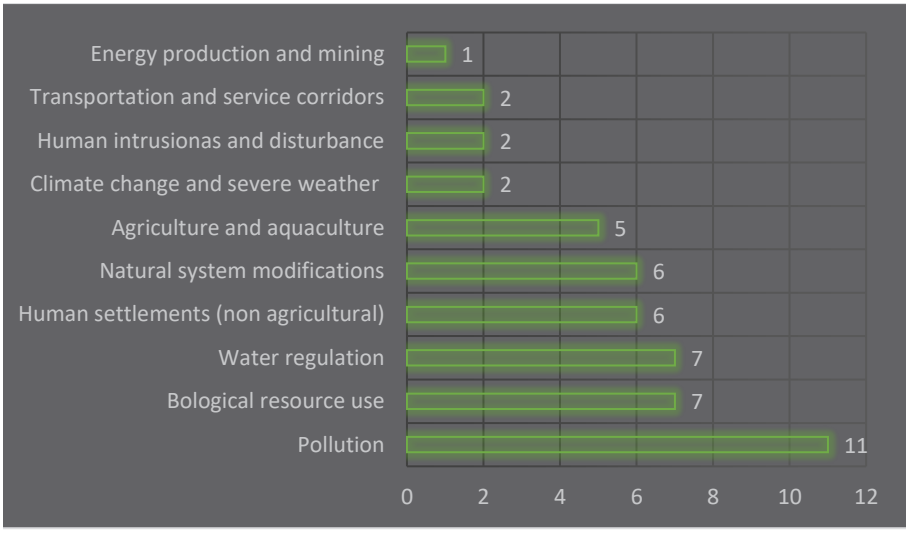


Figure 5. Existing Threats in Turkey's Wetlands

(*created with data from the https://rsis.ramsar.org/ris-search/?f%5B0%5D=region-Country_en_ss%3AEurope&f%5B1%5D=regionCountry_en_ss%3Aturkey page)

Destructions incurred by wetlands and their indicators are summarized in Table 3.

Table 3. Destruction and Causes

Type of Destruction	Indicator of Destruction
Energy production and mining	Mining activities, construction of industrial facilities for energy production
Transportation Services	Alternative transportation with the purpose of economic savings
Human interference	Draining, excavation and filling activities, dumping waste, excavating sand, pebble etc., recreational and touristic utilizations
Climate change and extreme weather events	Drought, rising sea levels, storms
Farming and Aquaculture activities	Agricultural and aquaculture production for economic purposes
Changes in natural cycles and water levels	Dredging for flood control, deterioration of natural drainage routes, holding surface water with dams and levees, erosion
Human settlement other than farming	Urbanizations, zoning for development, demand for secondary housing, infrastructure and superstructure endeavors
Biological resource utilizations	Hunting, flora and fauna destruction, overgrazing, burning down reeds, collecting bird eggs
Pollution	Dry and liquid wastes, industrial, urban and agricultural pollution
Invasive and other problematic species and genes	Invasion of exotic species
Inadequate legal and administrative foundation	Legal gaps, lack of deterrent penal sanctions, lack or insufficiency of administrative plans, administrative clashes between different institutions with overlapping administrative rights, lack of monitoring-assessment programs, lack of a sound understanding of the importance of wetlands by users

With realization of the importance of wetlands, number of scientific studies relating these areas have considerably increased especially in the past twenty years (Girgin, 2000; Yazıcı and Şahin, 1999; Arı, 2001; Arı, 2003; Çalışkan, 2003; Yiğitbaşıoğlu, 2003; Arı, 2006; Adams and Hutton, 2007; Gürbüz et al, 2008; Adaman et al., 2009; Evered, 2012; Karedeniz et al., 2009). In this way, existing threats are slowly being prevented. Management plans play the most

important role in preventing damages suffered by wetlands. Lack of management plans, on the other hand, undermines the conservation endeavors. According to the Ramsar Sites Information Service website, (URL-2) of the 14 Ramsar sites present in Turkey, only 3 has management plans, and management plans of the 4 are in the preparation phase. In this respect, 7 Ramsar Sites of Turkey in no means have a management plan of any sort. Globally speaking, 765 of 1179 Ramsar Sites have their management plans, and 474 are waiting for their management plans to be completed.

2.2. Effects of Climate Change and Draught on Wetlands

The greenhouse effect deriving from the increasing carbon dioxide levels in the atmosphere is the main cause of global warming, which results in abnormal (irregular) climatic behaviors. Climate change on a global scale triggers increasing temperatures. Increasing temperature, in return, causes meltdown of glaciers and rise of water levels of the sources feeding them. Diminishing precipitation brought about by draught, on the other hand, results in decrease of water levels and vanishing wetlands. The most severe impacts of the climate change and ecological damages are monitored in the differences in water distribution and seasonal and annual fluctuations of the water levels.

Draught is one of the most dangerous 28 meteorological disasters stemming from global climate change (Kadıoğlu, 2001). According to Intergovernmental Panel on Climate Change (IPCC), human-oriented activities increase global warming (WWF Turkey, 2020). In this respect, fighting against draught, which is closely related with human activities, is particularly difficult as it is experienced in a vast area and each and every place has its own peculiar sensitivity levels (Kapluhan, 2013). IPCC findings show that the temperature of the world has already increased by 1 °C, and it is estimated that it will add another 1.5 °C between 2030-2052 (URL-8, 2019). As a result of this, experts assume that the effects of global warming will seriously be seen within the next 100 years (Gingerich, 2019), and therefore, functions of wetlands will gain further importance.

Draught is a key factor in the changes taking place in wetlands. Examining the data of the past 20 years on draught experienced around the world indicates that draught results in the lack of present water resources that are vital for humanity, i.e. river discharge and reservoir deposits (Van Loon, 2015). 41% of the land surface of the world according to United Nations Development

Program (UNDP) (URL-9), and Central Anatolia, Southeastern Anatolia and Mediterranean regions of Turkey according to 2020-2021 Annual Meteorological Drought Status assessed through Standardized Precipitation Index (SPI) are critically facing draught (Figure 6).

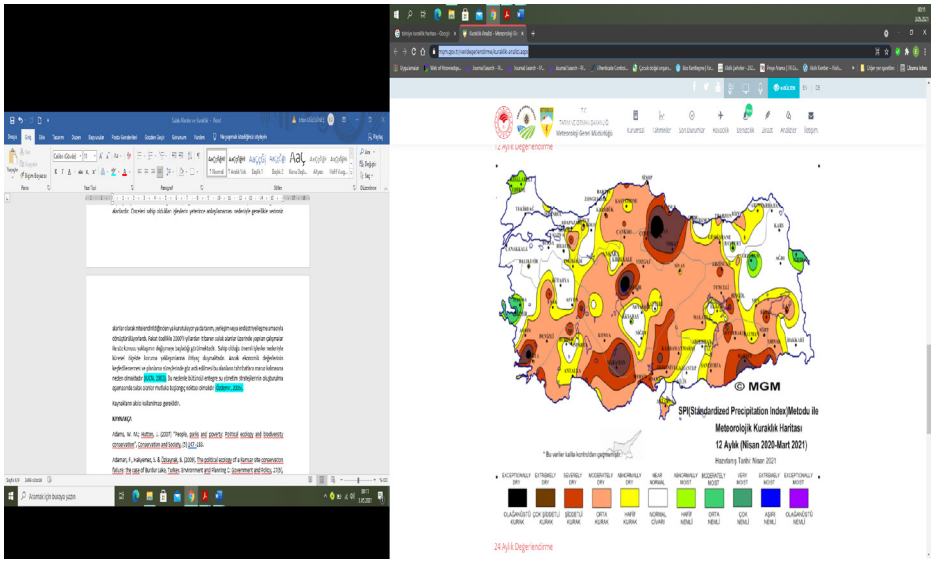


Figure 6. Turkey's Drought Map (URL-10)

The difference of wetlands from other ecosystems lies in the fact that they are deeply and quickly affected by climatic conditions, which brings about abrupt physical and functional changes. These areas supply their waters directly from rain and snow, and tidal flows, underground sources and other surface flows accumulating from nearby areas (Marsh, 1991). On the other hand, they lose water through evaporation, transpiration, infiltration, tidal moves and drainage via rivers and other streams (Korkanç, 2004; Çağırankaya and Köylüoğlu, 2013). Changes in precipitation and temperature directly affect the biological processes, water balance, evapo-transpiration conditions, flood intervals and frequencies (DeBusk, 1999). Seasonal fluctuations in water levels are closely parallel with dry and rainy seasons; yet, long-term changes significantly vary based on the climatic conditions (Aydın et al., 2013). Thanks to the pressures deriving from climate and draught, wetlands were declared as one of the life-support systems in Agenda 21 by Earth Summit (1992) (Karadeniz and Güneş, 2002).

3. Discussion and Conclusions

Serious problems are witnessed in water resources, as in many other vital resources, in our globalized world. One of the indispensable ecosystems of the ecological cycle, wetlands are areas that are resourceful in ecological and biological terms, bearing significant reservoirs of water resources, and they seriously need protection. In the past, they were either drained or transformed for agricultural, constructional and industrial purposes as they were generally seen as infertile land due to the fact that their functions were not adequately known, their economic potential was undiscovered and the planning procedures were ignored (IUCN, 2003). An area of about 24 ha on the average was lost every hour as the result of anthropogenic impacts in the past two hundred years (Yıldız and Yılmaz, 2009).

Apart from human oriented impacts, climate changes and draught, which are among the indirect effects of human activities, pose a serious threat to wetlands. Wetlands have been in a critical jeopardy in recent years due to draught accompanied by global warming. These areas, which are already facing total drainage, are also exploited for the sake of economic development, easy agricultural yields, industrialization and creating more settlements. This simply means extinction of habitats of numerous species (birds, fish, mammals, reptiles etc.). As a result of their essential functions, wetlands need efficient protection approaches on a global scale.

Taking into consideration the functions and ecological riches of the wetlands, urbanization, industrialization, agricultural and water exploitation policies should be carefully planned (Çepel, 2003; Tırıl, 2006). Otherwise, these special places, which are efficient carbon absorbers, may start producing greenhouse gases as well. Wetlands should surely be a starting point in creation of holistic and integrated water management strategies (Özdemir, 2005). So as to be able to reveal the changes deriving from climatic conditions and draught, they should be monitored, analyzed and protected with geographical information systems, remote sensing, hydro-meteorological methods (Şener et al., 2005; Günal and Özdemir, 2010). Environmental awareness should be raised in visitors and future generations at an early age with the help of education and all means of written and visual media. Wetlands keep 40% of the carbon around the world (WWF, 2008). Thus, man-made destructions on wetlands could easily cause emission of this carbon into the atmosphere, which will positively contribute to the draught

brought about by global warming. Therefore, efficient wetland management and protection programs based on economic and sociological analyses should be introduced before late. Negative effects of draught and climate change on wetlands are not discussed in national and international scientific researches as intensively as they should be. The main cause of this may be the fact that concrete effects of climate change generally become visible in the medium to long run. However, responding to these effects of medium and long run is equally difficult, and requires a lot of time. So, international action plans on climate and water against global warming and draught should be put into action by any nation wi**thout losi**ng further time.

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CHAPTER XIV

THE EVALUATION OF CULTURAL ROUTES IN THE FRAME OF LANDSCAPE ARCHITECTURE; THE CASE OF MARMARA SULTANS ROUTE

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Introduction

Cultural routes are the routes containing cultural heritage and cultural landscapes as a part within itself. Initially, cultural tours were organized to raise awareness about historical destinations in Europe in 1964. Accordingly, 'European Routes aiming to revive the Common European Heritage' efforts were also designed on raising awareness among the European people in order to inform the society more about their past (Council of Europe, 1964). In 2008, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Council on Monuments and Sites (ICOMOS) published the 'Declaration of Cultural Routes' and the necessary conditions have been determined for a route to be considered as a culture route. The Lycian Way sets the first example of cultural routes in Turkey which was designed and registered in 1999 by an amateur historian Kate Clown (Saka, 2017). Cultural Routes Association of Turkey was established in 2012 to protect the existing cultural routes in Turkey, to promote the new route formations and to set

standards for their development (Durusoy, 2013). ÇEKÜL (Foundation for the Conservation and Recognition of Environment and Cultural Values) published Culture Routes Study Guide in 2013 by conducting studies on Cultural Routes (Saka, 2017). The "cultural route" is presented conceptually within the scope of this research; cultural routes at international and national level were examined, and the Sultans Route, which has a significant value in the history of Anatolian civilization and traces the footsteps of Suleyman the Magnificent, known as the international long-range natural and historical hiking track, was introduced and addressed in terms of landscape architecture. The natural and cultural assets on the route were evaluated and discussed from the aspect of landscape architecture as a result of the literature review.

Human beings have occasionally had the tendency to travel in their immediate surroundings and in geographies that they do not know. While, initially the phenomenon of travelling was practiced in order to satisfy the survival requirements such as accommodation and food, it has been interpreted in new and different ways throughout history such as religious, commercial, military and social purposes and many forms of travelling like the pilgrimage, transportation of commercial goods, exploring new regions, military travels, seasonal migrations, have been the main factors shaping the history of societies and civilizations. Travelling either individually or in groups based on a planned or unplanned itinerary by means of different transportation options, natural formations observed during the journey as the most basic aspect, settlements, societies and events constitute the travel experiences. In other words, when the journey is completed, the places visited is not experienced only physically but also with all its aspects. For instance, the trails of social, cultural and economic interactions in the history are traced on a route having cultural heritage values (Çekül, 2014). Cultural routes consist of historical, archaeological, natural and cultural landscapes constituting the parts of cultural heritage. One of the purposes of creating cultural routes is to protect and exhibit resource values and to ensure their sustainability for future generation.

The concept of cultural route, which is an alternative tool for comprehending the history of ancient routes, emerges in a process where most of the irreplaceable national cultural values are threatened by various reasons as well as to determine the values they have accumulated until today, to continue its existence in a healthy manner in the future and to ensure the sustainability of the cultural heritage (Durusoy, 2013). Cultural routes reveal a different approach

to monuments, historical sites and natural landscape in terms of view and experience (Karataş, 2011). Sultans Trail, tracing the footsteps of Suleyman the Magnificent, is an international long-range natural and historical walking track and it is a route starting from the town of Simmering, Vienna where Suleyman the Magnificent pitched his tents during the expedition and extends to Topkapı Palace in İstanbul including the routes of the Sultan's first and second attempt to conquer Vienna. The Neugebaude Castle was built by the "Habsburg" Dynasty in the area where the tents were pitched (Çakır, 2013).

The aim of this study is to examine the cultural routes in terms of landscape architecture, especially the Sultans Route, to introduce and examine the immovable natural and cultural assets on the route, and to evaluate the cultural routes in which cultural assets and cultural landscapes are preserved as a whole both national and international scales.

Material and Method

The main material of research is the Sultan's Route beginning from İstanbul, Turkey to Vienna, Austria & the natural and cultural values/heritage areas and cities that take place throughout this route namely Istanbul, Kırklareli, Tekirdağ and Edirne as well as the related written and visual data about Sultans Route, the countries on the European route and the natural and cultural values in these settlements and their written and visual materials (photo, map, etc.). In Marmara-Turkey section of the route on one hand. On the other hand, the natural and cultural values of the cities and countries such as Sofia, Bulgaria, Serbia, Budapest, Hungry, Bratislava, Slovakia and Vienna-Austria in the European section of the route. The data obtained from the analysis studies were synthesized and evaluated the, proposals were offered in the frame of landscape architecture and conservation. In this study, the natural and cultural assets on the Sultans Route were examined from the aspect of landscape architecture. The concept of cultural route has been defined primarily in order to interpret the evaluated samples accurately, the cultural route components were classified according to the criteria of the ÇEKÜL Foundation by defining and emphasizing that the purpose, target and components of the cultural routes and the Sultans Trail was an existing historical road used in the Ottoman period and cultural route components on the Sultans Trail were evaluated.

The Concept of Cultural Route

Cultural routes are a phenomenon that represents the link between dynamic and developing human cultures, aiming to preserve the diversity of cultural heritage of countries and nations and societies, to ensure their promotion and sustainability. Cultural routes do not conflict or overlap with other types of cultural assets (monuments, cities, cultural landscapes, industrial heritage etc.) that may be found on a route. The route is considered as a system that will increase the significance of these value that take place. The main objective is to research and register cultural routes, to protect and improve the heritage on the route, and to increase social and economic interaction (ICOMOS, 2008). Cultural routes can be found in a wide variety of geographies and accordingly, their history, symbolic characteristics, functions, forms, social environments and economic values may differ from each other. Cultural routes, which should not be compared with any monuments, urban location or cultural landscape elements they accommodate, on the contrary, are considered as "inclusive", "complex", "innovative" and " multifaceted" dynamic layouts that gather and increase the singular values of all these components under a single formation (Durusoy, 2013). According to International Council on Monuments and Sites (ICOMOS, 2008): "cultural routes reflect the multidimensional, continuous and mutual interaction of ideas, knowledge and values between societies, countries, regions or continents for significant periods of time. They reflect both tangible and intangible heritage places of the cultures influenced by them. The historical relations and cultural assets forming the cultural route are integrated into a dynamic system." According to the ICOMOS Declaration of Cultural Routes, the goals and objectives of cultural routes are as follows:

- Developing information for the protection of cultural assets, evaluation, management and conversation of cultural routes,
- While ensuring sustainable social and economic development, determining the basic principles and criteria for the correct use of cultural pathways, respecting the originality and integrity of roads and cultural assets, and defining historical significance with appropriate conservation methods,
- To establish the basis of national and international cooperation for research, conservation and development projects on cultural routes, as well as the necessary funding for these efforts.

According to the International Council of Monuments and Sites (ICOMOS, 2008); the components of the cultural routes are such as **geographical environment**: determine the characteristics and natural value of the road and shape its development in the process. **Roads:** connect and link geography and cultural asset or heritage sites to form a whole. Cultural routes and settlements are naturally or associated with different cultural landscapes and have their own Distinctive features and identity according to their own location and the different areas and regions they pass through. They characterize the segments of the route and enrich it by providing variety. **Relationship with natural values**: the relationship of routes with nature can be sensitive in such areas. These areas are urban and rural environments, important buildings (mosque, church, fountain, bridge, boundaries, etc.), isolated monuments and landscape areas that shape the nature of the cultural route of these monuments. Boundaries: well-defined and regulated buffer zones and boundaries are well defined to support the preservation of tangible and intangible cultural values within the boundaries of the route with their unique characteristics. This protection reflects different landscape values that reflect the identity of the cultural route. **Protection of cultural routes**: determining the history, natural and cultural characteristics of the environment and developing appropriate methods is the first step for conservation. The aim is to protect natural and cultural assets, to make the route sustainable while respecting the identifying characteristics without disturbing the traditional landscape.

Specifically, in relation to huge tangible and intangible heritage, in recent years many projects, especially in the inland areas, started with recognition of the cultural landscapes and from the identification of cultural routes. Cultural landscapes, as defined by the World Heritage Committee, are produced by long-term interactions between human and nature in indigenous societies (UNESCO, 2015). In addition, cultural landscapes are the result of consecutive reorganization of the land by indigenous people in order to adapt the land's uses and spatial structures to fulfill the needs of the changing of demands of the society. They have been recognized as multifunctional landscapes that provide a multitude of services that benefit people: provisioning goods and products, regulating and supporting local resources, improving cultural services, etc. As a result, cultural landscapes have been highlighted for their importance in rebuilding a society that is better in harmony with nature. Therefore, cultural landscapes were added to the UNESCO world heritage site system in 1992,

with the following definition. Cultural landscapes are cultural properties and represent the "combined works of nature and man. They are illustrative for the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their environment and successive social, economic and cultural forces, both external and internal" (Campolo at al., 2016).

Cultural Routes Throughout the World

In this section, the Santiago de Compostela route and the Semmering Railway route, which were included in the UNESCO World Heritage List that has to be preserved as world heritage areas/routes, are introduced.

- **Santiago de Compostela Route:** The Santiago de Compostela Route, which was accepted as the first "European cultural route" through in history in 1987, is a pilgrims' route extending from the north of the French and Spanish border to Santiago, where all pilgrimage routes in Europe intersect on this route. There are approximately 1800 cultural assets with historical and religious characteristics along the Santiago de Compostela route, whose main objectives of which are to mark all pilgrimage routes in Europe on a common route and to create the best possible network by providing cultural cooperation at local, national and regional levels. This cultural route, where millions of Pilgrims are still walking today to reach Santiago de Compostela, played an important role in the religious and cultural exchange that took place between the Iberian Peninsula and the other part of the Europe during the Middle Ages. Due to these characteristics, the Santiago de Compostela route, which was included in the UNESCO World Heritage List in 1993, has not been accepted as one of the most important testimonies of the Christian faith since that period (Durusoy, 2013). Camino de Santiago is made up nine routes all of varying lengths, terrain, culture and natural beauty. These routes are; Camino Frances, Camino Portugues, Camino Portugues Coastal, Camino del Norte, Le Puy Route, Finisterre, Via de la Plata, Camino Primitivo, Camino Ingles (Follow the Camino, 2021)
- **Semmering Railway Route:** The Semmering Railway Route is the first railroad in Europe, built in the Austrian geography where construction conditions in mountainous areas are quite difficult. The construction of the

Semmering railway was completed between 1848-1854 under the leadership of Carl Van Ghega. There are 14 tunnels, 16 viaducts, more than 100 bridges and 11 small metal bridges along the Semmering Railway Route between Glognitz and Semmering on the route consisting of the emerged landscape areas. Therefore, considering the terrain conditions, when a new technical perspective was developed during the railway construction process, the Semmering Railway was entitled to be included in the UNESCO World Heritage List in 1998. Today, the Semmering Railway cultural route, introducing people a route where technology and nature are intertwined, opened the original natural landscape areas to tourism and brought along many accommodation services in its vicinity (World Heritage Semmering Railway - Management Plan, 2010). In 2021, there are approximately 40 countries cultural routes of the council of Europe with different themes contributing to the history, culture and tourism activities of Europe. Some of them having special emphasis are as such: Viking route, El Legado Andalusi, European Mozart Ways, Via Regia, Routes of the Olive Tree, European Routes of Megalithic Culture, European Routes of historical Thermal Towns, European Routs of Industrial Heritage and so on.

Cultural Routes Throughout Turkey

ÇEKUL Foundation (2015) has classified cultural routes into two groups in Turkey. One of them is the routes that were used for a specific purpose through in a historical period and the second one is routes created today for the purposes such as the development of tourism, supporting the development and preserving the heritage by using cultural heritage and natural heritage. The routes used for a specific purpose in a historical period are the roads that witnessed collective human movements such as trade routes, sacred routes, migration routes, military routes (such as Sultans Trail, Via Egnetia and independence route located within the borders of Turkey) and roads used by people who played an important role throughout a historical period (such as cultural routes of Evliya Çelebi Route, St. Paul's Route, Prophet İbrahim Route situated in Turkey). These historical routes, formed by social, economic, war, siege, administrative or religious sanctions in their own period, and take their current form through their interaction with the natural environment, are routes that can be considered in the organically develpoed cultural landscape category.

Table 1. Local, National and International Cultural Routes in Turkey (Prepared by Authors, 2021).

Cultural Routes	Theme / Activity	Related Institution	Level
Lycian Route	Coastal, Cycling	Association of Cultural Routes	International
Prophet İbrahim Route	History, Religion	Association of Cultural Routes	International
Via Egnatia Route	Culture, Peace	Association of Cultural Routes	International
St. Paul Route	Nature, History, Horse riding	Association of Cultural Routes	National
Evliya Çelebi Route	Nature, History, Horse riding	Association of Cultural Routes	National
Caria Route	Coast, History	Association of Cultural Routes	National
Kaçkarlar National Park Hiking Route	Nature	Association of Cultural Routes	National
Phrygian Route	History, Cycling	Association of Cultural Routes	National
Hittite Route	History, Cycling	Association of Cultural Routes	National
Ağrı Mountain Route	Nature	Association of Cultural Routes	National
Küre Mountains National Hiking Route	Nature	Association of Cultural Routes	National
Istiklal (Independence) Route	Bicycle	Association of Cultural Routes	National
Sarıkamış Route	Nature, Cycling	Association of Cultural Routes	National
Yenice Forest Route	Nature	Association of Cultural Routes	National
Gastronomy Route	Cycling	Association of Cultural Routes	National
Between Two seas Route	Cruising	Association of Cultural Routes	National

- **İstiklal Route (Independence Route):** Turkey is one of the significant countries where the liberation war took place. At the end of the 19th Century, it was established by the collaboration of volunteers and prisoners work. The part of İstiklal road İnebolu-Kastamonu trail of İstiklal Route consisting of 95 km within the borders of Kastamonu province was marked off by the Kastamonu Governorship and arranged as a walking path. It is a rich route having natural, historical, traditional and cultural landscape values such as İkiçay Valley, Çuhadoruğu, Ersizler Canyon, Karacehennem Strait, Ecevithan Çatal Pond and Doğanlar Castle (Anonymous 1, 2021).
- **Evliya Çelebi Route:** It is the first horse riding road of Turkey following Evliya Çelebi's Pilgrimage Route. The first step in the creation of the Evliya Çelebi road was the six-week discovery tour that took place on horseback in 2009 and this tour is designed by taking the detailed descriptions of Evliya

Çelebi compromises the Gulf of İzmit to Simav. Evliya Çelebi route includes natural and cultural landscape values such as İzmit Bay, İznik Lake, Beech *Fagus sp.* Forests, Altıntaş Roman Road (Anonymous 2, 2021).

- **St. Paul Route:** one of its branches starts from Perge, Antalya and the other starts from Aspendos uniting at the Ancient City of the island near Sütçüler, following the Isparta-Yalvaç route over Lake Eğridir. This Route, marked off by Kate Clow in 2004 and is approximately 410 km long, includes the route followed in Anatolia for the purpose of spreading Christianity in Anatolia (Baştemur, 2010). It includes important and unique natural and cultural components such as St. Paul's Road, Yazılı Canyon, Adada Ancient City, Kovada National Park, Eğirdir Lake, and Sagalassos Ancient City. Routes created today for the purposes of developing tourism by evaluating cultural and natural heritage, supporting development and preservation the heritage did not exist in the past, but today they are planned routes that are developed around a specific theme and where cultural and natural heritage values are used as the main resources. These routes can follow a virtual trail that connects heritage areas, while including historical trails. The Cultural Routes in Turkey such as Hittite Route, Karia Route and Phrygian Route set examples to routes with historical values and Kaçkar Mountains Hiking Trail, Kızılırmak Basin- Gastronomy Route, Mount Ararat, Kure Mountains Hiking Trail, Sarikamish Trail, Yenice Forests are exemplary routes as natural routes. Natural routes created in natural areas in order to minimize the pressure of tourism and routes created for the promotion of the works of civilizations that existed in the past, for the conservation and sustainability of natural and cultural heritage are rich routes in terms of natural and cultural landscape areas.
- **Lycia Route:** The Lycia Route is formed by the contribution of Roman roads, old trails and mule roads. The route was explored, designed and marked off by the amateur historian Kate Clow in 1999, starting from Fethiye and ending in Antalya. Sdyma, Pyndai, Phellos, Apelia, Theimussa, Letoon, Xanthos, Patara, Antiphellos, Apollonia, Idyros, Simena, Myra, Limyra, Gagae, Olympos, Sura, Belos, Phaselis archeological sites are located on the route of the Lycian route in which all of them are very significant ancient cities in the history of Anatolian civilization. Beside, ther are numerous *Pinus sp.*, *Arbutus unedo* and *Ceratonia siliqua*, *Juniperus sp.*

and *Cedrus sp*. tress in their qualified natural habitats in the natural forest area throughout the route.

- **Caria Route:** The Carian Trail, 800 km long walking path, extends towards the Southwest Turkey through the provinces of Muğla and Aydin. On this route, one can explore a region, which is highly rich in terms of ancient ruins of Greek and Roman settlements and profound history. The caravan roads paved with stone and mule pathways connect villages from the coast to the mountainous hinterlands. Pine forest cloaks and the mountain slopes as well as the olive trees terraces and almond groves have a substantial share in the economy of the region. Carian Trail, which is the longest trekking route (820 km) in Turkey, includes the provinces of Muğla and Aydin. The route is named after the Caria civilization, an ancient civilization settled on this area in ancient times. This walking route, with its unique architecture, passes through a number of villages, unspoiled bays, olive and almond tree hills, as well as small-scale and large-scale ancient cities with some of them only accessible on foot (Erdoğan and Göker, 2019).
- **Frig Route:** A contemporary and highly civilized civilization named Phrygia has been established around 3000 years ago in the geography spreading across the provinces of Afyon Karahisar, Ankara, Eskişehir and Kütahya cities. The trails of Phrygians, setting the heather alight with their legends, are long walking and biking routes on the international standards at the present time. The total length of the road, which is compromising of three main routes, is 506 km in length and the entire route is marked with red and white colors for the purpose of facilitating the tracking of the road. Magnificent ancient roads, with a width of 2 to 3 meters at certain locations, due to the tuff-rock structure predominant within the region, and interconnecting the ancient sites in Phrygia named as Gordion, Pessinus and Midas, constitutes the principal theme of Phrygian road. Starting in three main branches from Gordion (Ankara), Seydiler (Afyon Karahisar) and Yenice Farm (Kütahya), and proceeding towards the Phrygian territory, aligns in Yazılıkaya-Midas (Eskişehir) as the central location of the Phrygian civilization. The road follows splendid routes where the splendid monuments created by rock-scraping by Phrygians, and the unmatched works of Roman, Byzantine and Seljukian civilizations can be encountered, while bearing the traces of marginal touches of Phrygian harmoniously blended with nature

and history, as well as its breathing the relaxing atmosphere (Erdoğan and Göker, 2019).

- **The Hittite Route:** Anatolia, where different civilizations have been established and interacted with each other, is a synthesis of the cultural mosaic which that is important in human history. The area covering the ruins of Hattusa and Alacahöyük known as important Hittite Cities in Boğazkale district, which was declared as a national park in 1988, constitutes the main point of the Hittite Route. Hittite Road, is an important cultural route containing natural and cultural values and data about the history of Anatolian settlements in the prehistoric period such as Hattusa, Alacahöyük, Sapinuva Ruins, Yazılıkaya Midas Monument, İncesu Canyon, Alaca Valley, Evci Pond, Çatak Pond, Sogucak Pond, Kizilhamza Pond, Kalecikkaya Pond.
- **Kaçkar Mountains National Park Hiking Routes:** Kaçkar Mountains National Park is located within the borders of Rize, Artvin and Erzurum provinces covering an area of 51,550 ha. There are 7 villages and 33 plateaus in the National Park area. The national park has been designated as one of the "100 priority regions of the world" by WWF (World Wide Fund for Nature) because of the rare flora and fauna it has. A total of 75 taxon have been identified, 54 of which are endemic among the plants growing in the national park. The dominant forests along the route contain plants such as *Picea orientalis, Carpinus sp., Ulmus sp., Tilia sp., Betula sp., Populus tiremulus, Buxus sempervіresns, Corlyus sp.* and *Rhododendron caucasium*. In addition, there is a 1.5 ha *Buxus sempervirens* gene protection forest on the route. The only point in the world where the boxwood creates a forest is located in this area (Orman ve Su İşleri Bakanlığı, 2021).
- **Kızılırmak Basin- Gastronomy Route:** It is an ecotourism route in which the settlements extending along the Kızılırmak basin are blended with traditional and original food culture by benefiting from the cultural, historical and natural resources. Gastronomy Route is an itinerary where ruins of Hattusa, Yazılıkaya, Alacahöyük, Corum Museum and clock tower, Kapılıkaya, Osmancık Koyunbaba Bridge and Kandiba Castle, Kargı Hacıhamza Castle and Mosque, İstiklal Castle and Rock Tombs, Uğurludağ Resuloğlu and historical structures such as Sungurlu Clock Tower are located where culture and traditions can be experienced together (Anonymous 3, 2021).

- **Ağrı Hiking Route:** Ağrı is surrounded by mountains whose peaks exceed 3000 meters. The foothills of these mountains are covered with rocks and lava flows formed as a result of volcanic eruptions. Ararat mountain and the surrounding area, which is the highest peak in Turkey and Europe, has been declare as a national park in 2004. Ağrı hiking routes include Büyük Ağrı, Küçük Ağrı, Suphan Mountain and Köse Mountain peak climbs as well as the trails of Balık and Küp lakes. These routes are the itineraries allowing more specific activities such as hiking, trekking, climbing and mountaineering.
- **Küre Mountains National Park Hiking Track:** The field study of the hiking routes made within the scope of the ecotourism project of the Küre Mountains National Park Directorate was completed in 2010. The borders of the national park consist of Azdavay, Cide, Pınarbaşı, Şenpazar districts of Kastamonu province and the districts of Kurucaşile and Ulus of Bartın province. Among the selection criteria determined by the World-Wide Fund for Nature (WWF) for the protected regions, there are factors such as the integrity of the area, biological diversity, wildlife, endemism, rarity, vulnerability, and the importance of threats. Out of 637 plant species growing in Küre Mountains, 33 of them and 40 of 132 mammals are endemic and 129 bird species exist. Küre Mountains which has rich diversity of flora and fauna is listed among 100 hot points across the world and among 9 hot spots in Turkey by the World-Wide Fund for Nature (WWF). In this manner, it is one of the important areas functioning as a cultural route (Kaçkar Mountain National Park, 2021)
- **Sarıkamış Tracks:** Sarıkamış is an important settlement area because it is located on the route of Anatolia to the Caucasus and where different tribes have lived. The first traces of life in the region, is dating back to 9000 BC, belonging to the chalcolithic period and early bronze age periods. Following those periods, the traces of many civilizations such as Hurri, Scythian, Med, Parth, the Armenian kingdom of Bagrat, Roman, Sassanid, Byzantine, Seljuk and Ottoman are see(Anonymous 4, 2021). Sarıkamış hiking tracks are especially spread over the area where the yellow pine forests are integrated with the district identity and reach a total of 256 km on 21 different routes. It is a significant and unique cultural route with its natural and cultural values**.**

- **Yenice Forset Cultural Routes:** In 1999, the Worldwide Fun for Nature (WWF) identified one hundred (Hot Spots of European Forests) regions in terms of having extraordinary biodiversity requiring prompt conservation. The Yenice Forest in the Province of Karabük is identified as among the nine "Hot Spots" of Turkey. The route has been created as a part of the project instigated by the Governorship of Karabuk and the Administration of the District of Yenice in October 2009. 21 trails have been marked along 210 kilometers, and together with the alternative trails, the length of the total route is 396 kilometers. The trails are classified either as daytrips, short trips or long trips and include forest roads and pathways. The length of the mountain bike trail is a total of 292 kilometers. Trail marking is in accordance with the international "Grande Randonnée" system, in where the red and white paint markers and signposts mark the beginning, end and junction points of the route. Subsequently, the trails are extended towards Eskipazar (Karabük) including the ruins of Hadrianoupolis. 8 more paths have been included and the extended project is then called as 'Trekking Routes from Nature to History – Eskipazar' (ÇEKÜL, 2015). Yenice Forests, with its monumental trees, considered to be quite unique and rare within the world except for the tropical areas, verdant valleys, mountains up to the altitude's of 2000 meters, deep canyons, rivers, surprising falls, wild life and the botanical diversity has been recognized and acknowledged as a real ecotourism center for various outdoor activities. In addition to daily or camping walking trails and biking routes, such activities, among others, like rock-climbing, bird watching, photo safari, botanical hiking, rafting and paragliding can be performed within this area accordingly.

Sultans Cultural Route

The road network of the Ottoman Empire, which covered a wide area in three continents, such as namely Asia, Europe and Africa, can be addressed in two categories referred as the road network of Rumelia and the Anatolian road network.

- **Road Network of Rumelia:** Rumelia and Balkan Lands, which have an important geographical location due to being a connection between Asia and Europe, in other words connecting east to west, have been used as a

two-way (return) route in every period of world history. There are three main roads connecting İstanbul; the capital of the Ottoman Empire, to the western Black Sea and Crimea to the Balkans and central Europe, and Greece and the Adriatic Sea, and there are secondary roads connected with these roads. According to Halaçoğlu (1982), the names of all of these roads are such as;

- **Right Route:** This route is the main transportation axis connecting İstanbul with the western Black Sea and the Crimea. This route starts from the capital İstanbul (Dersaadet) and extends to Büyükçekmece, Çatalca, Vize, Kırkkilise, Prevadi, Karasu, Babadağ, Akkirman road until to Özi and Crimea. Today, the destination is out of Turkey's borders extending to Bulgaria, Romania, Moldavia and Ukraine.
- **Middle Route:** is the road of central Europe. Today, settlements outside the Turkish border; after Edirne are located within the borders of Bulgaria, Macedonia, Serbia, Croatia and Hungary. The main road starting from İstanbul to Belgrade through Büyük Çekmece, Silivri, Çorlu, Karıştıran, Lüleburgaz, Babaeski, Havza, Edirne, Cisr-i Mustafa Pasha (Sivilengrad), Filibe, Sofia and Nis were extended until Budin for a certain period.
- **Left Route:** covers İstanbul, Silivri, Rodoscuk (Tekirdağ), Malkara, Ferecik, Dimetoka, Komotini, Pravishte, Lanzaka, Larissa to Istefe (Tabai), and it covers the destinations of Gordüs with Eğriboz.

The most widely used and the most significant one is the Middle Route among these three main roads. The route, formed within a system during the Roman Empire for the first time, was built for military purposes before the Ottoman period. The name of this road connecting Signidinum (Belgrade) and Byzantion/ Costantinopolis (İstanbul) during the Roman Period is Via Militaris (İreçek, 1990). On the way, there are great cities such as İstanbul, Edirne, Sofia, Niš and Belgrade that have been important throughout history, as well as settlements that fall within the scope of medium and small-scale villages, towns and districts. Structures such as residences, mosques and bridges were built in these lodging areas referred as "Menzil" arranged around "Menzil" complex. In line with the research, it was found that the sultan/ state road also known as "İstanbul Street", "Grand Road", was built between Istanbul and Edirne, especially at destinations with certain distances, structures such as complexes offering religios, social facilities to travelling and accommodation people and

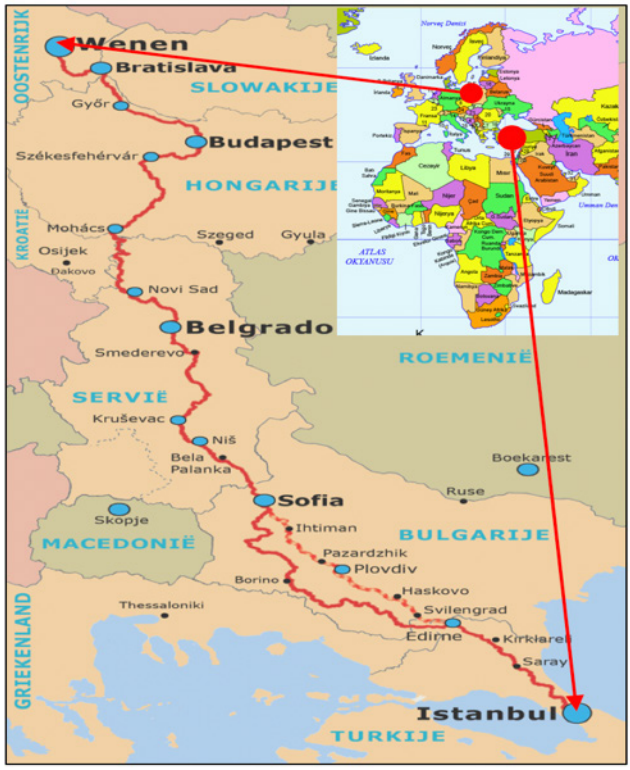


Figure1. Route of Sultans Route (Anonymous 5, 2021)

Hambeli bridge were constructed. Most of the buildings were designed by Mimar Sinan the Sultan's architects (Özkaya, 1977).

Middle Route (Via Militaris)" and "Right Route" are the other route used also during the Ottoman Period. Sultans Trail is a hiking track that includes the expedition routes in the First and Second Vienna Siege. The route covers many countries such as; Austria, Hungary, Croatia, Serbia, Bulgaria, Greece and Turkey. This route, which was built for the purposes of war and siege in its own period, was later shaped according to cultural and social uses. With this feature, Sultans Trail is a route that can be considered in the category of "Organically Emerged Cultural Landscape" which is one of the three types of cultural landscape as a whole. The natural and cultural assets on the Sultans Trail are classified according to the cultural route components of the ÇEKÜL Foundation. Cultural routes are classified in three categories as the most basic components, tangible and intangible cultural heritage elements and natural formations. When it is examined in detail, the components of the cultural route that vary according to its main theme, function and scope components

according to ÇEKÜL Foundation (2014); Historical Cities: consists of urban areas that stand out with traditional urban patterns and unique urban identities. Archaeological Traces: consists of archaeological sites such as ancient cities or individual structure remains (castle, church, cistern, etc.). Historical Structures: consists of buildings in or in rural areas such as mosques, churches, castles, bridges, mills and industrial buildings. Natural Environment/ Natural Values: consists of natural assets such as valleys, canyons, mountain tops, coasts, lakes, etc. with different characteristics. Protected Natural Areas are classified as national parks, natural parks, wetlands and monumental trees. Accordingly, some natural and cultural values on Sultans Trail are given in table 2.

Table 2. Some Natural and Cultural Heritage on Sultans Cultural Route

Sultanlar Yolu Kültür Rotasındaki Bazı Doğal ve Kültürel Varlıklar		
Routes (Cities)	**European Route** Sofia, Nis, Belgrad, Novi Sad, Osijek, Budapest, Bratislava, Wien	**Turkey Route** Edirne, Süloğlu, Kırklareli, Pınarhisar, Vize, Saray, İstanbul
Historical Cities	Osijek, Zigetvar	Edirne, İstanbul
Archaeological Traces	Osijek Bridge	
Historical Structures	St. Stephen's Cathedral, Zigetvar Castle, Gazi Kasım Pasha Mosque, Petrovardin Castle, Mustafa Pasha Bridge	Meriç Bridge, Tunca Bridge, Selimiye Mosque and Complex, Hızırbey Complex, Hacı Adil Bey Fountain, Topkapı Palace
Natural Environment/ Natural Values	Meric River, Neusedler Lake, Vitosha Mountain, Arda River	Meric River, Tunca River, İğneada Longoz Forests
Protected Natural Areas	Furshka Gora National Park, Swinkell National Park	İğneada Longoz Forests

Important Natural and Cultural Values of Sultans Route

- **Vienna St. Stephen's Cathedral-Austria:** It is a cathedral Route in Europe in gothic architecture built in 1365, located in the city center of Vienna. The cathedral is located in Stephansplatz Square bearing the same name. The tower of the cathedral was used for defense against the Ottomans; soldiers posted in the tower to mount guard all day and ring the bell of the church in case of danger in order to announce any Ottoman attack that might come.

The 21-ton bell in the north was made by melting weapons and cannons from Ottoman raiders (UNESCO, 2001).

- **Lake Neusiedl- Seewinkel National Park– Fertö/ Australia:** Lake Neusiedl is the second largest closed basin in Europe, located between Austria and Hungary. This protected area has a unique site landscape reflecting the cultural landscape of the region. Seewinkel National Park is also Austria's largest Ramsar region. In the Neusiedler Region, where *Quercus sp.* forests prevailed before human interventions such as agriculture, animal husbandry and trade, the steppe landscape is dominant today (Ronald, 2021).
- **Szigetvar Castle- Szigetvar, Baranya District / Hungary:** Before the conquest of Zigetvar city by the Ottoman Empire the city was mainly formed three parts namely (Szigetvar Castle), the old and the new town areas and the three parts of the city surrounded with water-filled moats which were connected to each other by bridges. Szigetvar Castle, the last castle conquered by Suleyman the Magnificent in 1566, was used as the starboard center during the Ottoman Period (Aydınlı, 1966).
- **Gazi Kasım Paşa - Pécs/ Hungary:** Gazi Kasım Paşa mosque, located in the city of Pécs, Hungary, was built between 1543-1546 by Gazi Kasımpaşa. The minaret of the mosque was demolished by the Jesuits (Christian sect) in 1766 and serving as a Catholic church today. The main place of worship of Gazi Kasım Paşa Mosque has a square plan scheme with internal sides 16.36 m. in size. Each exterior facade is 19.45 m. and the top of this place is covered with a wide dome with a diameter of 16 m. The facades of exterior walls covered with cut stone have classical arched Turkish windows. However, when the building was used as a church, these windows were changed and some of them were closed (Yılmaz, 2019).
- **Osijek Bridge (Suleiman Bridge)- Osijek/ Croatia:** Osijek is a city located in the front of the Drava River River in Croatia. Osijek, which was established as a colonial settlement under the name of Mursa during the Roman Empire in 131 AD. was transformed into an Ottoman city as a result of development activities and named as Osijek in 1526 After being conquered by the Ottoman Empire in 1526. Suleyman the Magnificent had built the Osijek Bridge built on the Drava River in 1566 (Tanyeli and Tanyeli, 1990)
- **Fruška Gora National Park, Vojvodina, Belgrade/ Serbia:** Fruška Gora is the most dominant orographic unit in Northern Serbia. The largest part of

Fruška Gora is located in Vojvodina, while a small part is spread over the eastern Croatia. The flora on Fruška Gora Mountain is diverse and special. There are approximately 1500 plant species, 211 bird species, 60 mammal species, 24 amphibian and reptile species. The forest complexes prevail at high altitudes. The most important tree species are: *Quercus petraea, Carpinus betulus, Tilia argentea* (Vujko and Plavsa, 2014).

- **Banyabaşı Mosque, Sofia/ Bulgaria:** The Banyabaşı Mosque which was built in Sofia, the capital city of Bulgaria, was designed by Mimar Sinan. The mosque, which was completed in 1566 is the only mosque open to worship in Sofia. The plan scheme of the mosque is formed of a square space covered with a single dome combined with a plan for late cowers space with three parts.
- **Rila Mountains, Bulgaria:** The Rila mountains are located in the north west of Bulgaria which is 100 km away from the capital Sofia. The glacial erosion that occurred in the Quaternary period on the hills of Rila Mountain caused the formation of many lakes. There are more than 1400 hundred plant species in the Rila Mountains, in which some of them are rare endemic species. Species such as (Rila Cowslip, Lady's Mantle and Rila Rhubarb) are threatened with extinction (UNESCO, 1983).
- **Old Bridge or Cisri Mustafa Paşa Bridge Svilengrad/ Bulgaria:** It is a town located in the Haskova province of Bulgaria on the edges of the Meriç river which is 32 km away from north west of Edirne, near the Turkey-Bulgaria-Greece and Bulgaria. This place was chosen as a settlement center in the period of Suleyman the Magnificent and Bosnian Mustafa Pasha, the son-in-law of Yavuz Sultan Selim, and known as "Shepherd" or "Veteran", one of the viziers of the period, had a bridge built here on the Meriç river with under his name. Along with 18 Bridges, a "han" building and a bath were also built. Afterwards, Haseki Hürrem Sultan, the wife of Suleyman the Magnificent, had built a large mosque, school, almshouse and a mill next to the bridge (Akın, 2020).

Natural and Cultural Heritages values of the Sultans Routes in Turkey

Seferyolu (expedition road) Route: this route is passing through Kapıkule, Sırpsındığı, Edirne, Kocasinan, İskender, Oğulpaşa, Ottoman, Köseömer,

Babaeski, Lüleburgaz, Çorlu, Silivri, Selimpaşa, Büyükçekmece to Eyüp Sultan and Topkapı Palace. The road follows the old expedition route and is parallel to the current to highway.



Figure 2. Cultural Route on Sultans Trail (Anonymous 7, 2021)

- **Edirne:** Edirne was first established by the odyssey of the Thracian tribes and was known as the Odeon during the Thracian period. Edirne City is an important border settlement reflecting the urbanization and structural qualities of early Ottoman period situated in the European/Trakya part of Turkey (Erdoğan, Kuter, 2010). The city, which was later captured by the Roman Emperor Hadrianus, was named Hadrianapolis in 124 A.D. The city, conquered by Sultan Murat I in 1361, was the capital of the Ottoman Empire for 92 years (Anonymous 8, 2021).
- **Karaağaç Road Lozan Street Edirne/ Turkey:** Karaağaç is a quarter in the central district of Edirne and named after *Ulmus sp.* forests. Söğütlük City Forest, Meriç Bridge, Tunca Bridge, Historical Train Station and Hacı Adil Bey Fountain are important cultural assets located on the historical causey extending to Karaağaç (Edirne İl Kültür Turizm Müdürlüğü, 2021). Plant species in Söğütlük Urban Forest consist of; *Salix alba, Ulmus laevis, Acer negundo, Cercis siliquastrum, Populus tremula*.
- **Hacı Adil Bey Fountain/Edirne:** Governor of Edirne, Hacı Adil Bey had built this Fountain in 1904 and it is located at the beginning of the Karaağaç Road where the Meriç Bridge ends. The facades of the fountain built with marble in the Baroque style are plain. There are inscriptions on all four sides of the fountain. The fountain, covered with a wide wooden eaves, was repaired by Edirne Municipality in 2000 (Karademir, 2007).

- **Meriç Bridge:** Sultan Abdülmecit had built the bridge which is still used today between the years of 1842-1847 which was decided to be constructed during Mahmud II. Period. The bridge connecting Edirne city center to Karaağaç is located on the Meriç River and is also known by many different names such as "Meriç, Mahmudiye, New, External, Second, Sultan Mecid and Mecidiye Bridge". This building is the latest among Edirne bridges due to its inscription panel. It is known that stones of the bridge were brought from the surroundings of Arnavutköy and the ruins pf ancient settlement used in its construction, and also in Edirne Demirtaş Pavilion (Harmankaya, 2018). This bridge, which is 263 meters long and 7 meters wide, is a stone bridge with 12 pointed arches on 13 abutments and is sloped to the sides (Uluöz et al., 2015). There are also drain sections between the abutments. Pavilion located in the middle of the bridge, was built with marble.
- **Selimiye Mosque and Complex/ Edirne:** Selimiye Complex is located in the urban archeological site within the scope of the 1/1000 scale Conservation Master Plan approved by the decree of Edirne Regional Board of Cultural and Natural Heritage Preservation dated 25.05.1988 and numbered 37. Within the complex, the mosque and the court of porch with a fountain adjacent to the north, two madrasahs (darü'l-kurra and darü'l-hadis) built on the east and west ends of the south facade of the mosque and the primary school, library, "muvakkithane" (timinghouse for ezan) and the tomb is located. Currently, the social complex covers an area of 22.194 m2 (Sav, 2019). The Complex was designed and built by Sinan as a climax of his architectural ability reflecting all the qualities of classical Ottoman period. The complex is acting as a religious, educational, commercial and social center in its period.
- **İğneada Lengoz Forests National Park (İLOMP)/ Kırklareli:** ILOMP is located within the borders of Demirköy district of Kırklareli and at the foothills of the Istranca (Yıldız) Mountains with a climax of the highest point of 1031 m. The Global Environment Facility (GEF) II Biodiversity and Natural Resource Management Project was carried out between 2000 and 2007 in a wider area, including the borders of the National Park. In line with the outputs of this project, the area declared as Saka Lake Nature Protection Area (1345 ha) on 29.04.1988 was expanded and designated as İğneada Longoz Forests National Park (3155 ha) and was declared as a

national park in 2007 in order to protect its natural resource value (Özdemir, 2019). In the Longoz forest ecosystem; in addition to the tree species such as *Alnus glutinos*a and *Fraxinus angustifolia* and *Quercus robur* and climbing species such as *Clematis viticella* and *Smilax excelsa* are the most distinctive features of the forest.

- **Vize Antique Theater (Odeon)/ Kırklareli:** Vize (ancient Bizye) is located within the provincial borders of Kırklareli, on the northwest slopes of the Istranca-Yıldız mountains. Vize is located in the north of the military road which was one of the most important roads in the Balkan Peninsula in ancient times, starting from Belgrade, passing through Edirne, along the Marmara Sea coast and reaching to Istanbul (Külzer, 2008). Vize theater, located on the southern foothill of Çömlek Tepe, was unearthed during archaeological excavations between 1995-1997 (Yılmaz and Sipahioğlu, 2005). Visa Theater is the only known Roman theater within the borders of Thrace. The direction of the theater points to the south, and it is argued that the theater, which is considered to be medium-sized, has a capacity of 3 thousand audience (Kolektif, 2006).
- **Topkapı Palace, Istanbul:** Topkapı Palace, the oldest and the largest of the Ottoman palaces that survived up today, is located in the east of the city, starting from the rear part of the Hagia Sophia, in the part where Istanbul was first established referred to as Sarayburnu Peninsula overlooking the Golden Horn, Bosphorus and Marmara Sea.

The area covered by Topkapı Palace is approximately 700,000 square meters. The buildings cover approximately 80,000 square meters of this area. The Saray-ı Cedide-i Amire, planned as a castle-palace, was surrounded by walls referred to as "Sur-ı Sultani" and by Byzantine period walls from the seaward. The palace has walls approximately with a total length of 3,300 meters consisting of landside walls of 800 meters and the seaward walls approximately 2,500 meters (Ortaylı 2007).

The New Palace, is a complex established by the continuous addition of new buildings starting from the period of Sultan Mehmed the Conqueror of Istanbul to the period of Sultan Abdülmecid. In other words, from the middle of the 15th Century to the middle of the 19th Century. During this period, the sultans had built different numerous buildings, flats, halls, rooms, baths, masjid, library, pavilions and mansions spontaneously in this area throughout history. This

unique palace, each part of which is called by a different name, was referred to as the New Palace until the 19th century, and at the beginning of this period, the name of New Palace was changed as Topkapı Palace (Koçu 1951). The gardens of Topkapı Palace are designed as courtyards in line with their spatial functions. The courtyard, entered from the Bab-ı Hümayun, the main gate, is the "first courtyard" which is also referred to as Alay Square positioned outside the official palace and connects the official palace and the city. The 'second courtyard', also referred to as the divan or justice square is reached from the middle gate referred to as Babüsselam and the third courtyard also known as the Enderun Square is the forbidden area belonging to the sultan and his family, passing through the Akağalar Gate, also known as Babüssade. Unlike other courtyards, the 'fourth courtyard', also referred to as Suffa-i Hümayun due to its being used privately by Sultan and his family is a collection of gardens overlooking to the unique view of the nature and especially the Marmara Sea and the Bosphorus and was built on four terraces arranged in sets on different levels. This courtyard, consisting of a courtyard and gardens partially, has been connected to other parts through many courtyards, stony pavements and porticoes.

Conclusion

Marmara Sultans Route is an itinerary with many cultural heritage values and cultural assets as it was used as a military road during the Ottoman period. In addition, since the route covers countries with different cultural and civilization remnants such as Austria, Croatia, Bulgaria, and Turkey, it integrates cultural assets with different qualities and diversity in the same route creating a rich variety of natural and cultural values. In addition, since this diversity includes different geographies, it also includes many different and unique habitats such as Fruska Gora National Park in Serbia dominated by the steppe landscape, the largest floodplain forestland ecosystem in Turkey with a rich natural environment in terms of habitat and biological diversity, the largest alluvial floodplain forestland of Europe known as İğneada Longoz Forests in Turkey. Sultans Route, which includes many monumental buildings, Mustafa Paşa Bridge, Meriç Bridge, Tunca Bridge, Hızırbey Complex, Selimiye Mosque, and Complex is one of the significant cultural routes of Turkey with all of these natural and cultural assets.

In order to protect and preserve the rich, natural and cultural heritage on the route of Sultans Trail, organized efforts studies should be conducted not

only with individuals and groups related to trekking, but also with relevant professional groups such as tourism planners, archaeologists, architects, ecologists, landscape architects and urban planners. Along the route, along with the route markings, introductory and informative signs should be included (by providing detailed information about the endemic plant species and monumental structures found in natural landscape areas) to ensure that the visitors get to know about the cultural and natural values. Observatory areas with high visual landscape values such as summits and hills covering the route and where natural and cultural landscape values are perceived should integrally as a whole should be established.

Historical routes are the historical documents of the civilizations which create them and they are the rich cultural accumulations established by these civilizations that were transferred from the past and should be transferred to future generation. As mentioned by the examples (Sultans Route, İstiklal Route, Hittite Route, etc.), the historical roads, which transform the cultural routes of such potential areas such qualities and life styles of different civilizations reflect cultures and history up today, have been interpreted in different ways and presented to the visitors by considering the values as a whole. In this context, historical routes reinterpreted with the values of sustainability in addition to the aesthetic and artistic, education, documentation, function, symbolic, social and/or economic values, have been areas that increase the general quality of life in their homelands by reviving the traces of history at the present time.

Cultural routes that reflect the life styles and cultural characteristics of different periods and civilizations, and natural and cultural landscape areas consisting of natural and cultural heritage elements, are among the most important elements that determine the identity of these areas. The historical roads such as the Sultans Route addressed within the scope of the study which functions as a bridge between the past and the future, should be considered as an opportunity in terms of their contribution to nature and shaping the social life (with natural landscape, cultural landscape, urban and rural landscape areas). In order to prevent their loss or deterioration, they should be conserved to be free from threats and protected, developed and kept alive as a whole with cultural values that they make sense together.

In conclusion, cultural routes are the roads that focus on the natural and cultural environments in urban and rural areas because they are socially, historically, spatially unifying and protective, aiming to preserve and ensure

the sustainability of natural and cultural heritage values. Therefore, the holistic protection potential of cultural routes should be used effectively, especially in a process where natural and cultural assets are rapidly by damaging day by day. Cultural routes contribute the promotion of Turkish identity through knowledge and awareness of the common heritage of Anatolia belonging to numerous unique civilizations and the development of cultural links both at national and international scales. It gives way to form a common cultural space through the development of cultural routes with different themes encouraging sensibility towards rich natural and cultural heritage of Turkey.

Cultural routes have to be planned and designed systematically with reference to their specific goals and themes in a progressive manner. An integrated planning approach should be established considering the physical and aesthetical values of the environment as well as social, cultural and economic values of the cities that they are linking. Besides the management planning of the cultural routes should also be defined according to the component of each route specifically as well as its conservation plan and its management with a self-sustaining and holistic understanding. Natural, men-made, cultural, social, functional, economic, visual and aesthetical context of cultural routes should be evaluated and assessed sensitively in order to make healthy decisions for the future of these routes, places, countries and regions, on the other hand, community groups should be encouraged to take part in safeguarding the heritage values on cultural routes and heavy common activities should be avoided in order not to cause damage to the sites, natural and cultural values.

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CHAPTER XV

A MODEL PROPOSAL TO READ THE MEMORY STRATAS WRITTEN ON THE LANDSCAPES

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1. Introduction

Landscapes rebuild themselves repeatedly because they are living systems. The changes in the landscape leave traces over time. These traces are a vital record of our comprehensive history; nonetheless, these records are not written documents (Hoskins, 1955). The landscape contains lots of tangible and intangible data concerning natural and anthropogenic activities. These activities create a medium in which landscapes evolve based on the interrelated effects. Thus, it is essential to understand the changes within a landscape to ensure the continuity of landscapes processes and develop resilient landscapes.

Each landscape is unique with its memory (Brierley, 2010); each memory layer in landscape must be read from a holistic perspective. The holistic evaluation of landscape memory shapes the natural and cultural context of contemporary landscape designs. Designing landscapes separate from its embedded memory codes makes designed landscapes irrelevant and vulnerable. Designing landscapes detached from anthropogenic memory codes generate places without identity and a sense of belonging. When the landscape designs disregard memory layers, landscape practice will overlook the site's heritage, hence misinterpretations of its unique character.

The present essay aims to present a holistic model for the systematic reading of landscape memory. It asks whether the landscape can remind and remember natural and anthropogenic processes and how these memory layers can be read systematically.

The logical structure of the present work contains three stages; 1- to explore the definitions of landscape in literature, 2-to understand the parameters of landscape memory, 3- to create a holistic and systematic model for landscape memory.

To explore terminology related to landscape and landscape memory, we utilized Graph Commons software and reclassified the outputs with Lipsky's (2009) landscape character assessment approach. Finally, all the parameters and the sub-parameters emerged in the format of codes of memory. These codes guide designers and planners to look holistically at the spatial and temporal dimensions in the landscape.

2.1. Definitions of Landscape

The landscape has been defined in different ways by various researchers and experts historically. The landscape definition starts with a naturalist, explorer, and geographer Alexander von Humboldt (Figure 2.1). Humboldt defines the landscape as a "total character of a region" (Potschin & Bastian, 2004). Henry David Thoreau, a contemporary of Humboldt, also emphasizes "natural landscape" like Humboldt (cited by Ndubisi, 2014). In 1864, George Perkins Marsh added the concept of cultural landscape to the definition, emphasizing that culture is an integral part of nature (Ndubisi, 2014). Aiming to engage nature and humans in the new garden city concept, Ebenezer Howard expands the cultural landscape concept at the urban scale. Being the pioneer of cultural landscape studies, Carl Sauer adds the space, time, and natural vegetation meaning to the landscape (Sauer, 1925). Sauer is the first person to use ecology with space, time, and natural vegetation (Sauer, 1925).

In the late 1930's Carl Troll used the term "landscape ecology" to explain the reciprocal structure and function relationships in landscapes. Landscape ecology is the prevailing paradigm even today. The pattern and process relationship has been constituting a promising methodology for contemporary landscape architecture practice for more than half a century.

After emphasizing natural and cultural content in the landscape, geographer Edward Relph discussed it as a place phenomenon in 1976. Relph states that

transforming land into a physical and visual form, so-called "the place," is only possible by landscape medium (Relph, 1976). The emphasis on place continues to get stronger after Relph (Jackson, 1984; Sack, 1980) transforms the landscape into a place by purifying it from a physical phenomenon. This definition also strengthens Sauer's definition of the cultural landscape. The close relationship between the individual and environment helps give meaning and richness to space and create a place. This human-place relationship formed by human activities develops human beings' idea of natural and anthropogenic interventions in spatial usage practices. The human constantly recreates the space with the traces of the cultural past and transforms it into a place. This conversion includes a history as well as the current period. Guelke also states that different land use styles reflect the way of thinking, that is, the culture of the communities living in that area (cited by Holt-Jensen, 2017). Sauer's emphasis in 1925 reminds us that the landscape is a constantly changing system rather than a static one. Human perception and time description of the landscape become stronger with Marc Antrop in 1997. While the landscape is placed on a cultural and natural landscape by the European Landscape Convention in 2002: *"Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Article 1a),* (*European Landscape Convention*, 2000)

In this emphasis, Lyn-Leader Elliott re-expands the concepts of space, human activity, time, and culture (Leader Elliott, 2004). The landscape includes natural life and cultural life; however, it also contains intangible values. In 2008, "the sense of place" becomes an important term in landscape discussions (Taylor, 2008). Taylor's addition connects the landscape with anthropocentric and ecocentric poles. The place is now both a geographic, natural, and spatial task, creating the landscape. This formation reflects the spirit of the place when the natural and anthropogenic memory strongly feeds it. It increases the resistance of the flora and fauna, hydrology, climate, and topography in a landscape and strengthens the relationship between humans and land.

Although the term "landscape" was in the focus of the scientific realm since the 19th century, the studies specifically exploring landscape memory emerged almost at the end of the 20th century (Figure 1). In the pioneering book of Simon Schama in 1995, "Landscape and Memory," the landscape was investigated culturally and combined with myths. Schama also included the natural landscape in the memory reading (Schama, 1995). Santos-Granero

(1998) assessed the memory of landscape in the perspective of cultural landscape: legends, performances, oral history, place names. The place-name provides to read for the landscape memory directly. Thus, Guo (2003) took the subject with place names and identity. Landscape memory parameters evaluated within the scope of the cultural landscape by Leader-Elliott (2004) and highlighted by Whyte on space-belonging and place in 2007.

In 2008, Ken Taylor determined the landscape memory parameters with the identity and place, while Balej et al. (2010) selected the parameters as land use, memory, culture. has been added to memory and culture. Brierley (2010) approached the subject in terms of hydrology, geology, and climate. Skalos and Kasparova (2011) deepened the notion and included anthropogenic factors, land use, place, topography, and land cover to read the memory of a landscape. At the same time, Lewis (2013) analyzed the landscape memory with the natural landscape elements, memory, history, and culture; Hill (2013) taken the subject with remembering, belonging, and memories. After three years, Ortmann-Ajkaia et al. (2013) selected Brierley's (2010) model and added anthropogenic factors, topography, and flora to the hydrology, geology, and climate titles. While Logan (2011) added the concept of place to read the memory of a landscape, Kolen (2017) addressed the subject based on the traditional and regional characteristics of the landscape. The parameters in this context were determined by conventional information such as land use, climate, hydrology, topography, and flora, while artistic products in regional characteristics, memories, belongings, oral history information, identity, and place names. Gagnon (2018) emphasized two pillars of landscape to read landscape memory: Natural landscape and cultural elements.

2.2. Parameters of Landscape Memory

In his "Present Changes in European Rural Landscapes" article, Lipsky examines the landscape in three groups; natural landscape (geomorphology, water, soil, natural vegetation), human uses (land cover, land use), and cultural values (historical events, traditions, memory, culture, etc.). The natural landscape category refers to natural memory, human-based uses, and cultural values refer to anthropogenic memory. We utilized Lipsky's landscape typology and character assessment classes (Lipský, 2010)workshops and seminars dealing with the topic of landscape changes, the seminar Landscape change and its

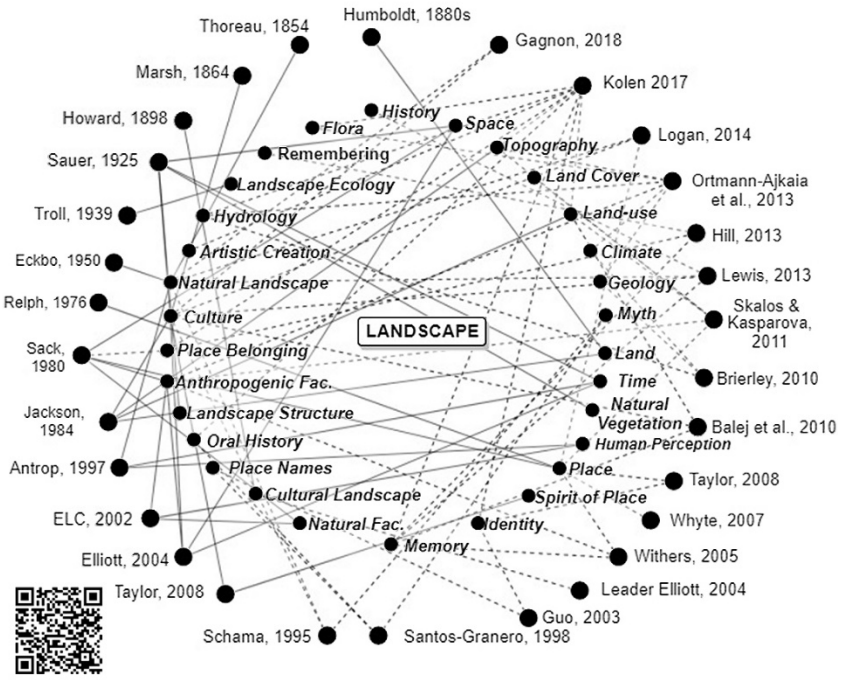


Figure 1: The evolution of landscape definitions and landscape memory studies in literature.

ecological consequences in Europe held in Tilburg in 1995, from which the important report on the state of land use and landscape change in EuropeEurope in the 1990s was published (Jongman to reclassify the literature map as an input to the landscape memory model (Figure 2.4).

Subsequently, since natural events and natural landscape are inclusive, such parameters have been evaluated directly under the natural memory. Natural memory relies on biotic and abiotic factors according to the functional hierarchy system of landscape character (Lipský & Romportl, 2007) (Figure 2). According to the functional hierarchy system of landscape character, abiotic factors include climate, hydrology, and geomorphology; and the biotic factors include flora and fauna. Geomorphology refers to landforms formed by natural or artificial elements and the analysis process of landforms, topography, and ground layers in landscape architecture design and practice.

Cultural values and human-based uses construct Anthropogenic memory, which relies on the place-space-based codes and social-cultural codes. Cultural

codes of landscape memory include social life and place names, traditions, cultural outputs, while place/space-based codes include land use and land cover. Place/Space-based codes concern land use and land cover.

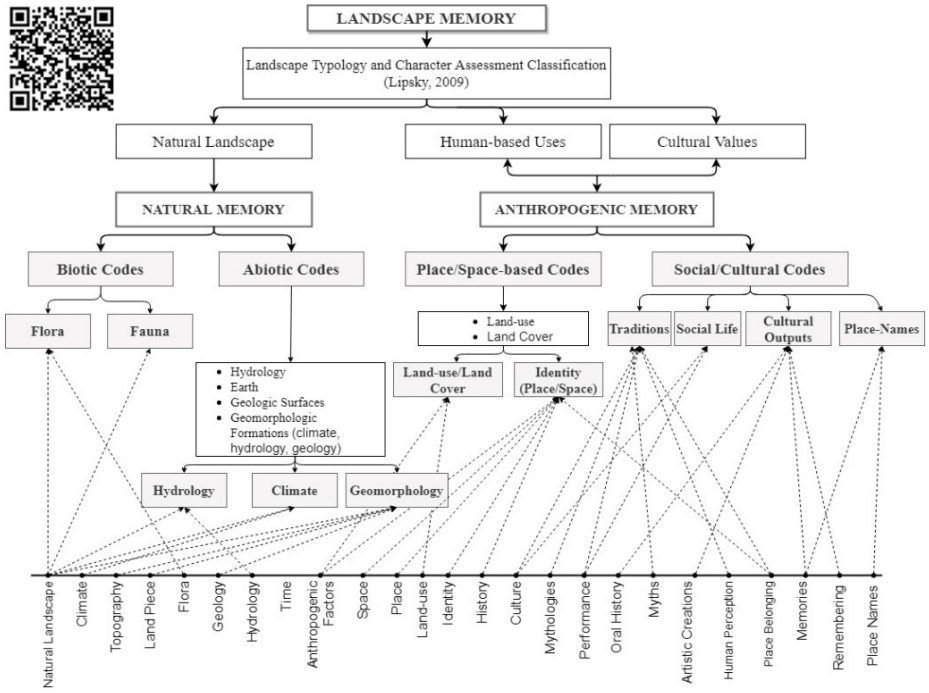


Figure 2: Systematic classification of the landscape memory.

Altogether, the systematic classification of Natural Memory and Anthropogenic Memory codes yielded 25 parameters. We then performed another critical evaluation and reduced the parameters to 11 to achieve an optimal set, gaining a holistic and easily understandable model to read the landscape memory (Figure 3).

3. Landscape Memory Model: The Codes of Landscape Memory

Our model consists of two parts: natural memory codes and anthropogenic memory codes. Natural memory concerns abiotic factors representing inorganic elements and biotic factors representing organic elements. On the other hand, anthropogenic memory consists of social and cultural codes and place/space-

based codes. Because the memory has strong ties with time passing, the model includes the "temporality" with an intangible scale. A temporal depth is needed to build a memory, and a time dimension is essential for experience to be a memory. Time, which is one of the concepts that constitute the definitions of the landscape in the scientific memory, is the main reason for the physical and cultural changes occurring in the landscape. The landscape itself is in constant fluctuation. Consequently, the model predicts that landscape memory is unable to be read solely with existing layers. Instead, it requires a holistic reading process with historical layers in a timeline.

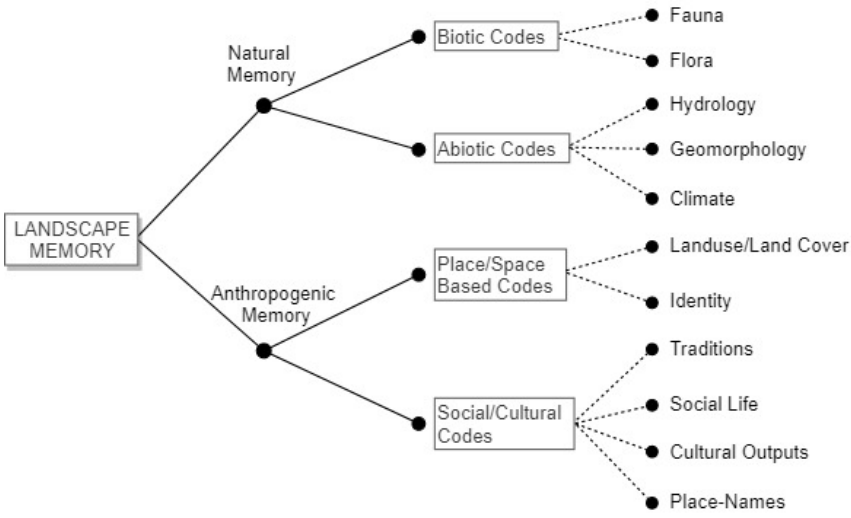


Figure 3: Landscape memory model.

3.1. Natural Memory Codes

The landscape offers a threshold between nature and culture. While nature has existed on earth before humankind, culture has arisen from the geographical conditions of the landscape in a time continuum. Thus, the communication between man and nature shapes lifestyles, beliefs, cultural values, production activities, and landscape practices according to geographical locations. Natural memory is in a strong relationship with anthropological activities; they affect each other and are affected by one another. For this reason, a correct reading of the natural memory of a landscape and its codes will yield a better understanding of the cultural memory that forms the landscape. Natural memory involves abiotic and biotic codes (Figure 3).

3.1.1. Abiotic codes

Abiotic codes contain the climate, topography, and hydrology, forming the study subjects of geomorphology. These three concepts are closely interrelated. The consequences of climatic changes affect the topography, hydrology, and the distribution of flora and fauna. Moreover, climate affects anthropogenic memory. The critical point here is to do a holistic reading instead of looking at hydrological changes, geological processes, and climatic events as isolated phenomena. Ecological modeling, environmental history studies, and geoarchaeology discipline present essential findings of abiotic codes and, therefore, cultural construct by revealing the changes experienced in the past.

3.1.2. Biotic codes

Biotic codes include flora and fauna. Flora and fauna are the concrete results of natural evolution and past environmental conditions, creating ecological memory (Ortmann-Ajkaia et al., 2013). Fauna in a landscape sense comprises not only wild species but also domestic species and livestock. Flora acts as a medium in nature: while supporting themselves, they also create a habitat for animal species and humans. However, while creating this environment, they are also affected by the abiotic factors that make up the landscape. The physical states of present-day biological communities and genetic structures of species help in reading biotic codes (Thompson et al., 2001)physical, mathematical, and sociological disciplines. The burgeoning base of theoretical and empirical work, made possible by new methods, technologies, and funding opportunities, is providing the opportunity to reach robust answers to major ecological questions. In December 1999 the National Science Foundation convened a white paper committee to evaluate what we know and do not know about important ecological processes, what hurdles currently hamper our progress, and what intellectual and conceptual interfaces need to be encouraged. The committee distilled the discussion into four frontiers in research on the ecological structure of the earth's biological diversity and the ways in which ecological processes continuously shape that structure (i.e., ecological dynamics.

3.2. Antropogenic Memory Codes

The landscape is a mediator in-between nature and community (Burel & Baudry, 2004). Landscape shapes human activities: human activities shape landscape.

In a sense, the landscape is a cultural construction process. In this context, it is more convenient to think of the landscape as a "palimpsest" that can be re-written, erased, re-existed, and open to new situations rather than as a static layer (Schein, 1997). Expressing a historical stratification, "palimpsest" refers to overlapping conditions and states in a spatial sense. The landscape creates stratifications by constantly changing with natural and human-centered interventions. The palimpsest state of the landscape allows it to retain these changes. Thus, to understand the cultural/social background besides the natural environment of the landscape, a holistic evaluation of the anthropogenic memory codes is vital.

The anthropogenic memory of the landscape includes two groups: Place/Space-based codes and Social/Cultural codes.

3.2.1. Place/Space- based codes

Place/space-based memory codes involve two groups: Land use/land cover and Identity. The land use/land cover deals with how people spatially use land in the past and present and how the implications of land cover changes affect landscape quality. Land use/land cover changes are a reflection of landscape structure and function relationship. The output is a direct indication of ecological viability and unique identity.

The stratification in the land-use turns the space into a place and grant it an identity. The land is no longer a mere geographical land; instead, it becomes a place (Relph, 1976). The relationship of humans with their physical environment through activities exists by spatial meaning, differentiation, and place. This contextual relationship leads us to think about the human interventions on the landscape and the land (Sack, 1980). According to Guelke, land-use practices represent the way of thinking of communities, and the land-use practices change in different cultures. (cited by Holt-Jensen, 2017). As a result, land use and Identity create necessary memory layers to read the past of a landscape.

3.2.2. Social/Cultural codes

The landscape's social and cultural memory codes consist of traditions, social life, cultural outputs, and place names. While the landscape combines the elements of time and space, it represents the social, cultural, economic, and political structure of a culture living in a landscape. The changes in traditions help evolve the landscape and give new layers that can be analyzed by the

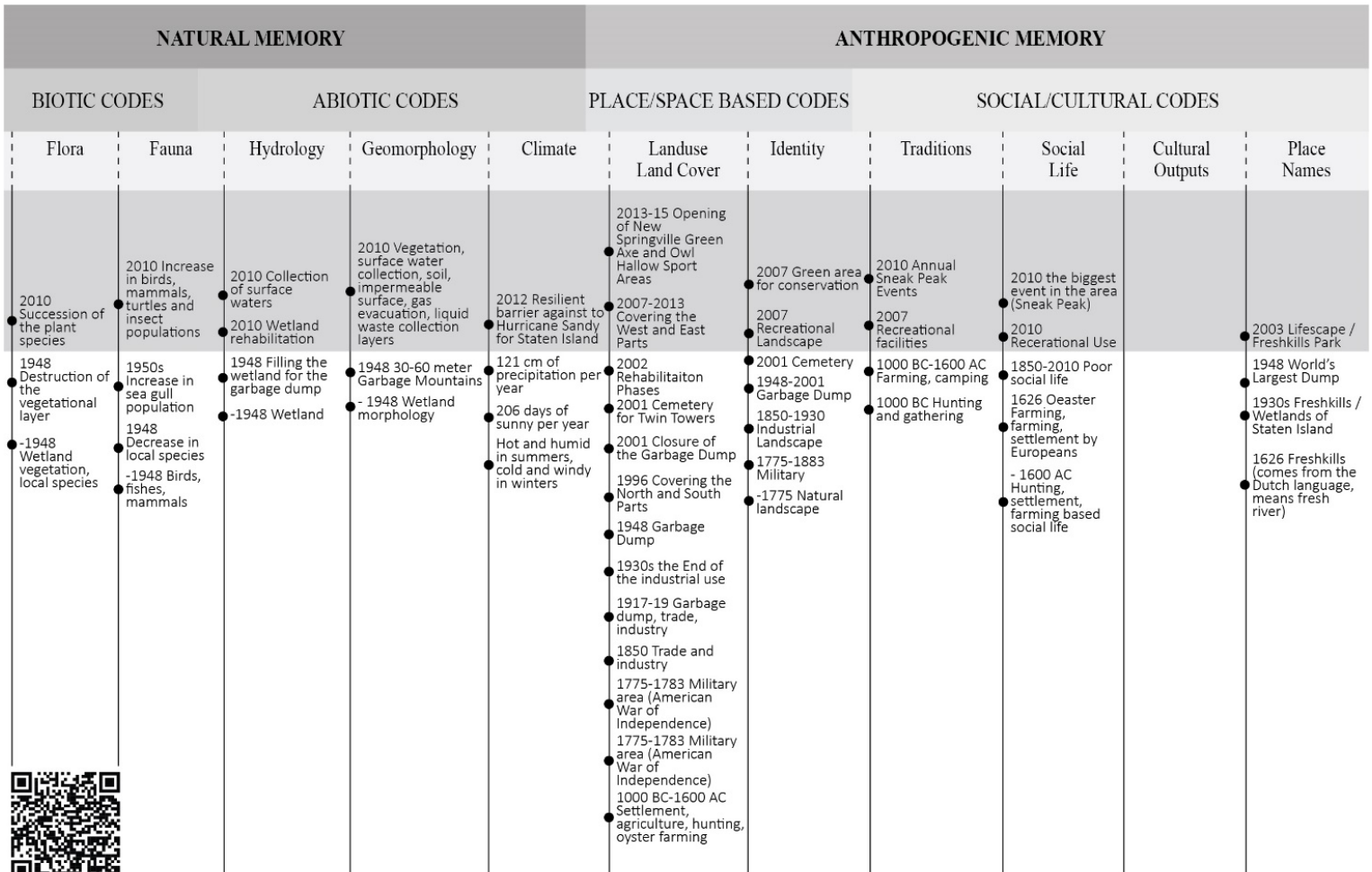
studies in history, archaeology, geography, and sociology (Leader Elliott, 2004). In different geographies, the changes in the cultivation forms of agricultural lands and crop types constitute a landscape tradition that has been formed over time. Rules show not only landscape practices but also how they are used and reproduced. The code of "social life" refers to the tangible and intangible anthropocentric activities in the landscape and daily life practices in everyday landscapes. After that, the traditions and the social life, with the help of the culture, generate "cultural outputs." From the cave paintings to the potteries of prehistorical societies, from oil paintings to the architectural works of modern times, the different productions of the humans assessed in the cultural output codes of landscape memory. In the model, the human memories, oral history, myths are also assessed in the regulation of the cultural output.

The multi-layered structure of the landscape also becomes alive in the place-names. The place names are the compressed forms of landscape history. Indeed, they symbolize the past version of the area, cultural traditions, landscape character, or even the famous person who has the power to transform the landscape/region. They become the mnemonic devices for the culture of a specific community, the collective memory, the local stories, traditions, rituals, or even the perception of the landscape by locals (Smith, 2003). On the other hand, they give clues about the production in the landscape; the maps in Medieval Europe include signs and place names about which village produce which product (Elerie & Spek, 2010). Mnemonic devices also work as remembering elements for different places, such as remembering rural landscape in an urban landscape (Güler, 2021), or work as a "memory(scape) making" to remember and commemorate historical events, like wars, in an experimental remembrance (Erbaş Gürler, Yetişkin, & Özer, 2018). It is also essential to take the mnemonic elements as design data in both natural and cultural factors.

4. Utilizing Landscape Memory Model in Contemporary Landscape Designs

Contemporary landscape architecture projects use landscape memory and mnemonic devices for their design practices (Eşbah Tunçay, Erbaş Gürler, & Onuk, 2013; Field Operations, 2009, 2012). In order to demonstrate the applicability of our model to design and read the existing designs, we looked at three contemporary landscape projects: Fresh Kills Park, Kamil Abduş Lagoon, and The High Line Project.

Figure 4: The Landscape memory model of the Freshkills Park.



4.1. Fresh Kills Park

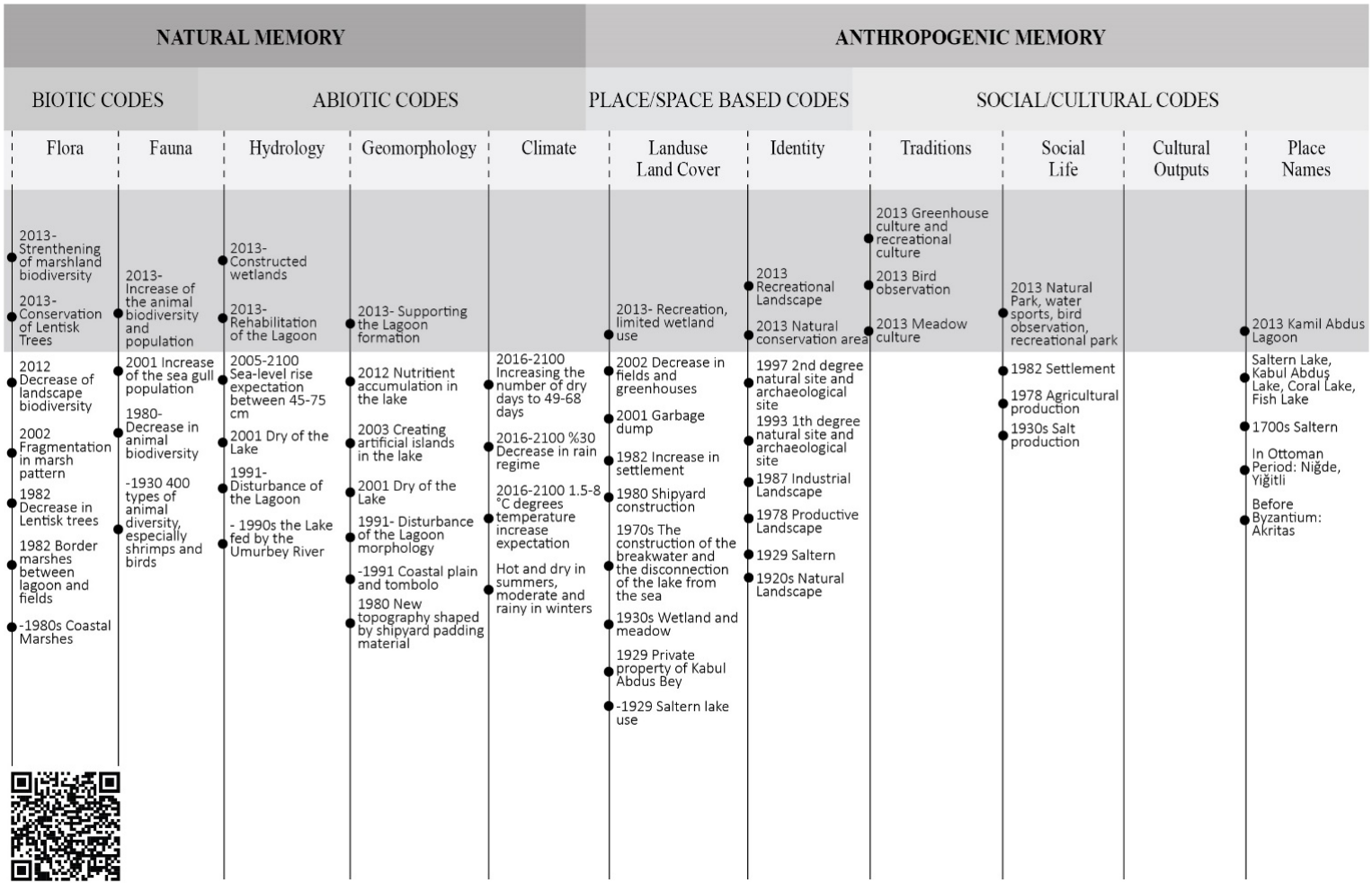
Locating in Staten Island, US, The Freshkills Park uses natural memory codes to recover the landscape disturbed by anthropogenic factors in the past (Figure 4). The site was a hunting, settlement, and agricultural area in prehistory. Later, Fresh Kills area became a military land in the 1700s, an industrial area in the 1880s to 1930s, and a garbage dump until the 1990s. After 9/11, the remains of the Twin Towers transferred to the site with the bodies of dead people. This case became the main reason for the protests against the dump area, and the competition/design process started. Including the sad memories in minds, the Freshkills Park focuses on the natural memory codes to rehabilitate the landscape. The old wetland image re-created the new landscape content. The design team analyzed the biotic and abiotic landscape characters to provide a strong landscape structure and tried to combine the historical and contemporary landscape use needs. Gained the old land use, topography, and hydrological character with new landscape design, the Freshkills Park became a barrier against Hurricane Sandy in 2012. The project's robust research methodology enabled the utilization of landscape memory layers that is now transferrable to the future. The project shows that how landscapes become resilient against climate change by using natural landscape memory codes as a design process (City of New york Parks & Recreation, 2010; Reilly, 2013; Svendsen, Campbell, Hirsh, & Grassi, 2009).

4.2. Kamil Abdus Lagoon

The HET landscape office uses the natural and anthropogenic memory background of the Kamil Abdus Lagoon to recover the lagoon and strengthen the sense of place in a degraded site (Figure 5).

The project site is in the south part of the metropolitan city of Istanbul, Turkey. Fed by the Umurbey River, the Kamil Abduş lagoon was an ecological hot spot of migrating birds until the 1970s. Later, the country's biggest shipyard was constructed to the lagoon's mouth, degrading all the ecosystem's functions. In 2001, the lagoon died, and the site became a derelict land with many social and ecological problems. The project started in 2013 in an attempt to gain old lagoon character; revive the natural flora and fauna; create a landscape in which the visitors can feel the place-belonging. The historical coastal line, flora, fauna, and vernacular land utilization were the design research focus. The natural and

Figure 5: The Landscape memory model of the Kamil Abdus Lagoon.



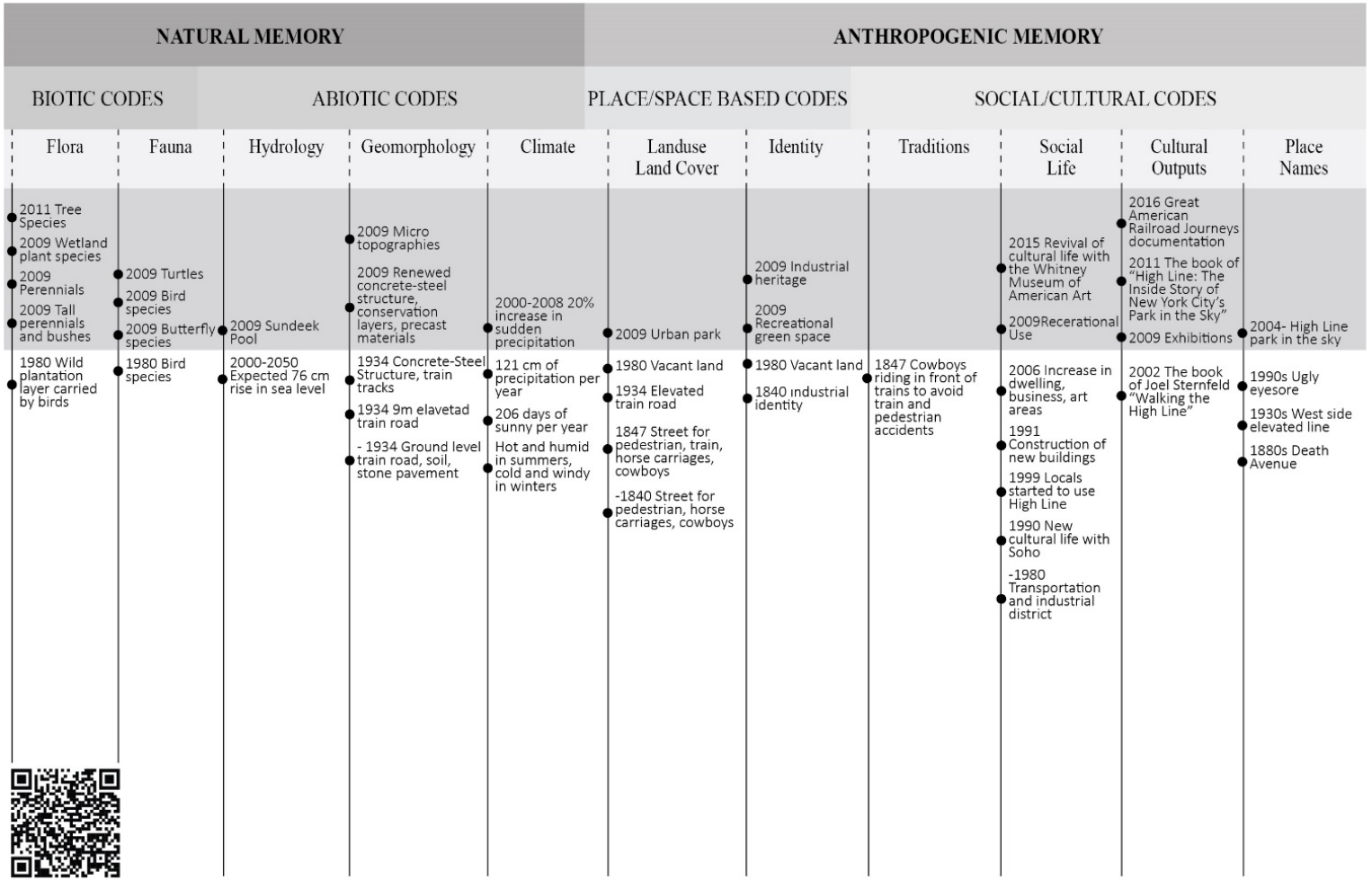
cultural memory layers helped develop novel hydrological solutions such as re-utilization of treatment water, rain gardens, and bioswales to rejuvenate the lagoon environment. The design team also focused on the forgotten cultural land-use practices and proposed small-scale greenhouse areas, meadows, walking paths. The recycled materials of the old shipyard were instrumental in emphasizing the industrial past of the site. Today, the award-winning project enhances the area's resiliency, promotes sustainable co-existence of nature and industry, and facilitates the community's well-being. The project has benefitted from the historical information and turned them into memory codes to generate a sensitive space and place design.

4.3. The Hight Line Project

The High Line landscape project, opened in 2009, locates in New York, US. As an urban rehabilitation project, the High line represents one of the most powerful landscape urbanism projects worldwide. The design team focuses on anthropogenic memory (Figure 6). The physical and social change of the area includes strong meanings, memories, cultural outputs, and even place names. The site was a primary elevated railroad corridor for a long time; later, the area became a disastrous urban degraded corridor with abandoned industrial activities. The decrease in industrial usage, new accessible districts, and trade areas caused the closure of the train route. After the closure, the train road went through succession and was covered by the plants naturally; birds and butterflies came. The new dwellings built around the road and the district becomes the address of the art life. The world-renown project preserves the old railroad ties, natural plantation image, and the main structure of the elevated line. Because these design elements are the cultural, social, and natural representation of the area's historical background, the design also ties in between urban and rural life. The events and the cultural outputs (oral histories, books, and exhibitions) try to continue the narrative of the area. The High Line is an actual example for preserving the anthropogenic memory by the design elements and social/ cultural life in the area.

The identity and spirit of the place emerge from the strong memory codes and contemporary design fed by the history of the area. Thus, the place belonging is preserved (Ascher & Uffer, 2015; Berg, 2015; Geberer, 2015; Oudolf & Darke, 2017; Stalterl, 2019).

Figure 6: The Landscape memory model of the High Line.



5. Conclusion and Discussion

The landscape definitions historically start with the ecocentric to include more anthropocentric perspectives. On the contrary, landscape memory research begins with the anthropocentric memory parameters and gains the natural landscape codes in time. A holistic approach to landscape centers itself on "Whole is more than the sum of its composing parts"; Every new landscape design constitutes a new memory layer and creates a new challenge. In this regard, reading landscape memory in a holistic sense will ensure today's landscapes become resilient landscapes in the future.

Landscapes include data for both natural and anthropogenic memory. Thus, every landscape has a unique character with its memory. In this context, revealing the anthropogenic memory will be helpful to increase space-belonging, sustain cultural traditions and ownership of the place. Strengthening the natural memory will help create resilient and sustainable habitats.

The landscape memory model provides the design parameters for the designers, planners, and decision-makers. The strong memory codes in the designs show that the reviving the historical character will prepare the landscapes to the future crisis as climate change, hurricanes, sea-level rise, habitat loss. Standing as a barrier against Hurricane Sandy, the Freshkills Park reminds us that using the natural landscape memory as a design approach can fight global natural disasters. Considering the effects of climate change on Istanbul, the rehabilitated Kamil Abdus Lagoon demonstrates what we can do to mitigate the unwanted effects. As in High Line Park, the projects that read landscape memory well have the power to solve the social crises (detachment, vandalism, lack of identity, lack of place belonging, etc.) while generating economic stimulus. Strong social involvement depends on the relationship between the community and its environment. The cultural land-use practices, traditions, and social life will empower the sense of belonging, the spirit of place, and identity.

The latest technologies in landscape architecture are promising to read the memory of a landscape. The data collecting, processing, and visualizing software help designers and planners analyze and understand landscape change implications and interaction between people and the environment. While big data technologies assist the data collecting for memory codes, the software for modeling simulation use data for visualizing changes. Softwares based on climate change, heat fluxes, topographical, hydrological modeling simulates the past states of landscapes while allowing future predictions. In this context,

the time-based reading of landscape structure is beneficial for the evidence-based landscape past. Using the software to understand landscapes' is helpful to understand the existing natural and cultural/social problems based on place. It helps interpret the landscape and provides assumptions for the future by designers, planners, and decision-makers. The remote sensing technologies provide a reading year to year and reveal the changes in a landscape. Virtual reality technologies help to visualize the landscape change and perceive the changes easily. The AI technologies help designers and planners to read the landscape with the sense of being in the landscape. On the other hand, the accessibility of the memory representation will enrich the environment of landscape awareness on a community and global level. The visualizing past and possible future of the landscape through the existing situations create a strong message for the human perception.

In conclusion, the research within the scope of landscape memory promises to keep the archive of landscape and create more sustainable landscapes for the future. With the help of digital technologies, landscape memory models can provide a broader range of applications. We recommend implementing the landscape memory model in more case studies to improve the model for future studies.

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CHAPTER XVI

SHIFTS - DISCONNECTIONS - BORDERS: CHANGING FACTORS BETWEEN LANDSCAPE AND CULTURE DURING TRANSFORMATION PROCESS OF BEYKOZ, İSTANBUL

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1. Introduction

Towards the end of the 20th century, numerous areas were built within cities as part of the modernization processes taking place within countries. Following developments and advances in technology at the beginning of the 21st century, these areas either lost their function and became vacant or their purpose changed. As part of this process, urban renewal/transformation processes began in many countries, especially in Turkey, to reuse these vacant buildings or to re-plan irregular settlements.

In Turkey, following the Draft Law on Urban Transformation which came into force in 2005, powers outside the normal expropriation process were granted to municipalities to make the process faster and more efficient. These powers were supported by the merger of the 'Draft Law on Transformation

Areas' immediately and various government units (The Housing Development Administration, The Council of Ministers). However, due to insufficient attention to the planning process, many of these projects were generally based on building renovations. Several urban transformation practices, especially in regions with slum-like structures, progressed on the axis of mass housing projects. However, in the process of planning these areas of mass housing and their surroundings, disharmony was created in the daily lives of existing landowners which caused existing users to leave the area and/or attracted new users to the area. Because these urban transformation projects were planned and implemented extremely quickly, local users experienced very dramatic changes and transformations in a short time, especially in regions where the local culture was observed intensely. This transformation was experienced more acutely by neighbours in terms of both open spaces, which are the main venues of everyday life, and changes in the social aspects they were accustomed to seeing in this environment. Another potentially negative change that occurred in urban transformation projects implemented in these types of settlement was the separation and boundaries that emerged between local users who have created a culture in the region over the years and new users who moved to the region later. Within the rise of capitalism in Turkey, especially in the last 20 years, posed great risks during these transformations (Chamber of City Planners, 2005; Karagüler 2014; Urban Transformation and Development Draft Law, 2005; Demirel and Gürler, 2017).

Today, rapid changes are continuing to take place in the social and physical fabric of cities in the context of increasing urban transformation. Within such separation and boundaries, the thoughts and therefore the behaviour of local people changes and has a penetrating effect on the culture. This study aimed to examine the relationship between culture and landscape in the axis of the above-mentioned problems, to reveal the factors affecting this relationship, and to examine how the relationship between culture and landscape has altered as a result of the changes that taken place in urban transformation areas. To achieve this; Beykoz district, one of the old Bosphorus settlements of Istanbul city, was chosen to explore the visible social and physical changes taking place as a result of urban transformation projects in the region. With traces of local identity and relationships from past to present, and combining city and neighborhood life, industrial areas on the coastline especially have entered a rapid period of transformation in recent years. During the transformation of the district, the change in social structure experienced from the upper elevations towards the

seashore provides a suitable ground for reading the relationship between culture and landscape. One of the biggest factors in this change is the rapid increase villa type luxury housing projects in the upper elevations of the region. As the number of people living in these villas has increased, serious socio-economic and cultural differences have emerged between local users and new users who have been living in the region for a long time. Accordingly, segregation and boundaries in the social and physical texture of the region have become increasingly apparent. The case study area was limited to Paşabahçe and Gümüşsuyu Neighborhoods as these contain a number of these shoreline renewal projects, the post-industrial campus, and old types of housing affected sharply by the revised Boğaziçi Front View Law which was renewed in 2013 (Demirel and Gürler, 2017; Urban Transformation and Development Draft Law, 2005).

First, a review of literature on the relationship between culture-landscape and the study area was conducted. The factors that caused the changes in the region were investigated in terms of which were affected by the axis of culture and landscape in the urban transformation process. Accordingly, the basic concepts that direct the relationship between culture and landscape in the Beykoz axis were determined. These concepts constitute the basic structure of the landscape-culture relationship in the region. By examining how these concepts affect each other during the process of transformation, a model was created that interprets the possible shifts in this structure and consequently reveals how the relationship between landscape and culture is formed (reshaped) on the axis of change in Beykoz.

2. Methodological Approach

To effectively examine the relationship between landscape and culture in the region, factors that simultaneously affect landscape and culture in Beykoz were identified. This was achieved through simultaneous literature screening and cross-reading of on-site observation and pilot interview data. The data obtained during this process was collected whilst also carrying out pilot interviews. Based on the relationship between the identified factors and the culture, it was decided that the case study should be carried out on an ethnographic basis. Following the observations and pilot interviews, a semi-structured interview technique was employed to impartially analyze the impact of the relationship between neighbours and the local culture and how this changed in the urban transformation process. Prior to conducting the interviews, the researcher prepared the interview protocol, which included the questions planned to ask in

advance. However, the researcher was also able to affect the flow of conversation with different prompts or sub-questions to encourage the interviewee to open up and add more detail to their answers. The most important advantage of the semi-structured interview technique is that it provides more systematic and comparable information as a result of adhering to the pre-prepared interview protocol. To select the sample, 'Contrary Case Sampling' and 'Typical Case Sampling' methods were employed and blended with a phenomenological approach so that individuals who had experienced cultural and landscape change in the region and had detailed knowledge of each situation were selected. Thus, internal stakeholders were included in the sample according to user-participatory design principles. It was thought that internal stakeholders could provide more realistic data about changes in the social patterns as they have personally experienced and observed the area. When the pilot interviews were held, it became clear that interviews should also be held with people who were born and raised in Beykoz but moved for various reasons and thus had stronger perceptions of Beykoz from outside. These people were able to perceive the distinction between old and new more clearly and were selected from groups who frequently use the area. In addition, given the political and economic factors that make up the social pattern, professional and economic diversity among the interviewees was achieved. In this context, the process of recruitment resulted in a total of 15 people from 4 different socio-economic groups (Table 1).

Table 1. Demographic Characteristics of Interviewees.

Group	Professional Class	Number of Interviewees	Economic Class	Residence in Beykoz
Workers	Retired factory worker and Crystal-Labor Union Employees	6	Low - Medium	Yes - No
Landowner	Retired Civil Servant	2	Low	Yes
Landowner	Businessman	2	High	Yes
Administrator	City Councillor	2	High	No
Public speaker	Journalist and Crystal-Labor Union Managers	3	Medium	Yes

To explore the relationship between culture and landscape, semi-structured interview questions were categorized and prepared according to the factors identified in the literature in order. Depending on the semi-structured interview method, the questions asked to individuals according to the course of the negotiations were differentiated. When the response from the interviewees began to become repetitive, the research was considered to have reached saturation. Data from the case study was encoded and evaluated according to categories created using NVivo, a qualitative data analysis software. In the analysis process, the relationship between all the categories was evaluated simultaneously and crosswise. Because each of these categories is rich in qualitative meaning, an analytical structure was devised to avoid getting lost in the data during the analysis (Figure 1).

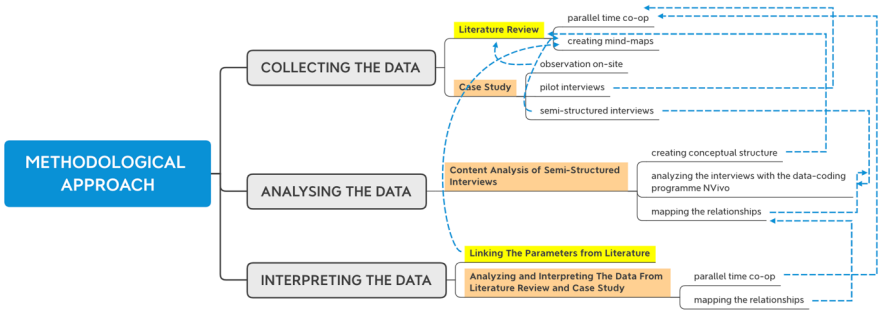


Figure 1. Research design graphic.

3. Beykoz As A Culture-(Land)scape

Beykoz district is one of the oldest settlements in Istanbul and contains 20 Bosphorus villages within its boundaries, starting at sea level on the west coast of the Bosphorus and extending to the upper elevations. Due to the coastline, which is referred to as the 'Pearl of The Bosphorus', with its natural landscapes, which are still actively used in present days, and forest areas in upper elevations; Beykoz has a socio-physical structure that reflects a way of life intertwined with the natural landscape and a culture that is maintained to the present day. For example, it is said that the name Beykoz originated from the name 'bin koz' which means the largest of the walnut trees (Bişkin 2013). During the Ottoman period, Beykoz was depicted as a fairy tale city with its streams, promenades, lands, sea, and forests, and was also a large hunting area; it thus appears to

occupy an important place in the history of the Ottoman Empire. Because it was suitable for hunting, it became one of the attractions for the Ottoman executive class (Url 6) (Figure 2).

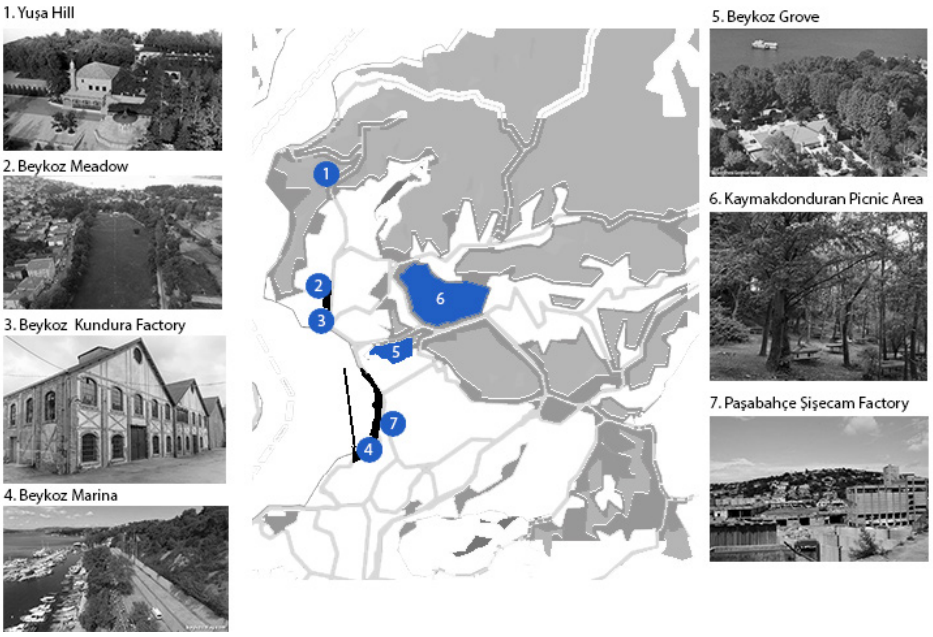


Figure 2. The main areas that shape and affect the public open space culture in Beykoz.

In addition to the Beykoz Leather and Shoes Factory dating back to the Ottoman Period (1810), other industrial works have been carried out intensively since the early years of the Republic. For instance, Beykoz Tekel was established in the 1920s and the Şişecam Factory was established in 1935. With the establishment of the latter, the Paşabahçe district became renowned for its glass production (Figure 3). In the last century, the fact that it was seen as a region suitable for industrialization gave Paşabahçe an atmosphere dominated by the working class. The Paper Factory, Paşabahçe Glass Factory, Leather Factory, Shoe Factory and the former Russian company Sokani Vacuum Filling Facilities established in Beykoz changed the Ottoman texture of the district. Beykoz is now dominated by a feature for production, not for recreation. This situation is not compatible with the settlements located along the entire Bosphorus coast.

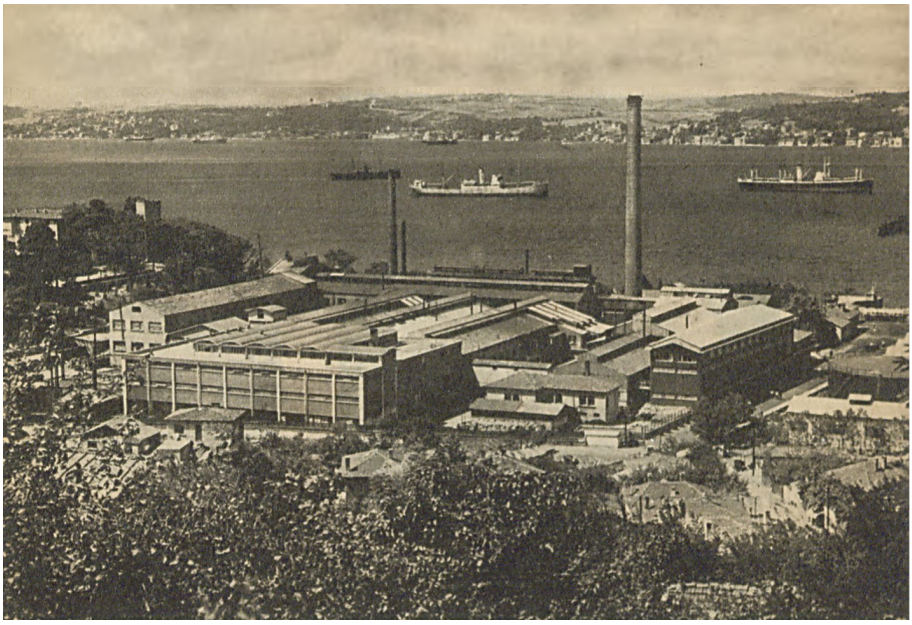


Figure 3. Before the demonstration of the Paşabahçe Şişecam Factory (Url-1).

With the establishment of factories, construction increased rapidly in the district and, as a result, unplanned instances of construction began to be seen. However, this form of construction is seen in a similar way to the landscape texture of the district and the landscape usage culture, as simple structures with gardens and usually single floors. The natural landscape of the region located at the upper elevations of the district (such as forest areas and recreation areas between settlements) limited this structure. As a result, Beykoz maintained its position as a Bosphorus village by continuing its fishing and forestry activities until the beginning of the 2000s. All these features are a result of the interaction between culture and landscape in the region. In addition, on-site observations have shown that people use the coastline in accordance with their own public space cultures. Despite the changes made to the coastline, the picnic and swimming area called 'Fisherman's Shelters', which people have used since the industrialization period, is an indication that the culture of space use in the region has changed little. Although swimming activities do not take place in most coastal areas of Beykoz, local people in the district continue to use this area for swimming purposes. At the same time, fishing activities along the coastline continue as much as possible and historical recreational areas are often used for family picnics (Figure 4).



Figure 4. Recreational areas of Beykoz in the 1800s and today (Url-2).

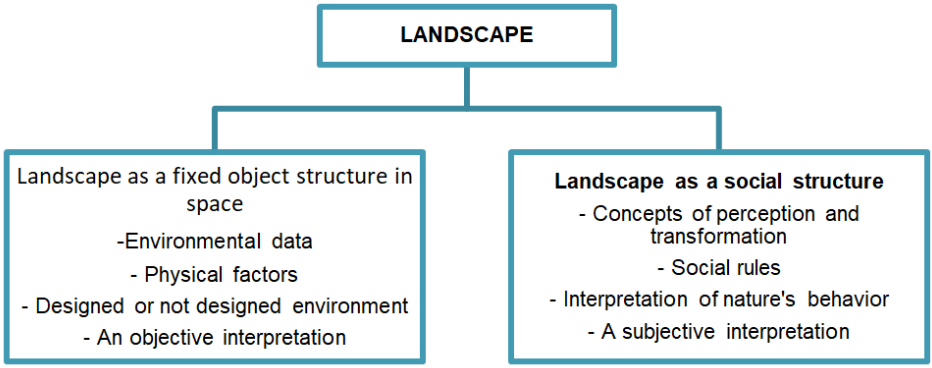
On the axis of all the everyday habits described above, there is a highly visible relationship between culture and landscape throughout Beykoz. Studies by Detlev Ipsen (2012) and Robert Rotenberg (2012) on the relations between locality, culture, behaviour, and landscape relations have been conducted to explore the relationship between culture and landscape in Beykoz through studies of literature and on-site observations.

According to Rotenberg (2012), culture is a collection of various meanings that can also have material forms, such as landscapes. The landscape establishes an indirect link between the variability of nature and human behaviour, thus maintaining and sometimes producing the boundaries between culture and nature. In this context, to examine the relationship of landscape with culture, it is necessary to understand the relationship between the behaviour of individuals (and therefore society) and the behaviour of nature. Individuals can create a change of space with the traces they leave in the physical space, however the situation is much more complicated when it comes to a 'cultural' structural change. If we accept that individuals maintain their presence in society physically and socially, it is appropriate to claim that the two main elements that make up the structure of the community are physical structure and social structure. According to Ipsen (2012); given all the individual, social, and physical elements contained within it, there are two different conceptions of the term 'landscape' with respect to its daily use:

1. Landscape as a fixed object structure in space', which often references environmental data, identifies the surrounding world in terms of physical elements and primarily tries to explain the environment objectively - whether it is designed or not designed.

2. The 'landscape as a social structure', where this structure of this fixed object is subjectively exposed by perception and transformation, and where the behaviour of nature is controlled not only by technology but also by social rules (Ipsen 2012) (Table 2).

Table 2: Two different ways of using the landscape in everyday life according to Ipsen (2012)



As a result of analyzing the social behaviours observed in the social relationship established by local users with the natural landscape, it is reasonable to assert that the landscape structure in the Beykoz region constitutes a social structure. This structure, which is blended with the natural landscape of the region, has been shaped by the active use of promenade areas and coastline since the Ottoman Period. Over time, the region's knowledge of the natural landscape increased with forestry, which began to develop in the upper elevations of the region, and the species of trees in the forests were included in the memories of interviewees. For instance, chestnut trees, especially those seen in forest areas, were frequently referred to in childhood memories of 'old Beykoz'. Although the fishing and agricultural activities that provide the quality of being a 'Bosporus village' have moved to small ports and the backyards of houses, their assets are still retained as a cultural trace. Through the observations, the culture-landscape relationship became clearly visible. However, it is not clear how this relationship changes depending on certain factors associated with landscape and culture. This means that when the culture needs to be examined on the landscape scale, the factors that allow us to read the culture should be examined in more detail and the connection between them and the landscape should be established. Culture

reflects the ways in which societies feel, think, and live. Thus, the concepts that emerge are:

A. Intangible concepts such as memory, perception, and so on that shape societal perceptions and people's frame of mind
B. Behavioural patterns that define the lifestyles of societies.

Therefore, what are the main components that affect culture on a landscape scale?

According to Rotenberg (2012), landscape design establishes an indirect link between the variability of nature and human behaviour. Thus, landscape maintains and sometimes produces the boundaries between culture and nature, and strives to be protected from the effects of nature. Each designed landscape area creates a link between nature and humans. The concept of landscape, which serves as a link between nature, environment, and humans, is a reflection of communities' own internal relationship to the exterior. From this perspective, trying to understand changes in the 'landscape use' parameter only is not sufficient to explain the relationship between culture and landscape in regions that have created a 'locality', especially when addressing the same mass of users for a long time. To fully resolve this relationship, it is necessary to analyze the factors that form the culture in that place. Every element contained within social culture appears in landscape areas, and every landscape change shapes this culture in the same way. According to research, the elements that affect culture on a landscape scale are as follows:

- Intangible values
- Physical and mental accessibility
- Place attachment (Rotenberg 2012) (Boyer 2015).

Accordingly, the main elements that demonstrate the impact of culture on the landscape were investigated to determine the interview questions for the case study. Based on Ipsen and Kaufmann's studies, these elements were determined as follows:

- Landscape experience
- Landscape perception
- Landscape knowledge/awareness (Ipsen 2012) (Kaufmann 2005).

These were chosen as the basic concepts that constitute the structure of the relationship between culture and landscape within the scope of the literature review. However, for the model formed on the basis of these concepts to function properly, it is necessary to examine whether the cultural and landscape structure in the region is subject to simultaneous transformation. Accordingly, questions regarding the effect of the transformation process on the local culture in the region were asked during semi-structured interviews. Analysis of the responses indicated that the landscaping elements referred to by users constituted 15% to 22% of the discourses that referred to the local culture. This is the rate at which the social structure of the landscape is observed within the local culture (Table 3).

Table 3. Cultural discourses of users referencing the landscape

Group	Professional Class	Economic Class	Residence in Beykoz	Total Encoded Data	Data Encoded on Landscape	%
Workers	Retired factory worker and Crystal-Labor Union Employees	Low - Medium	Yes - No	188	37	%20
Landowner	Retired Civil Servant	Low	Yes	113	17	%15
Landowner	Businessman	High	No	138	30	%22
Administrator	City Councillor	High	Yes	86	17	%20
Public speaker	Journalist and Crystal-Labor Union Managers	Medium	Yes	113	23	%20

In addition to specific questions about the landscape, interviewees often included some landscape elements in their answers that referred to collective memory and place attachment, as the following examples demonstrate:

Question:

‘What are the top 5 things that come to your mind when we say Beykoz?’

Employee 1:

‘Nature, sea, beauty, the sound of birds and hunting, clean forest air. Let me call it breathing, more precisely. ‘

Employee 2:
'Bosporus, greenery. A place where nature is untainted for me.'

Landowner 1:

'Everything is natural here, everyone has a garden, they grow their own tomatoes.'

Based on the interviews, it is clear that the landscape, which is a 'social structure' in the region, is reflected not only in the use of public space by users but also in their rhetoric. As an element that facilitates the transition from physical space to social space, landscape treats humankind differently from the concepts of nature and environment, and emerges as a way of defining one's own environment. These types of definition were evident in approximately 19.5% of the discourses that referred to culture in the semi-structured interviews. Thus, approximately 1/5 of the factors that create the culture in the case area contain elements related to the landscape.

4. Shifts Between Landscape and Culture

4.1. A Cultural Conflict: Transformation Process of Beykoz

In the early 2000s especially, the user profile in the Beykoz region began to change rapidly in line with the emergence of villa type luxury public housing projects established in the upper elevations of the district. The region has also become one of the biggest objectives of rent, as the structures along the Bosporus shores have become the focus throughout Istanbul. According to the frequently changing legislation, and within the framework of the laws brought in to prevent crooked construction in the Bosporus Coastline and Front View Region, there is no residential structure to reach the planned population except for the slopes with old works registered as housing that are described as 'Structures that are in accordance with the Decisions of the Plan' (Karagüler 2014). This situation promotes transformation of the construction along the Bosporus coast into a focus of rent. According to the people of the neighbourhood, when any exterior renovation is required in their homes, they are forced to move from the neighbourhood by preventing the renovation by pointing the Bosporus Law. Because of this situation and the rapid increase of the land registry values makes changes in the neighbourhood texture. While

this process of persuasion continues, luxurious settlements in the upper parts of Beykoz increase rapidly and a change in identity from the upper elevations to the shore takes place.

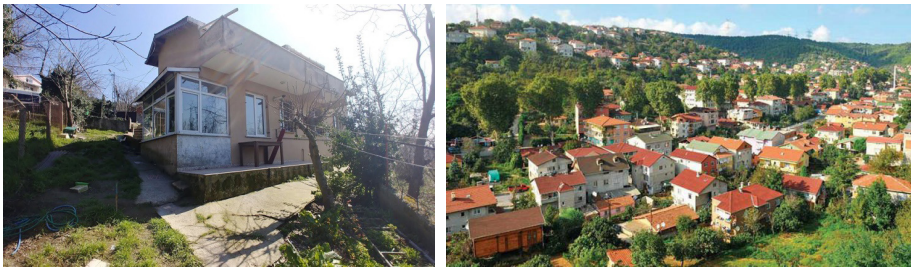


Figure 5. Bosphorus village type residences and settlements in Beykoz (Url-3; Url-4).



Figure 6. Çubuklu Vadi Houses settled on the upper elevations of Beykoz (Url-5).

With this changing type of user, significant differences have emerged in terms of economic situation and social life between local neighbors who have been living in the region for a long time and newly arrived users. These differences are also reflected in the use of public space. Because new residents of the region are in a better socio-economical condition, local users often mention that they feel like 'they should be move from Beykoz', 'Beykoz no longer belongs to them' and 'All urban transformation efforts in Beykoz are serving for the needs of the upper class who are new to the region'. Moreover, the nature of some public space transformation efforts in the region support this rhetoric. With the change in the user profile, so-called improvements were made to the quality of the landscape areas in Beykoz. Some of the changes made to the physical appearance and social activities of the district under the motto 'Beykoz Gains a Contemporary City View' were as follows:

- Beykoz Marina Project.
- Opening the military barracks in Beykoz Meadow and Beykoz Pavilion (the Public's Palace Hospital) to tourism.
- Beykoz Leather and Kundura Factory, which was privatized after losing its function, was quicky replaced by a 5-star hotel in a very short time.
- The first and only largest cinema in Turkey in Riva Village.

Another situation local users frequently alluded to in the interviews is that there is no demand for these changes from neighbours, and that the structure of Beykoz's natural landscape adequately meets their own daily landscape needs. Cafes and restaurants, which are in stark contrast to the texture of the area, and planned hotel and shopping mall projects suggest that some changes are being made at Beykoz Shore with a focus on rent and gentrification. It is also notable that coastal arrangements are not made, especially in the Fisherman's Shelters area of Incirköy Neighbourhood, which is frequently used by the men of the neighbourhood and is not a safe zone due to alcohol consumption.

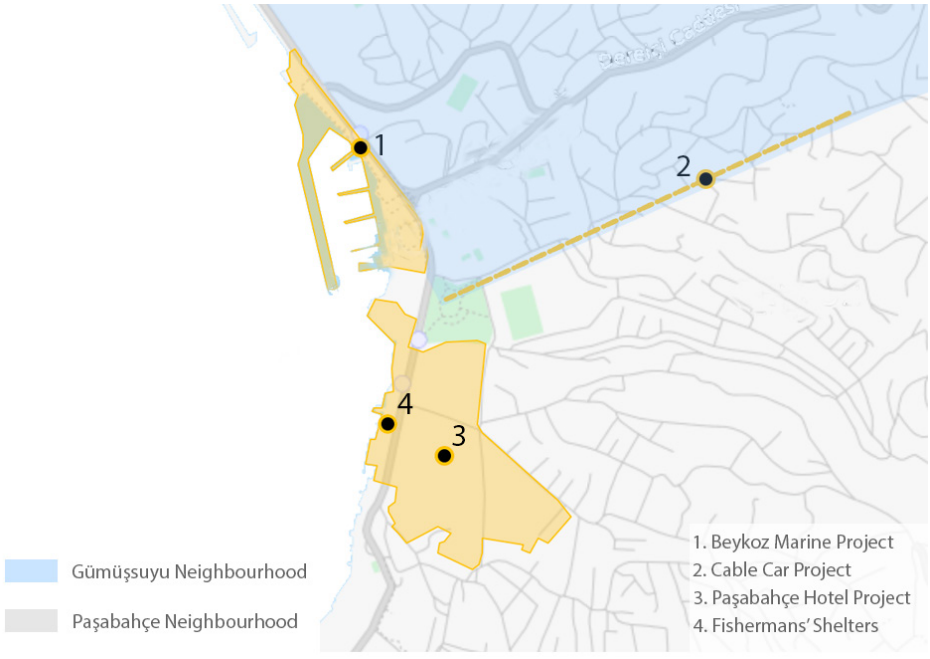


Figure 7: Beykoz Transformation Project, project boundaries and connections.

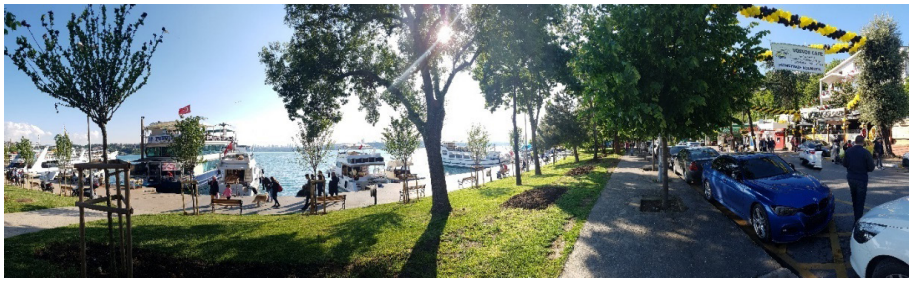


Figure 8. Beykoz coastline and fishermen's shelters (Taken by author)

As mentioned previously, Beykoz district has been subject to drastic change and transformation over the last 20 years. Even though the rate of open area usage has not changed a great deal, serious changes have occurred in usage patterns. The fact that these changes were experienced in a short time created various separations and borders between these places and the local people. Many of these areas have separated from their local users within the transformation process, and shifts have occurred in the spatial usage culture in these regions due to the change in the user profile and limited options with respect to accessibility.

4.2. Shifts-Disconnections-Borders: Changing Factors Between Landscape and Culture in Beykoz

Beykoz district has a neighbourhood culture that continues to have an influence, even though this has decreased despite the changes taking place in urban and rural life. Its parameters describe the cyclical relationship between culture and landscape, and it is a place where the culture and the landscape continue to influence each other. However, it is also a region where various disconnections, borders, and shifts have been observed in its spatial and cultural identity due to the sudden changes experienced in its social and physical structure. From the pilot interviews conducted in the case study, it was observed that 6 basic elements (intangible values, accessibility, place attachment and landscape perception, landscape knowledge/awareness, landscape experience) were not sufficient to express the cycle between culture and landscape during the transformation of Beykoz. Because there is an existing transformation process in the region, the political and economic aspects of this new transformation were also included in the factors that shape the decomposition-boundaries and shifts in culture and landscape. The transformation process was identified as a separate parameter in the coding process, as it is an important factor that directly and

independently affects landscape and culture. In the coding of discourses during the interviews, a discourse could refer to more than one parameter associated with the relationship between social texture and landscape. This is because the main and sub-parameters that affect the relationship between landscape and culture are in a continuous and intersecting cycle. Thus, the aspects of this cycle were analysed after the interviews were completed. As indicated in Table x, the codes determined in the previous sections were divided into one-way effects and two-way interactions, and were processed cross and simultaneously according to the codes. According to the table, there are 42 possible interactions between the impact of the landscape on culture, the impact of culture on the landscape, and the elements that form the transformation process. Almost half (22) of these interactions affect each other in two ways. In addition, as indicated in Table 4, the transformation process in the region did not affect the landscape at the cultural scale, but bilaterally affected the culture at the landscape scale. One of the main reasons for this is that no serious changes occurred in the landscape of the region during the transformation process.

Table 4: Analysis of the cyclical process between landscape and culture in Beykoz



The transformation process helps to provide the time and place variations necessary to analyze the relationship between the change in landscape and

time. Although the interviews primarily focused on the transformation process, the interviewees frequently described discourses that refer to the relationship between culture and landscape through their cultural habits. To understand both aspects of the cycle between culture and landscape, discourses around accessibility, locality and space, all of which are factors affecting culture, were evaluated by cross-reading the landscape experience/elements, landscaping knowledge/consciousness, and environmental/landscape perception parameters that constitute the concept of landscape. As shown in Figure 9, the primary cultural parameter that affects the landscape in the transformation process is accessibility, which constituted 37.6% (53 codes) of the 141 codes of cultural data. The second cultural parameter affecting the landscape is place attachment, which was mentioned 49 times (34.4%). The intangible values were referred to 39 times (28%). These results thus explain the effect of culture on the landscape.

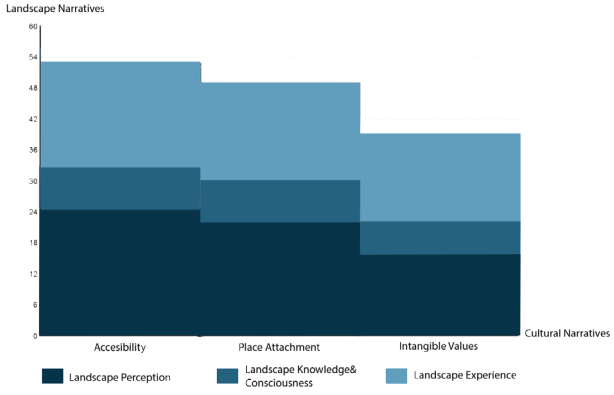


Figure 9. The effect of culture on landscape.

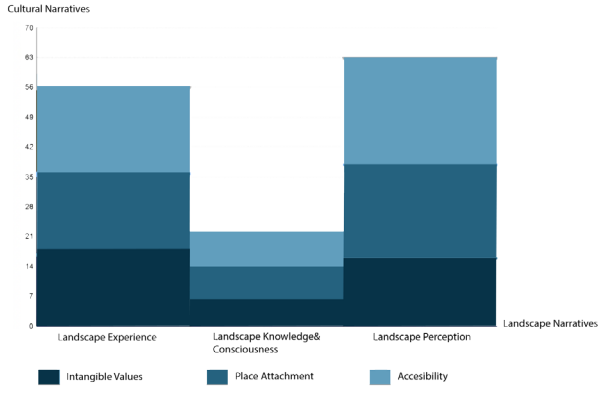


Figure 10. The effect of landscape on culture

To fully understand the relationship between culture and landscape, it is also necessary to examine the effect of landscape on culture. To that end, discourses about landscape that refer to questions about culture were examined in the interviews (Figure 10). According to this assessment, the landscape element with the highest impact on culture is landscape perception, which was mentioned 63 times in a total of 141 discourses (44%). Landscape perception most affects accessibility which is coherent with Figure 9. Users affect the culture of the place by creating mental borders with it as a result of perceived changes in the environment and landscape. Because the relationship between culture and landscape is a cycle, no distinction was made between discourses coded as 'the effect of culture on the landscape' or 'the effect of the landscape on culture', instead the results were evaluated using a cross reading method. Hence, there were 141 discourses regarding the relationship between culture and landscape for both parameters. To describe the general daily lifestyle of Beykoz, interviewees primarily drew on discourses regarding the relationship between landscape and culture (Figure 11).

Employee 1:

With its greenery, with people's acquaintance, with the absence of apartments. Greeting people even if their standard of living is lower. It's not like the mass housings, I mean do you know your neighbours?

I had flowers, I left it this year. I love flowers, I love nature very much. It is already resting. Your stress is dissipating.

Employee 2:

I feel like I'm living in the green. When we look at other regions, I have moved to Çekmeköy 7 years ago, but I was here until 2010. Then I bought a house from there, again. But you are missing Beykoz. There is no density in housings there, no greenery, the buildings are facing each other. When you go out on a window or a balcony, you wonder whether the other person will be uncomfortable. Or if you smoke, you extinguish it when someone goes to the balcony to hang laundry on the balcony in order not to disturb you. That kind of thing isn't happening around here. After all, everyone has their own garden. I never thought of going to a picnic while I was in Beykoz. We were making our barbecue in the garden of our own house; we were having our picnic there. But now, since we do not have our own open space in Çekmeköy, we are trying to evaluate it by going for a picnic on weekends. To spend time with nature. We do not have such a problem here, you sit on the balcony, the greenery, the sea, everything. In that sense, this is a very spacious and beautiful place.

Land Owner 1:

Everyone is connected here. Of course, this affects street life and peace. To be honest, street life in Beykoz has not changed much. It has not changed because everyone knows each other, we are like a nuclear family here. If there was a serious change, nobody would know anyone here. Our street culture still continues. Drug addiction only affected us a little. It happened here (in the area of Shelters) that I brought very young people into the sea and brought them to the shore. But we got through that too. Street life is still very good here, it happens when I return home at 2 am, nobody disturbs anyone. Is there such a safe district left in Istanbul? It is the same for our women. Nobody disturbs a woman on the street. This security is very important.

Land Owner 2:

It would be a funny fact if I say Kemençe, Rize, Black Sea, Turkish music folk music. Because we live our culture here. I can say that Beykoz has the Bosphorus, its green and walnuts, especially the people of every region to live together.

Manager:

Chips, walnuts, cherries, fish, sea. There are many recreation areas. There are lots of places to breathe and visit. The seaside is very.

Community Spokesperson:

I work from home; I have an office on the side facing the sea. But while I am working, I close my curtain because I see the state of Beykoz, I see it change and I feel sorry. In the same window, there is the grave of my mother and father close to His Holiness Joshua, I see it, I am sorry. I hear the call to prayer; I feel sorry that I cannot go. I'm a little emotional person on that subject.

Figure 11. Culture and landscape relationship model of Beykoz district during the transformation process

5. Discussion and Conclusion

The transformation process in Beykoz initially began with the establishment of factories in the region. The results of this transformation differentiate Beykoz from a typical Boğaziçi Village structure that is directly related to the natural landscape in the region. Nevertheless, it can be said that these two cultures together created a new common culture. During the interviews, it was observed that no disconnections, boundaries, and shifts happened during the process of this transformation. One of the most important reasons as to why this re-formation happened in a healthy way is that the cultural and landscape changes in the region have progressed simultaneously in relation to each other. However, due to the loss of function of these factories over the past 20 years, some shifts have started to occur in people's urban memory. For instance, a conflict of intangible values between these two communities emerged due to the reduced accessibility of various public open spaces for social and economic reasons, rapid migration from the district due to the obstacles caused by the Bosphorus Law, immigration driven by the growth of luxury housing projects, and the fact that new users came from very different socioeconomic circumstances. Many of the new users who moved to luxury residences became more powerful and began to employ former neighbours of Beykoz who had lost their jobs because the factories in Beykoz were no longer functional. This meant that they were now under the rule of the new users, which hurt the intangible values of Beykoz by restricting their mental access to their own neighbourhood.

Due to this change in accessibility and intangible values, local people's attachment to the place began to change and therefore shift within the concept of locality. Simultaneously, as a result of the entrance fee and additional security measures imposed on places used by local residents, their physical access to these places decreased and, as a result, foreign migration increased. For this reason, habits that refer to local culture in the settlement have disappeared, and the close relationship between the landscape and culture in the region has started to decrease over time. At the same time, physical changes in the settlement (mega conversion projects) and changes in the landscape have affected the use of urban open space and a new cultural structure has arisen in the landscape areas of the region (Figure 12).

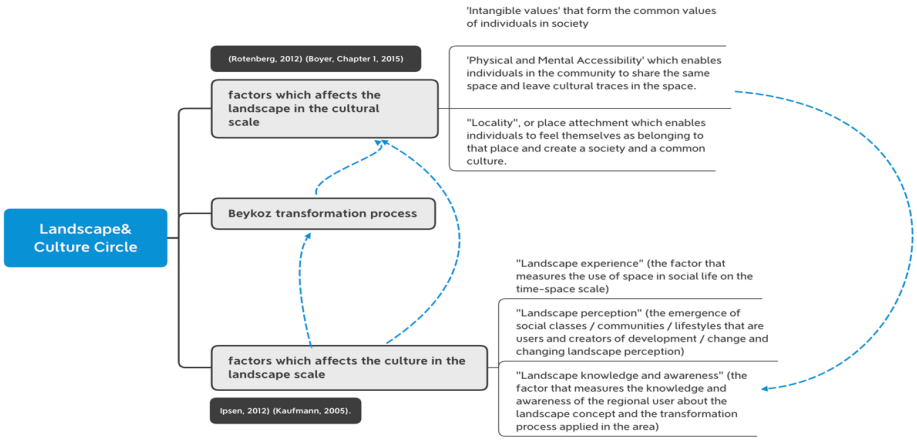


Figure 12. The structure of the culture and landscape change experienced by the Beykoz district during the transformation process

Therefore, this research indicates that it is not sufficient to describe the urban transformation process in Beykoz region solely as a spatial and/or political issue. These kinds of transformation processes primarily affect the culture of the region, and the fact that this cultural shift takes place in a short time creates a shift in the memory of the users and reduces their place attachment. Accordingly, the changes experienced by the region within the time-space scale strongly affect the landscape perceptions of individuals. All the parameters describing the relationship between landscape and culture in the research are overlapping - individually and together - depending on all political, economic, and social parameters. This change in landscape and texture, which takes place in the memory of local users, directly affects place attachment, creates a mental boundary between users and the place where they live, and also cyclically affects the culture and social texture. Most evident in metropolitan cities where multicultural experiences are commonplace, landscape has a circular and mutually interactive relationship with economic, cultural, and political factors. Recognizing and analyzing the structure created by the landscape within the social structure is important, especially during urban transformation projects. If the transformations planned in the landscape and/or cultural texture of a region are first examined in terms of these parameters, it may be possible to produce healthier and socio-economically more sustainable communities in the region.

Acknowledgements

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CHAPTER XVII

EVALUATION OF DESIGN APPROACH IN TERMS OF LANDSCAPE ARCHITECTURE IN ACCORDANCE WITH NATURE

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1. Introduction

Although the human factor is a leading factor in the rapid destruction of nature in the human-nature relationship, the habitat conditions (soil, climate, physiography, etc.) in some regions can be more decisive in these disasters. Developed countries have an ecology disappearing due to the humans who constantly consume resources unilaterally and have a world view that sees all kinds of desires and demands appropriate in its relationship with nature and that the whole earth belongs to humans (Önder, 2003; Dindaroğlu, 2021). This view and lifestyle brings with it many problems (Bekar et al. 2017, Gülpınar Sekban and Bekar 2018; Sekban and Düzgüneş 2021).

Construction activities have an important role in the development of these problems experienced today. However, it is possible to reduce its role by reducing the environmental impact of buildings. For this purpose, it is necessary to know and implement suitable strategies. Perhaps the most important of these strategies are those related to building materials as these materials have different parameters that undertake many tasks. For example, they affect the environment in many ways with their ecological properties. In this direction, it is important to make the right decisions at the beginning of the design process, taking into account the environmental characteristics related to the selection of building

materials (Karadayi and Coşgun, 2021). All of these decisions are shaped depending on the design goals.

No creature in nature is alone. Every living creature has an environment that it affects and is affected by. The concept of 'ecosystem' is defined by natural sciences as the whole that is formed by the mutual relations of the living creatures in a certain area and the environment that surrounds them. The science that examines the relationships of living creatures both among themselves and with their environment is known as "ecology". The ecological approach, on the other hand, has also been used to explain human behavior, adapted from natural sciences. It is a complex world and intertwined systems. Each of them is an approach that considers multi-faceted interactions. It asserts that the change in any component in the system cannot be considered independently of other components (URL-1).

The process of interfering with nature, which started with meeting the shelter needs of people, has become one of the main factors that disrupt the balance of nature over time. The industrialization by the technological developments experienced with the industrial revolution has increased the level of comfort and has led to uncontrolled developments in many sectors such as architecture, tourism, health, retail, food, advertising, communication, transportation, fashion and entertainment. As a result, our environment has become unhealthier with each passing day (Gül, 2000). Daily activities, building facilities, have transformed cities into places where global and local environmental concerns are seriously experienced. The global warming problem caused by the increase in greenhouse gas emissions, the depletion of the ozone layer, the energy crisis caused by the increase in the energy need per capita, the unlimited and unconscious consumption of natural resources, the intense use of fossil-based energy resources, the decrease in biodiversity, and environmental problems has gradually reached great scales. (Asimgil, 2016). Survival of living creatures is possible with the sustainability of living conditions in nature (Aytis and Polatkan, 2010; Gülova, 2013). In this direction, important duties fall on every professional group, especially landscape architectures in the field of environmental design and planning has great responsibilities (Alkanoğlu, 2009). The main objectives of this process are; the minimum and most effective use of energy, materials and resources; reducing all kinds of pollution considering the conditions such as climate, topography, heat, terrain, comfort, etc. in design, and thus protecting the natural environment (Türkmenoğlu Bayraktar, 2011).

Many currents have been on the agenda in the design and planning fields of architecture from past to present. In the early 1900s, Ebenezer Howard saw himself as a pioneer as a social reformer and had the idea of improving people's lives and creating better societies by creatively designing suburbs and cities. They wanted to build the architectural structure on useful activities such as going out and getting fresh air and growing vegetables in the garden. Howard believed that both the city and the countryside had their attractive aspects and wanted to combine both in the new city type (Atmaca, 2015). However, the rapidly increasing urbanization with the industrial revolution prevented nature-compatible architecture and caused the formation of unhealthy structures and concrete environments.

With the increase in migration from villages to cities, many disasters such as overpopulation, pollution, food shortage, energy insufficiency, polluted water resources, destruction of green areas, floods have been experienced in urban areas. Bektaş (2012) emphasizes that to cope with these negativities, related professional disciplines such as architects, city planners, landscape architects should act considering the environment (nature), people, thrift, and the sustainability of a balanced and co-sharing social structure.

2. Landscape Design Process

The method used in the design process varies according to the goals and objectives of the designer. In short, this process does not have a single correct answer (Casakin, 2011; Bonnardel, 2000). Today, ecological approaches are being put forward to regain nature, which has been on the way to extinction as a result of increasing construction and modernization. The professional discipline of landscape architecture is an indispensable part of this process (Figure 1).

Landscape architects use a number of design elements to fulfill their objectives in creating and managing outdoor spaces for human need, use and enjoyment (Booth 1990). When creating an outdoor space in landscape design, it is primarily considered that it serves people's wishes and needs, produces social solutions, and is ergonomic and comfortable. The most important difference of landscape design from other design professions is that it is inside nature, it is directly affected by natural conditions and moves with nature. This shows that not only human activity, but also air-humidity activity, water activity, shadow-sun activity are important in landscape architecture. Apart from these

daily activities, there are soil activities climate and heat activities, vegetation activities that occur more slowly outdoors. Human beings are a part of nature and they want to meet their basic needs and senses from nature. In landscape design, in order to observe the activities of nature and to be included in life in communication with these activities, the design must be created together with nature itself and the activities of nature (Gürbüz and Arıdağ 2013).

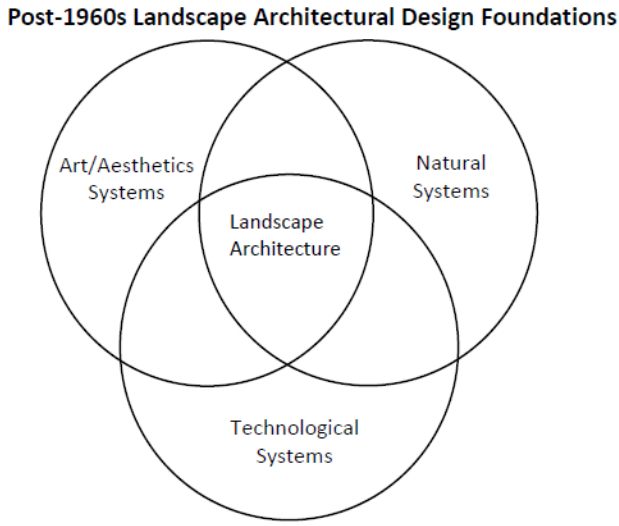


Figure 1. Schema of Landscape Architectural Foundations (Motloch, 2001).

3. Landscape Design Approaches in Urban Areas

The concept of sustainability is an approach that has been on the agenda in recent years and is seen as a solution to prevent environmental problems in urban areas (Figure 2). Sustainability refers to the potential for continuity of residence factor that governs the connection of land and place. Sustainability includes the protection and management of the existing land with all its meanings (Asımgil, 2016). In return for a fast life, the people and society of the modern world are faced with not only stress, depression, crises, an increase in violence and crime, but also disasters resulting from the deterioration of the ecological balance of nature (Gülova, 2013). Cadenasso and Pickett (2008) gathered the most important urban formations that host the living spaces of people under 5 main headings in their study. The main ecological principles concerning cities are that (Table 1):

Table 1. The city parameters of Cadenasso and Pickett (2008)

1	Cities are ecosystems;
2	Cities are spatially heterogeneous;
3	Cities are dynamic;
4	Human and natural processes interact in cities;
5	Ecological processes are still at work and are important in cities

It is vital to restore the balance of nature that has been disrupted by ecological-based design approaches in urban areas, which are defined as living organisms and on which the future of people depends.

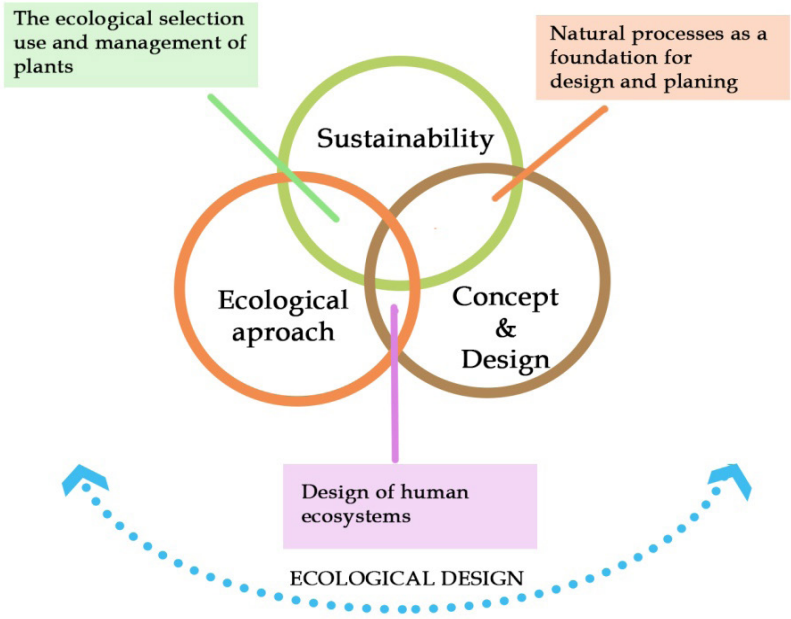


Figure 2. Design with ecological approach methodology

There are thousands of case studies that can be given to sustainable design approaches all over the world. Some examples of these have been compiled as follows (Table 2).

Table 2. Some examples designed with ecological design approaches

Singapare Green Building
The vertical garden of Treehouse in Singapore also reduces its carbon footprint owing to its energy-saving green building feature. The building is ecologically equipped and includes sky gardens. The building consists of 30-story office towers, and each floor has an area of 175 square meters. The construction of the towers was completed according to LEED Platinum standards. Natural lighting and natural ventilation systems for all areas were designed according to Green Mark Platinum criteria. (https://www.plumemag.com/surdurullenen-mimari-ornekler-ve-yesil-binalar/)
    https://inhabitat.com/worlds-largest-vertical-garden-at-the-singapore-tree-house-condominium-sets-new-guinness-record/
Aspen Art Museum (https://www.plumemag.com/surdurulebilir-mimari-ornekleri-ve-yesil-binalar/)
Aspen Art Museum, which makes a name for itself as an environmentally friendly art museum, is located in the American Ski Center. The museum has the 2014 Pritzker Prize. The museum building, designed by Japanese Architect Shigeru Ban, was built based on transparent and open planning. This feature allows insiders to see outside and outsiders to see inside. A composite natural wood panel was used on the exterior of this architectural design of the nature-friendly museum, which resembles a wicker basket.
    (https://www.archdaily.com/546446/aspen-art-museum-shigeru-ban-architects/540f8859c07a80441900004d-aspen-art-museum-shigeru-ban-architects-photo?next_project=no)

Green School Bali (https://www.plumemag.com/surdurulebilir-mimari-ornekleri-ve-yesil-binalar/)

Green School Bali, built-in Bali in 2008, received the "World's Greenest School" award in 2012. Green School Bali continues its existence with the principles of sustainability in every aspect, from the building structure to the educational philosophies. The beautiful part is that the students of this school understand the sustainability culture by experiencing it.

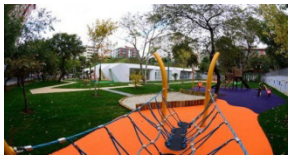




https://tr.pinterest.com/pin/31806741107013229/ https://tr.pinterest.com/pin/568649890426567474/

Bahriye Üçok **Ecological Kindergarten** (https://www.ekoyapidergisi.org/4006-bahriye-ucok-ekolojik-cocuk-yuvasina-leed-platin-sertifikasi-.html)

The LEED (Leadership in Energy and Environmental Design) certificate issued by the American Green Building Council (USGBC) is the most widely used Environmentally Friendly Building certificate in the world among international rating systems. Bahriye Üçok Ecological Kindergarten became the first educational institution in Turkey to receive the LEED certificate, the system that ensures buildings are healthy and environmentally friendly.

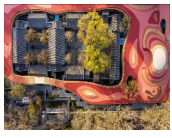
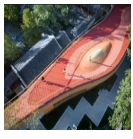




(https://www.ekoyapidergisi.org/4006-bahriye-ucok-ekolojik-cocuk-yuvasina-leed-platin-sertifikasi-.html
https://listelist.com/bahriye-ucok-cocuk-yuvasi/)

Courtyard Kindergarten **(**https://decombo.com/anaokulu-projesi-cati-tasarimi/)

The Courtyard Kindergarten project, designed around a historic courtyard, was built by MAD Architects. The project stands out with its red dynamic roof designed as a playground for children. The Beijing architecture firm led by Ma Yansong aims to preserve the cultural heritage of the city by creating new spaces around the historical buildings of the 18th century with their kindergarten project.


(https://www.archdaily.com/951734/yuecheng-courtyard-kindergarten-mad-architects)

4. Landscape Design Methods Compatible with Nature

The professional discipline of landscape architecture not only performs space design but also ensures the functionality and sustainability of the space. In this direction, ecological landscape design approaches gain importance (Gül, 2000) (Table 3). Especially in the last decade, the compatibility of lifestyle with nature has begun to be sought in new living environments with an ecological approach in cities. This phenomenon, which emerged with the concern of protecting nature and natural resources, brought the improvement of urban life quality to the agenda. In this context, in recent years, a new understanding has dominated that takes into account all aspects of human life in planning and design, offers a certain comfort of life, aims to improve the quality of space and give identity. In urban settlements with ecological solutions, approaches such as less motor vehicle use, environmentally sensitive transportation system, more public space and open-green space, which lead the people of the city to be lived in better conditions, without excessive consumption, have begun to be accepted (Alkanoğlu, 2009). According to the researches, nature-based sustainable landscape approaches can be grouped under the following headings (Aklanoğlu, 2009; Gürbüz and Arıdağ 2009; Korkut et. al. 2017).

Table 3. Nature-based sustainable landscape approaches

1	Preservation of existing landscape characteristics
2	Preservation and improvement of existing landscape components
3	Design suitable for ecological and climatic conditions
4	Water-efficient landscaping :
5	Xeriscape and natural landscape design
6	Energy-efficient landscape design
7	Permaculture
8	Green roof and green wall design
9	Creation of alternative green spaces

1. *Preservation of the existing landscape characteristics*: Determining the existing natural and cultural landscape characteristic creates the data that should be consulted while making planning decisions. The existing landscape characteristic should be protected and a balance of protection and use should be provided in order to transfer it to future generations. While areas such as forest, pasture, agricultural land, valley, and coastal habitats

play an important role in determining the landscape characteristic, it is stated in the literature that vegetation is also an important landscape component (Eroğlu, 2015).

2. *Preservation and improvement of existing landscape components*: Existing landscape components are revealed and these components are protected and improved.
3. *Design suitable for ecological climatic condition*: Design planning is performed by considering the ecological conditions and climatic data of the place where the design will be carried out.
4. *Water-efficient landscape design*: There is a lot of work conducted on water-efficient landscape design (Çorbacı et al. 2011; Bayramoglu, 2016). Bayramoğlu (2016) recommends the use of natural plants native to the region, in addition to the use of plants with low water needs (high thirst tolerance) in order to provide effective water use. This approach is generally based on the "Water-Wise, Water-Smart" logic. So; It has been developed on new landscaping concepts such as "Low-Water" and "Natural Landscaping". Although each of these concepts shows some differences in the way they approach the subject, they are all based on the same basic principles and are often used interchangeably to have the same meaning.
5. *Xeriscape and natural landscape design*: The use of plant species with low water demand is the desired application for xeriscape applications. Instead of species with high water demand, alternative species suitable for xeric landscaping can be preferred in terms of aesthetics and functionality. The use of natural plant species in xeric landscape applications is very important owing to the more effective use of water. In addition, natural plant species need less fertilization and spraying compared to other exotic plants and they are more durable and adapt even to the extreme climatic conditions of the region, reducing maintenance costs and other costs (Bayramoğlu, 2016).
6. *Energy-efficient landscape design*: Energy-efficient landscape design includes landscaping activities aimed at energy conservation. Energy-efficient landscape design, in other words, covers environmentally sensitive landscape planning, design and management. Along with the aesthetic value of the area, it also increases the environmental quality. It is argued that landscaping applications should be done by helping the nature, ecosystem and human health by reducing heating and air conditioning expenses and dependence on fossil fuels, and by arrangements with low cost and less

maintenance. Well-arranged landscapes not only increase aesthetic quality but also reduce heating and cooling costs (Erdoğan and Uslu 2011; Zolnoun, 2013).

7. *Permaculture*: Permaculture is a system based on using permaculture designs by creating self-sufficient sustainable living spaces while protecting and improving nature for this purpose (Tatar and Olay 2015).
8. *Green roof and green wall design*: Green walls are a new sustainable gray water treatment technology. They can be placed on any vertical surface (i.e. building walls, vertical parking lots, etc.), occupy minimal horizontal space (Jim, 2015) and have high aesthetic value (Perini and Rosasco, 2013).
   Green walls, which are the pillars of green infrastructure systems in urban areas, are widely used in the world due to their important benefits such as reducing the impact of dense urbanization and climate change caused by population growth (Bekar and Güneroğlu 2016, Bayramoğlu et al. 2020).
9. *Creation of alternative green spaces*: It is based on the idea of creating alternative and different green areas in the city.

5. Results and Recommendations

In the context of the concept of "sustainability", nature is what actually means the lasting of human beings, and therefore it is necessary to transform the society (culture) in order to continue its life. Thus, the technological power produced by the human mind is developed not to suppress nature, but to keep it alive. In order to ensure the transformation of nature, it is necessary to take the process of nature as and to use the technological developments, which are the product of the human mind, for the conservation of resources in order to protect nature and keep it alive (Asımgil, 2016).

As a result, if the designs to be made are required to be based on an "ecological understanding", some of the items given in Figure 3 will be provided.

- Increasing permeable surfaces in cities in order to prevent the loss of rainwater by surface runoff.
- Local, recyclable, reusable, low maintenance materials should be preferred in material use.
- Existing landscape components should be utilized, and materials used in environmental designs should be selected as recyclable with reuse opportunities.

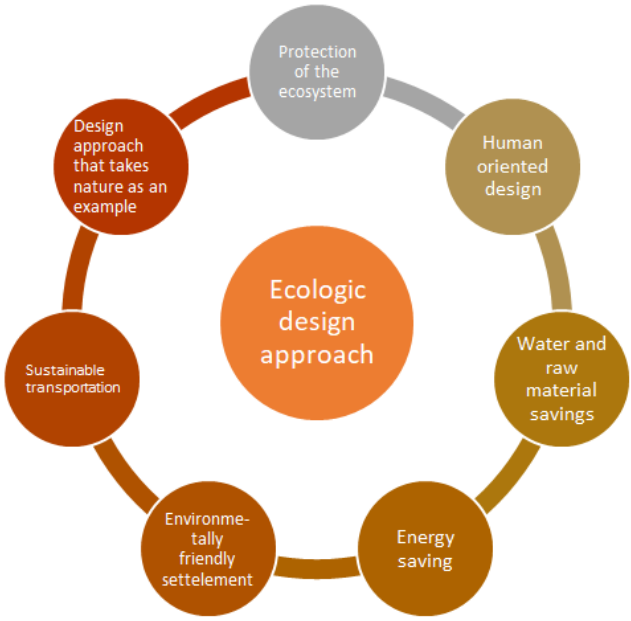


Figure 3. Some subjects used in ecologic approaches

- Existing vegetation should be protected and this cover should be evaluated by the purpose of the design.
- Designs should be made without forgetting the fact that nature is a part of the design.
- Plant selections should be made that require low maintenance and are suitable for climatic characteristics.
- Plans should be made with a design concept with the use of renewable energy, which provides a balance between humans and nature and does not consume natural resources.
- Designs that better respond to human needs should be made.

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CHAPTER XVIII

LANDSCAPE DESIGN PROCESS IN FACE-TO-FACE AND DISTANCE EDUCATION

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1. Introduction

Social development requires improving the personalities of individuals, equipping and empowering them with knowledge, skills and practices, increasing their professional qualifications, educating them in order for them to adapt to the society and providing the necessary educational environment (Karaca and Kelam, 2020). Universities, which contribute to the development of students with quality education, are shaped to include intellectual development, learning, social and lifelong learning and student-centered learning methods as a result of global trends (Aubusson and Schuck, 2013; Eroğlu and Kalaycı, 2020). Education can be given in four different ways. The same-time-same-place method is a traditional face-to-face approach where the instructor and students are in the same geographic location at the same time. In the different-time-same-place method, the participants of the learning and teaching process interact in the same area but at a certain time of their choosing. In the same-time-different-place method, students from different geographical locations are connected simultaneously using different media such as video conferencing, telephone or Skype. In the different-time-different-place method, education takes place via e-mail where students and instructors are geographically in different locations and in different periods, or using applications through which participants can

interact asynchronously (Redmond, 2011). However, education constantly evolves and transforms due to its autonomous characteristics, through which it becomes an evolving practice (Akdemir and Kılıç, 2020).

The COVID-19 pandemic (Coronavirus disease 2019) has caused changes in the teaching-learning process in higher education institutions, affecting the interaction between instructors and students (Coman et al., 2020; Sobaih et al., 2020). During the pandemic, all schools around the world had to take a break from education, and face-to-face education activities given in the classroom environment had to be carried out online with students only through distance education (Avcı and Akdeniz, 2021). Distance education (Orçanlı and Bekmezci, 2020), which started with correspondence in the early 18th century, could initially transfer information through a single channel via mail, radio and television, but nowadays it has become a reciprocal process with the widespread use of the internet (Akbal and Akbal, 2020). In Turkey, it was carried a step forward to higher education after the establishment of Anadolu University Open Education Faculty after 1980. Since the early 2000s, with the developments in information and communication technologies, distance education has become an education model with millions of students (Türkkan, 2021), taking its place in Turkish education system. As of 2017, distance education centers, through which distance education is actively carried out, have been opened in 85 universities (Çakmak Karapınar et al., 2020). These centers underwent four basic stages in education and teaching, which are in increasing order: discussion and suggestion period, correspondence education period, education period utilizing audio-visual tools, and the period in which information systems have been integrated into the system (Erkoca, 2021).

Traditional face-to-face education is a method of teaching by lessons and textbooks in which the teacher and a group of students are physically in the same classroom (Pearcy, 2009). In face-to-face education, especially in applied courses, there is an interaction between the student and the instructor, motivation and competition in the workshop environment (Türkkan, 2021), whereas distance education is a multi-disciplinary educational ecosystem with many different components as well as systematic and powerful theoretical foundations, which addresses a culture of learning (Sezgin, 2021). Distance education, of which e-learning is the main component, is defined as synchronous or asynchronous education provided by technological tools (computer, internet, one or two-way communication tools, etc.), in which electronic technologies are utilized to

access the educational curriculum outside of a traditional classroom (Ananga and Biney, 2017) and which is maintained by students and instructors independently of time and space (Özonur et al., 2019). It is the newest form of distance learning (Pearcy, 2009) based on asynchronous text-based communication over the WEB, in which teachers can send questions to learners and vice versa and learners can send questions and answers among themselves through multimedia presentation systems such as computer conferencing, electronic mail and the internet (Kaçan and Gelen, 2020; Allen and Seaman, 2017; Gökbulut, 2021; Yaman, 2021). In addition, it is a system that takes place under the learner's own responsibility and supports individual learning, in which the learner develops learning skills, plans and controls their own learning process (Duman, 2020).

Differences between face-to-face education and distance education include separation of the teacher and the learner from each other during the learning period, different planning and preparation of learning tools and different presentation methods, different ways of utilizing communication and information technologies (Verduin and Clark, 1994; Akyürek, 2020). While distance education provides some advantages with its flexibility, accessibility of the same content multiple times, low cost, practicality and prevalence of education, and supporting education anywhere without being bound to the school environment, its disadvantages include lack of discipline in learning, potential health problems that may arise as a result of extended periods of use of technology, inadequate technological facilities and infrastructure (Koç, 2021). The easy relationship in face-to-face education cannot be achieved in distance education, in which students cannot socialize, cannot benefit from applied courses sufficiently and become dependent on communication technologies (Akyürek, 2020).

When students don't reuse their knowledge for a long time, they may have difficulty recalling such knowledge. This is called learning loss. Students may forget some of the information while they are away from school and cannot bring back what they have learned. The COVID-19 pandemic is also thought to cause learning loss (Baz, 2021). Negative experiences arising from technical problems or difficulties in self-management and time management may cause state university students to perform lower in online lessons compared to face-to-face lessons (Jaggars, 2014). Problems including the small screen size of the mobile devices of the students who try to participate in the lesson, reasons arising from the device operating system, incompatibility of the educational content with the

mobile device might also positively and negatively affect the perception level of the students (Gökbulut, 2021). In addition, according to TUIK data; 17% of the households don't have an internet connection, 37.90% of the households only have a computer, 26.70% have a tablet and 17.60% have a desktop computer (Orçanlı and Bekmezci, 2020), and the applied courses requiring workshops and laboratories prove to be weak in distance education, which causes students to resist the system (İlic, 2020) and give up online learning. Besides, the decrease in the sense of belonging and responsibility that the students in the learning environment gain when they are in a group might also cause the students to drift away from the system (Enfiyeci and Büyükalan Filiz, 2019; Yıldız, 2020).

In distance education, the perceptions of instructors while trying to use new technologies affect the quality of service and student success. The workload of the instructors has increased compared to the traditional face-to-face education and preparation of course content and length of the lesson result in more effort and waste of time. In addition to preparing course content and presenting it to students, instructors also have to fulfill multiple tasks such as technical support and reporting problems to administrators. The lack of incentives compared to the effort made, the technical problems experienced during the lesson and the concerns about the quality of the lesson also act as strong disincentives to distance education for the instructors (Gök and Kılıç Çakmak, 2020).

Distance education has some positive outcomes including the fact that the exams held by universities in digital environments give students flexibility in terms of time, that general and statistical data can be obtained quickly, that the results are easy to read and quickly announced, that the errors that may arise during measurement are reduced, that the prepared test questions can be reused in other exams or can be easily updated, that multimedia such as display and audio can be added to the exam, that distance education eases the burden on the instructors on printing and distribution of exam sheets. However, the most important problem in the distance education system is the security vulnerability in the online exam system (Solak et al., 2020). Inability of the instructors to monitor the students during the exam in the same way as in the case of face-to-face education and the element of cheating prevent accurate measurement of a learner's knowledge and skills. Therefore, it's necessary to establish certain strategies for effective learning and assessment.

Any effective learning strategy needs to bridge the gap between our knowledge about student learning and what we need to do as teachers. McDonald

(2001) lists five common features of an effective learning strategy for online learning as follows:

- Openness in the Education Process: In this process, the learner should be fully involved in the learning process, both as a participant and as a contributor. This requires discussions during the lessons, evaluation between students and self-evaluation of the student.
- Learning to learn: The ultimate goal for a student's knowledge building is to impart self-awareness to the student by promoting and improving high-level cognitive skills such as self-expression, reflection, analysis and synthesis, problem solving and assessment and providing them with a focus for the design of learning activities.
- Prior Knowledge and Experience: Existing knowledge and personal thoughts form the starting point for discussion, clarification and planning of learning so it should be ensured that the student has prior knowledge of the subject.
- Problem/Action-Based Learning: It should be ensured that student activities use stimuli and problems as the focus.
- A Sense of Community: Learning activities that promote collaboration among group members should be implemented as a way of creating a sense of community and promoting learning as a social process (Stern, 2004). These strategies also play a key role in courses covering a long process in which a design is given.

In the design process of landscape architecture, comprising an aesthetic, perceptual, ecological, historical and natural structure, students make observations based on human activities in decision-making, production, analysis and shaping while designing a space. During the lessons, the students go through the stages of researching, defining and determining the problem, acquiring information, developing and improving options, evaluating and obtaining the resulting product (Bayramoğlu et al., 2019). Therefore, students should be fully incorporated into the lessons, learn to learn and have prior knowledge about the subjects.

Design education starts with seeing and continues with visual thinking. Design education is of a paramount importance in Urban Design and Landscape Architecture and Landscape Architecture departments because these professional disciplines bring together suitable spaces for people in a certain hierarchy

and form. Therefore, the stages of decision-making, production and analysis should be considered when starting the design process (Wong, 1993; Rodiek and Steiner, 1998). In general, the design process consists of identifying and defining the problem, obtaining information, generating options, selecting and developing one of the options, evaluation, and the resulting product (Yılmaz and Yılmaz, 2000). According to Steinitz (1990), in the landscape design process, the data obtained by analyzing the current situation of the outdoor spaces to be designed should be synthesized in order to create original designs.

In this study, the landscape design process was explained in detail during 'KPM301 Studio-5' courses in the Fall Semester of the 2019-2020 Academic Year, in which face-to-face education was given, and in the Fall Semester of the 2020-2021 Academic Year, in which distance education was given in the Department of Urban Design and Landscape Architecture of the Faculty of Architecture of Amasya University, and the products of these processes were revealed. Gündüz (1985), Steinitz (1990), Yılmaz and Yılmaz (2000), Polat and Önder (2004), Şahin and Önder (2008)'s landscape design process was taken into account during development of the process. The steps of the process followed in face-to-face and distance education are summarized in Table 1.

Table 1. Landscape Design Process Followed in Face-to-Face Education and Distance Education

	Face-to-Face Education	**Distance Education**
Defining of Problem	To design a recreation area for the Darıca coastline of Trabzon province, Akçaabat district, which has a coast to the Black Sea, taking into account the user's demands	To design a recreation area for the Fatsa coastline of Ordu province, Fatsa district, which has a coast to the Black Sea, taking into account the user's demands
Research and Analysis	Researching concepts related to the subject	Researching concepts related to the subject
	Obtaining the ready maps of the study area	Obtaining the ready maps of the study area
	Determination the current condition of the area, natural and cultural landscape components during the field studies	-
	Determination of the perceptual data during the field studies	-

	Existing current problem analysis of the area, transportation analysis at the scale of 1/2000, green area analysis at the scale of 1/2000, property status analysis at the scale of 1/2000, land use analysis at the scale of 1/2000, noise analysis at the scale of 1/2000, SWOT analysis and user profile analysis	-
	Preparation of analysis and photo sheets of the study area	-
	Collection of inspired examples related to the subject	Collection of inspired examples related to the subject
Design Phase	Identifying user needs	Identifying user needs
	Determining the concept (main theme of the project) and creating the scenarios	Determining the concept (main theme of the project) and creating the scenarios
	Creating of the needs program (needs-activity- activity space list)	Creating of the needs program (needs-activity- activity space list)
	Creating the bubble diagram	Creating the bubble diagram
	Making the main design decisions and creating the stain plan	Making the main design decisions and creating the stain plan
	Form work by developing at least 3 alternative design proposals in accordance with design decisions	Form work by developing at least 3 alternative design proposals in accordance with design decisions
	Selecting 1 suggestion from among the alternative design proposals	Selecting 1 suggestion from among the alternative design proposals
	Making preliminary design sketches	Making preliminary design sketches on computer
	Preparation of concept and land use decision sheets	Preparation of concept and land use decision sheets
	Creating the final design phase by developing preliminary design sketches	Creating the final design phase by developing preliminary design sketches

	Drawing the planting design	Drawing the planting design
	Drawing the detail project	Drawing the detail project
	Drawing section-views of the project	Drawing section-views of the project
Presentation of Design Products	Preparation of presentation sheets	Preparation of presentation sheets

2. Landscape Design Process

The steps related to the landscape design process followed under the study are briefly explained below, with examples from student studies:

Step 1. Defining the Problem: The stage where design decisions are made by determining the problems within the boundaries of the study area and taking into account the users' wishes and preferences. At this stage, the goals and objectives of the design problem are clearly defined.

Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2019-2020 Academic Year, where face-to-face education was given in the Department of Urban Design and Landscape Architecture of the Faculty of Architecture of Amasya University, the Darıca coastline stretching for 2 km in the Akçaabat district of Trabzon province, located by the Black Sea, was chosen as the study area (Figure 1), and the students were asked to design a recreational area for this area, taking into account the building functions and user demands.



Figure 1. Coastline of Akçaabat district of Trabzon province study area

Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2020-2021 Academic Year, in which distance education was given, the 2 km

long coastline of Fatsa district of Ordu province, located by the Black Sea, was chosen as the study area (Figure 2). The students were asked to design a recreational area for this area, considering user demands.



Figure 2. Coastline of Fatsa district of Ordu province study area

Step 2. Research and Analysis: Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2019-2020 Academic Year, in which face-to-face education was given, the students were asked to research the concepts of city square, city park, shoreline arrangement, public open spaces, recreational areas and prepare individual presentations by examining the examples related to such concepts. The presentations were presented and discussed by the students in the classroom. The ready maps of the study area were obtained from Trabzon Metropolitan Municipality. Current condition of the area, natural and cultural landscape components, and perceptual data were identified by conducting field studies that lasted 3 days with 34 students who took the course. The students, in groups, prepared a 70x100 cm 'Survey-Analysis Sheet' that included the analysis of the current problem of the area, transportation analysis at the scale of 1/2000, green area analysis at the scale of 1/2000, property status analysis at the scale of 1/2000, land use analysis at the scale of 1/2000, noise analysis at the scale of 1/2000, SWOT analysis and user profile analysis as well as a 70x100 cm 'Photo Sheet' containing silhouette photographs of the area. Samples that could inspire the students about the subject during the design phase were collected individually and presented in the classroom.

Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2020-2021 Academic Year, in which distance education was given,

the students were asked to research the concepts of city park, shoreline arrangement, public open spaces, recreational areas, theme park and prepare individual presentations by examining the examples related to such concepts. The presentations were presented and discussed by the students in the online classroom environment. The ready maps of the study area were obtained from Ordu Metropolitan Municipality. Since it is distance education, in-situ field work could not be carried out with 51 students who took the course. The instructor visited the study area to take photographs and obtain video recordings of the area showing in detail the current condition, natural and cultural components of the area and shared them with the students. In this process, the students didn't prepare a ' Survey- Analysis Sheet' and 'Photo Sheet' individually or as a group. Samples that could inspire the students about the subject during the design phase were collected individually and presented in the online classroom.

Step 3. Design Phase: Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2019-2020 Academic Year, in which face-to-face education was given, each student determined the user needs related to the study area in line with the observations and surveys they carried out during the field studies. They specified a design concept to solve the design problem and developed design scenarios related to the concept. A needs program (needs-activity- activity space list) was created in line with the field studies carried out on site, the identified user needs and the main theme of the project. The bubble diagram showing the relationship between the activity spaces was drawn by hand. The main design decisions were made by discussing whether the concept and the activities related to the concept were suitable for the area, in the classroom. Accordingly, a stain plan at the scale of 1/2000 was created by hand drawing. At least 3 alternative design proposals were developed in accordance with the design decisions in the classroom, and form work was carried out. Out of 3 alternative proposals developed in different forms, 1 was selected and drawn to a scale of 1/2000 on tracing paper, and a few preliminary design sketches at the scale of 1/2000 were made. Preliminary design sketches were developed by hand drawing before the final design was created. The students transferred the hand drawings of their projects to Autodesk AutoCAD (herein after referred to as AutoCAD) on computer during the final design phase. While the students were drawing the planting design, detail project, section-views of the project, they simultaneously made both hand and AutoCAD drawings.

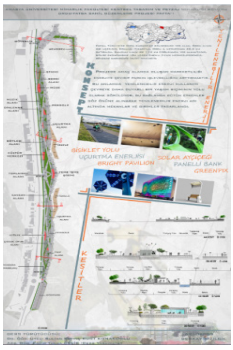
Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2020-2021 Academic Year, in which distance education was given, each student commented on the photographs and video recordings given to them by the instructor, made online interviews with their acquaintances living in the city of Ordu and determined user needs about the study area. They specified a design concept to solve the design problem and developed design scenarios related to the concept. In line with the identified user needs and the main theme of the project, the needs program (needs-activity- activity space list) and the bubble diagram showing the relationship between activity spaces were created on computer. The main design decisions were made by discussing whether the concept and the activities related to the concept were suitable for the area in the online classroom environment. Accordingly, a stain plan at the scale of 1/1000 was drawn in AutoCAD. At least 1 alternative design proposal was developed on computer in accordance with the design decisions, and form work was carried out. AutoCAD, Adobe Photoshop (herein after referred to as Photoshop), Microsoft PowerPoint (herein after referred to as PowerPoint), Sketchbook, etc. were used to perform form work on computer. One of the alternative proposals developed in different forms was selected to make a preliminary design at the scale of 1/1000 on computer. Preliminary design was developed digitally, with the final design created in AutoCAD. The students drew the hard ground-soft ground design, planting design, detail project, section-views of the project using AutoCAD on computer. At the beginning of the distance education process, a variety of software packages, including AutoCAD, Photoshop, PowerPoint, Sketchbook, etc. were used, whereas only AutoCAD was used after the final design phase of the project.

Step 4. Presentation of Design Products: Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2019-2020 Academic Year, in which face-to-face education was given, each student prepared a Hard Ground-Soft Ground Plan at the scale of 1/2000, a Planting Plan at the scale of 1/2000, a Detail Sheet at the scale of 1/500 using AutoCAD and 2 presentation sheets using Photoshop (Figure 3). The sheets prepared in AutoCAD were printed out on 70x100 cm white paper and delivered in the form of folded sheets. 70x100 cm presentation sheets prepared in Photoshop were also printed out in color and delivered.



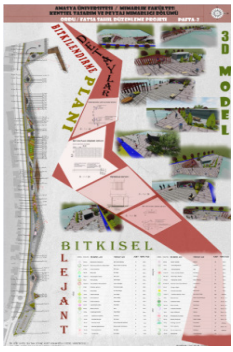
Figure 3. Some presentation sheets created during the face-to-face education process

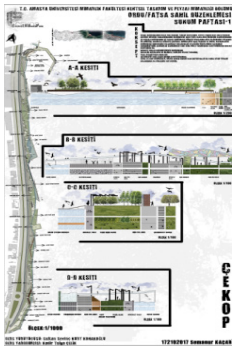
Within the scope of the 'KPM301 Studio-5' course in the Fall Semester of the 2020-2021 academic year, in which distance education was given, each student prepared a Hard Ground-Soft Ground Plan at the scale of 1/1000, a Planting Plan at the scale of 1/1000, a Detail Sheet at the scale of 1/100 using AutoCAD and 2 presentation sheets using Photoshop (Figure 4). 90x160 cm sheets prepared using both AutoCAD and Photoshop were submitted online.

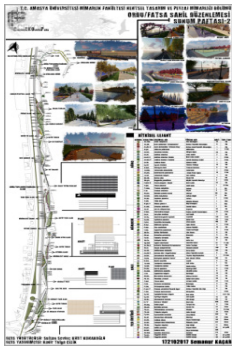






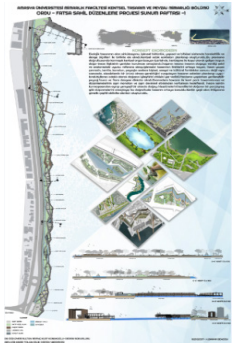


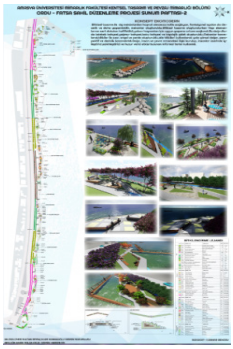












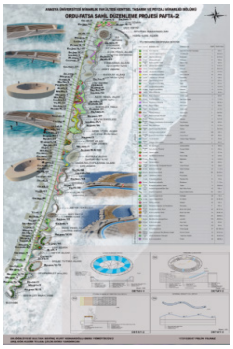


Figure 4. Some presentation sheets created during the distance education process

3. Discussion and Conclusion

As in all disciplines involving design and creativity processes, the style and methods of teaching and imparting design skills to students are critical in Urban Design and Landscape Architecture and Landscape Architecture education programs. This is not achieved by reading and describing but rather acquired over time with experience and education. In this study, the landscape design process followed within the scope of 'KPM301 Studio-5' course in the Fall Semester of the 2019-2020 Academic Year, in which face-to-face education was given in the Department of Urban Design and Landscape Architecture in Faculty of Architecture of Amasya University, and in the Fall Semester of the 2020-2021 Academic Year, in which distance education was given, was described.

The advantages and disadvantages of the 'KPM301 Studio-5' lessons performed in the Fall Semester of 2019-2020 Academic Year, in which face-to-face education was given, and the Fall Semester of 2020-2021 Academic Year, in which distance education was given in the Department of Urban Design and Landscape Architecture are as follows:

- In face-to-face education, students had the opportunity to visit the study area to gain a personal experience and were able to carry out the survey work of the area on site by making qualitative and quantitative observations. It was observed that the students who had the opportunity to make on-site observations were able to realize the elevation differences related to the study area more easily. The students were able to solve the problems arising from the height differences in their projects more easily. However, since the

students couldn't see and experience the study area in distance education, the photographs of the area and the descriptive videos provided to them caused difficulties in their perception of the area. This difficulty was reflected in the project, and they couldn't reach the desired level in space analysis in accordance with the elevation values.

- In face-to-face education, students were able to make sketches by hand drawing in the classroom. In distance education, on the other hand, the sketching phase with hand drawing couldn't be carried out, and the students tried to digitally draw the sketches using a variety of software packages, including AutoCAD, Photoshop, PowerPoint, Sketchbook, etc.
- By courtesy of the sketches drawn in the classroom during face-to-face education, the hand drawing skills of the students improved, and the course instructors could observe this development of the students more easily, whereas in distance education, students' hand drawing skills couldn't improve compared to face-to-face education.
- In face-to-face education, students made at least 3 alternative hand drawing suggestions for the design problem and at least 1 suggestion on computer in distance education.
- Explaining the preliminary design, final design, planting design and their details by showing hand drawings of the same, while criticizing the student in face-to-face education, allowed the students to quickly understand what they need to do. In distance education, on the other hand, it was more difficult for them to understand and manage the process, although the same things were repeated over and over by the instructor due to the variability of internet connections of the students while the instructor was giving criticisms verbally or by drawing in the online classroom. Apart from the verbal criticisms given to the students participating in the online class, 51 students who took the course were given written criticisms on their projects in AutoCAD to help them manage the process more easily.

In this study, although the landscape design process followed in different study areas in the face-to-face and distance education processes was applied in the same way to all students, the resulting products and description techniques were different from each other.

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CHAPTER XIX

HUMAN INTERVENTION ON NATURE: HISTORY OF ENVIRONMENTAL TRANSFORMATION IN TURKEY FROM 1900S TO 2000S*

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1. Introduction

Modernization has been the most transformative force among the relations between nature and human in history. Turkey met this force in the second half of the 19th century. In contrast to western experiences, it did not emerge as a contingent result of an evolutionary process, but rather, has been an attempt that consciously aimed to achieve the contemporary institutions of modern societies. Therefore, besides the outcomes of western experiences, the modernization of Turkey as a project has its special and original outcomes that result from interventions of pre-modern internal interest groups, and external forces of already modernized societies.

The study affirms that the changes in social context throughout the development process of human societies define the historical factors of the transformation of the environment. Therefore, as the social context of the modernity project in Turkey change the features of the environmental transformation also change. The periodization of the social context in the study is defined through Tekeli's (2007) four periods. The first period from end of the 19th century to 1923 consists of the *Shy Modernity Period* when the institutional

* This paper is based on the author's Ph.D. thesis (The environmental history of land and water usage in the modernity period of Turkey) completed in 2005. However, in the course of preparing the paper, the references, as well as the data and information, have been updated to the extent possible.

roots of modernization and the transformation of the environment have been set. It is characterized by the social changes that later on have determined the social institutions of the Modernist Republic. The years from the proclamation of the Republic, until the years following the end of the Second World War (1923 – 1950), is characterized by a fervent effort for development to supply the habitable human-made environment and is named as the *Radical Modernity Period*. Following the Second World War, the change in social context enters a new and more environmentally destructive period named as *Populist Modernity Period* (1950 – 1980), within which, one significant social transition can be observed: urbanization. In the years following the 1980 coup, Turkey got into a new economic and political era that can be defined as the *Eroded Modernity Period*, characterized by the increasing consumption-driven industrialization that later shifted towards construction-based progressivism in the 2000s.

The study examines the impact of social change on environment through pioneering examples in the first three periods. Although all three periods have their characteristic impacts on nature, with the accelerating development, changes experienced became more repetitive than exemplary. Therefore, in the fourth period from 1980 to 2000s, a conceptual approach has been preferred to explain the transformation.

2. Late 19th Century Anatolia and the Roots of Modern Turkey

Although the initiation of modernity in Anatolia can be dated to the 18th century, it sorts itself out in the second half of the 19th century, in a period of hesitant growth of modernism. The period is characterized by the dual development of modernity, which as Tekeli (2001) argues, spread to Anatolia through two mutual processes. First, in the form of exogenous pressure of market economy that came in with the worldwide spread of capitalism. Second, in the form of reformist movement directed by the elite of Ottoman that demands to modernize bureaucratic institutions and army to cope with the developed nations of the "modern west".

Kıray (1969: 107) asserted that the Ottoman Empire was based on agriculture that "had a distinctly centralized mod of government with relatively efficient transportation and communication". However, the face of the Empire was turned towards Europe, and Anatolia was left as a closed basin for the

capitalist markets. Wheat and most of the other needs of Istanbul were supplied from Romania, Odessa, and even Marsala. The land regime in Ottoman Empire until 19th century was organized to optimize and control the surplus under the government mechanism, and would not let the control of surplus to the farmer. The rest of the territories controlled by the Ottoman authorities were in relatively feudal social relations, and until the 19th century, there has been no attempt to improve the agricultural production in these territories.

Ironically, until the 19th century, most of the Anatolian lands were not considered as a productive basin for capital accumulation. The subsistence economy of the farmers in Anatolia was based on human and animal force, traditional techniques, domestic stockbreeding, and agricultural production was dependent on natural conditions. At the beginning of the 19th century, not only the production relations but also the tools used in agriculture were underdeveloped. Thousands of years ago, tools had developed in Mesopotamia and Anatolia with the introduction of wooden plow (karasaban). However, since then, there had been no important development of agricultural tools used in Anatolia. The wooden plow was mostly pulled by ox, and the field was near the village that did not require extra effort for accessibility.

As the Ottoman Empire lost its lands at wars in the 18th and 19th centuries, the empire has also lost control on most of its cereal-producing lands, and the closed basin character of Anatolia has changed this. The immigrants from the lost territories came to Anatolia and increased the amount of cultivated lands and cereal production. Hence, in those years both the Ottoman Government and the foreign entrepreneurs simultaneously saw Anatolia as a fruitful land to be exploited to supply the increasing demands of Istanbul and Europe's avaricious markets. The spread of capitalism in the 19th Century forced the Ottoman Empire to open its lands to the European Market and the imperialist nations entered Anatolia by means of their entrepreneurs in order to transform the agricultural production and to control local markets so that to collect the claims. Consequently, as the European market expanded towards the peripheral countries in the 18th century and started to influence the agricultural production and trade in the Ottoman lands (Kıray, 1999), the Empire became the periphery of 'Imperialist Europe' in the 19th century (Pamuk, 1994; Toprak, 1988).

The first significant intervention on the nature of foreign entrepreneurs has been an outcome of the demands of the increasing European population and industrialization. Yet, to invest in Ottoman lands for external markets

required accessibility, and in those years Aegean Region was one of the most accessible and developed regions in Anatolia, with its valuable land and agricultural characteristics at B. Menderes and Gediz Basins (Kıray, 1969; 1971; Özyüksel, 1988). The British entrepreneurs attempted to regulate the stream at Menderes River in the Aydın district, and implement drainage applications in Aegean Basins (State Archives, 1910a; 1911; 1910b). The mixed production pattern that Aegean farmers had developed in centuries due to the substantial economy around Manisa, Uşak, Izmir, and Afyon (Kıray, 1971) changed towards a capitalist agricultural practice of mono-cropping wheat and pulses. The development of the railroad demolished the existing crafts and organized the region so that to produce only the necessary agricultural products for the external markets (Kurmuş, 1974).

As Aegean Region was dominated by British entrepreneurs, other countries were forced to shift to additional productive regions in Anatolia. The Ottoman Government saw this demand as a chance to open new lands to modern production and to diffuse development to Anatolia. For this, a concession was given to the German *Anatolian Railroad Company*, to start railroad construction from Marmara to Çukurova in 1883, which opened Konya and Çukurova basins to capitalist agricultural production (Balaban, 1965; Özyüksel, 1988). Özyüksel (1988) and Toprak (1988) argue that an indirect aim of the project was to increase wealth in Anatolia and enable the local population to buy German products. The water needed for irrigation of the basins would be brought from Beyşehir Lake with a channel at a length of 200 km. The Çarşamba Cannel has been built in order to drain the wetlands and open the Çumra valley to the farmers. Next, the Karaviran Lake has been drained and opened to cultivation, which transformed 53.000 ha area into arable land and the region became independent from the climatic conditions. The irrigation project ended was finished in 1913 and introduced the engineering practice of waterworks to Anatolia. Following year, to widen the development within the region wetlands in the Tarsus region have been drained and opened to cultivation (Özyüksel, 1988; State Archive, 1914).

3. The Proclamation of the Republic: An Endeavour for Progress with Scarce Resources (1923-1950)

Kıray (1999) defines the history of modernity in Turkey as a structural transformation that has crystallized in the 1920s. With all its institutions,

modernity grew and found its meaning after the proclamation of the Republic of Turkey. While the modernist institutions developed, the rational engineering ideology diffused into the institutions that enabled the radical application of the modernity project (Göle 1998). The 'radical modernity period' of 1923-1950 is characterized by a fight against the environment to sustain the new Republic with a feverish endeavor for development and modernization that starts to transform the environment to survive in harsh environmental conditions and supply the habitable human-made environment to the citizens.

The environmental transformation during the *Radical Modernity Period* can be analyzed under two main factors that have been set out to improve public health, and make the environmental conditions habitable; firstly the Public Health Campaigns, and secondly the infrastructure investment, in particular waterworks. However, in the first 10 years of the Republic, due to the scarcity of capital at the beginning of the new Republic, the state allocated 10 to 15 % of the budget to development works, mostly used for health campaigns, waterworks, and railroad constructions (Kepenek and Yentürk, 2000). The health policy applications of the state had a significant role in changing the nature compared to the other investments at that period. The campaigns against malaria required wetlands and even all masses of water at any scale and at any location near the human settlements to be drained, in order to eliminate the niches of the mosquitoes. Hence, in eleven years, between 1925 and 1936, to prevent the malaria epidemic the drained wetlands reached a sum of 61.440 ha (SIS 1933; 1937). Intervention to the water ecosystem provided additional benefits besides those of Health Campaigns. To improve water resources and to prevent plains and settlements from flood and regulating the flood enabled the land to be cultivated for the whole year, exterminate the periodic wetlands that were the result of floods. Flood control would significantly improve the living conditions and public health at the basins such as at the Cellat Marshland, which took the name Cellat (executioner) for spreading the malaria epidemic to the whole region. Close after the drainage applications finished, opening the lands of the wetlands to cultivation was another additional benefit, besides the improvement of the environmental health conditions. Yet, most of the waterworks in this period were at a small scale such as dike and canal construction, and were realized mostly by using only bare human power and little machinery. Due to the scarce resources, development was slow and even at some project excavators had to

be brought from abroad with special permission to use at the constructions (State Archives 1933; 1934; 1935).

3.1. Limited Development in Agriculture

In contrast to development efforts, the only relevant production force during the *Radical Modernity Period* was a combination of depleted and unhealthy human force and unused land, while 22 % of the rural population had no animal power and even wooden plow (Köymen, 1999). Tekinel (1983) states the situation of agriculture of the 1920s and 1930s as still dependent on nature. To improve agricultural production in these circumstances, the 'self-sufficient agriculture' policy has been put into practice at the end of the 1920s (Raşit, 1932). The policy of crop development would be implied in such a way that instead of colonization of agriculture by foreign genotypes, the mono cultured production practice would be replaced with various species of local genotypes. Raşit (1932) was arguing that diversifying the genotypes would both increase the productivity and economic compatibility at the market. The agricultural product pattern in most of Anatolia in the 1920s was only cereals. With the application of the 'diversification policy' by the state, pulses and industrial plants would replace the product pattern, together with the development of vegetable gardens and vineyards farming practices. The plants that the agricultural engineers were suggesting like seedless grapes, figs, tobacco, opium, and Antep pistachio nuts were already growing in Anatolia in their natural habitats. To improve the crop genotypes and their productivity, seed improvement and testing stations, fields, and Agricultural Improvements Stations have been opened by the governments where many new plant genotypes have been improved to sustain the productivity in Anatolian agro-systems (Tekeli and Ilkin, 1988; 1982). However, to realize a planned crop rotation requires the introduction of new crops to farmers which worked very slow, both due to the low accessibility to rural areas and due to the poor financial circumstances of both farms and the state.

One of the exceptions to the 'self-sufficient agriculture' policy was the introduction of industrial crops, in particular sugar beet (Beta Vulgaris). The first sugar factories, which were also the first examples of the Turkish industry, were opened by the state at Uşak and Alpullu in 1926 without any purification facility. The area that sugar beets planted for these factories reached 49.200 ha in 1934, nearly 1 % of sown lands of Turkey (Aktepe, Malkoç and Molbay, 1960;

STB, 1973). The introduction of sugar beet production to the farmers has not been easy, and it required a high and widespread specialization in practice. The seeds, machinery, and technical expertise were given by the factory, and a crop rotation was applied in a predetermined sequence and repeating this sequence cyclically (Velet, 1958). The fact that the sugar factories were polluting the water resources at dangerous levels, on the other hand, was unknown or neglected. In the following decades, after the number of sugar factories would dramatically increase, the pollution would become a problem and their environmental costs would enter the agenda especially after the 1960s.

Besides the 'self-sufficient agriculture' policy, for improving productivity in agriculture, mechanization attempts in those years have not been very successful due to financial constraints. In 1923 to increase the number of agricultural machinery in Turkey, the government signed a contract with the Turkish-American Development Company and brought 70 new tractors (State Archives, 1923). Moreover, to speed up the transformation from solar to fossil energy dependent agrarian production private farmers were supported to buy tractors. However, the number of tractors in these years reached only a few hundred, and due to the lack of capital, the financial effect of the 1929 crisis, and debt refunding the use of machinery and chemical fertilizers at agriculture to increase production at that period have been obstructed.

3.2. Urbanization and the City of Ankara

Between 1923 and 1950, neither factors of impulse, nor attraction were not strong enough to cause depeasantization, and migration from rural to cities has not been observed. When the socio-economic conditions and the states preventing manner came together, urban population growth did not exceed the crude population growth rates. Until the 1950s, the urban population increase will not gain speed. The only exception has been Ankara, the new Capital of the Republic, with an annual population increase of 6 %. At the 1927 census, the city had already a population of 74553, and continued to increase as observed between 1927 and 1935 censuses. From the beginning, important infrastructure investments were realized in the city. The drainage of the Station Marshland of Ankara to prevent malaria in 1925 opened four ha of land to the urban development drainage (State Archives, 1943), and later the Gazi Farm (contemporary AOÇ) Marshland is drained, which was approximately 200 ha. In total, 1838 ha area

was drained in the territory of Ankara District in the early years of development (SIS, 1933; 1937). Improving the quality of soil resources in the Gazi Farm required additional input usages such as machinery and irrigation. For this, a dam has been planned to supply water to the Gazi Farm and to control the area and the vicinity from flood. The construction started in 1930, and in 1931, due to the increasing population, a commission decided to benefit from the Çubuk dam for urban water needs. For this, a purification facility is constructed and opened together with the dam in 1936 (Güvenç, 1986).

4. The Populist Modernity Period and Accelerating Environmental Transformation

Although Turkey did not participate in the Second World War, with the strategy of being ready for war at any moment, the allocation of a large part of the budget to military expenses disrupted the country's economy. With the effect of this, Turkey that had aimed to develop with its own resources since the establishment of the republic turned to foreign resources in 1948 achieved to become part of the Marshall Plan. While this situation accelerated the increase in production and income, it also caused an increase in the dependence of the economy on external resources and foreign debt. When the liberalization of the market combined with the social and policies outcomes of the shift to multiparty, the radical character of the Republic's modernity project altered into a more populist feature, which has also given its name to the decades following the Second World War as 'populist modernity period'. The period is characterized by urbanization and its growing impact; agriculture acquainted with mechanization and green revolution; industrialization shifted from machinofacturing to mass production; and infrastructure investment that spread the development trend to the whole country.

4.1. Urbanization Boom and Developing Industry

Kıray (1972: 320) stated that the immediate effect of the introduction of machinery has been to displace labor and to change the status of sharecroppers and tenants into agricultural labor in Çukurova and other developed regions. According to Tekeli (1978), rural depeasantisation is also a result of the developing cities and the enabling of transformation in Turkey. The increase of urban population from 1950 to 1980 gives a value increase of almost 14,4 million with an increase

of 400 %. Hence, Topraksu estimated the amount of land occupied by new settlement areas as 569.000 ha between 1965-1969 (TÇSV, 1987). This amount reaches more than 1 million ha with the inclusion of industrial, administrative, recreation, and other urban areas. Yet, the impact of industrial and urban areas is not limited to land exploitation.

In the 1950s, with the growing urban market, to produce for the demand for consumption goods of urban settlements became profitable for the private sector, which resulted in the emerge of high polluting industrial sectors started to production in Turkey such as oil refinery (1955, 1961, 1972) plastic industry (1950s), medicine industry (1950s), chemical industry (1950s), fertilizer industry (phosphorus 1950s; nitrogenous 1960s), tire industry (1963), petrochemical industry (1970), (see STB 1973). With the industrialization wave at growing cities as Istanbul, Kocaeli, Izmir, Eskişehir, and Ankara, the pollution of water resources has instantly reached critical values at the end of the 1960s. A report (State Archives 1967) states the polluting effect of the industry at Kocaeli on water resources and air. According to the studies of Tunca (1976) and Carden et al. (1976), Haliç at Istanbul, where many small-scale industries were discharging their wastewater, was highly polluted with heavy metals at almost critical levels. The mercury levels at the aquatic living elements were at higher values than the WHO accepted (~0,5 ppm Haliç; 0,05 WHO). The detergent concentration was also at a critical level (~1,3 ng/l). The same year, an article written by R. S. Stokvis and N. V. Zonen that was discussing the cleaning processes of the chemical pollution caused by the industry was given to the Prime Minister Süleyman Demirel (State Archives 1967). Likewise, the pollution in Izmit Gulf has dramatically increased due to the increasing wastewater discharges to the golf stated in the reports of İller Bankası (1976) and Kor (1976). The Biological Oxygen Demand 5 (BOD5) is at higher levels than acceptable levels, in addition to other toxic chemicals and high concentrations of e-coli that were discharged by the factories at the golf. The report stated that the water quality of the gulf would not allow any fish to live in the water.

In the 1960s, rivers with industrial cities in their vicinity started to experience important pollutions, such as Sakarya River, where Eskişehir, Ankara, and Adapazarı. Hence, it is not surprising to see that the first analyses made in the 1970s verified the decreasing water quality at Sakarya River Basin. At the end of the 1970s, together with the impact of the sugar factory, the Porsuk Stream had reached a pollution level of 3rd (dirty) with a BOD value of 14

mg/l. Measurement at different sugar factories has given similar results (Dumlu, 1980). The Çark Stream in Adapazarı district had high pollution caused by heavy industry in the region with the BOD at 99 ppm and 4th level (very dirty) water (Sümer, 1977).

According to the analyses of State Hydraulic Works (DSI, 1975) and Enuysal and Karabağ (1977), the quality of the Ankara Stream, was at 4th level pollution according to the BOD values, almost always over 100 mg/l. Considering the domestic water quality for human consumption, which is 2 mg/l, the stream is dramatically polluted. Furthermore, the city Ankara is polluting the stream with its wastewater, the detergent concentration of which was almost always over 1 mg/l. (the acceptable value is 0.1 g/l even at discharge water). Similarly, The Nilüfer Stream that collects the waters of Bursa and vicinity was also at a critical pollution level (4th level). (DSI, 1976).

4.2. Green Revolution and Its Impact

In the years following the Second World War, the shift towards capitalist production in rural has accelerated, with significant consequences on soil resources, the most alarming of which was the over-cultivation of lands. The total of the cultivated lands has increased from 14.542.000 ha in 1950 to 23.264.000 ha in 1960 with a growth of over 90 % and reached its peak in 1972 with 25 million ha. More dramatically, it is tragic to note that the decrease at meadows between 1965 and 1980 is 6.483.000 ha, as the cultivated lands have only increased 1.004.000 ha in that period. That is to say that 5.479.000 ha cultivable land is transformed into non-productive uses and lost its resource character forever. Although new lands were opened to agriculture, the introduction of new technologies into Turkey's rural areas with the Green Revolution has been more influential. The Green Revolution name came from the development of new cereal varieties and improved agricultural mechanization practices that increased wheat yield in Mexico in the 1940s and refer to the increase in agricultural production observed around the world from the 1940s to the 70s. The environmental impacts of the green revolution are difficult to measure, but examples of environmental damage such as the salinization problem in the fields due to over-irrigation and the threat of water resources caused by pesticide and artificial fertilizer use became visible in Turkey during this period as well.

With the green revolution, in addition to the increase in mechanization and irrigation, fertilizer and insecticides have gradually entered agricultural production at the end of the 1950s. The consumption of total fertilizers was 5.363 tons in 1951 and increased to 37.062 tons in 1960, with an increase of 691 % in 9 years (Kacar, 1989), and continued to increase with 1162 %, reaching 430.750 tons in 1970. In the following ten years, the acceleration at the consumption of fertilizers has slightly decreased with an increase at the value of 338 percent (for planned period see, Aydeniz, 1977). The use of fertilizers in agriculture has its beneficial outcomes at productivity, but in that period the environmental costs of the use of fertilizers have not been taken into consideration. It became a well-known fact in time, that the use of chemical fertilizers in agricultural production has important pollutant effects, especially when overused or misused, with eutrophication effects on water resources and accumulate at wetlands. In order to know the amount and type of fertilizer that is necessary for the fertility of the land, there is a need for the knowledge of experts. However, to get expert service is money consuming and the farmers do not want to support its cost, particularly at small-scale farms (Laiviere, 1998; Merter, 1994).

The consumption of insecticide, on the other hand, has a less significant increase at that period with an amount of 100 %, from 37.442 tons in 1963 to 81.760 tons in 1978. Yet, insecticides have a dramatic impact on soil and especially water resources. The insecticides, similar to fertilizers, also accumulate in wetlands and water resources and are more dangerous and hazardous due to permanent and toxic effects. As they dissolve in water resources, they cause collective deaths at the water ecosystems and leaving toxic effects on the vegetation grown for human and livestock consumption (Merter, 1994; Yetiş and Dilek, 1997).

One of those first important examples of the environmental impact of the green revolution is the Red Tides pollution in Izmir Gulf due to eutrophication dating back to 1955s. The wastewater of the Izmir settlement and the agricultural wastewater that came with Gediz causes over-growing at water mosses. Later the location of the Gediz riverbed will be relocated farther from the gulf to prevent the impact of agrarian wastewater (Çetin, 1978). Other examples of hazardous effects of the Green Revolution have been given above as their impacts on rivers were combined with the effects of industrial pollution.

Besides the green revolution, the second source of improvement in agricultural production has been irrigation applications that are rather an

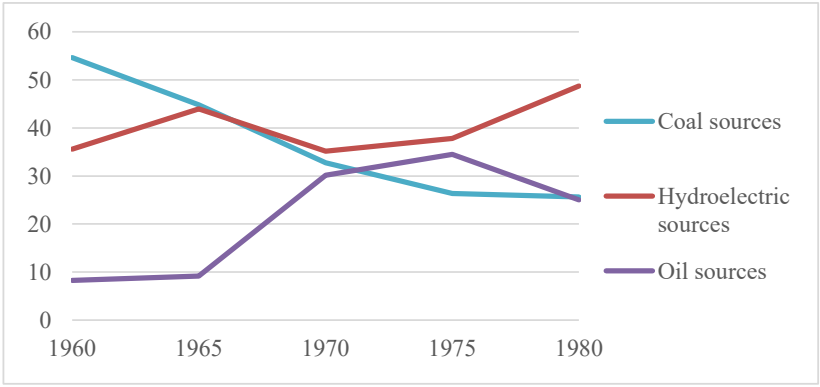
infrastructure investment that drastically changes the environment. The shift from dry cultivation to irrigation is a cultural change and to get adapted to the new production process with continuous availability of water takes almost a generation. In most irrigation projects, getting used to the irrigation practice takes a time in which the soil resource loses particles and fertility due to either water erosion, or salinization. Not knowing the techniques, the farmers either over irrigate the field, or the organization responsible for the supply of the irrigation water gives low-quality water to the fields that are previously polluted.

An early and illustrative example of the problems that irrigation causes is the Çukurova Irrigation Project, which started in 1946. It involved a dam constructed in 1957, and canals at a length of 18,8 km. In 1968, when the first stage of the project has been completed, irrigation was realized at 65.000 ha in total (Tekinel and Dinç, 1981). However, Tekinel and Dinç (1975) argue that the unconscious overuse of water by farmers and the unbalanced agricultural product patterns in the basin has caused the irrigation project to dysfunction in 80.000 ha land, although drainage infrastructure was built. The product pattern was planned to be only 35 % cotton, 15 % wheat, and other vegetation, but the practice has been different. The area where cotton has been planted has been in the range of 75 % to 90 % throughout the years, and such an increase in cotton production has not only sabotaged the irrigation project but has also ruined the fertility of soil resources in the region in time. With the malpractice of irrigation, salinization had also started, and as stage one was finished in 1968 most of the area was already having salinization problems. The base water salinity value reached EC=2000 in 1975, and the percentage of salinization first reached 53 % in 1966, then decreased to 32 % in 1975 as the result of the efforts of DSI (Tekinel, Dinç and Kumova, 1976).

4.3. Growth and Increasing Demand for Energy

One of the major indicators of growth-oriented modernization is the increasing demand for energy. Development requires energy, and governments were eager to support the required electricity with available means in those years. At Radical Modernity Period, the priority in electricity generation was coal-based thermal power plants, due to the contemporary technology, know-how, and logistical difficulties. Financial scarcity hinders large-scale investments in electricity production (Söğütlü, 2019). Especially İstanbul and Ankara has been

the main consumer of thermal power in those years (Yurtoğlu, 2018). After the Second World War, with new global conjuncture and liberalization, both oil and hydropower energy has been used as subsidies of coal and the proportion of coal decreased dramatically from 55% in 1960 to 25% in 1980, but the amount of coal used did not change much. In contrast, oil consumption has drastically increased in the 1960s but has quickly lost its growth trend after the global oil price crisis of the 1970s, and its proportion decreased, while the share of hydroelectric power has become dominant with almost 50 % (WB, 2021).



Graph 1: Percentages of Electricity Generation
Sources at Radical Modernity Period (%) (Source: WB, 2021)

The domination of hydroelectricity has not been only due to their electricity generating capacity but as an outcome of a broader planning perspective. Dams were seen as tools to produce electricity, in addition to control and regulation of the streaming water resources in order to prevent floods, and supply water for irrigation and urban consumption. Electricity generation from hydraulic sources grew from 35% to 50% proportionally with the acceleration of the construction of dams (WB, 2021). The introduction of hydroelectric energy does not happen in a short time and requires infrastructure investments, not only but mainly in form of large-scale and time-consuming dam constructions. In the 1950s, 13 new dam constructions have been started. In the 1960s, the dam constructions accelerated and 43 new dam constructions started. The Keban Dam, the largest within the dams that started to be constructed in that period, was projected to produce 6.000 GWh annually. Dams have a huge transformative impact on the

local environment changing both the climate and the flora. After a few years from the opening of the Keban, Günay (1983) states that the reservoir area of the dam started to experience siltation problems. Its reservoir volume is 31.000 hm3, and the artificial reservoir has covered an area of 67.500 ha. The rivers, which end at the dam reservoir, had been covered gallery forests at an altitude of 845 m. leaving the north, and west of Elazığ, and south of Tunceli with no tree. Not only Murat River but also Munzur and Peri Rivers were covered with the water of the dam's reservoir. Moreover, the reservoir has changed the climate in the region towards more temperate seasons, and similar rainfall statistics with the Mediterranean.

5. Eroded Modernity Period: Utilitarian Growth and Consumption

The 1980s is the decade when the change in social context took a spurt and the modernist progress has given its place to consumption-oriented utilitarianism. Structural changes in the form of privatization of state enterprises, price liberalization, and integration into the global economy have resulted in major socio-economic changes that can be named as 'eroded modernity'. It is possible to define 'Stabilization Precaution' of '24 January' in 1980 as the date when the social and economic transition has crystallized. It dates the opening of the national market to the 'guidance' of the price mechanism that would be determined by the demand and supply relation within the market, which would determine the consumption, investment, and production (Kepenek and Yentürk, 2000).

Although a populist view of modernism had been dominant prior to the 1980s, the liberalization and the erosion at modernity project resulted in changing state policy towards allocating resources for built environment production with large-scale infrastructure investments throughout the 1980s that made significant contributions to the growth of the construction sector and played an important role in the economic growth (Balaban, 2011). This trend reached its peak in the 2000s when growth became dependent on the government-led construction sector, and protection of the environment is seen as hindering economic growth and socio-economic development both by the government and society in general.

5.1. Growth and Consumption

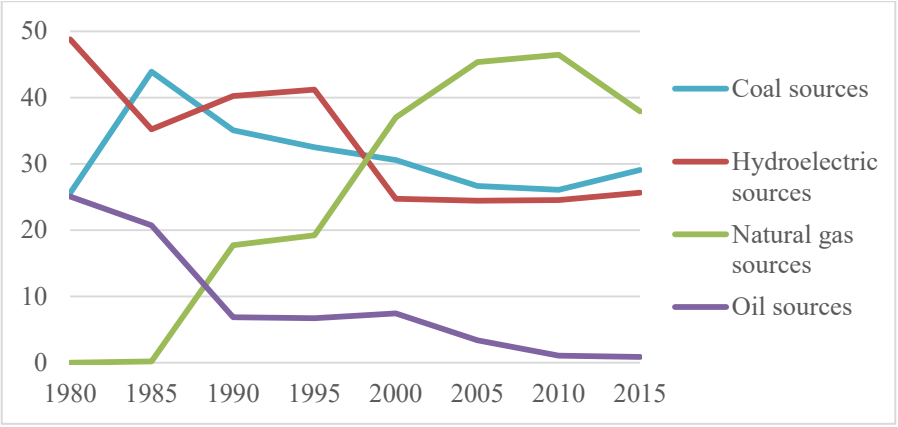
The impact of this change in the social context could not easily be observed for two important reasons. First, there is deliberately not sufficient data collection, which blunts awareness of environmental transformation. Second, the existing data is scattered and exceeds any individual or institutional capacity. As examples of environmental degradation that accumulate throughout Turkey in the last decades, they are repetitions of the previous ones. What differs is that although it is difficult to reach the individual data of exemplary cases, it is easier to make a conceptual interpretation of their effects using indicative data. Therefore, in the Eroded Modernity Period, individual observations of how the environment begins to transform have been replaced by observing the total effect of transformation through a proxy indicator, which is CO^2 emissions. Therefore, it becomes possible to make broader monitoring of the course of consumption and economic growth using the available data and to interpret the impact on the environment.

According to Grossman and Krueger (1991), trade and investment liberalization leads to an increase in economic activities, thus pollution and environmental degradation also increase. It is observed that there is an inverted U-shaped relationship between environmental degradation and per capita income, similar to the relationship between per capita income and income inequality. For this reason, the inverted U relationship between economic growth and environmental quality has begun to be called the Environmental Kuznets Curve (Dinda, 2004, 432-433). In the beginning, environmental transformation and deterioration increase as economic growth rises. However, once a certain turning point in economic growth is reached, the deterioration in the quality of the environment begins to decline. Findings for Turkey match this approach. Moreover, they also match with the argument that although in historical context developed countries are responsible for a large percentage of CO^2 emissions, they are in a declining trend, while developing countries are still drastically increasing their emission values (Balsalobre-Lorentea, 2018). C02 emission per capita increased from 1,72 Mt in 1980 to 4,46 Mt in 2015. C02 emission per capita was only 0,61 Mt in 1960 (WB, 2021).

Studies point out that energy consumption is the main contributor to carbon emissions (Balsalobre-Lorentea, 2018). Turkey, as a developing country is continuously increasing its energy use. While energy consumption (kg of

oil equivalent per capita) increased from 715 kg in the 1980s to 1651 kg in 2015, electricity consumption reached a value of 2491 kWh per capita in 2010 (WB, 2021). Although these values are relatively love compared to developed countries, the source of energy plays an important role in CO^2 emissions and environmental pollution and transformation. For electricity generation, Turkey has a tendency of continuing to use highly polluting sources like coal.

The tendency of decreasing coal consumption in the populist modernity period was mainly due to the use of oil as a substitute. However, as oil prices had increased in the 1970s and kept relatively high, coal consumption dramatically increased in the 1980s. As oil dropped to 0,85 %, imported natural gas became the dominant source of electricity generation reaching almost 50 %, especially after the 2000s. However, it is interesting to see that coal has been and still is an important source of energy in Turkey as seen in graph 2 (WB, 2021). Still, new thermal power plants are planned to be opened in 2020s' Turkey.



Graph 2: Percentages of Electricity Generation Sources at Eroded Modernity Period (%) (Source: WB, 2021)

6. CONCLUSION

In the first years of the Republic, the issue of environment was only on the agenda as a factor that reduced the quality of life, caused epidemics such as malaria, and had to be regulated for development. The only effective sector was agriculture, and the vital demand of the society in that period was to improve the environmental conditions and to sustain an economy for domestic needs. The intervention on nature in the 1930s was relatively harmless compared to

the 21st century. As the Republic grew, the characteristic of the intervention to the environment changed. First, the transition in agriculture shifted from nature-dependent towards fossil fuel-dependent production. Second, the industry became vigorous at polluting. Third, cities grew and transformed their environment into immense human-made lands where consumption-oriented market relations became dominant. However, against the environmental problems caused by these developments, only a feeble reaction emerged during the Populist Period.

Consequently, the international agenda forced governments in the 1970s to organize for the environment before there was a social demand for environmental legislation in Turkey at large. Although the 'Constitution 1982' has blunted the social life and a-politicized the society in Turkey, it is one of the privileged Environmentalist Constitutions in the World, as an outcome of the modernist bureaucracy and intellectuals. It has given the environmental rights to the citizens stating that; "everyone, has the right to live in a healthy and balanced environment", and the duty "to improve the environment, protect environmental health and prevent environmental pollution" to the state and citizens (article 56). Furthermore, the 1982 Constitution charges the state with "the protection of historical, cultural and natural assets and values, and takes supportive and encouraging measures for this purpose" (article 63). In 1983, the Environment Law (no: 2872) is brought into force. The same year the National Parks Law (no: 2873), and the Law on Conservation of Cultural and Natural Assets (no: 2863) are accepted at the parliament.

This brought a contradiction compared to the Western experience. Government institutions of Turkey took the lead in the formation of environmental awareness in society and support the formation of this awareness. However, it would be wrong to say that governments participate voluntarily and completely. In this process, it is possible to talk about a conflict between the bureaucrats of the Republic, who are more committed to the ideal of modernization, and the governments eager for development, and the tense support caused by this conflict. While laws and regulations are ahead of the demands of society, practices of governments slowed down the process.

Consequently, contrary to the improvement that the constitution and laws brought, the environmentalist movements in the 1990s and especially in the 2000s could not get support from, and legitimacy in society. However, this alone is not enough to explain the surprising willingness of Turkish society to prioritize its short-term interests in its relationship with the environment. Although everyone

agrees on the protection of the environment, when it comes to their individual interests, people use their preferences for the sake of their short-term interests to exploit nature and destroy the environment. This results from the short-termed mentality of modernity that Polanyi (1944) named as "the market society" and means the rejection of planned and regulated development as a factor of modernist progress. Due to the political break-off with the 1980 military coup, the institutions that balance the market in the modern society could not develop and within a society in which all modern institutions are not properly working, the dominance of the market institution leads to malfunction of the modernity project. Such a dominance of the market among other institutions, without any social direction and control results in the changes at the institutions that also regulate environmental transformation.

Therefore, environmental problems are no more only problems of some ordinary misunderstanding and mismanagement. They are structural problems rooted in the institutional set of market societies. However, despite these awful truths, it is important to note that the last few decades have observed a reflexive outcome of the environmental disruption that rises within the long-termed mentality of modernity. It gives an opportunity to re-establish the institutions of modern societies in overcoming the short-termed immorality of utilitarianism and the market society and establishing a more sustainable relationship with the environment.

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CHAPTER XX

STUDYING EDUCATIONAL FUNCTION OF PROTECTED ENVIRONMENTS IN PRE-/ PRIMARY EDUCATION INSTITUTIONS - TRABZON

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1. Introduction

Education and schooling are the main building stones for human beings to learn the things to be required and act accordingly during the life time. In that sense, most of conscious actions are harvest of education. Considering that environmental problems emerged and are emerging today are caused by humans, inadequacy in education can said to be lying in the core of environmental problems. In order to raise awareness of environmental problems, education can be used as a tool which itself is a discipline to guide individuals cognitively, psychomotorically and affectively in knowledge, skills, behaviour and gaining positive attitude. Every generation steers the wheel of education to meet the requirements and cope with problems of the time and one of the most important problems we're having today is environmental problems (Bozkurt, 2015; Bruner, 2009).

The thought of nature being important and environmental education are great matters today that have to take place in our local educational syllabus starting from early ages. Having children educated starting from early ages will

strengthen their bounds with nature and thus will help them raised up more aware. By doing so, we can have a generation who is more aware of environmental problems to come in the future. These awareness and bound have to be started to build up during pre-school educational period where awareness can be raised better comparing to primary and secondary educatio**nal period.**

2. The Purpose of The Research

The main purpose of this research is to examine the function of nature and protected areas in pre-school and primary school educational period. In addition;

- To reveal environmental consciousness of pre-school students by evaluating their attitudes towards environment.
- To reveal consciousness of 1st and 2nd grade primary school students towards activities done in nature.
- To reveal consciousness of 3rd and 4th grade primary school students towards species of plants and animals in their local protected areas.
- To determine affects to perception differences of primary school teachers towards protected areas (national parks, natural parks, natural monuments etc.) by evaluating their aspects like; period of duty, field, schools' locations they've worked and/or working, if they have been to any of protected areas and purpose of their visits.

2.1. Restrains of The Research

The research is limited with the data collected during 2018-2019 educational period. Research has been completed by questionnaires made in city of Trabzon, Of*province with 128 pre- and primary school students of 28 Subat Primary School and with 40 teachers who officiate in 28 Subat and Sehit Ali Bulut primary school. 168 questionnaires have been made for this research in total.

2.2. Conception of Areas Under Protection

According to the definition published by T.R. (Turkish Republic) Municipality of Agriculture and Forestry, Head office of Nature Preservation and Natural Parks; protected areas are the geographical areas that are managed and defined in order to protect and maintain ecosystem and cultural values existing together for a long term. In Turkey, areas entitled to be protected areas according to the law number 2873 National Parks' Law and number 4915 Land Hunting Law. (Url-1, 2019).

Protected areas in the scope of IUCN (International Union for Protection of Nature);



Figure 1: Protected Areas in the Scope of IUCN
(International Union for Protection of Nature (Url-2, 2019)

2.3. Educational Function of Protected Areas

Education for environment should aim to get to know nature not theoretically but interactively and use natural and cultural resources as education material. In that sense, national parks and such other places are beneficial places where many tangible and influential natural/cultural materials are offered. Since natural and cultural values' locations, their seasonal conditions and lifecycles in protected areas are known; planning the subject, time and location can be done much easier (Kurdoğlu, 2005).

There are several methods are used to understand the relation between individuals and environment surrounding them. In today's world, natural protection places like national parks are considered to be labs of environmental education and used for educational purposes (Atik and Toksöz, 2005).

2.4. Environmental Education

The concept of environmental education was first introduced in 1948 at congregation of International Union for Protection of Nature held in Paris. After that at biosphere congregation of UNESCO held in Paris, the importance of environmental education to take place at every stage of education was strongly pointed out (Özdemir, 2017).

Environmental education; a teaching process which aims that the individuals get informed, gain skill, be aware and have experience to cope with environmental problems for next generations (Balkan Kıyıcı, 2009).

The purpose of environmental education is that individuals;

1. Love the life in nature and environment, embellish their surroundings,
2. Have the chance to experience, research and examine natural surroundings,
3. Gain a lifelong habit to protect natural environment,
4. Get them supported in their journey to embellish and contribute to natural environment (Gülay and Önder, 2011).

2.5. Environmental Literacy (Ecological Literacy)

The term of environmental literacy was first introduced by Charles Roth in the year of 1968 (Roth, 1968). According to Roth (2002), environmental literacy is combined of perception, knowledge; skill and behaviour that are enhancing the individuals' relations with nature and with their selves in a positive way by having them gained the habit to do things on daily basis and in longer term.

There are several aims of environmental literacy pointed out by Archie in 2003. These aims are that individuals;

1. Improve their abilities to research, question and analyse,
2. Get informed for refinement of environment and enhancement of humankind
3. Get skills to gain understanding and susceptibility of environment
4. Get educated and take more responsibility for environmental decisions (Altınöz, 2010).

2. Metho*d*

2.1. Definition of Study Field

Teachers and students from two different schools of Of* province in the city of Trabzon have participated in the research. Being one of the 81 cities of Turkish Republic; having the territory of [4]685 km2, Trabzon composes of 0.6% of total territory of the country and is located in Eastern Blacksea Region of Turkey. Trabzon is surrounded by Rize from the east, Giresun from the west, Gümüşhane and Bayburt from south and Blacksea from the northern coast. Trabzon's provinces are; Akçaabat, Araklı, Arsin, Beşikdüzü, Çarşıbaşı, Çaykara, Dernekpazarı, Düzköy, Hayrat, Köprübaşı, Maçka, Of, Sürmene, Şalpazarı, Tonya, Vakfikebir and Yomra (Url-3, 2019). There are one national park (National Park of Altındere Valley) and 8 natural parks (Uzungöl Natural Park, Sera Lake National Park, Kayabaşı National Park, Çalcamii National Park,

Görnek National Park, Sürmene Çamburnu National Park, Beşikdağı National Park, Kadıralak National Park) in Trabzon (Url-4, 2019).

Questionnaires are made in 28 Şubat Primary School and Şehir Öğretmen Ali Bulut Primary School which are both institutionally bounded to provincial directorate of national education of Of*.



Figure 2: Locations of 28 Şubat Primary School and Şehit Öğretmen Ali Bulut Primary School

28 Şubat Primary School is located in İrfanlı Neighbourhood, Of* Province and is 51 km away from Trabzon city centre. There are 26 classrooms, 28 Teachers (22 Primary School Teacher, 3 pre-school teachers, 1 English teacher and 2 special education teachers) and 641 students in the school. 28 Şubat Primary school has been awarded with White Flah Project in June, 2017 and Nutrition Friendly School Project in December, 2017.

Şehit Öğretmen Ali Bulut Primary is 40-45 minutes far away to Trabzon city centre by driving and is located at Hastane Street in the province of Of*. There are 28 classrooms, 27 teachers (23 primary school teachers, 3 pre-school teachers, 1 psychological counsellor) and 755 students in the school (Url-5, 2019).

2.2. Questionnaire Work to Determine Attitudes of Pre-School Students Towards Nature

A Questionnaire work has been done with 34 pre-school students of 28 Şubat Primary School, to determine their attitudes towards nature. There have been some pictures involved in our work that demonstrated bad and good attitudes/cases towards nature and both pictures are presented to students, one from each case at a time. All students were asked to choose one from two pictures and paint the box with smiling face underneath the picture of their choice. Students were asked to evaluate 6 different circumstances in total and then asked to make a picture about nature and what that meant to them.

A happy-clean world and a dirty-sad world pictures were introduced to pre-school students. Students were asked to choose in which world they want to live and paint the one of the boxes with smiling face given underneath the picture.

Then two other pictures, one with children planting trees and the other one with people cutting trees were introduced. Introducing the pictures, students were asked to choose one of the pictures by asking if we should plant more trees or we should cut them.

Introducing the third visual pair to students one of which is with clean-green environment and the other one is with dirty-smoky environment, students were asked to choose in which kind of environment they want to live in and fill in the smiling-face box given under each of the pictures.

A picture of garbage pollution and a picture with people collecting garbage are shown to students and they are asked to choose the correct visual for them.

Captivated animal visual and animals living with people in open wild visual were then shown to students then they were asked to fill in the smiling-face box given under the pictures of their choice.

In order to determine if students want rather choose open nature over classrooms, pictures of students in the classroom and students in the open nature were shown to pre-school students. They were asked to choose where they'd rather be and fill up the one of the smiling-face box given under the each picture. Evaluating the students' answers a conclusion has been made.

Students were asked to draw a picture of what the nature meant to them. The elements they have used in their pictures were classified as natural elements and artificial elements. Evaluating the dense of the dense and repetition of the elements, colours they have used in pictures, it was possible us to put comments. We aimed here to determine pre-school students' attitudes against nature.

2.3. Questionnaire Work to Determine Attitudes of 1st and 2nd Grade Students Towards Nature

Some open-ended questions were asked to 1st and 2nd grade students, such as asking what grade are they in. Then 8 different visuals of natural activities (Bird observing, camping, picnic, trekking, nature photographing, planting sapling/tree, fishing) were shown to students, then they are asked to fill in the star given

under each visual and write down the name of the activity as they know. By doing so, it is aimed to point out students' awareness towards nature.

Then students were asked to draw a picture with theme of activities in nature. Following the similar procedures as it was done for pre-school students like repetition of element types, pictures were evaluated for 1st and 2nd grade students as well.

2.4. Questionnaire Work to Determine Attitudes of 3rd and 4th Grade Students Towards Nature, Protected Areas, Plants and Animals in The Nature

A questionnaire was prepared including personal information and visual multiple choices section for 3rd and 4th grade students.

In personal information section, students were asked their gender, what grade they are in, school they're attending, if they know any protected areas (national parks, natural parks, natural monument) in their city and if they've been to any of protected areas before.

Additionally, detached questions were asked such as; what was their purpose of visit if they've been to any protected areas, if they've been educated about protected areas in any of their subjects, if they'd rather prefer to be educated in nature then in the classroom and if they'd like to attend any of the local natural activities in the future.

In the visual section of the questionnaire form, 6 protected areas located in the city of Trabzon were given and students were asked which of those places they know and write down their names in the dotted areas underneath the pictures as they know it. In another visual section, we aimed to determine if students know local animals and plants in the nature by introducing them 8 local plants (tea plant, nut, chestnut, nettle, mushroom, roseum, bilberry-ligarba, blackberry) and 8 local animals (mountain goat, sparrow hawk, fox, tortoise, squirrel, deer, bear, snake the deaf adder).

Students were asked to tick the boxes of the plants and animals they know and write down their names as they know it. By doing so, it is aimed to determine students' relation with nature and how much they are aware of the nature around them.

Finally, students are asked to draw a picture of activities can be done in the nature. Following the similar procedures and aspects as done before, an evaluation has been made for the pictures.

2.5. Questionnaire Work to Determine Attitudes of Primary School Teachers Towards National Parks and Other Protected Areas

In order to determine primary school teachers' attitude towards national parks and other protected areas, a likert 5-scaled questionnaire (I don't agree at all (1), I don't agree (2), Abstaining(3), I agree (4), I completely agree(5)) was prepared.

In personal information section of the questionnaire, teachers were asked of their genders, fields, period of duty, field, schools' locations they've worked and/or working, if they have been to any of protected areas and purpose of their visits and if they know the local national parks and other protected areas. Additionally, they were asked what they think about the importance given to protected areas and what their function might be in the education system.

In order to determine the attitude among teachers, 23 students were asked to teachers from different fields. As mentioned above 5-scaled likert questionnaire used for grading and SPSS (Statistical Package for Social Sciences Program, Version 22.0) was used to analyse if there has been a significant difference between groups. At the end of the work, outcome data has been evaluated statistically.

3. Outcomes

This section aims to serve to analyse research outcomes and evaluate accordingl***y.***

3.1. Questionnaire Outcome of Pre-School Students to Determine Their Attitudes Towards Nature

The outcome data belonging to 34 pre-school students' questionnaires aiming to determine their attitudes towards nature is given in the Table-1.

Table 1: Distribution of The Answers Given by Pre-School Students to Visual Questionnaire (Percentages of Correct Answers are Given.)

	CORRECT	WRONG	%
World	34	0	100%
Planting Tree	24	10	70.6%
Environment	23	11	67.6%
Garbage Pollution	30	4	88.2%
Animals	21	13	61.8%
Outdoor Education	11	23	32.4%
Total	**143**	**61**	

As shown in the table, pre-school students chose the picture representing happy and clean World. There is no student who chooses picture representing the sad and dirty World. While 70.6% of the students think we should plant trees, 29.4% of the students believe we should cut trees. Answer of the question "In which environment would you choose to live?" is answered by 67.6% with the picture representing clean and green environment.

88.2% of the students believe we should collect garbage and 11.8% students believe that we should contribute to garbage pollution. While 61.8% of the students believe that animals should live in their natural habitats, 38.2% of the students think it is better for animals to live in captivation. Finally, %67.6 of the students chose to be educated in the classrooms while %32.4 chose the visual representing outdoor education.

The evaluation results of the pictures pre-school student have drawn, including artificial and natural elements' evaluation is given in the Table-2 on a percentage basis.

Table 2: Distribution of Artificial and
Natural Elements Pre-School Students Used in Their Drawings

	Natural Elements	**Artificial Elements**
Animal Figures	6 individuals - 17.1%	-
Flower	12 individuals - 34.3%	-
Rainbow	8 individuals - 22.9%	-
People	14 individuals - 40.0%	-
Tree	8 individuals - 22.9%	-
Sun	10 individuals - 28.6%	-
House	-	5 individuals - 14.3%
Cloud	5 individuals - 14.3%	-

When the students are asked to draw a picture with nature theme, 40% of students think mostly of people, while 34.3% think of flowers, 28.6% think of Sun and 22.9% think of Trees and Rainbow. At last 14.3% of the students have drawn house as an artificial element. 34.3% of the students have chosen to draw either unrelated, meaningless or blank pictures (e.g. lines, blank, robot drawings).

21 students out of 35 have chosen to draw colourful, where the rest of the students have chosen to complete their drawing with black or one colour crayons.

3.2. Questionnaire Outcome of 1st and 2nd Grader Primary School Students to Determine Their Attitudes Towards Natural Activities

Gender distribution of 1st and 2nd grader primary school students are given below:

Table 3: Gender Distribution of 1st and 2nd Grader Primary School Students

	GIRL	BOY	
1st Graders	12	9	
2nd Graders	14	11	
Total	**26**	**20**	**46 Students**

Among all students attended to questionnaire, 56.5% of the students are girls by 26 students and 43.5% of the students are boys by 20 students. Outcomes of the questionnaire to determine 1st and 2nd grader primary school students' attitudes towards activities done nature are given in Table-4.

Table 4: Distribution of The Answers Given by 1st And 2nd Grader Students (Percentages of Correct Answers are Given)

	CORRECT	WRONG	%
Bird Observation	13	33	28.3%
Camping	41	5	89.1%
Picnic	42	4	91.3%
Trekking	17	29	37.0%
Climbing	26	20	56.5%
Photographing	25	21	54.3%
Sapling-Tree Planting	32	14	69.6%
Fishing	42	4	91.3%
Total	**238**	**130**	

As demonstrated in the table, 1st and 2nd graders answers correctly by 28.3%, while 71.74% of the students are unaware of the activity. There is only a minor percentage of students who do not know camping by 10.9%. While students are aware of picnic activity by 91.3%, only 37% of the students are aware of trekking.

Students that are aware of climbing activity is 56.5% and %54.3 of the students know about photographing in nature. 69.6% of the students have answered sapling-tree planting activity correctly. Although fishing activity is widely known by the students by 91.3%, 8.7% of the students were unable to recognize the activity.

The artificial and natural element analysis outcomes of 1st and 2nd grader students' pictures about natural activities are given 1st graders in the Table-5 and 2nd graders in Table 6.

Table 5: Distribution of Artificial and Natural Elements 1st Graders used in Their Drawings

	Natural Elements	Artificial Elements
People	6 individuals - 76.2%	-
Clouds	4 individuals - 19%	-
Sun	8 individuals - 38.1%	-
Tent	-	3 individuals - 14.3%
Picnic Elements	-	4 individuals - 19.0%
Swing	-	1 individual - 4.8%
Flower	2 individuals - 9.5%	-
Tree	5 individuals - 23.8%	-
Car	-	1 individual - 4.8%
Mountain	4 individuals - 19.0%	-
Animal Figures	1 individual - 4.8%	-
Water Elements (Sea-River-Waterfall etc.)	3 individuals - 14.3%	-
Sky	5 individuals - 23.8%	-

According to pictures drawn by 1st graders, when it comes to natural activities' theme; 76.2% of the students think mostly of people and %38.1 thinks of sun. %4.8 of the students have chosen to draw unrelated pictures (blank, meaningless, lines etc.) and did not use natural activities theme in their drawings. While 12 out of 21 students have chosen to draw colourfully, 9 of the students have chosen to draw with black or single colour crayons.

Table 6: Distribution of Artificial and Natural Elements 2nd Graders used in Their Drawings

	Natural Elements	Artificial Elements
Animal Figures	4 individuals - 16.0%	-
Flower	3 individuals - 12.0%	-
People	23 individuals - 92.0%	-
Tree	14 individuals - 56.0%	-
Sun	6 individuals - 24.0%	-
Mountain	1 individual - 4.0%	-
Grill Elements	-	2 individuals - 8.0%

House	-	2 individuals - 8.0%
Cloud	5 individuals - 20.0%	-
Picnic Elements	-	11 individuals - 44.0%
Tent	-	2 individuals - 8.0%
Car	-	1 individual - 4.0%
Swing	-	1 individual - 4.0%
Water Elements (Sea-River-Waterfall etc.)	2 individuals - 8.0%	-

According to pictures drawn by 2nd graders, when it comes to natural activities' theme; 92% of the students think of people, 56% of students think of trees and 44% of the students think of picnic elements. 11 out of 25 students have chosen to draw colourfully and 14 of the students have chosen to draw either with black or with one colour crayons.

3.3. Questionnaire Outcome of 3rd and 4th Grader Primary School Students to Determine Their Attitudes Towards Species of Animals and Plants in Nature and Protected Areas

Several questions have been asked in the questionnaire to 3rd and 4th grader primary school students to determine their attitudes towards species of animals and plants in the nature.

According to the answer given by students, 31 students (64.6%) are found to be aware of protected areas (national parks, natural parks, natural monument) in their city. Local protected areas are known by 34 students (70.8%) and 22 students (45.8%) have been at least one of the protected areas before.

Among the student who have been to protected areas before; 19 students (39.6%) have visited for recreational purposes, 1 student (2.1%) has visited for educational purposes and the rest of the students have visited for other reasons.

While 41 students (85.4%) said they have been educated about protected areas in their education life before, 7 students (14.6%) answered the question negatively. 39 students (81.3%) have chosen to attend classes in protected areas and 26 students (54.2%) would like to attend local natural activities in the future. The answer of the students given in the visual section of the questionnaire is given in the Table-7.

Table 7: Distribution of The Answers Given by 1st and 2nd Grader Students

	CORRECT	WRONG
Altındere National Park	28 individuals - 58.3%	20 individuals - 41,7%
Uzungöl National Park	39 individuals - 81.3%	9 individuals - 18,8%
Sera Lake National Park	-	48 individuals - 100.0%
Kayabaşı National Park	-	48 individuals - 100.0%
***Çamburnu** National Park*	-	48 individuals - 100.0%
***Çalcamili** National Park*	1 individual - 2.1%	47 individuals - 97.9%
Total	**68**	**220**

While 81.3% of the students of 3rd and 4th graders are aware of Uzungöl Natural Park by most, no student was aware of Sera Lake Natural Park, Kayabaşı Natural Park and Çamburnu Natural Park. There has been only one student who knows Çalcamii Natural Park. More than half of the students were aware of Altındere National Park. The question related to awareness of animals' and plants' species by asking 8 animals and 8 plants was answered as given below in the Table-8.

Table 8: Distribution of Answers of 3rd and 4th Grader Primary School Students to the Question Related to Awareness of Animal and Plant Species

	CORRECT	WRONG
Tea Plant	44 individuals - 91.7%	4 individuals - 8.3%
Nut	47 individuals -97.9%	1 individual - 2.1%
Chestnut	16 individuals - 33.3%	32 individuals - 66.7%
Nettle	39 individuals - 81.3%	9 individuals - 18.8%
Mushroom	42 individuals - 87.5%	6 individuals - 12.5%
Roseum	0 individuals - 0.0%	48 individuals - 100%
Wild Fruit-Ligarba	13 individuals - 27.1%	35 individuals - 72.9%
Blackberry	33 individuals - 68.8%	15 individuals - 31.3%
Total	**234**	**150**
Mountain Goat	26 individuals - 54.2%	22 individuals - 45.8%
Sparrowhawk	9 individuals -18.8%	39 individuals - 81.3%
Fox	46 individuals - 95.8%	2 individuals - 4.2%
Turtoise	48 individuals - 100%	0 individuals - 0%
Squirrel	37 individuals - 77.1%	11 individuals - 22.9%
Deer	44 individuals - 91.7%	4 individuals – 8.3%
Bear	48 individuals - 100%	0 individuals - 0%
Snake	45 individuals - 95.8%	2 individuals - 4.2%
Total	**304**	**80**

While students are found to be more aware of the plants like nuts, tree plant, mushroom, nettle and blackberry which grow widely in their local environment, none of the students are aware of roseum. For the animal species; bear, tortoise, snake, fox are most widely known animals by the students and sparrowhawk is found to be the least known animal. Students are also asked to draw a picture related to activities done in nature and outcome results of artificial and natural elements are shown in Table-9 and Table-10 seperated each by students' class levels with given percentages.

Table 9: Distribution of Artificial and Natural Elements 3rd Graders used in Their Drawings

	Natural Elements	**Artificial Elements**
Animal Figures	4 individuals - 20.0%	-
Flower	4 individuals - 20.0%	-
Sky	12 individuals - 60.0%	-
People	19 individuals - 95.0%	-
Tree	6 individuals - 30.0%	-
Sun	10 individuals - 50.0%	-
House	-	4 individuals - 20.0%
Cloud	7 individuals - 35.0%	-
Mountain	4 individuals - 20.0%	-
Picnic Elements	-	6 individuals - 30.0%
Water Elements (Sea-River-Waterfall etc.)	4 individuals - 20.0%	-
Car	-	2 individuals - 10.0%
Tent	-	1 individual - 5.0%
Grill Elements	-	3 individuals - 15.0%
Swing	-	1 individual - 5.0%

According to the drawings made by students; 95% of the students think of people, 60% of the students think of sky and %50 of the students thinks of sun figure when they are asked to draw with theme natural activities.

Table 10: Distribution of Artificial and Natural Elements 4th Graders used in Their Drawings

	Natural Elements	Artificial Elements
Animal Figures	6 individuals - 21.4%	-
Flower	10 individuals - 35.7%	-
People	22 individuals - 78.6%	-
Tree	15 individuals - 53.6%	-
Sun	5 individuals - 17.9%	-
House	-	1 individual - 3.6%
Cloud	3 individuals - 10.7%	-
Mountain	2 individuals - 7.1%	-
Picnic Elements	-	8 individuals - 28.6%
Grill Elements	-	10 individuals - 35.7%
Swing	-	1 individual - 3.6%

It is observed that %78.6 of the students think of people, 53.6% thinks of trees and %35.7 thinks of grill elements when usage of their artificial and natural elements are analysed. While 181 of the 3rd graders have drawn colourful pictures, only 1 of the 4th graders has drawn with colourful crayons and the rest have completed their drawings with pencil. 2 students (7.1%) of the 4th graders have chosen not to draw anything.

3.4. Questionnaire Outcome of Primary School Teachers to Determine Their Attitudes Towards Protected Areas

40 Teachers were chosen, as 19 teachers from 28 Şubat Primary School and 21 students from Şehir Öğretmen Ali Bulut Primary School. 31 of the teachers are primary school teacher, 2 teachers are special education teachers, 6 of them are pre-school teachers and 1 of them is psychological counsellor. Among the chosen teachers; 60% of the teachers are women and 30% of the teachers are men.

In the personal questionnaire form, 35 (87.5%) of the teachers answered yes to the question if they have been to any protected areas (national park, natural parks, natural monuments) before. Among the teachers who have been to protected areas before; 27 (67.5%) of them have been to protected areas for recreational purposes, 11 (27.5%) of them have been to protected areas for stopping over/ entertainment purposes, 7 (17.5%) have been to one of these

areas for picnic and 4 (10%) of them have been to protected areas for educational purposes.

There are 33 (82.5%) students who are aware of protected areas around them. 7 (17.5%) of the teachers stated that they think protected areas around them are protected sufficiently, while 28 (70%) of the teachers stated that they didn't agree and 5 (12.5%) of the teachers said that they are not knowledgeable on the matter.

Teachers' thoughts on functions of the protected areas are given with their own anonymous quotes below;

'Protected areas have function in learning; they provide active learning, they offer lasting learning and raise awareness of environment.' 'Protected areas provide knowledge about nature, teaching students harmony of living and inanimate entities.' 'I think that nature and natural beauties open children's horizon up and provide efficient learning by offering observation and scouting experiences. 'Functional education is only achieved by teachers' personal efforts. I wished that provincial national education directorates would organize more trips to those areas. 'Protected areas don't fulfil its function. 'I don't think educational functions of protected areas are sufficient. 'Protected areas help us being aware about values like protecting nature, environment and historical formation''Protected areas let us have the love of nature, love of our country and willing to live.' 'I believe protected areas contribute to long lasting learning by letting students have hands on experience of living and doing things themselves. 'Protected areas are very important to raise awareness of environment. They should be used for recreational and observational purposes. 'Protected areas contribute to objectives being taught in Science and Natural Life by letting students witness habitat's solid indicators like geographical variety and lifecycle.' 'In this kind of environments, students have the advantage of using their all senses in learning and have a free learning environment.'

23 questions were asked in the questionnaire in 5 scaled likert form prepared as; 'I don't agree at all, I don't agree, Abstaining, I agree, I completely agree'. The answers given by teachers are given in the Table 11 below;

Table 11: Distribution of Answers Given by The Teacher in Percentages.

QUESTIONS	I Don't Agree At All	I Don't Agree	Abstaining	I Agree	I Completely Agree
1. I've enough knowledge about protected areas in my own region	-	15,0	27,5	57,5	-
2. Protected areas do not attracts my attention	47,5	35	2,5	15	-
3. Protected areas has the function of protecting ecosystem	-	-	2,5	47,5	50
4. Protected areas have aesthetical beauty	-	-	5	45	50
5. Protected areas have educational function	2,5	2,5	15	47,5	32,5
6. Protected areas raise environmental awareness	2,5	2,5	7,5	40	47,5
7. I teach my students the importance of protected areas	-	2,5	10	62,5	25
8. Teachers from all the fields have to have enough knowledge about protected areas	-	2,5	2,5	35	60
9. Teaching in protected areas would be inefficient	55	42,5	-	-	2,5
10. It is important for me that my students learn about protected areas	-	2,5	2,5	47,5	47,5
11. I'm knowledgeable enough to teach about protected areas	-	7,5	25	60	7,5
12. It is important for me that my students gains positive habits against protected areas	-	2,5	-	50	47,5
13. I'd like to camp with my students in protected areas	2,5	2,5	32,5	32,5	30
14. I plan to give research assignments about protected areas to my students	2,5	2,5	35	50	10
15. Protected areas are important because they can contribute to active learning	-	-	2,5	50	47,5

16. I let my students do activities about protected areas	-	10	22,5	57,5	10
17. Protected areas are not required to be protected	75	25	-	-	-
18. Protected areas in Turkey are not protected sufficiently	5	5	17,5	47,5	25
19. Plant species in protected areas are important for our country	-	-	5	27,5	67,5
20. Animal species in protected areas are important for our country	-	-	5	25	70
21. Educational Institutions have great role in raising awareness of protected areas	-	5	10	27,5	57,5
22. I'd like to be educated before visiting protected areas	2,5	5	7,5	60	25
23. I think positively of TÜBİTAK's nature educations held in protected areas	2,5	2,5	22,5	35	37,5

4. Discussion

According to questionnaire evaluations, it is observed that pre-school students have highly internalized the visuals illustrating nature protection.

In the questionnaire conducted to determine the attitudes of 1st and 2nd grader primary school students towards activities in nature, it is understood from answers that students didn't have trouble recognizing the activities shown them but had troubles to name the activities they didn't practice or observed before. In this case, it is understood that the students have difficulties in recognizing some nature activities and it is also can be said that they should be practically introduced to students for a long lasting learning. Thus, as much as children's awareness about nature and nature activities will increase, families can also play a role in supporting their children's attitudes towards nature. While 70.8% of the 3rd and 4th grader students say that they are aware of the existence of protected areas in their environment, it is seen that 76.39% of the students don't have enough information about the protected areas in their cities according to the answers given to the photographs of 6 protected areas in their cities. Considering these findings, it is seen that there is an inverse relationship between students'

answers and the questionnaire results. Although 54.2% of the students stated that they have never been to a protected area before, 81.3% of the students stated that they wanted to study in national parks and similar protected areas instead of classrooms.

In a similar study done by Deniş (2007), it is seen that the majority of 8th grader students (77.1%) living around the national parks want to take classes in national park environment. Accordingly, students are curious about protected areas, want to have more information about these areas and want to take classes in natural environments instead of classroom environment.

Although 82.5% of primary school teachers stated that they were aware of the local national parks and similar protected areas, many teachers wrote the names of protected areas within the provincial boundaries incorrectly and named some areas that are not in protection incorrectly by naming them protected areas. Although the teachers stated that they provided information about the importance of protected areas to their students at least once during the academic year, it is observed that most of the students were unable to recognize national parks and similar protected areas in their provinces and they had difficulty in understanding what the concept of protected area is. Primary school teacher who think that educational institutions have a very important place in raising awareness about protected areas, think that educational function is provided only by the individual effort of the teachers themselves and want that the provincial national education directorates plan visits to these areas regularly every year. Although primary school teachers have positive attitudes towards protected areas; they can be more useful to students by educating the teachers themselves of being aware of enhancing the protection of the protected areas and importance of educational function.

Karakaş (2010) in his study; In order to increase the positive attitudes of the teachers towards the national park, required importance should be given to education, environment and nature education should be implemented in a programmatic way starting from primary education to higher education, the sensitivity should be increased and obsolete techniques should be abandoned in the education to implement educational methods into more practical perspectives. As a conclusion of this work, it is pointed out that education of nature protection and protected areas should be transferred to children from preschool period and children should be educated both in school and in family environment by taking nature awareness and education functions of protected areas into consideration.

5. Conclusions and Recommendations

This section serves to the results and recommendations obtained in the line of findings;

- While determining the attitudes of the majority of preschool students towards the environment, it was found that they were more likely tended towards protection of environment and visuals representing the clean environment.
- The majority of pre-school students (67.6%) stated that they do not want to study outside.
- It is seen that pre-school students more often use natural elements (flowers, sun, sky) to express nature when they are asked to draw a picture.
- It is seen that 1st and 2nd graders are aware of the activities carried out in nature at a rate of 64.67% in line with their responses to visuals representing nature activities.
- It is seen that 1st and 2nd graders mostly use natural elements (human, sun, tree, sky) in their paintings when they are asked to draw a picture about nature activities.
- According to the answers given by the 3rd and 4th graders to the pictures of 6 protected areas in Trabzon, it is seen that 76.39% did not have enough information about the protected areas in their cities.
- Most of the 3rd and 4th graders have enough knowledge about the plant and the animal species existing in their regions.
- It is seen that 81.3% of the 3rd and 4th graders want to get education in protected areas instead of classroom environment.
- 3rd and 4th graders are mostly using natural entities (human, tree) in their paintings in which they describe activities they do in nature.
- The majority of primary school teachers (70%) think that sufficient importance is not given to the protected areas in their region.
- 72.5% of teachers think that protected areas in Turkey are not protected properly.
- 34 (85%) of the teachers think that educational institutions have a very important role in raising awareness about protected areas.
- It is seen that the majority of primary school teachers think that plant-animal species in national parks and similar protected areas are important for our country.

- 29 of the teachers (72.5%) think highly of TUBITAK's educations in protected areas about nature.

In many previous studies, it is seen that pre-service teachers and secondary school students are preferred as sample groups. It is noteworthy that there are fewer studies for pre-school and primary school students corresponding to the period in which environmental awareness should be developed.

The concepts of environmental education and ecological literacy should be transferred to people starting from early ages and these concepts should not be limited to a certain part of the society but should be gained by the whole society. Only that way, it will be contributed to increasing environmental and nature sensitivities that have impact.

It is also the duty of families, especially educators, researchers and people from different disciplines in other parts of the society to carry out activities to instill environmental awareness in children. It is very important for educators to raise awareness about environmental behaviours and to be role models for pre-schoolers and schoolchildren. Because the researches show that the positive attitudes and behaviours gained from an early age continue throughout lifetime.

The aim of this study is to create environmental awareness among the students, to make them aware of the importance of protected areas and to increase their sensitivity to these areas, to make them aware of the educational functions of protected areas and to make them contribute in the context of such studies. Also, taking these problems into consideration in the improvement in the educational system, precautions should be taken about on how the educators should undertake the tasks to be followed in pre-school and later periods.

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CHAPTER XXI

STREET OPEN SPACES AS BEHAVIOR SETTING

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1. Introduction

Environmental psychology was developed through the collaboration of architects and environmental designers, scientists in psychology and sociology. With the development of environmental psychology, as an alternative to the visual-aesthetic approach used by architects and environmental designers for the design and planning of the environment, ecological psychology, which considers human needs, the characteristics of the space and human behavior, has been developed (Mehta, 2013). Considering ecology and psychology together provides opportunities for establishing a relationship between human and their environment (Thompson, 2003). The principles of this relationship, which include mutual interaction and exchange, are revealed by ecological psychology (Mumcu et al., 2019).

Ittelson (1976) said that not considering the human being who reacts to the environment and creates the environment as a whole with the environment creates problems in obtaining reliable results in human-environment research. It has been emphasized by many researchers that these problems can be overcome with the development of ecological psychology. Velioğlu (1990) explained this as follows: "Human is not just an observer in the perception of the environment, unlike her relationship with the object, she is an element that plays a role,

participates and is surrounded". Environment and behavior are treated as a single and interconnected unit (Scott, 1980). Therefore, the more the environment has an impact on human behavior, the more impact people have on the environment. It is impossible to consider the environment, the source of human behavior, and the human producing the environment and the environment produced by the human being separate from each other (Itellson, 1976; Alpak; 2017).

The human-environment communication system consists of two processes that balance each other. The first process measures changes in the behavior of people affected by the characteristics of the environment. The second process is defined as changing the characteristics of the environment according to the new needs emerging through behaviors (Canter, 1983). In other words, the relationship between humans and the environment is bidirectional and includes a continuous process that feeds each other. Therefore, the environment and the human reveal the behavior, and after this behavior, new human-environment situations emerge and this leads to new behaviors (Alpak, 2017; Alpak et al, 2019; Proshansky, 1976; Mumcu, 2009).

In order to understand human-environment interaction within the scope of ecological psychology, Barker developed the 'Behavior Setting Theory' (1968), Canter developed the 'Place Theory' (1977), and Gibson developed the 'Affordance Theory' (1979). While ecological psychology considers the environment and human as an inseparable whole, it tries to understand the behavior of the human in the daily environment in which it occurs, without disturbing its flow, by using the basic principles and research approaches of ecology (Mumcu et al., 2019). Within the scope of this study, open spaces on shopping streets were examined with Barker's 'Behavior Setting Theory' (1968).

2. Behavior Setting

Barker's (1968) 'behavioral setting' theory and the field of 'ecological psychology' focus on the daily behaviors of people related to a physical location (Mehta, 2013). Behavioral settings exist independently of any person's perception of it. Behavior setting is not a mere place, but a cluster of interactions within a place. Behavior setting has both physical and social characteristics (formed by human behavior, their presence and activities). While users change in behavioral settings, behaviors and activities remain constant (Gür, 1996; Mumcu, 2009).

The concept of behavior setting examines the relationship between the physical environment (setting) and the patterns of behavior that may occur in this environment. A 'behaviour setting' consists of a milieu (a particular layout of the environment), a standing pattern of behaviour (a recurrent activity), and a synomorphy (a congruent relationship between the two) (Barker, 1968; Lang, 1987; Mehta, 2009; Mumcu et al. 2013; 2019; Alpak et al., 2019).

'A standing pattern of behavior' describes activities and behaviors that are external to the individual and continue regardless of the participants. Various characteristics of the environment affect the standing behavior pattern. These features of the environment affect the form and quality of the behavior and contribute to the formation of behavioral settings (Mumcu, 2009).

As a result, the characteristics of the environment and the activities that turn into standing behavior patterns should be examined for the transformation of an open space into a behavior setting. Within the scope of this study, it has been focused on which environmental characteristics should be included to transform shopping streets into a standing social behavior pattern. Therefore, primarily, 'what are the shopping streets and their features' and 'what they mean for the users' are emphasized.

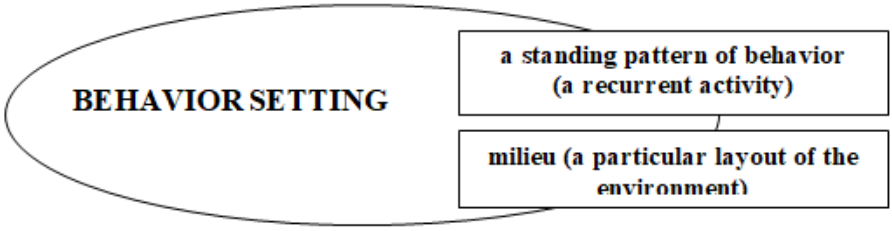


Figure 1. Behavior setting components

3. Shopping Streets

Jacobs (1961) says that the open-air representation of many cities is the streets. Because people depend on the streets for functional, social and leisure activities. People use these places to travel, shop, play, meet, gather, walk, and most importantly interact with other people (Jacobs, 1961; Appleyard, 1981; Carmona et al., 2003; Mehta, 2013).

Schulz-Norberg (1971), on the other hand, defines shopping streets, which are also defined as main streets, as a "small universe" that intensely presents

the character of the city as a whole to the visitor in the past. For this reason, throughout history, shopping streets in cities have been used for basic needs, communication and entertainment and various religious, political, commercial and social functions (Rudofsky, 1969; Lofland, 1973, 1998). Main streets are places that support the social vitality and democratic life of the society. These spaces provide social equality according to the profile of their visitors; it forms the basis for public and urban policies, strengthens the sense of place, reveals the habits of the society and provides psychological support to the society (Simms et al., 2005; Ercoşkun and Özüduru, 2013).

Shopping streets are third places, places of public interaction where citizens can come together (Oldenburg, 1989). They are equal living spaces, places where people reach the meaning of their lives by shaping their social identities and daily activities. Thus, they become centers that support social interaction and establish social life (Fyfe, 1998; Simpson, 2011). According to Project for Public Spaces (PPS), the most beautiful cities in the world, whether small or large, are always referred to by their main streets. They form the blood vessels of the city, pumping life around, connecting the most important places. Today's biggest streets are those that have gone far beyond their traditional use. Thanks to the emphasis on pedestrians and meaningful social interactions, main streets can meet the social needs of modern societies (PPS, 2008).

According to Southworth (2005), shopping streets can be defined as walkable places, consisting of low-rise buildings with commercial units on the ground floors, connected with the urban environment, having high pedestrian traffic, and uncontrolled public and social activities. Shopping streets support a common life with the active-passive participation and interaction needs by various businesses and most of the social life takes place in these places (Mehta, 2009). So here, people can meet, greet, meet each other, etc. entering into long or short-term relationships they can establish social relationships as a result (Gehl, 1987, 2010). In addition, open spaces of shopping streets are places where people spend most of their time apart from their work and home lives, and they are of great importance in terms of social behavior as they allow for social interaction that occurs incidentally in daily routine (Banerjee, 2001; Mehta 2007). Streets are living urban spaces to the extent that they contain different spaces and different intersections of these spaces that respond to all these expectations, and they can meet the social behavior needs of people (Gehl, 1987).

For all these reasons, it is necessary and very important to create shopping street open spaces that can support social behavior, which is one of the basic human needs. When shopping streets cannot carry out these functions, the relationship of people with each other may be negatively affected, and the sense of common understanding and community may deteriorate. Thus, recently, interest in the urban open space as a shopping street has begun to revive. Researchers have tried to find an answer to the question of 'what features a shopping street should have in order to support social behavior?'. The answers to this question point to human-environment interaction.

Human needs have always been the most important element of human-environment research. Human needs (Physiological, Safety, Belonging, Esteem, Self-actualization, and Aesthetic-emotional satisfaction) classified by Maslow (1954) have been used by many researchers to identify environmental characteristics that support human-environment interaction. Researchers have made some classifications in order to reveal the effects of these features, which they defined based on human needs, on human behavior with more reliable results (Rapoport, 1991; Baker, 1997; Mehta, 2007, 2009).

In the study on streets, Rapoport (1991) stated that the streets should be examined in terms of usage and activities (social) as well as examining the streets in terms of their physical / formal characteristics and revealed two environmental characteristics of the streets. The street, which is the 'linear space between buildings' with its physical features, cannot become a living space without a functional definition for use. The street, which is 'a public social space where certain activities take place in the settlement' with its social features, turns into a living space only when physical-social features are approached and designed together. For this reason, the characteristics of the environment are defined as the relationships of the components that make it up with each other, the components with people and between people. Thus, the environment is not only a space with boundaries and physical features for human activities, but also a space with social features that are an important part of the behavior model (Lang, 1987; Rapoport, 1990a). Proshansky et al. (1983) and Canter (1983) also stated that the environment we live in is a social phenomenon as well as a physical phenomenon, so these two features should be considered as a whole in environment-behavior studies.

Within the scope of this study, the relationship between the social and physical characteristics of shopping streets and their behavioral sitting was

examined. The micro-scale physical and social characteristics of the environment revealed by various researchers are shown in Table 1 (Alpak, 2017; Alpak, et al., 2018).

Table 1. Micro scale-environmental characteristics of street

Environmental characteristics	**Indicators**	**Researchers**
Physical	Activity pockets Alcove Sidewalks Steps Small openings Thresholds Soft-active edges Public sittings Commercial settlements Water scenes Walls Proximity - a short distance Well-kept - comfortable Nodes Spaces Surround - Enclosure Boundaries/Confinedness Intersection points Tree, water, plant, etc. and Shadow elements Permeability Personalization Third places	Jacobs (1961) Alexander (1977) Whyte (1980) Gehl (1986, 1987, 2010) APA (2007) PPS (2008) Marcus & Francis, 1998 Mehta (2007, 2008, 2009, 2013) Farida, 2013 Goliˇcnik & Thompson, 2010 Aelbrecht , 2016 Oldenburg, 1991
Social	Community places Business diversity User diversity Variety of uses Mixed-use Social comfort Human presence in groups Stationary activity	Trip, 2007 Gehl, 2010, PPS 2008 Farida, 2013 Montgomery, 1998 Mehta, 2007, 2009, 2013 Whyte, 1980 Aldulkadir ve Nasar, 2014

4. Shopping Streets and Behavior Setting

With a literature review, different shopping streets with similar characteristics were examined. As a result of the examination, the streets were grouped according to their characteristics and behavior setting (Table 2).

Table 2. Street open space as behavior setting

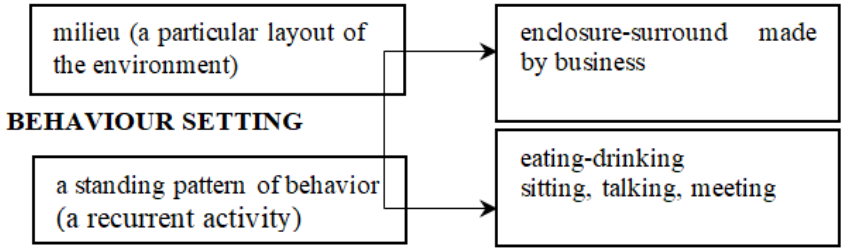
Group 1-
Environment characteristics: small and large pocket-space



URL 1



URL 2



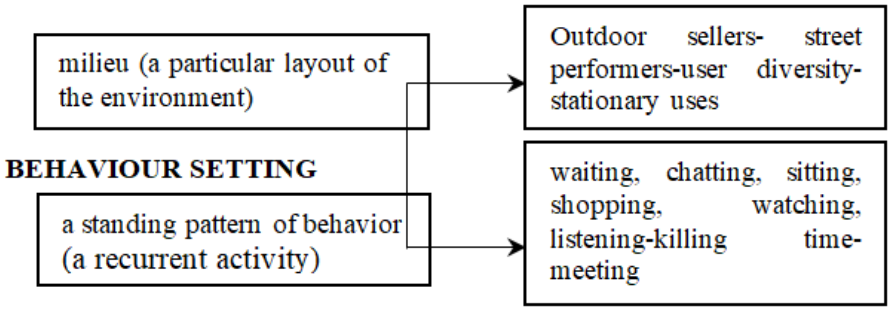
Group 2-
Environment characteristics: soft edges



URL 3



URL 4



Group 3-

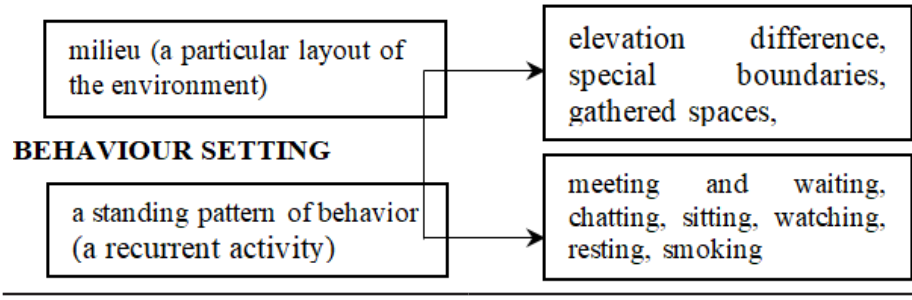
Environment characteristics: public sitting- steps- thresholds



URL 5



URL 6



Group 4-

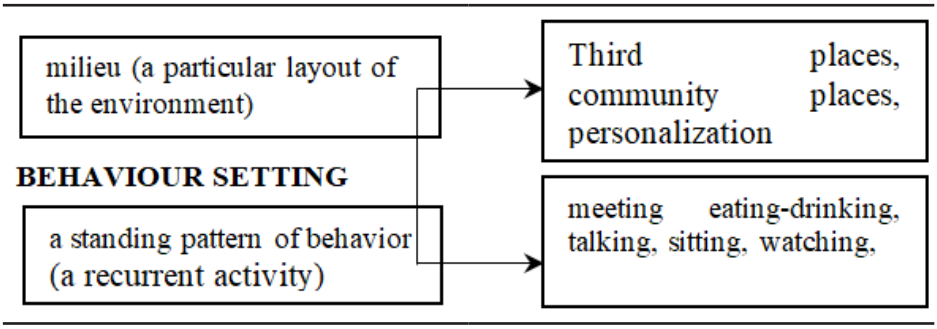
Environment characteristics: sidewalks-spaces



URL 7



URL 8



4. Conclusion

The environmental characteristics of the open spaces of shopping streets, the activities held there and the behavior settings that occur as a result of this are examined within the scope of this study. The environmental features, street examples and the activities that took place there obtained through literature review were evaluated by grouping. Street examples with similar environmental characteristics were compared with the activities taking place there.

It has been determined that similar behaviors and activities are carried out in different street open spaces with similar environmental characteristics. It has been observed that in the streets with small and large pocket-spaces, businesses create an environment (milieu) by enclosing and surrounding them. The tables and chairs placed in the pockets and the products they sell have enabled people to turn into a behavior pattern by constantly performing behaviors such as stopping, eating, sitting, meeting. With small interventions by businesses with permission of the administrations or municipalities large or small pockets in the streets have turned into standing behavior patterns, especially by sitting, chatting and eating and drinking activities with acquaintances (Figure 2).

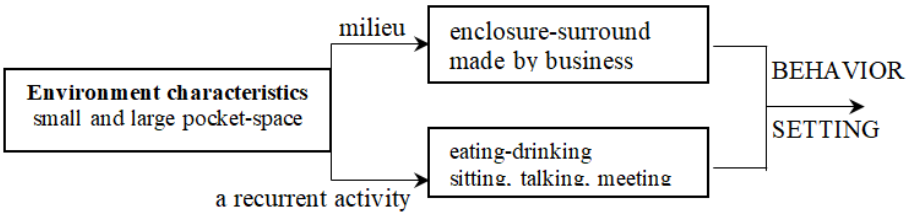


Figure 2. Small and large pocket and behavior setting

It has been observed that in shopping streets with environmental features, which Gehl (2010) defines as soft edges, street artists create their own scenes, peddlers

display their products and have environments with various uses-users due to their structure. With these environmental features soft edges on the streets have turned into standing behavior patterns, especially such as leaning, waiting, watching, killing-time (Figure 3).

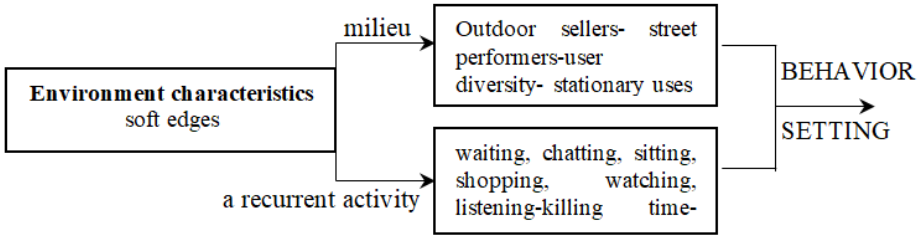


Figure 3. Soft edges and behavior setting

It has been observed that shopping streets with public sitting- steps- thresholds have a particular layout of the environment such as elevation differences, special boundaries, gathering spaces. While the steps on the streets, the borders or thresholds in front of the doors allow people to turn into a behavioral pattern by constantly performing behaviors such as sitting, lying, waiting, resting, public sittings support the formation of behavioral patterns such as resting, watching the surroundings, waiting, eating-drinking (bagel-corn), playing games for children (Figure 4).

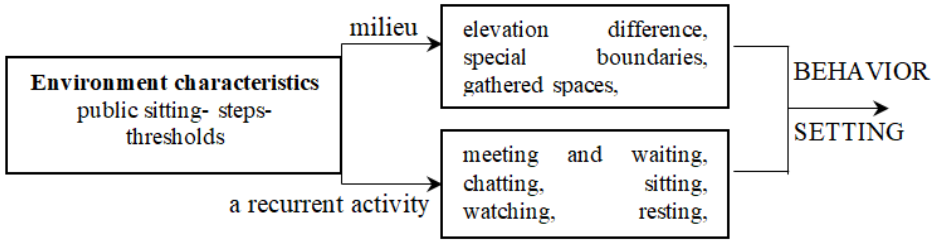


Figure 4. Public sitting- steps- thresholds and behavior setting

Finally, within the scope of the study, the relationship between wide sidewalks and behavioral sitting, which is the most important feature of streets, is examined. Sidewalks are often places where milieu occurs via personalization and third places. Sidewalks are environments where businesses completely surround the space with boundary elements such as tables-chairs, fences, barriers, and now they function as private areas. Behaviors made by constantly such as eating, sitting, and meeting become a behavior pattern in these places (Figure 5).

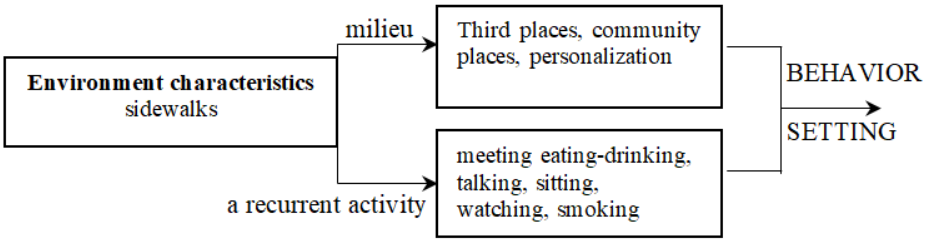


Figure 5. Sidewalks and behavior setting

Human behavior in urban spaces is an important research topic. Since it is the person who experiences the place, the opportunities offered by the place should meet the human needs. In this context, we cannot consider elements such as human needs, perception and behavior environment independently of each other as the basic concept of human behavior.

People try to meet their psychological and social needs by interpreting as much as they perceive from the environment. The resulting behavior may differ according to each person, apart from the opportunities provided by the space, but the effect of the space and the features that make up the space on people can lead to the formation of common behavior patterns/types of use. In this study, the common effects of the environment's sidewalks-spaces, small and large pocket-space, soft edges, public sitting-steps-thresholds features on users and the behavioral patterns and behavior sittings formed in shopping streets were determined. The results show that the places with these features and transformed into behavior sittings are important places in terms of social behavior. In future studies, in order to obtain more reliable results and to obtain data suitable for scientific infrastructure, it can be suggested that instead of grouping behaviors and activities over examples, it can be developed by making observations on existing shopping streets and comparing them with the characteristics of the streets.

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CHAPTER XXII

EFFECTS OF COVID-19 PANDEMIC ON PREFERENCES OF URBAN OPEN GREEN SPACE USERS

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1. Introduction

Urban open green spaces are defined as private or public spaces with vegetation within urban landscapes, commonly used for recreation and other leisure activities. Urban open green spaces can be of different scales. Besides trees and open spaces, sometimes water bodies, games, and exercise equipment can also be found in it (Cilliers, 2015). Urban open green spaces reduce the negative effects of building density and offer people

the opportunity to integrate with nature in the city. Urban open green spaces directly contribute to environmental quality with their physical, aesthetic, and ecological functions. It increases the contact of city dwellers with nature and causes a decrease in their stress levels. Green spaces also have positive effects on physical health as they provide opportunities for physical activity. In addition, urban open green spaces help to strengthen harmony and communication between dwellers (Kısak, 2021; Mansuroğlu et al.,2021a Kalaycı Önaç and Birişçi, 2019; Markevych et al., 2017; Akpınar et al., 2016; Gülgün et al., 2014).

Today, stress and stress-related diseases have increased dramatically among adults and children, especially in western societies. Diseases such as burnout syndrome, insomnia, depression, chronic fatigue, panic feelings are diseases directly related to stress (Mansuroğlu et al., 2021). In a study conducted in Sweden, the relationship between health and open green spaces in different proximity was investigated. The study was carried out with 953 participants randomly selected from 9 cities. As a result of the study, statistically, significant relationships were found between the use of open green space and stress levels, regardless of gender, age, and socio-economic status of the participants. As a result of the study, it was determined that as the frequency of visits to urban open spaces increases, stress-related diseases decrease. In addition, as the distance to urban open spaces decreases, the frequency of visits increases (Grahn and Stigsdotter, 2003). A study conducted in Kuala Lumpur investigated the perception of urban open green spaces and their effects on health and well-being. As a result of the research, it was determined that urban open green spaces have a positive effect on people's stress reduction, physical health and awareness (Nath et all., 2018). It has been observed that there is a positive relationship between access and use of urban open green spaces and low stress and obesity. (Nielsen and Hansen, 2007). As people move away from open green spaces in the city, the frequency of use of green spaces decreases. People who live closer to open green areas have lower obesity rates, which is thought to be due to their higher physical activity. (Coombes et al, 2010). According to a study conducted on elderly people, the availability of green spaces offering walking opportunities is independently associated with an increase in lifespan (Takano et all, 2002). It has been found that even watching nature views other than physical activity has calming effects on patients, reducing the use of painkillers and shortening the length of hospital stay (Ulrich 2002). There is a negative correlation between living close to urban open green spaces, the occurrence of

cardiovascular diseases, and mortality from these diseases. The reason for this is explained as open green spaces reduce air pollution, encourage physical activity and reduce stress (Shen & Lung, 2016; Tamosiunas et al., 2014).

Green spaces positively affect social interaction and physical activities and help to reduce stress, loneliness level, and also these spaces decrease health inequalities and weakening the effects of poverty (Burnett, et al., 2021) Negative physical and psychological health problems can be dealt with by spending time in nature. Generally, urban green spaces provide to enhance individual and community resilience in stressful times (Berdejo-Espinola, et al., 2021). Besides, green spaces and urban parks include various ecosystem services (Alizadehtazi, et al., 2020) and provide quality of life and health status (Xie, Luo, Furuya, & Sun, 2020). There is a positive connection between urban parks and also visiting these spaces develop mental health. In addition to these opportunities, they provide outdoor activities for the different types of the population such as different ages, ethnic groups, and socio-economic groups (Xie, Luo, Furuya, & Sun, 2020). Developing green area management involves societal and cultural context, and also, green areas, which are infrastructural elements of society, need to be promoted by residential (Uchiyama & Kohsaka, 2020). In this Context, Urbanism movements such as landscape urbanism, ecosystem urbanism, ecological urbanism, ecological landscape urbanism, encourage nature and ecological services in an urban area. Different usage patterns and events like a global event of great magnitude have drastically changed different geographical contexts (Ugolini, et al., 2020). Besides, trends of use and access to green areas have started to change with the Covid-19 pandemic as a known global problem (Uchiyama & Kohsaka, 2020).

The Covid-19 virus has become a serious problem for public health worldwide and it has become important to prevent infections and protect the population. During the pandemic, many countries limited travel and people had to stay in their houses. In addition to this, green spaces are not equally created in individuals and communities. If there is a green space near to neighborhood within ten minutes, people living there receive the full green benefits (Ahmadpoor & Shahab, 2021). With the pandemic days, visiting the park has changed, and the number of visiting the park in many countries early in the pandemic reduced (Geng, et al., 2021). Access to green spaces during Covid-19 caused inequalities. People had to receive special permission for accessing the parks and gardens (Hariyani & Pratama, 2021). On the other hand, using of

green spaces increased with the pandemic, people need to access open green area like the small neighborhood parks (Honey-Rosés, et al., 2020).

In addition to these, during the pandemic, designers need to create a new perspective for parks. For example; creating more spaces for individualized, expanding running trails and paths, and exercise infrastructure, creating new sports areas with social distance (Honey-Rosés, et al., 2020). Walking, biking and recreational infrastructure are highlighted with the Covid-19 pandemic days, and also creating a stronger infrastructure of neighborhood parks and green spaces helps public health (Slater & Christiana, 2020).

The COVID-19 epidemic isn't the first time humanity has had to deal with a global public health crisis. Pandemics such as plague, smallpox, and malaria have covered the globe throughout history (Liu and Wang, 2021) (Table 1).

Domestication, which led to close relationships between humans and animals (animals often lived in the same household as humans), caused humans to contract diseases that afflicted animals. Some of these diseases adopted humans as new hosts and thrived in these new environments; others changed their characteristics to become human diseases (Ponting, 2000). That is why, ever since mankind began farming, there have been pandemics all throughout the planet.

The word "pandemic" comes from the Ancient Greek words "pan" which means "all" and "demos" which means "people." Epidemic diseases/epidemics that spread and affect a large area, such as a continent or even the entire planet, are referred to as pandemics in epidemiology (Tapisiz and Kiykac, 2020).

Epidemic disease emergence, spread, retreat, and finally extinction processes, which have caused massive losses from ancient times to the present, involve some fundamental dynamics that have yet to be fully addressed. On the other hand, it will take thousands of years for humanity to completely comprehend the logic of epidemic-related mass mortality. With his remarkable foresight ability, Hippocrates went down in history as one of the first to realize that war, drought, humidity, and even wind play a role in this complex cycle (Nikiforuk, 2007).

Table 1. Epidemics affected our world in historical chronology

Name	Date	Location	Number of death
Atina Plague	BS 429-426	Greece	75,000-100,000
Antoninus Plague	165-180	Europe, West Asia, North Africa	5 Million
Justinianus Plague	541-542	Europe	30-50 Million
Japaneese Smallpox	735-737	Japan	1 Million
Black Death/ Plague	1347-1351	Europe	200 Million
New Earth Smallpox	1520-1902	America	56 Million
Italian Plague	1629-1631		1 Million
Great London Plague	1665	Great Britain	100.000
Cholera Pandemic	1817-1923	Asia, Mediterranean, Europe, America, Africa (Worldwide)	>1 Million
3. Plague	1885	China, India, Asia, Europe, America	12 Million
Yellow Fever	1853	New Orleans, ABD	100,000-150,000
Russian Influenza	1889-1890	Russia, Europe, America, Asia, Africa	1 Million
Spanish Influenza	1918-1919	America, Europe, Asia, Australia, Africa (Worldwide)	40-50 Million
Asia Influenza	1957-1958	Worldwide	1,1 Million
Hong Kong Influenza	1968-1970	Worldwide	1 Million
HIV/AIDS	1981-Still	Africa, America, Asia	35-40 Million
SARS	2002-2003	Asia, Canada	770
Swine Influenza	2009-2010	Asia, America (Worldwide)	200.000
Ebola	2014-2016	West Africa	11.000
MERS	2015-Still	Mediterranean (Worldwide)	850
COVID-19	2019-Still	China Wuhan, Europe, America, Asia (Worldwide)	436,632

Source: Tapisiz and Kiykac, 2020

The pandemic has a long history of influencing urban development and encouraging creative solutions to problems. Disease has shaped and influenced the city, and a number of common urban management acts and design practices in reaction to disease outbreaks, such as public health crisis and development, have had a significant impact on modern urban planning and design (Liu and Wang, 2021). The "Urban Park Movement" and Howard's "garden City Theory" at the end of the 19th century in the United States were aimed to improving urban public health problems by increasing urban green space (Landrum, 2013; Howard, 2010).

When cholera outbreaks swept the United States in the 1850s, communities throughout the country created the public health and urban planning departments

to create and enforce laws. During the same time period, the Board of Health of New York City approved the creation of Central Park, the nation's first public park, on the grounds that open urban space benefited human and environmental health. A reservoir was built in the park to provide fresh, clean water to the growing metropolis. It drew water from one of the country's first large aqueducts. (Brinkley, 2021). Landscape architect Frederick Law Olmsted, advocated for the healing powers of parks, which he believed could act like urban lungs as "outlets for foul air and inlets for pure air." The planning for Central Park, which would be planned by Frederick Law Olmsted and Calvert Vaux, began soon after New York's second cholera outbreak. Olmsted, whose first child had died of cholera, went on to build more than 100 public parks and recreation grounds, including those in Boston, Buffalo, Chicago, and Detroit, as a reward of the project's success (Brinkley, 2021).

Emperor Napoleon III ascended to power in France in 1848, in the midst of a cholera epidemic that killed 19,000 Parisians. The nephew of Napoleon Bonaparte, a fan of London's parks and garden squares, set out to reshape Paris in the aftermath of the epidemic. "Let us open new streets, make working-class areas more healthful by allowing helpful sunshine to reach everywhere within our walls," he stated. French officials demolished 12,000 buildings, created tree-lined boulevards and parks, erected fountains, and established a sophisticated sewage system under the leadership of Baron Georges-Eugène Haussmann, transforming Paris into the modern-day "City of Light." (Klein, 2021)

As the above examples demonstrate, despite the fact that the pandemic has alienated individuals from society and eliminated needless public activities, every major epidemic in history has inspired fresh thinking and innovation by iterating the notion of urban planning and updating people's lifestyles. It is a fact that open green areas have various positive effects on human physical and mental health. However, the pandemic affected the life habits of people in many ways, including the preferences on usage of open green areas. This study aims to determine the positive and negative effects of pandemic on open green area usage preferences comparatively with their former habits on using urban open-green areas before the pandemic. Therefore, a questionnaire was designed and applied with 469 the people living in the first three most populated cities of Turkey, which also got affected by the Covid-19 virus most in the country, İstanbul, Ankara and İzmir.

2. Materials and Method

2.1. Materials

As of today, it is known that approximately 187 million people worldwide are exposed to Covid - 19 Virus and approximately 4.04 million of them have died. It has been learned from statistics published by the Ministry of Health that the total number of cases in Turkey is approximately 6 million and the total number of deaths is approximately 50 thousand people (Ministry of Health, 2021).

According to TUIK 2020 data, approximately 31% of Turkey's total population lives in the provinces of Ankara, İstanbul, and İzmir. These three cities, which are the largest metropolises in Turkey, are settlements that have developed under the pressure of migration, lack equipment, and where open and green areas are not enough to meet the needs of the citizens. In this context, these three cities were chosen as the study area in this study to measure the change caused by the Corona Disease due to the Covid - 19 virus on the open green space needs of individuals.

In the scope of this study, the survey study is conducted online. Besides, SPSS20 software is used for the evaluation of surveys.

Ankara, the capital of Turkey, is located in the middle of the country. According to TUIK 2020 data, it has a population of 5.600.000 people. It is the second largest city in the country. İstanbul is located in the northwest of Turkey and is the country's largest metropolis. According to TUIK 2020 data, approximately 15,500,000 people live in the city. İzmir, the 3rd largest metropolis of Turkey, has a population of approximately 4,400,000 people according to TUIK 2020 data and is located in the west of the country (Figure 1).

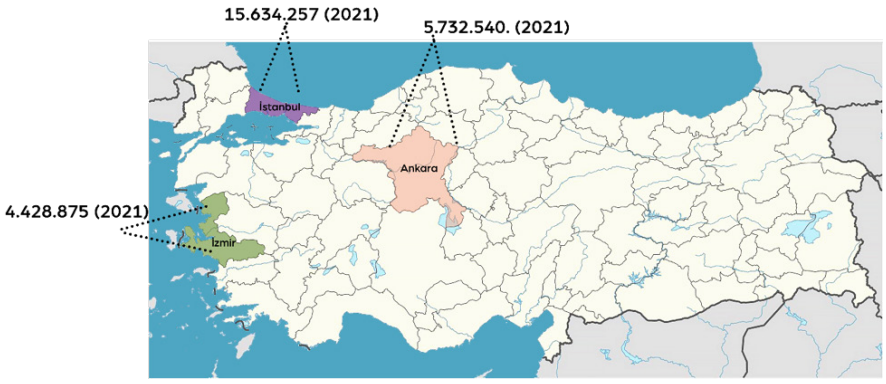


Figure 1. Location and population of case areas

2.2. Methods

The design and application of the survey

The phases of research include establishing the scope and technique, gathering information about the study subject, calculating the sampling size, selecting the inquiry method, creating the survey, pre-testing the survey and fixing mistakes, administering the survey, and analyzing the survey findings.

The sample size for the survey study was determined using the method proposed by Baş (2001), taking into consideration the size of the relevant population. The universe of the study was determined as the people living in Ankara, İstanbul and İzmir cities of Turkey. The sample was estimated with a margin of error of 5% (95 percent confidence interval). Therefore, the survey of 384 people represents the relevant population. However, considering the possibility of incomplete, incorrect and invalid investigations, in order to improve the reliability of the investigations, we conducted further investigations and evaluated 469 valid investigations.

Because inquiries made through interviews are safer and faster, an online survey using standard forms was utilized to obtain the opinions of the persons who comprised the study's population concerning the usage of open and green areas in pandemic circumstances.

A survey was prepared consisting of two parts, namely determining the demographical characteristics of the target group and determining the effect of Covid-19 pandemic on open green space usage preferences. The survey form includes 4 more scales to determine the usage preferences before the pandemic, after the pandemic; the motivations and restrains of people during and after the pandemic while using the urban open-green spaces.

The survey form was created largely with the input of specialists in surveying, the environment, urban open and green spaces, and landscape design. This survey was reviewed by experts in three aspects: content, form, significance and evaluation. A preliminary investigation was conducted on 20 randomly selected people living in the case area. And the final form of surveys were shaped according to the opinions obtained from these individuals.

Surveys were applied to the people living in the case areas of this study in the period of September 2020-March 2021 in the electronic environment to get the views of metropol residents'on the effect of Covid-19 pandemic on urban open green space user preferences.

Evaluation of Survey Results

The survey results were evaluated via IBM SPSS26 software. The survey includes 2 question types as single choice, and the level of agreement with 7 likert scale. Sections I and II items were designed with three alternatives, multiple-choice, open-ended, and ranking criteria, to make it easier for people to express their opinions on the topic and achieve the research objectives.

The information gathered from the survey forms was coded and analyzed using IBM SPSS26 software. The questionnaire scales' level and frequency of agreement were determined using "Frequency Analysis". In data analysis, contingency tables were used to compare variables and display the mutual sub-options of the binary variable together. A normality test using the "Kolmogorov-Smirnov and Shapiro-Wilk Test" was done on the data set to evaluate if the comparison tests for two or more variables are parametric or not (Table 2).

Table 2. Normality distribution

Scale	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Attitudes and thoughts on open-green spaces before the Covid-19 pandemic process	0,171	469	**0,000***	0,835	469	**0,000***
Attitudes and thoughts on open-green spaces during and after the Covid-19 pandemic process	0,172	469	**0,000***	0,839	469	**0,000***
Factors that positively affect the use of open-green spaces during and after the Covid-19 pandemic	0,188	469	**0,000***	0,818	469	**0,000***
Factors that negatively affect your use of open-green spaces during and after the Covid-19 pandemic	0,103	469	**0,000***	0,954	469	**0,000***

*p≤0,05

Two nonparametric tests were selected and applied; the "MannWhitney U test" is used for the paired comparison, and the "KruskalWallis H test" is used to compare two or more variables, since the results of the analysis show that the data do not fit the normal distribution. (Griffith, 2010).

3. Results

3.1. Demographic characteristics and definition of the scales of research

The demographic characteristics of the urban residents of the case areas who participated in the study were determined by frequency analysis and presented in Table 3.

Table 3. Demographic characteristics of the participants

	Group	n	Rate (%)		Group	n	Rate (%)
Age	18-29	166	**35.4**	**Number of children**	0	276	**58.8**
	30-39	126	26.9		1	85	18.1
	40-50	50	10.7		2	93	19.8
	51-64	97	20.7		3+	15	**3.2**
	65+	30	**6.4**	**Education status**	Elementary	2	**0.4**
Gender	Female	272	58		High school	23	4.9
	Male	197	42		Barchelor's degree	286	**61**
City	İzmir	175	37.3		Master's degree	114	24.3
	Ankara	122	26		Ph.D.	44	9.4
	İstanbul	172	36.7				

Among the 469 respondents that participated to the study. 58% were female and 42% were male. Table 2 shows that 35.4 % of the participants are between 18 and 29 ages, while 6.4 % of them are above 65 ages. 37.3% of the participants live in İzmir; 36.7% in İstanbul and 26% of the participants are from Ankara city. 58.8 %of the respondents do not have any children while 3.2 % of them have 3 or more children. It is determined that the educational status of the participants is at a quite high level as 61% of them have at least graduated from university.

After defining the target group of the study, the reliability of the scales was tested via "Reliability Analysis" and the results are presented on Table 4.

Table 4. Reliability scores of the scales used in the research

Scale	Cronbach's Alpha	N of Items	Mean	Std.
Attitudes and thoughts on open-green spaces before the Covid-19 pandemic process	0.96	17	5.21	1.468
Attitudes and thoughts on open-green spaces during and after the Covid-19 pandemic process	0.96	17	5.33	1.432
Factors that positively effect the use of open-green spaces during and after the Covid-19 pandemic	0.92	8	**5.57**	1.405
Factors that negatively effect your use of open-green spaces during and after the Covid-19 pandemic	0.91	9	**4.11**	1.372

Table 3 presents that the respondents reported the most agreement on the "Factors that positively affect the use of open-green spaces during and after the Covid-19 pandemic" proposals with 5.57 mean, and the least agreement was calculated for the scale of proposals given about Factors that negatively affect your use of open-green spaces during and after the Covid-19 pandemic with a mean of 4.11.

The results of reliability analysis for three of the scales differ between 0.91 and 0.96, which means the scales are quite reliable.

3.2. Agreement levels of the participants to the propositions presented on the scales

The participation levels of respondents to the propositions that were presented on the survey to measure the effects of Covid-19 pandemic on open-green space usage preferences were tested via "Frequency Analysis" and the results of each scale are presented on Tables 5, 6, 7 and 8.

Table 5. Attitudes and thoughts on open-green spaces before the Covid-19 pandemic process

Propositions		**(1)***	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**Mean**	**Std.**
1	I often used to go to open green spaces.	6.4	6.2	5.5	4.1	20.7	27.3	29.9	5.27	1.799
2	I would prefer open-green areas that I can reach on foot to those that I can reach by car.	7.9	7.7	5.8	6.2	13	28.1	31.3	5.18	1.937
3	It was important for me to have sports fields in open-green areas.	9.4	13.4	5.8	16.8	18.1	19.2	17.3	4.47	1.929
4	It was important for me to have skate/rollerblade rinks in open-green areas.	15.6	23.5	7.5	20.3	15.4	10.7	7.2	**3.57**	1.863
5	It was important for me to have lake. sea. forest. etc. landscapes in open-green areas.	6.2	5.3	3	5.8	17.5	26.4	35.8	5.45	1.772
6	It was important for me to have security/cleaning etc. staff in open-green areas.	7.5	4.5	3.2	5.1	12.8	24.7	42.2	5.54	1.85
7	It was important for me to have enough trash bins. toilets. and benches in open-green areas.	6.6	2.6	2.1	3.8	10.4	23.9	50.5	5.82	1.73
8	It was important for me to have grass areas in open-green areas.	7.2	2.1	1.5	3.6	13.6	23.5	48.4	5.78	1.735
9	It was important to me that services in open-green areas are free/cheap.	5.8	6.6	2.3	8.1	16.8	29.2	31.1	5.35	1.762
10	It was important for me that open-green areas were clean.	7	1.5	1.1	1.5	8.5	17.7	62.7	**6.06**	1.768
11	lt was important for me to have plant diversity in open-green areas.	6.4	4.5	4.5	11.9	16	26.7	30.1	5.26	1.768
12	It was important to me that open-green areas were afforested.	5.1	3.4	2.3	2.1	9.6	26	51.4	5.91	1.652

13	It was important for me to have open-green areas close to my house.	6.4	5.1	3.8	8.7	12.6	32.2	31.1	5.37	1.777
14	It was important for me to have suitable types of equipment for family/group activities in open-green areas.	7.5	9.6	4.7	10.9	20.5	22.6	24.3	4.92	1.885
15	It was important for me to have drinking water taps in open-green areas.	13.4	6.4	6.4	12.8	18.1	22	20.9	4.65	2.012
16	It was important for me to have hygiene materials at certain points in open-green areas.	11.3	6.6	4.3	8.5	15.4	22.8	31.1	5.02	2.034
17	It was important for me to have types of urban equipment suitable for physical distance in open-green areas.	13	6.2	4.5	8.3	13.9	24.7	29.4	4.95	2.081
*(1) Strongly disagree (2)Disagree (3) More or less disagree (4) Undecided (5)More or less agree (6) Agree (7) Strongly agree										

It was determined that the respondents most agreed on the proposition of "It was important for me that open-green areas were clean" with a mean of 6.06 while the least agreed proposition was "It was important for me to have skate/rollerblade rinks in open-green areas" with 3.57 mean.

Table 6. Attitudes and thoughts on open-green spaces during and after the Covid-19 pandemic process

Propositions		**(1)***	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**Mean**	**Std.**
1	I often go/will go to open green spaces.	5.8	10.7	7.2	7	16.8	24.7	27.7	5.03	1.898
2	I prefer open-green areas that I can reach on foot to those that I can reach by car.	4.5	8.5	8.5	7	11.5	25.6	34.3	5.26	1.86
3	It is important for me to have sports fields in open-green areas.	10.9	11.1	8.7	14.7	17.9	20.7	16	4.43	1.942
4	It is important for me to have skate/rollerblade rinks in open-green areas.	17.1	16	9.2	21.5	17.1	11.9	7.2	**3.7**	1.867
5	It is important for me to have lake. sea. forest. etc. landscapes in open-green areas.	4.5	6.2	5.1	8.7	13.4	23.9	38.2	5.44	1.771
6	It is important for me to have security/cleaning etc. staff in open-green areas.	6.6	2.8	2.1	6.8	7.2	23.2	51.2	5.79	1.763

7	It is important for me to have enough trash bins. toilets. and benches in open-green areas.	6.2	2.3	1.9	4.7	7	22	55.9	5.93	1.706
8	It is important for me to have grass areas in open-green areas.	5.5	3.8	1.7	5.3	10.9	25.8	46.9	5.77	1.702
9	It is important to me that services in open-green areas are free/cheap.	5.8	6.2	4.5	7.7	14.1	29.2	32.6	5.36	1.79
10	It is important for me that open-green areas are clean.	5.5	2.3	0.9	4.1	6.6	17.5	63.1	**6.08**	1.641
11	It is important for me to have plant diversity in open-green areas.	7.5	4.5	4.7	11.5	16.6	24.3	30.9	5.21	1.827
12	It is important to me that open-green areas are afforested.	5.8	1.9	1.9	5.8	9.6	24.1	51	5.87	1.656
13	It is important for me to have open-green areas close to my house.	5.8	4.9	3.8	6	11.7	29.6	38.2	5.54	1.762
14	It is important for me to have suitable types of equipment for family/ group activities in open-green areas.	7.7	9.8	6.4	9.8	15.6	25.2	25.6	4.93	1.934
15	It is important for me to have drinking water taps in open-green areas.	12.4	6.6	7	11.9	14.9	20.5	26.7	4.78	2.051
16	It is important for me to have hygiene materials at certain points in open-green areas.	7	3.8	1.3	7.2	9.2	17.5	53.9	5.75	1.832
17	It is important for me to have types of urban equipment suitable for physical distance in open-green areas.	5.5	4.7	2.3	4.9	10	21.7	50.7	5.77	1.762
*(1) Strongly disagree (2)Disagree (3) More or less disagree (4) Undecided (5)More or less agree (6) Agree (7) Strongly agree										

Table 5 shows that participants did not show a significant difference on their attitudes and thoughts on open-green spaces during and after the Covid-19 pandemic process compared to their scores that were calculated for before the pandemic. According to the results, the most (6.08) and least (3.7) agreed propositions did not differ in two scales regarding the pandemic conditions.

Table 7. Factors that positively affect the use of open-green spaces during and after the Covid-19 pandemic (%)

Propositions		(1)*	(2)	(3)	(4)	(5)	(6)	(7)	Mean	Std.
1	Increasing desire to integrate with nature.	4.5	2.3	3.4	4.1	11.3	34.1	40.3	5.78	1.562
2	Desire to protect my mental health by reducing my stress level.	4.5	2.3	2.6	3	7.9	35.4	44.3	**5.91**	1.537
3	Desire to protect my mental health by reducing my stress level.	4.5	5.1	3.8	5.1	10.4	32.2	38.8	5.63	1.689
4	Good air quality due to plant elements.	4.5	4.5	3.6	2.6	9	32.2	43.7	5.78	1.658
5	Hygiene of sports equipment and playgrounds.	14.3	9.6	7.2	15.8	14.7	19.8	18.6	**4.4**	2.048
6	Availability of open-green space within walking distance.	4.5	4.5	3.6	3.4	8.3	28.4	47.3	5.81	1.68
7	Having urban equipment suitable for physical distance.	7.7	5.3	4.3	5.3	11.1	27.5	38.8	5.44	1.888
8	Due to the physical distance. there is enough open and green space.	6	3.6	3.2	3.4	7.7	26.4	49.7	5.81	1.744

*(1) Strongly disagree (2)Disagree (3) More or less disagree (4) Undecided (5)More or less agree (6) Agree (7) Strongly agree

As presented on Table 6, the most agreed motivation of using open-green spaces during and after he Covid-19 pandemic reported by the participants has been determined as “Desire to protect my mental health by reducing my stress level” (Mean: 5.91) and the least agreed proposition has been “Hygiene of sports equipment and playgrounds” Mean: 4.4).

Table 8. Factors that negatively affect your use of open-green spaces during and after the Covid-19 pandemic

		(1)*	(2)	(3)	(4)	(5)	(6)	(7)	Mean	Std.
1	People around me (family-neighbor-friends) avoid spending time in open-green areas.	16.6	21.5	11.3	13.9	15.4	14.3	7	**3.6**	1.919
2	Restriction of the use of open-green spaces.	12.8	15.6	8.1	12.2	16.2	16	19.2	4.28	2.076
3	Discussions and news on television/ social media about spending time in open-green spaces during the pandemic.	11.5	15.8	10.2	14.3	17.9	18.3	11.9	4.14	1.935
4	Concern about catching the virus because of the crowd.	5.1	6.6	7	6.2	15.1	25.8	34.1	**5.33**	1.809
5	Unhygienic sports equipment and playgrounds	6.6	4.9	7.9	9	13	22.2	36.5	5.29	1.872

6	Lack of open-green space within walking distance.	11.5	10.7	9.8	9.6	16.4	20.3	21.7	4.56	2.045
7	Lack of open-green areas close to the main transportation arteries.	11.7	11.7	11.3	7.9	17.3	20.3	19.8	4.47	2.046
8	Lack of urban equipment suitable for physical distance.	10.4	9.8	10.2	9.8	15.6	19.4	24.7	4.67	2.036
9	The insufficient size of open and green spaces due to physical distance.	11.5	7.9	8.1	8.5	13.6	21.3	29	4.84	2.078
*(1) Strongly disagree (2)Disagree (3) More or less disagree (4) Undecided (5)More or less agree (6) Agree (7) Strongly agree										

The most effective restrain that keeps the respondents away from using the open-green spaces during and after the pandemic has been reported as " Concern about catching the virus because of the crowd" (Mean: 5.33) and the least effective restrain of the respondents was determined as "People around me (family-neighbor-friends) avoid spending time in open-green areas" (Mean: 3.6).

3.3. Differences on attitudes and thoughts on urban open-green spaces regarding based on socio demographical data

According to the results of the normality distribution tests of the scale nonparametric tests were used to determine the differences of the participants' open-green space usage preferences, motivations and restrains before, during and after the pandemic regarding their demographical characteristics. Table 9 presents the differences between the responds given to the scales according to their gender.

Table 9. The difference between users' the effects of pandemic on preferences of open-green spaces according to gender

Gender	**Before the Covid-19 pandemic process**	**During and after the Covid-19 pandemic process**	**Motivations during and after the Covid-19 pandemic**	**Restrains during and after the Covid-19 pandemic**
Female	5.32±1.381	5.41± 1.359	5.70±1.322	4.32±1.294
Male	5.07±1.572	5.22±1.524	5.39±1.498	3.83±1.429
Total	5.21±1.468	5.33±1.432	5.57±1.405	4.11±1.372
p	0.104	0.211	**0.009***	**0.000***
**p≤0.05*				

According to the results of Man Whitney U test that was conducted to determine the differences of participants' answers to the survey scales regarding their gender showed that there is not a statistically significant difference on attitudes and thoughts about the open-green spaces before and during or after pandemic between the answers of the male and female participants. However, the motivations (p: 0.009) and restrains (p: 0.000) of the participants differ at a statistically significant level considering their gender; in which female participants were reported more motivated to use the open-green spaces (5.70) than male participants (5.39); while females also had more restrains (4.32) than the male respondents (3.83) to use the open-green spaces during and after the pandemic.

Table 10 shows the results of Kruskal Wallis test that was applied to the scales to determine the differences of the user preferences on open-green spaces before, during and after the pandemic according to the ages and education levels of the participants.

Table 10. Differences between the user preferences according to the ages and education levels of the participants

Age	**Before the Covid-19 pandemic process**	**During and after the Covid-19 pandemic process**	**Motivations during and after the Covid-19 pandemic**	**Restrains during and after the Covid-19 pandemic**
18-29	5.17±1.390	5.39±1.389	5.48±1.532	4.12±1.325
30-39	5.34±1.140	5.38±1.304	5.62±1.265	4.15±1.329
40-50	5.06±1.930	4.88±1.865	5.61±1.281	4.11±1.566
51-64	5.10±1.770	5.39±1.460	5.59±1.437	4.08±1.355
65+ 5.47±1.126 5.42±1.216 5.71±1.393 4.07±1.587				
Total	5.21±1.468	5.33±1.432	5.57±1.405	4.11±1.372
p	0.626	0.819	0.969	0.996
Education	**Before the Covid-19 pandemic process**	**During and after the Covid-19 pandemic process**	**Motivations during and after the Covid-19 pandemic**	**Restrains during and after the Covid-19 pandemic**
Elementary	6.35±0.915	6.02±1.372	3.37±3.358	3.55±3.771
High school	5.56±1.625	5.75±1.459	5.73±1.688	4.25±1.404
Barchelor's degree	5.13±1.541	5.29±1.472	5.57±1.415	4.12±1.345

Master's degree	5.29±1.235	5.39±1.277	5.55±1.319	4.03±1.420
Ph.D.	5.31±1.457	5.23±1.549	5.62±1.305	4.26±1.334
Total	5.21±1.468	5.33±1.432	5.57±1.405	4.11±1.372
p	0.149	0.185	0.241	0.892

According to the data on Table 10 the open-green area usage preferences of the respondents do not differ at a statistically significant level according to the ages or education levels of the participants.

Table 11 shows the Kruskal Wallis test results that was applied to the scales of the survey to be able to determine the differences of effect on open-green space user preferences before, during and after the pandemic according to their residence city.

Table 11. Differences between the user preferences according to the residence city of the participants

City	**Before the Covid-19 pandemic process**	**During and after the Covid-19 pandemic process**	**Motivations during and after the Covid-19 pandemic**	**Restrains during and after the Covid-19 pandemic**
İzmir	5.27±1.545	5.30±1.545	5.52±1.614	4.20±1.520
Ankara	5.30±1.596	5.43±1.412	5.61±1.308	4.03±1.205
İstanbul	5.09±1.280	5.29±1.329	5.59±1.242	4.09±1.326
Total	5.21±1.468	5.33±1.432	5.57±1.405	4.11±1.372
p	**0.003***	0.303	0.540	0.155
**p≤0.05*				

According to the data obtained by the analysis of the differences between the user preferences according to the residence city of the participants; only the attitudes and thoughts of the open-green spaces before the pandemic has a statistically significant difference regarding the residence city of the participants (p: 0.003) among all three other scales.

Table 12 presents the Kruskal Wallis test results that was applied to the scales of the survey to be able to determine the differences of effect on open-green space user preferences before, during and after the pandemic according to the number of the children that the participants have.

Table 12. Differences between the user preferences according to the number of the children that the participants have

Number of children	Before the Covid-19 pandemic process	During and after the Covid-19 pandemic process	Motivations during and after the Covid-19 pandemic	Restrains during and after the Covid-19 pandemic
0	**5.23**±1.385	**5.44**±1.369	5.59±1.405	4.13±1.322
1	4.99±1.600	**5.00**±1.492	5.42±1.354	3.97±1.443
2	**5.35**±1.467	5.36±1.417	**5.80**±1.222	**4.30**±1.320
3+	5.17±2.090	5.10±2.067	**4.63**±2.227	3.45±1.949
Total	5.21±1.468	5.33±1.432	5.57±1.405	**4.11**±1.372
p 0.140 0.092 0.017 0.136				
**p≤0.05*				

It was determined that only the motivations of the usage of open-green spaces differed at a statistically significant level regarding the number of the children that the participants have (p: 0.017).

4. Conclusion

The results of this study have proved that the attitudes and thoughts of the participants about open-green spaces were not affected by the pandemic as they reported similar attitudes and thoughts before and during the pandemic. However, the participants gained new motivations and restrain to use the open-green spaces during and after the pandemic. The participants showed a statistically meaningful agreement about open-green space usage is vital for human mental and physical health. The results show that residence city is not statistically significant on user preferences of post-Covid on open-green spaces; which means people tend to use open-green areas and connect to nature no matter how crowded the city they live in is. That is a devastating finding of this research, which must be considered by the decision-makers that limitations on reaching to nature affect people negatively by the decision makes that areas are good for their mental and physical health.

The covid-19 pandemic has changed recreational activities, economic balance, ecological approach, environmental concern, and the use of green areas dramatically. Urban green areas have been crucial spaces for many people on pandemic days. Because, most activities have been restricted and houses have

become offices and schools, so open green areas have transformed significant recreational activity spaces. These areas serve both biodiversity, ecosystem services, the house of various animals, observing nature and meeting people, sports activity, and walking outdoors. With the beginning of the pandemic in 2020, the missing for the open-air has increased and the areas used only for walking or sports have become our working, rest, or eating spaces. This behavior change has transformed drastically the way perception and use open green spaces. In addition to these, more time has begun to be spent in green spaces. Because recreational activities have become more significant for both physical and mental health. In this situation, the goal of increasing the square meter of green space per capita gained importance in this period. As Venter et al. (2020) stated, understanding the changing outdoor use behaviors with the Covid-19 pandemic process will strengthen the bridge between future designs, use and use of public spaces.

Even if there is no Covid-19 pandemic, the importance of open green spaces would have increased with the increasing population density, but with the pandemic process, changes began to occur in the use behaviors. Users who spend most of their time at home have started to prefer open green spaces with easier accessibility. In addition to all these, with the pandemic process, many changes have begun to occur in the design approach both in open and closed areas. By paying attention to social distance, equipment such as sitting units, lighting elements, wastebasket began to be designed, and the idea of increasing the width of walking and cycling paths occurred. In addition to all these, with public health at the forefront, social distance rules have started to be observed throughout the neighborhood and the street, in this case, it has caused the change of space designs. Urban dwellers began to choose modes of transportation where they could be individual instead of using public transportation. The priority of these is the use of bicycles and walking, so the design of bicycle and walking paths in urban parks, picnic areas, and neighborhood parks have been given importance. In this way, these uses, which were collected at certain points of the cities, started to spread towards the neighborhoods and the urban fringe. With the increase in the issue of public health, places with intensive plant use began to be preferred, so tree textures were tried to be increased throughout the cities.

With the changing conditions, architects, landscape architects, and city planners have important duties both at the design scale and at the planning scale. It is very important to make planning and design decisions by considering

pandemic conditions from macro scale to micro scale. It is very important to raise the rate of green areas in land use, especially in city centers, and to use native plant species suitable for the climatic characteristics of cities in these areas. Besides, decision-makers need to support planning decisions with necessary laws. In addition to these, at the design scale, it is among the missions of the designer to design urban equipment elements by paying attention to social distance and to design open green spaces in easily accessible places. In addition to all these, users also have great duties. Keeping the spaces clean and using open green spaces by following the social distance rules are among the most significant issues. If the city dwellers prefer to use bicycles or walking on their way to work and school, they will prevent the density in certain areas and will not endanger their health.

This study deals with the relationship between the Covid-19 pandemic and open green spaces. Along with the pandemic period, there have been significant changes in the design and planning decisions of these spaces and the user's behavior. This study also measures these changes and aims to guide the open green space planning and design decisions to be made in the future. It is also pointed out how the potential green spaces planned to be built throughout the city should be designed according to the pandemic conditions and how important accessibility is in this process and the efficient use of open green spaces and the ability to respond to user needs are the main objectives of the study.

As Brinkley (2021) stated in his study; after the cholera epidemic, in which more than a million people died, Olmsted, whose first child had died of cholera, went on to build more than 100 public parks and recreation grounds, including those in Boston, Buffalo, Chicago, and Detroit. However, as a consequence of our research, even though it has been proven that people's desire for open and green spaces has grown during pandemic periods, no action has yet been started by the state or local government to enhance open green spaces following the epidemic.

Despite the fact that Liu and Wang (2021) stated in their study that pandemics have affected cities throughout history and that many city management actions have emerged after the pandemic and have had a significant impact on modern planning, the current Corona Pandemic, which has been ongoing for two years, has not yet been reflected in urban planning standards.

Although the Turkish government or local administration has done no action, there have been academic papers exploring the impacts of the epidemic

on the urbanization process. Karlı and Çelikyay's (2020) research named, "Covid-19 Impact on the Development of Smart Cities," sought to support the creation of appropriate policy interventions for smart planning and smart city construction processes based on "public/public health" following the Covid-19 outbreak. The research, which stresses our country's low number of open green spaces and their accessibility, supports our research by highlighting the necessity of walking to these locations during the pandemic phase and proposes the adoption of smart city apps to address this.

Another study that confirms the findings of our research is the "Pandemic – Sustainable City Goals" by Yüksel and Hepcan (2021). They argue that anti-pandemic policies have altered people's everyday lives, lifestyles, and the way cities are utilized, and that the usage of public places like as streets, parks, and squares has been reshaped in accordance with social distance norms and corona pandemic highlighted the need for the protection and development of the urban green infrastructure and the importance of green areas, which are essential for the sustainability of cities. Despite the fact that this research, which is a review study, does not assess people's perspectives, such as surveys and interviews, it eventually validates our study.

Esermiş and Atanur (2020) investigated the impact of the pandemic on public places in their study. It is argued that; in the pandemic process, crowded spaces become frightening and, in this context, serious changes are observed in the use of public spaces with heavy users. They believe that the present crisis will have a positive impact on the process, the impact of healthy cities and successful public spaces on human health has started to be talked about more than before, and this situation will lead authorities and planners to take decisions in this direction in the future. This forecast is parallel with this study, which statistically reveals the importance of open and green spaces during the pandemic process.

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CHAPTER XXIII

IMPORTANCE OF PERMACULTURE TODAY

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1. Introduction

The concept of sustainability is one of the most important issues in today's world in economical, ecological and social meanings. Ecological unsustainability causes a lot of environmental degradation such as depletion of the ozone layer, greenhouse gases, climate change, global warming, rising water level and acid rains. All of these are critical global issues and they threaten us and future generations. Therefore, people, institutions and states looking for a solution to take precautions to prevent the collapse of the natural cycle we live in, tent to create more sustainable landscapes all over the world.

For creating sustainable landscapes, Permaculture is one of the significant concepts. The concept was developed by Austrian Bill Mollison and David Holgrem in 1974 as a design system for creating sustainable human settlements. Permaculture as a word is the combination of "**perma**nent agri**culture"** and "**perma**nent **culture**". It aims that creating ecological systems which meet its own need, are non-polluting and not exploiting its environment, sustainable in long term, healthy and economically applicable (Mollison, 2012). According to the concept of Permaculture, there are many positive benefits of working with nature (not against it), seeing the functions of animals and plants as a system working together and making good observations more than waging war against nature. The needs of a system must be met from within the system. In this way, both of nature and us can get benefit.

In this chapter, it is intended to explain the importance of permaculture, based on expressing the ethics, principles and system of permaculture.

2. Concept of Permaculture

Permaculture is a design approach. Its applicability ranges from different scales, for example, from balcony to farm, from city to wilderness. It enables us to provide our food, energy, shelter, material and non-material needs by supporting them with the social and economic infrastructures (Permaculture Design Magazine, n.d.). Permaculture is a system which aims to increase environmental awareness, achieve equality, work with nature instead of harming and spoiling nature, use of renewable energy sources that benefit nature, create a healthy food cycle, reuse of waste, protect social and cultural values. Briefly, it is a system that teaches us to create and promotes a sustainable and healthy lifestyle.

2.1. Permaculture ethics

Permaculture has essentially three ethics;

"1. Earth care (rebuild nature's capital)

2. People care (nurture self, kin and community)

3. Fair share (set limits to consumption and reproduction, and redistribute surplus)" (Holmgren, 2020).

Caring for earth means to care forests, plants, animals, insects, micro living spaces, soil, water, air, so that we can use natural components of earth by providing active protection and using resources sparingly, conducting activities harmlessly and curatively. Caring for people is to meet the basic needs of human such as basic food security, health, equality, security, opportunities for all people. Therefore, the needs of food, sheltering, education, a fulfilling working and social life need to be met. Meeting the basic needs of humanbeing equally can reduce our destructive acts that harm the world. Equality between people, equal access to natural sourcess, care climatic, soil, vegetation characteristics, working together with traditional cultures and strengthening traditional practice also support the perspective of permaculture. Lastly, a healthy economy, healthy environment and healthy society and culture is possible if we can achieve a fair share. Surplus of time, money and energy should be used for caring for earth and people (McKenzie and Lemos, 2008; Mollison, 2012).

2.2. Permaculture principles

Twelve principles of permaculture are (Holmgren, 2020);

1. Observe and interact: Observation gives us a lot of information and it helps us to understand the land and interactions in it. Each result from observation gives us a clue for solutions of today's envronmental problems.
2. Catch and store energy: Catching and storing natural energy and also obtaining energy inside the system is very important to generate renewable and sustainable energy.
3. Obtain a yield: You should work hard until the system work for you in order to obtain a yield. However, it is cruial that all yields should not be sold. Some of them should use for caring for earth and people.
4. Apply self-regulation and accept feedback: For creating a successful permaculture system, thinking, applying and getting feedback is very informative and improving.
5. Use and value renewable energy and resources: In land, effective energy planning is essential. Create an effective interaction between animals, plants and structures enable us to create a cyclical and functioning system, for example, by using zone planing and slice planning.
6. Produce no waste: Preventing waste in the ground, water and air starts with not creating waste.
7. Design from pattern to detail: Before starting detail design, the land need to be considered entirely by helping patterns.
8. Integrate rather than segregate: When different elements and functions come together and integrate with each other in a system, the system starts to work in a single body and meets its own needs inside itself.
9. Use small and slow solutions: Small scale design decisions in relation to the whole plan enable to use the land efficiently and be controlled. Achieving the maximum yields is easier with small systems.
10. Use and value diversity: Diverse usage of plants and animals in a land leads to healthier, resilient and more balanced environments.
11. Use edges and value the marginal: Productivity increases at the border between areas with different ecological structures.
12. Creatively use and respond to change: using natural changes such as succession and evolution in a clever way leads to speed up the growth and development of the system.

3. Importance of Permaculture Today

Permaculture ethics and principles show that the focal point of the system is firstly earth and people and then using more of everything for these two. It can be said that observation, which is the first principle, frames 98% of permaculture because observing the nature very well helps us to understand how a natural system works and so it can be established a permaculture system based on the observations. This is important because, for example, the ecological system in a forest meets its own energy and needs in itself. As a quote of Leonardo DaVinci, "Everything connects to everything else", is a very suitable and meaningful sentence for a natural system. A system which established in understanding of permaculture, will undebatably be sustainable, permanent, resilient, healthy and fair.

Unfortunaltely, in today's world with the world population approaching ten million (Edward, 2011), increasing urbanization has left its mark on the world (Modelski, 2003). The increasing population causes many problems. For instance, increased consumption needs cause of demand of rapid and maximum harvesting from the soil. Increasing in construction leads to decrease natural areas and lands. Consumption and environmental pollution increased. Natural resources are running out fast.

Permaculture interests in soil, plants, animals, structures and infrastructures (water, energy, communication etc.). The important thing is their form of gathering in a land and correct interactions among them. The main point of many environmental problems today arises from not being able to analyze the workings of nature enough, inability to properly interact between functions, uniformity in design, the human instinct to dominate and control. In permaculture design, natural systems are successfully analized, the correct interactions and relations are established among well-known items inside the land, therefore; system of permaculture meets its own needs inside the system and does not exploit its environment. This makes the system sustainable, ecological healthy and economically suitable.

3.1. Natural Elements

Soil, water, plants, animals and people are main elements for permaculture. In today's world, especially for mass and giant production, urbanization and industrialization, these elements are mistreated. For instance, domestic and

industrial solid waste, wrong agricultural practices, wrong, excessive and long-term fertilizer use and pesticide applications are major contaminator for soil (TEMA, n.d.). This contaminators also causes water pollution. The main contaminators of water are sewage solid waste, liquid and solid wastes resulting from industrial and commercial activities, toxic substances, pesticides and animal waste. They changes physical, chemical and biological properties of water and cause the death of aquatic organisms and decreasing biological diversity. In addition to these, harmful gases emitted from industrial facilities, urban residences and vehicles also pollute the air. Plants exposed to the negative effects of air pollution become susceptible to diseases, their development slows down and they even die. These harmful substances also cause acid rain so they pollute the plant and soil (Elkoca, 2003). All of these are caused because of intervention in nature without understanding it and not in accordance with nature.

3.1.1. Soil

Today's soil usage makes soil unproductive, poisonous and unusable. Thus, the presence of healthy soil is continuously decreasing. However, permaculture aims to generate healthy soil, enrich it and increase the microorganisms inside it.

- Compost: It is called as "black golden". A large part of the waste organic matter produced in every house is brought together according to certain rules, and a very valuable material for plants and soil creatures emerges.
- Mulching: It is a method of suppressing weeds and enriching the soil.
- Cover plant cultivation: Cover plants cover the soil with vegetation to increase productivity, enrichment of soil and weed supression. Compact vegetation protects the soil, nourishes the surface and helps humus production.
- Sharing the richness of soil: for a sustainable land, healthy soil is crucial. When we take a good care of a land, we invite little creatures such as worms, insects, mites, bacteria and fungus. Sharing this healthy soil with these creatures enrich the land. Plants and, microorganisms and insects have mutualistic relationships. They are fed by soil and plants and help them to improve (Hemenway, 2018a; Hemenway, 2018b; Mollison,2012).

3.1.2. Water

Throughout history, human beings have given great importance to the water as one of the important elements of landscape by using it in the form of waterfalls,

streams, lakes, ponds, pools, fountains. Today, however, human beings have realized that water is not an unlimited resource and have sought to use water effectively. "The main objective in water resources management is to use water efficiently and economically, which is an essential natural resource for life, to identify and prevent threats to water, to protect water and water-dependent ecosystems, and to ensure sustainable water resources management in this context" (Aküzüm et al., 2010). Precipitation water is an important component of the natural water cycle and it is agreed that new solutions for the efficient management of permaculture. Precipitation waters will provide economic and ecological benefits. In permaculture gardens water is cought, collected and recycled.

- Keeping water in the soil: "The cheapest water tank is soil". Organic matter is fundamental point for soil's water-holding capacity.
- Tilting the land to catch water: This is another way of water-holding. For example, swales for collecting rain water is one of the most popular methods.
- Using plants that use water sparingly: Usage of native plants adapted to the local climate, drought-resistant species, plants whose water usage changes seasonally.
- High density planting: The soil is shaded by the shade of leaves and leaflets, so the loss of water from the soil through evaporation will be prevented.
- Malching: It provides moisture.
- Creating a basin: Storing water obtained from rain water, recycled domestic wastewater and roof by imitating nature.
- Rainwater storage: When rain falling on the roof is collected and stored, a significant amount of water is obtained. In addition, a biological pool can be created for gray water obtained by recycling household waste (Hemenway, 2018a; Hemenway, 2018b; Mollison,2012).

3.1.3. Plants

In order to implement the permaculture approach, we need to know plants as well as soil and water very well. Selection of plants which is suitable for the local climate, using plants from different species that are in a harmonious relationship with each other, taking advantage of the richness created by the edges, the preference of plants that enrich the soil and is multi-functional, such

as cereals and legumes create some of the system logic of Permaculture for a sustainable, healthy and productive land.

By choosing edible and useful plants instead of useless ornamental plants in the field of permaculture design, it aims to be in touch with nature and to create a more productive area specific to natural conditions by making use of it for free.

Diversity: Unlike the monocultural system, planting more than one plant variety together allows us to obtain a higher yield total. However, this variety must be stable, that's why, plant species that cooperate and do not harm each other should be selected.

Creating edges: The borders formed by two different environments reveal the edge effect such as the line where the sea and land meet. Many natural factors such as slopes, soil and climate also create an edge. In the "edge", which has two different ecological structures, the edges are very fertile as the resources of both systems are available.

Cereals and legumes: They add nitrogen and humus to the soil, produce micronutrients, contribute to honey production. They create safe areas for creatures in order be protected from predatory animals (Hemenway, 2018a; Mollison,2012).

3.1.4. Animals

Different animal species help the system to work on its own. Each species has different functions and benefits to the system. Animals plow the soil, "pollinate flowers, scatter seeds, germinate, prune plants, eat pests, dispose of waste, cycle nutrients, provide us with food" (Hemenway, 2018a). A well-organized system works with animals in correct number, correct place and correct time.

Little creatures: Insects, worms and others provide many benefits. Some of them like ladybugs and bees are used for pest control, pollination and removal of weeds.

Poultry: They may do fertilizing, ploughing, mowing, eating scraps and waste, eating insects and slugs, processing compost and garden waste, protecting the garden from strangers (Hemenway, 2018a).

Ovine: They are very useful for milk and meat production and land clearing (Mollison, 2012).

Bovine: If their place in the system is coordinated well (as place, number and time), they enable the land very productive. They are also used for milk, meat, fertilization, plowing.

3.2. Energy

Today, two types of sources are used to meet the energy need: non-renewable energies and renewable energies. Fossil fuels are non-renewable resources. The reserves of these resources are limited and will one day run out (Çukurçayır et al., 2008). Unconscious and excessive use of our energy resources seriously harms the environment. Renewable energy sources are more advantageous than fossil fuels as they are not limited in quantity, cause less harm to the environment and are safe. Permaculture aims to use energy in the most accurate way to ensure the sustainability of the system and to produce and store renewable energies such as solar and wind.

Zone system: Permaculture system divides the land into six zones, from Zone 0 to Zone 5. Zones are created for energy-saving. Zones express the idea of getting more efficiency by consuming less energy. Zone 0 is the place of housing. Zone 1 is the nearest circle around housing and Zone 5 is the last part of the land as the edge between the permaculture land and the nature. Each zones has different functions. While Zone 1 includes perennial, annual, salad grasses, shrubs, insect, bird attractive flowers, plants that increase productivity. For example, if you want to do salad for your breakfast, you should consume the minimum energy to get the salad herbs like four or five steps. So they should be inside Zone 1, which is nearest place of your housing. Zone 2 has fruit trees, plant beds, large shrubs, shrubs, pond, hedgerows. Zone 3 includes field crops and commercial gardens. Zone 4 places at large lands and is a semi-wild and poorly maintained area used for foraging and grazing. As the last part Zone 5 is a wild area and should be found in every garden.

Slice system: In addition to the use of energy in the land, the system should establish a correct relationship with the power coming from outside the land such as wind, sun and water. Slices in the system are sun, view, fire and wild life (Hemenway, 2018a; Mollison, 2012).

Wise use of energy, saving and being in a loop within the system is the correct usage of energy without the need for external energy.

3.3. People and Community

People are active in all stages of a permaculture system, such as gardening, water and energy resources. Besides, they are also significant for social relations

and social system. Permanent sustainability is social, psychological and political issues. People are more dynamic than a garden. So, understanding people and working with them is adaptable to permaculture system. For example, zonning system can be established from sincerity to rarely seen people. They can be divided into sectors; parenting, workplace, personal space etc (Hemenway, 2018b). Permaculture logic can be adapted to social relations and system.

Furthermore, nobody needs to be a gardener or a farmer to implement the permaculture system. However, it is important to form local groups and organizations in order to change all policies and our cities that are contrary to permanent sustainability (Mollison, 2021).

4. Conclusion

We first need to know nature very well in order to apply the permaculture system. The way to do this is to observe the workings of nature well. After that, it is necessary to know the plants, animals, natural elements and climate well. After all, it is necessary to analyze well to what extent all these elements can be used in order to turn them into a self-working system. At this point, it is significant to benefit from observations and use the mind. The rest is a learning process by trial and error method. Permaculture is a system that requires intensive knowledge and a good study until the system can stand on its own feet.

Permaculture is not just about the elements in a system, but the relationships between the elements, So it's a synergistic design. To do this, we must first discover, or in other words list, the natural properties of the items we use. Secondly, we should list the items your basic requirements. On the other hand, we have to calculate the products and outputs of the items. All these are very easy, but the most important thing is to be able to establish the relationship between the elements in the system. When placing an item, we need to place it in a position where other items can also benefit. We must not forget that as a result of improperly designed or unnatural systems, we both do extra work and have to deal with pollution.

Today's ecological and environmental problems arise out of living away from nature and contrasting with nature. In today's unsustainable world, permaculture gives us a new perspective with proven practices in order to change the ecological course of the world. If permaculture perspective is understood

correctly and practised well by individuals, communities, sectors and states, our understanding of life, lifestyle, practices and even our working style will move in a direction that acts in harmony with nature.

Human well-being depends on nature. Talking about well-being without a healthy life is against the workings of nature. For this, we must strive to establish a future that is compatible with ecological conditions and climatic data, such as permaculture, and lives in harmony with nature.

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CHAPTER XXIV

THE IMPORTANCE OF PEDESTRIANIZATION IN URBAN DESIGN: CARK STREET SAMPLE (SAKARYA, TURKEY)

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1. Introduction

Pedestrian movement is an ancient human activity known for its simplicity still occurring naturally through the ages in its original form of walking. Pedestrian movements are considered the most natural reflection of human interaction with the urban environment (Jou, 2011). Today, the need for roads with intense motor vehicle traffic, which has developed with the effect of rapid urbanization, is increasing and this restricts the comfortable movement of urban people in urban public spaces. (Barker, 1968). In order to allow pedestrian mobility and to keep the commercial vitality in the city centers alive, areas that are used extensively by pedestrians in many cities are closed to the use of motor vehicles and turned into pedestrian zones (Özkaynak and Korkmaz, 2019).

Spatial arrangement in cities is done in a vehicle-oriented way, pedestrians are the main factor in the organic growth of cities, and it is difficult for walking people to find a place in this new structure (Halu, 2010). Urban growth also causes rapid change and transformation in central functions. Traffic congestion and environmental pollution in city centers increase in parallel with this change and cause a decrease in the economic, physical and social values of cities (Birol,

2011). Pedestrian areas have numerous benefits in terms of social life, public health, economy and environmental health. For this reason, it is seen as a more rational approach to prefer designs based on pedestrian accessibility when creating urban areas (Asımgil, 2017).

2. Pedestrianization concept

Pedestrianization studies in Europe started in the 1920s and the first pedestrian zone was built in Essen, West Germany, in 1926 (Rubenstein, 1992; Özkaynak and Korkmaz, 2019). Pedestrianization activities were not implemented until World War II, but the arrangement of pedestrian zones in cities that were devastated after the war gained momentum in the zoning process. Depending on the environmental awareness that emerged in the 1980s, the pedestrianization works carried out in the 21st century began to be planned more comprehensively (Özkaynak and Korkmaz, 2019 from Postalcıoğlu, 2009).

Pedestrian zones are urban open spaces equipped with versatile functions, created by closing the area to vehicle traffic at certain times of the day in shopping centers and slowing down motor vehicle traffic in residential areas (Bayraktar et al., 1987).

There are many valid reasons to create a vehicle free zone. The most important reason is accidents caused by vehicles cannot be prevented and many people die in traffic accidents. Transportation systems, where private vehicle use is common, prevent disabled and elderly individuals from socializing. The negative effects of traffic noise and pollution on human and environmental health are known. Preventing noise is a very expensive investment (Yıldız, 2005).

When we look at the examples from the world, pedestrianized streets are implemented in three different ways as full mall, semi mall, and transit mall.

The first of these implementations is full malls are streets that are used as vehicle roads but are later closed to vehicle traffic, renewed and enriched with landscape elements such as urban furniture, trees, sculptures, and fountains, and are completely reserved for pedestrian use. These streets should be able to maintain the city's character and identity visually.

Another pedestrian zone implementation is the semi malls are also closed to existing private vehicles and trucks such as trucks. Only public buses, taxis, and light rail vehicles use these roads jointly with pedestrians. There is a parking ban. The street is uninterruptedly connected with all investments for pedestrians. Walkways are wide and enriched with landscape objects (Yıldırım, 2007).

In the third implementation, transit malls, vehicle traffic and parking have been reduced. By widening the pedestrian paths, the floor coverings have been made walkable, enriched with landscape objects such as trees, urban furniture, and lighting, and have been transformed into a state that strongly reflects the character of the city and has continuity. These roads are positioned in the main streets towards the city's center of attraction (Yıldırım, 2007).

All these practices provide numerous benefits to both cities and the public. The most common benefits of pedestrianization can be divided into five distinct categories: transport, environment, social, economic, and health (Soni, 2016).

2.1. The benefits of pedestrianization in terms of transportation

Investments to increase the use of private vehicles restrict pedestrians' accessibility and mobility (Ravetz, 1980). Therefore, it is necessary to improve the mobility and accessibility of sustainable mode users by banning personal vehicles and other motor vehicles. Safe and entertaining areas developed for personal vehicles cause a decrease in walking and bicycle use (Kodukula, 2006). Establishing pedestrian-friendly spaces allows for a rapid increase in pedestrian traffic (TEST, 1987). A good and safe shopping experience, high air quality, and the tendency of customers to streets with low noise are quite high (Hass-Klau, 1992). This enables the transition to personal vehicles or Non-Motorized transport. The pedestrian success indicator is understood by the number of pedestrians. In the Monheim study (1980), He concluded that the largest increase in pedestrian traffic in the cities studied was in the largest pedestrianization areas. Lots of parking possibilities, wide roads, and possibilities for motor vehicles increase the tendency for personal vehicles pedestrianization reduces automobile dependency by preventing motor vehicle friendly infrastructures. If the place where private cars are parked is less walking distance from the public transport stop, most people use their private vehicles (Knoflacher, 2006).

Urban traffic is a condition in which pedestrians suffer from injuries on a daily basis. The contact and confrontation between pedestrians and cars is the key factor for pedestrian injuries and fatalities. These encounters and disagreements are rendered almost negligible by pedestrianization. This results in decreased traffic accidents involving pedestrians. For elderly pedestrians who barely have enough time to cross safely, intersections are mainly dangerous (Transportation, 1987). In most Indian cities, the majority of individuals rely on

public transport, walking, and Non-Motorized transport (about 60-80 percent). For these sustainable mode users, pedestrianization reclaims public space for the growth of infrastructure. Pedestrianization of an environment thus leads to an increase in LOS (level of service) and the pace of users of this mode. A city center's popularity can not only be seen from the concept of eliminating traffic problems, but from the number of users who benefit from them in a leisure way (Monheim, 1992).

2.2. Social benefits of pedestrianization

If we talk about the social benefits of pedestrianization, pedestrianized streets foster face-to-face social connections and contact that are important to urban life's enthusiasm and excitement. Social encounters and collaboration are facilitated by pedestrian streets by offering a public forum (Gehl, 2011). Greater road flow often has a significant effect on the degree of mutual contact and group connectivity at the neighborhood level (Ross, 1999). It stemmed from studies in San Francisco (Whitelegg, 2002) where less-traffic neighborhoods have more group connections and citizens had more chances to connect and have healthy social experiences in these areas. Walking offers visitors the chance to learn more about the history, customs, climate, heritage and people of the area. It provides a feeling of identity, obligation and pride (Soni, 2016).

Owing to constant efforts in these regions, crime rates are lowered, and residents feel safer and more relaxed in these environments. Quite low chances of crashing make people feel secure, comfortable and able to move freely. Kids, the elderly and the disabled feel secure in such areas. Small children racing into the streets are at considerable risk of a car collision. This apprehension contributed to limits on children under the age of 6 on vehicle roads in Australia (Gehl, 2011).

Pedestrianization systems have been found to be the most successful low-cost and safe way of maintaining heritage in many cities around the world. Pedestrianization shielded historic structures from dangerous vehicular emissions and vibrations. It also tends to reduce the interference of heritage property or parking and other transport development ventures, such as road expansion, flyover building, etc. According to a paper published by the Singapore Urban Regeneration Authority (1998), Singapore's pedestrian streets are examples of one form of restoration that has helped to retain its Indigenous style, features

and buildings of high architectural significance (Soni, 2016). Streets, without a doubt, are a big part of the public domain, that is, areas where citizens communicate with their societies. More appealing, healthy and walkable streets improve group life (Forkenbrock, 2001).

2.3. Environmental benefits of pedestrianization

Another important benefit of pedestrianization is the environmental benefit. Numerous experiments have been undertaken in the United Kingdom and Europe to test the environmental effects of pedestrianization. Most of these findings have indicated that there are several positive environmental effects of pedestrianization. For example, Chiquetto (1997) analyzed the environmental impacts of pedestrianization in Chester (a medium-sized historic city situated in northwest England) with the use of a range of traffic and environmental predictive models. Results have shown that pedestrianization has a number of differences in the degree of environmental impact across different areas of the network, mostly in comparison to different environmental indices. In common terms, pedestrianization has been seen to be beneficial to Chester citizens (Soni, 2016). These benefits are such as air pollution reduction, fuel & land saving, noise reduction, micro-climate improvement, and greenery & plantation.

2.4. Economic benefits of pedestrianization

Researchers have sought to confirm the theory that a healthy physical condition is good to economic environment. They argued that pedestrianization greatly leads to economic improvement and that store turnover is the most important variable to assess this. Sellers in the pedestrian region gained from a remarkable rise in revenue. An OECD (1978) study covering more than 100 pedestrian cities around the world, showed that turnover in city centers grew in 49 per cent of cities and stayed steady in 25 per cent. Cities in Austria, Germany and Scandinavia have boosted their sales by more than 60 per cent (TEST, 1987).

2.5. Health benefits of pedestrianization

Vehicles release numerous hazardous gasses and dusts such as hydrocarbons, carbon monoxide (CO), nitrogen oxides (NOx), particulate matter, sulfur dioxide (SOx), volatile organic compounds (VOCs), etc. As mentioned in the previous segment, pedestrianization aims to eliminate all these toxins in the environment by restricting the usage of motor cars, thereby helping to strengthen

the lungs and respiratory system. Clean air absorption in respiration contributes to multiple health and protection gains from life-threatening lung diseases. In addition, pedestrianization can provide benefits such as weight balancing and body fat burning, improvement in metabolism and digestion, improvement in nervous and psychological health, cardiovascular and pulmonary fitness (Soni, 2016).

3. Study area

Cark Street is located in Adapazarı which is one of the 16 districts of Sakarya province, located in the northwest of Turkey. Cark Street is located between the coordinates 40° 46′ 38” and 30° 23′ 38”.

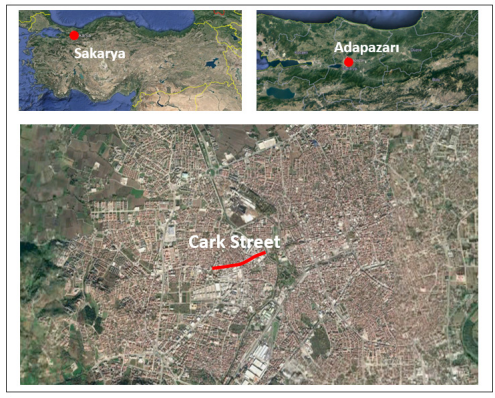


Figure 1. Study area

Cark Street is the most important commercial axis of Sakarya, located 5 km from the D-100 highway, 6.5 km from the E-80 highway and 900 m from the train station. Cark Street was used as a residential area during the Ottoman period, as seen in Figure 2.

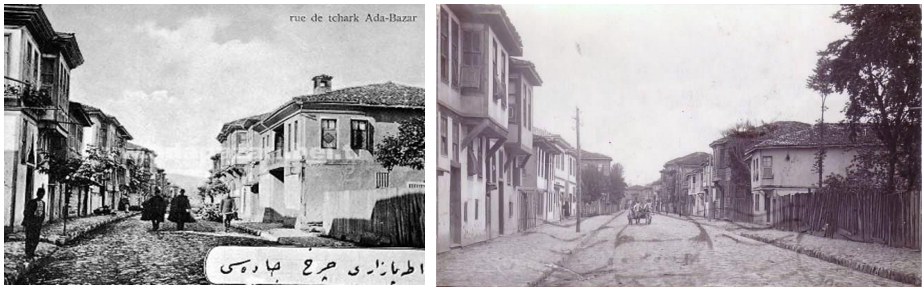


Figure 2. The view of Cark Street in the Ottoman period
(Avazyan, 2018; Sakarya Metropolitan Municipality Archive, 2003)

With the growth of the center, the increase in population and the widening of the street caused the street to turn into a system consisting of commercial and business sites (Figure 3).

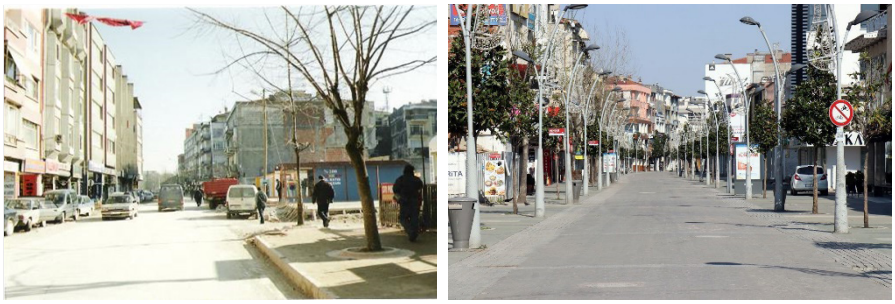


Figure 3. View of Cark Street before and after pedestrianization
(Sakarya Metropolitan Municipality website, 2021)

At the beginning of the 1980s, the construction around Cark Street consisted of two and three-storey buildings, while the zoning rights implemented in the late 1980s increased the floor height up to five floors. The route, which serves in the east-west direction as the central transportation axis of Adapazarı district, was devastated in the 17 August 1999 earthquake.

Sakarya Metropolitan Municipality has carried out pedestrianization works in order to eliminate the social, economic and spatial deterioration that occurred after the earthquake, to regain the vitality of the city center, to reduce vehicle traffic and to provide people with a comfortable shopping center.

4. Pedestrianization process of Cark Street

In order to evaluate the public opinion about the pedestrianization of Cark Street, the use of the pavement and the problems that arise, surveys and interviews with the tradesmen were conducted. 865 people participated in the research conducted on the website of Sakarya Metropolitan Municipality. As a result of the survey, in which opinions were asked about whether Cark Street should be closed to traffic or not, 82 percent of the participants stated that they wanted Cark Street to be closed to traffic. In addition to this general survey, interviews were conducted with 60 tradesmen who continue their commercial activities on the street. However, 80 percent of the tradesmen did not want the street to be closed to traffic because of the thought that it could cause loss of customers (Sakarya Metropolitan Municipality Archive, 2003).

Sakarya Metropolitan Municipality, taking into account the demand of the people throughout the district, agreed to close the Cark Street to traffic and a transportation plan was prepared to manage the existing traffic (Sakarya Metropolitan Municipality Archive, 2003).

As can be seen in Figure 4, which includes today's day and night images, a platform design with a length of 700 m and a width varying between 15-20 m was made as a result of the plan drawings made for the pedestrianization process of the street.



Figure 4: General view of Cark Street
(Sakarya Metropolitan Municipality website, 2021)

Cark Street platform design 5 m wide traffic path was left in the middle for use in emergency situations, 1 m wide bike path from where the emergency road ends and lighting poles were placed on the sides of this axle to ensure night use. (Figure 5). In order to provide comfortable night use, planting was carried out between the electricity poles placed along the street and the buildings, and a total of 185 trees were planted. In the construction work, both pedestrians walk comfortably and climb on their vehicles, steel-reinforced concrete was applied (Sakarya Metropolitan Municipality Archieve, 2003).

4.1. Results of the Pedestrianization Process

As a result of the pedestrianization process, the demand for Cark Street has increased rapidly. After the pedestrianization, the trade volume on the street increased rapidly. There was a serious decrease in traffic accidents in the area where Cark Street is located and in some periods there were no traffic accidents. After the pedestrianization, the buildings on Cark Street were renovated by their owners and their facades were beautified. User's state that this project meets

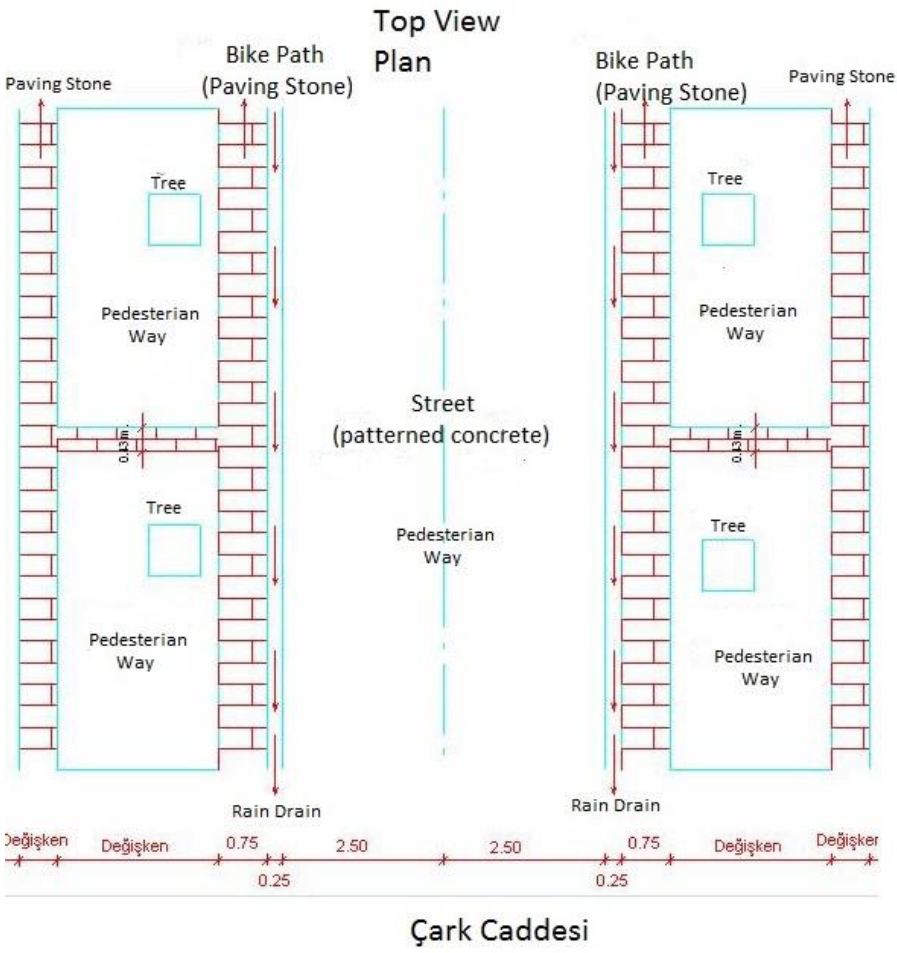


Figure 5. Plan drawings of Cark Street
(Postalcıoğlu, 2009)

their social needs, they are happy to spend time in pedestrian areas and they feel safe.

5. Conclusion

In today's rapid urbanization process, the number of motor vehicles is increasing day by day and this change negatively affects the use of urban space and accessibility. Especially dense commercial areas in city centers are affected by this situation and it is difficult for pedestrians to reach these areas. At this point, pedestrianization emerges as a savior solution for these areas, which are urban trade centers. As it is stated in the text, with the contributions of pedestrianization

in the fields of transportation, environment, social, economic and health, cities will enable people to adapt to globalization processes in a healthier way and to use these areas in a sustainable way.

As can be seen in the examination made in the case of Çark Street, the demand for the street has increased rapidly with the pedestrianization process. With this increase, it was observed that the trade volume on the street increased rapidly. Before the pedestrianization process, while there were traffic accidents in the area where Çark Street was located, it was revealed that there was a serious decrease in these rates after the pedestrianization process and even no traffic accidents were experienced in this region in some periods. The changes that took place after the pedestrianization also affected the owners of the buildings and the buildings on Çark Street were renovated by their owners and their facades were beautified. After the implementation, users stated that this project met their social needs, they were happy to spend time in pedestrian areas and they felt safe in this area. The success of the pedestrianization works in the Cark Street has set an example for the surrounding districts and provinces, and these provinces and districts have carried out pedestrianization studies on the important main streets.

Considering all these results, it can be concluded that pedestrianization reveals the hidden demand on users, benefits all segments in pedestrianized areas and positively affects urban identity.

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CHAPTER XXV

POST-INDUSTRIAL LANDSCAPE IN URBAN SPACES

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1. Introduction

Cities are spaces where societies and individuals gather and socialize, and individuals with all types of social and cultural background, different ethnic groups, and with different traits come together, and the urban spaces play the role of a meeting place for various social classes. Streets, squares, parks, open spaces are spaces of freedom and social-behavioral reconciliation where citizens gather, meet, mingle, express themselves individually and as groups, and create an urban culture. In particular, public spaces have played a significant role in the development of cities (Erdönmez and Akı, 2005). Due to impact of several political and economic dynamics after globalization, the current cities lose their meaning and change with technological advances, changes in social structure and capital (Tekel, 2009). One of the most important roles of public spaces is the urban development for public benefit and especially the creation of healthy urban spaces. The creation of healthy urban spaces means the preservation of a balance between frequently occupied spaces and population density. It is not possible for a city to create the necessary sports, health and education complexes and spaces for recreational activities without an inventory of public spaces. Thus, the public spaces play an important role in solving this problem (Akkar, 1997).

As the cities are shaped by population density, they continue to grow with more momentum than they could sustain. As the urban setting changes, urban spaces also change and become inactive due to certain dynamics. Today, there are unused, deserted urban open spaces due to the above-mentioned problem, and

the number of these spaces has gradually increased due to different factors (Boz, 2016). Unoccupied spaces are ineffective and undefined, empty, scattered, and disconnected spaces in physical and social domains, damaging the relationship between humans and the environment, and public life. Unsafe and unproductive open spaces where the citizens could not conduct socio-cultural activities and establish relationships cause the greatest damage to urban public life (Kayacan et al., 2019). Especially in recent years, studies were conducted to determine and analyze the potential of these spaces for the renewal of economic, ecological and public activities, and alternative planning methods were considered.

In cities, transformation projects are conducted for different purposes and in different dimensions to meet the new requirements due to socio-economic and technological developments. Transformation projects, considered as urban solutions for social, economic and physical problems, could help develop quality landscapes and a sustainable and adequate environment for individuals (Güneroğlu et al., 2019). To reveal the potential of vacant areas, the process should be conducted by architects, city planners and landscape architects, consistent with the existing structures. Thus, these areas that negatively affect urban integration could be described as the undiscovered urban resources and should be recovered with specific urban functions, adopting a multidisciplinary work that would include the above-mentioned professional disciplines and an accurate approach that prioritize public interest (Trancik, 1986). Vacant urban spaces contribute to urban development and improve urban habitability. Based on the needs of the residents, urban gardens could be employed in public or residential buildings. The reclamation of vacant urban areas for public interest would lead to an important opportunity to revitalize public spaces and social communication in the city. Thus, dysfunctional spaces would reconnect with the city and reclaimed by the residents.

2. Reclamation and Conversion of Industrial Areas

Industrialization, which led to significant economic developments around the world, has lost its impetus due to recent development. This period affected the economic and social life, introduced changes in the physical environment, and left its traces in urban spaces and human life. Several industrial facilities, which were established during the industrialization age, lost their functions, and still stand as examples of industrial heritage (Elhan, 2009). Furthermore, due to urban growth, certain facilities on large spaces that were built outside the city

are now inside the city limits. These facilities (such as factories, transportation buildings) with active functions could not improve, leading to negative effects on urban circulation due to their location. On the other hand, the dysfunctional facilities stand vacated and deserted, turn into undesirable spaces, and lead to safety concerns (Kayacan et al., 2019). Over time, these spaces reduced the social and economic quality of the surrounding areas as well as residential quality, turning into unoccupied and deserted spaces (Otaner and Keskin, 2005). Rehabilitation of these spaces, which lead to several environmental risks in or near the cities, and the conversion of these spaces to areas that would contribute to the urban identity became a significant planning problem.

After the industrial revolution, several industrial areas were moved out of urban centers due to zoning changes in urban centers (Otaner and Keskin, 2005). The conversion of the industrial facilities that were moved from urban centers, their integration with urban spaces, the development of these spaces as an alternative to the green space problem in urban centers, the rehabilitation of these areas, which in certain cases are collapsed and include several environmental risks, and their conversion to strengthen the urban identity became a significant planning problem.

Abandoned, dysfunctional, and vacant industrial areas are described as brownfields (De Sousa, 2003). Today, these spaces are rehabilitated with other functions that would serve urban demands. Redevelopment of brownfields could help eliminate ecological and socio-economic problems (Eskidemir et al., 2019). Today, interventions are conducted in brownfields to eliminate the negative effects of environmental pollution caused by their old functions and to preserve these industrial facilities as cultural assets. In practice the potential of brownfield land is often overlooked. Whereas brownfield sites offer substantial opportunities due to their often-high ecological potential (Ling et al., 2007). Planting the brownfields has several advantages for the continuous urban growth. Redevelopment of brownfields that are surrounded by residential areas as green areas would;

- improve the quality of life,
- lead to environmental and social benefits,
- create accessible green spaces, and
- reduce the negative impact of urban heat island (Stubbs, 2008; Bardos et al., 2016; Kristianova et al., 2016).

The rehabilitation of industrial brownfields and reintroduction to urban life, their conversion into open public spaces and new functions are discussed based on certain post-industrial landscapes.

3. Some of The Post-industrial landscape projects

3.1. Landschaftspark Duisburg Nord, Duisburg, Germany

In western Germany, the Ruhr Region was the largest industrial region in Germany and Europe in early 20th century due to rich coal mines, railway connections, and natural water resources (Labelle, 2001). Landschaftspark Duisburg Nord includes vast industrial spaces, factories, gas tanks, coal mills, water towers, blast furnaces, metalworks, turbines, harbors, shipyards and mining operations in the Ruhr region, and was almost completely abandoned in the 1980s. The project aimed to preserve and reclaim the industrial heritage in the Duisburg Nord area by developing an urban park that was integrated with the landscape. In 1990, a large park project was developed with the leadership of landscape architect Peter Latz. The project is a representative of conversion of industrial remains into significant cultural and natural spaces (Elhan, 2009) (Figure 1).

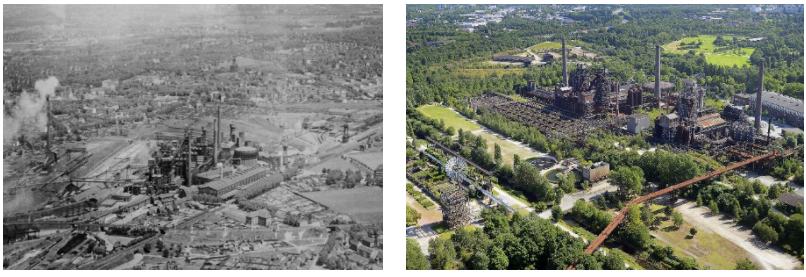


Figure 1. Duisburg Nord Ruhr, Germany 1959 (URL-1) and 2002 (URL-2)

Latz based the project on the existing industrial facilities and infrastructure in the area. The railway network, steel piers, canal system and monumental coal warehouses that linked the design elements were completely preserved, but their functions were altered, and they became the main parts of the design. New walkways and elevated pedestrian bridges were added to the existing ones to allow the occupants to view the space from different altitudes. The channel in the region was utilized as a symbol that reflects the main design idea. The channel, which was previously employed as sewage, was treated and relocated,

and connected to the clearwater waterways and ponds (Figure 2). Environmental improvement was achieved with the above-mentioned ecological work and interventions. In the urban park concept, the area with various functions was converted into an actively occupied habitat as an industrial heritage (Elhan, 2009).



Figure 2. Preserved and refunctioned design elements (URL-3,4,5)

The projects implemented in the area were designed by preserving the holistic texture and selecting adequate functions and implemented to appeal to large audiences (Figure 3).

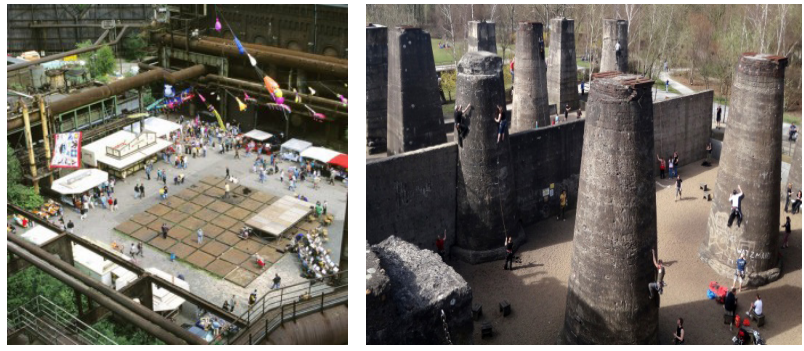





Figure 3. Several funny and cultural activities, (URL-4,5,6,7)

3.2. Parco Dora, Turin, Italy

19 on the banks of the Dora River industrialization, which started at the end of the century, reached its zenith at the beginning of the 20th century with the steel and sheet metal works of Fiat Ferriere Piemontesi and the construction of the Michelin tire factory. With the closure of factories in the 1980s with the decline of the industry, many urban abandoned areas remained in the city centre. An urban renewal program (Programma di Riqualificazione Urbana PRIU) was launched in 1998 to revitalize these abandoned post-industrial areas and give them a new use (URL-8).

Characterized by its industrial past, the park is located by the river Dora. The park has five separate areas with industrial ruins, functional differences and aesthetic effect. Promenades, stairs, ramps and bridges connect different parts of the park and help create one large continuous park. (URL-9). The most important elements are the large hall of the sheet metal works in the centre of the park, the widely visible Michelin cooling towers and the substructure of the ingest laminating works. The towers and the slurry basins now hold clean water. They are part of the stormwater management system that collects rainwater from roofs and surfaces in open rills and channels, and stores it in pools and cisterns. The opened up water course is flanked by walled-in promenades. On the terraces, which have been constructed with excavation material on both sides of the river, hundreds of trees are reminiscent of the grid of the former buildings. Their canopies provide shady spaces for diverse activities, and the tranquil setting creates the perfect backdrop for the “technical ravine” of the freed water course (URL-8) (Figure 4).

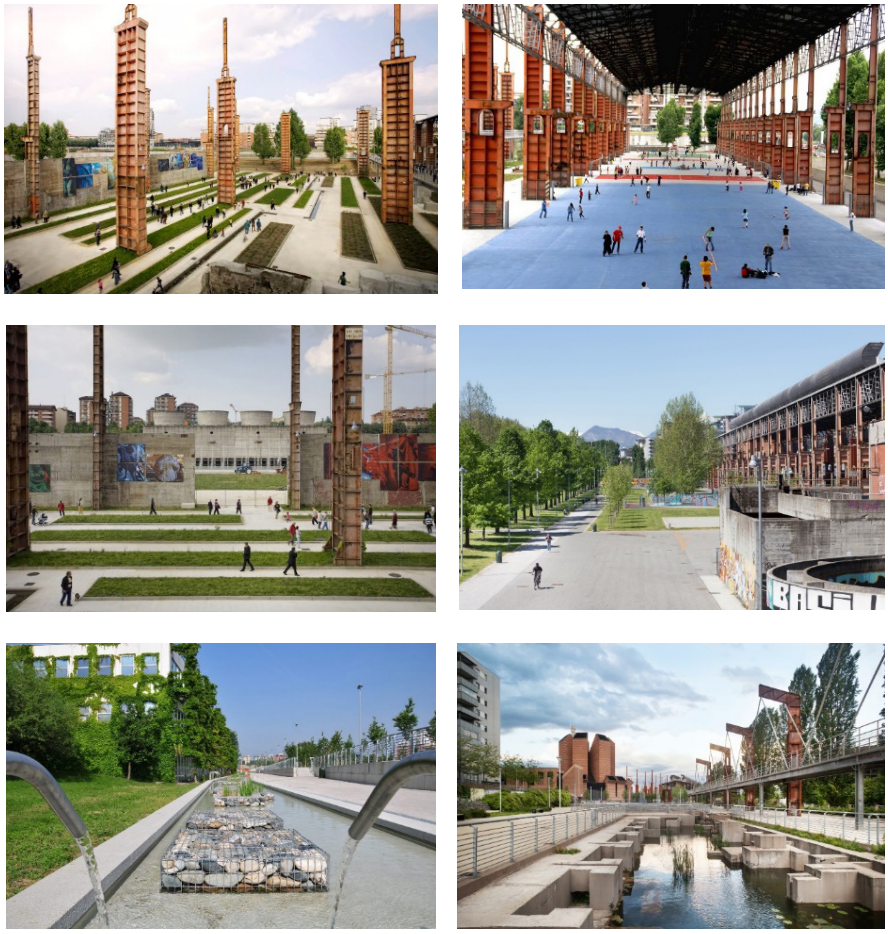


Figure 4. The converted spaces in Parca Dora (URL-9)

3.3. Gas Works Park, Seattle, USA

Gas Works Park in Seattle, Washington is a 19.1-acre (77,000 m2) public park on the site of the former Seattle Gas Light Company gas production plant located on the north shore of the Union Lake at the southern end of the Wallingford neighborhood. Gas Works Park includes the remains of the only remaining coal gas generation plant in the United States. It operated between 1906 and 1956 and was acquired by the Seattle City for conversion into a parkland in 1965 (URL-10) (Figure 5).



Figure 5. Gas Works Park site in 1966 (URL-10)

Opened in 1975, this reclaimed city park is a former coal gasification plant. Today it has become an iconic site for peace rallies, concerts, anti-war protests and a landmark for local cyclists and fireworks events (URL-3) (Figure 6).

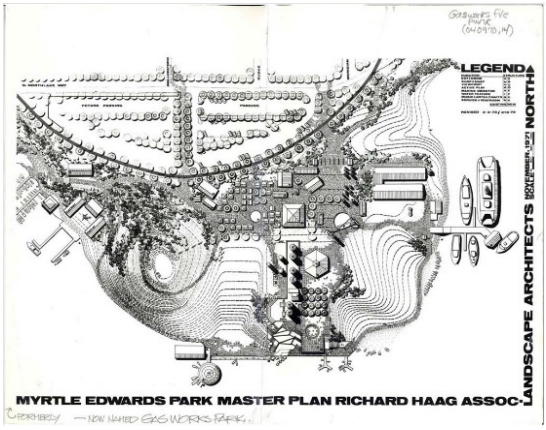


Figure 6. Gas Works Park Master Plan, 1972 (URL-10).

The park's designer, landscape architect Richard Haag, has described his work there as "thinning the forest," a reflection of how he edited the conglomeration of industrial towers, stacks, pipes, and sheds. The park was designed for passive recreational activities such as walk, picnic and various community events. The boiler house at the center of the area has been converted into a picnic shelter with tables and fire grates, while an old extractor-compressor building has been converted into an outdoor playground for children, housing a maze of brightly

painted machines. Concrete train trestles became part of the landscape in park. The six cracking towers underwent treatment, and the Prow, which once served as an oil-loading platform, becoming a gathering space at the tip of the promontory (URL-11) (Figure 7).



Figure 7. The converted areas and activities at Gas Works Park (URL-11,12,13)

Since it was completion, it has received a lot of attention with its design and the inclusion of residual gas plant equipment. Over the last few decades, Gas Works Park has been a successful example of redesigning warehouses, towers and tanks and other recreational areas (URL-12).

3.4. The High Line, New York, USA

The High Line was a railroad built in the 1930s to transport meat to New York's meat processing and packaging district and to serve industrial factories

and warehouses on Manhattan's west side. Built at a level higher than ground, the High Line is a track of approximately two and a half kilometers running through or between buildings (Figure 8). The traffic on the line, which was very busy when it was built, decreased in the 1970s. After the last freight service in 1980, the High Line was abandoned. After the transportation services ended, the High Line became a linear corridor, high above the ground, where garbage accumulated (Friend of The High Line, 2013).



Figure 8. High Line, 1937 (URL-14)

It stood for several decades as a characteristic piece of abandoned industrial infrastructure, such as has increasingly come to litter the American urban landscape (URL-14). The old structure with urban traces was redefined and converted into an urban corridor by the efforts of the city administration and the non-profit organization Friends of the High Line. The first section of Landscape architecture firm James Corner Field Operations; design studio Diller Scofidio + Renfro; and planting designer Piet Oudolf were selected as the team to transform the High Line. High Line was completed in 2009, and the second and third sections were opened to the public between 2012 and 2014 (URL-15) (Figure 9).

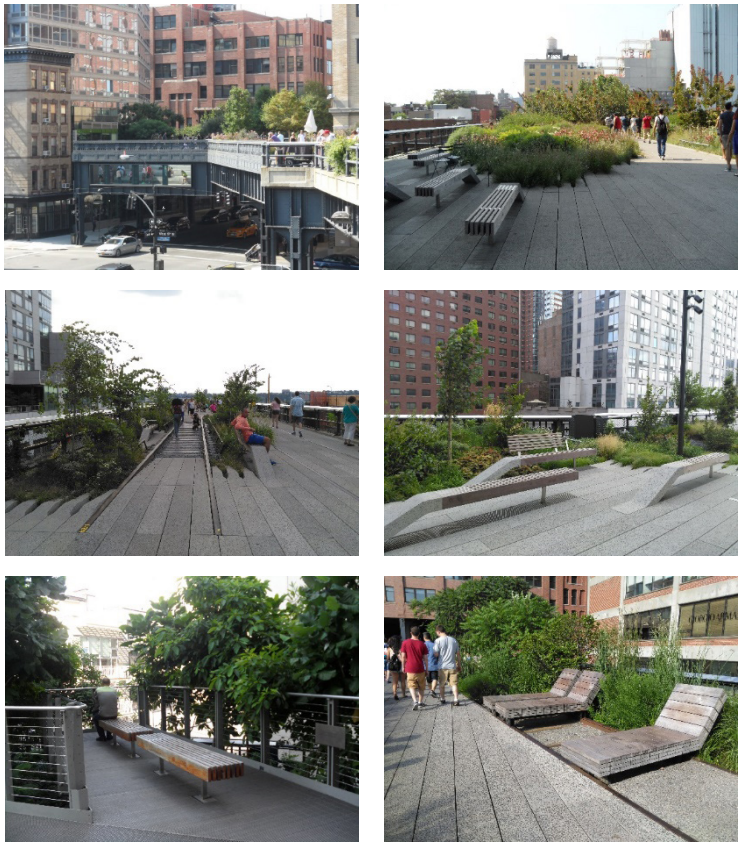


Figure 9. The High Line, 2015

The conversion of an abandoned railway into the "High Line" started with nature. Since its function, which was different from the previous one, created an important gap for natural growth, inviting bees and birds after the precursor plants were spontaneously seeded between the tracks. Thus, a natural environment was formed with flora and fauna (Friends of The High Line, 2013) (Figure 10).



Figure 10. The self-seeded landscape (URL-15)

The High Line landscape was designed by the Dutch designer Piet Oudolf. By preserving the existing vegetation, a natural composition that included indigenous plants and low irrigation, drought resistant and low maintenance species adequate for the climate (Friends of The High Line, 2013) (Figure 11). The High Line Project in Manhattan is a successful renovation/reoccupation project that converted an abandoned elevated railroad into a park.



Figure 11. Natural planting design in High Line

4. Conclusion

It is important to develop safer spaces through redefinition and conversion of undefined and vacant urban spaces as public spaces to improve the quality of urban life. In particular, industrial areas that preserve the history and transfer

the traces of the past to the present should be considered as cultural heritage. It is possible to maintain the original quality of these urban spaces or to develop new urban spaces with an approach that respects the past. In the rehabilitation of these spaces should consider urban requirements or complement the existing functions. The urban requirements and those of the residents should be analyzed, and public demands should be taken into account. The conversion conducted with the participation of the residents would also allow the production of sustainable and flexible solutions. Rehabilitation of unoccupied industrial buildings and urban spaces would eliminate environmental problems, improve the environment and quality of life, and would also provide for the social needs of the public such as recreational activities.

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CHAPTER XXVI

A DIFFERENT APPROACH POLLINATOR GARDEN

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1. INTRODUCTION

1.1. What is Pollination?

Pollination has evolved over millions of years and has benefited both flowering plants and pollinators. One of every food we eat depends on pollination. In order to ensure the continuation of the generations of plant species, first pollination and then fertilization take place (Sıralı and Cinbirtoğlu, 2018). Pollination in plants is an important step for the formation of viable seeds that can develop and turn into a new organism (Kesdek, 2012).

Pollination, which is a very important process in the fruit and seed production of the plant (Yılmaz, 2016), is the process of transporting the pollen from the male organs of the flower to the female organs. Pollen from a flower's anthers (male part of the plant) rubs off or falls on a pollinator. Pollinators then take this pollen to the next flower, where the pollen adheres to the stigma (female part). In this way, pollen sticks to the stigma, descends from the stigma to the ovary and fertilization takes place (Buchmann and Nabhan, 1996). The fertilized flower then produces fruit and seeds. This process is served by many insects and other animals seeking pollen, nectar, and plant food. Pollination is vital to the sustainability of ecosystems and human communities (UNEP, 2010). The preservation of the ecosystem balance depends on the sustainability of the relationship between plants and pollinator insects that provide their pollination. In this regard, pollinator insects are a key component of global biodiversity (Potts et al., 2010).

1.2. Heroes of Pollination

Wind, water, humans, bees, butterflies, insects, birds and bats, known as pollinators, make very important contributions to the continuation of life on

earth. Among these pollinators, the most effective ones are bees, butterflies and insects, since their targets are plants directly (Sıralı and Cinbirtoğlu, 2018). Insects collecting nectar and pollen from plants and plants pollinated by insects provide mutual benefits and both has developed together millions of years ago (Korkmaz, 2016). The co-development of insects and plants has been important for both groups for more than 100 million years (Evert and Eichborn, 2015). Pollination is vital to a strong ecosystem. It is one of the most complex ecological relationships in the world. For the continuity of the ecosystem balance, the relationship between the plants and the pollinators that provide their pollination must be sustainable. In this respect, pollinators are the most important heroes of global biodiversity (Bağrıaçık, 2017).

75% of its plants need insects for pollination. Studies have shown the importance of pollinator insects in increasing product yield and quality (Klein et al., 2007). The products obtained as a result of pollination by pollinators, especially bees, produce approximately 35% of human food (Sıralı and Cinbirtoğlu, 2018). If pollination does not occur, it is possible to see a decrease in plant production. However, without the work of pollinators, many native plants cannot produce seeds for future generations. Seeds and often accompanying fruits constitute important food sources for approximately 25% of pollinators (Krischik et al., 2015).

1.3. Habitats of Pollinators

Urban sprawl is recognized as one of the main threats to global biodiversity (Seto et al., 2012). Urbanization has adversely affected many species, including birds and plants (Baldock, 2020). Human activities can ruin the pollinator's habitat and disconnect from where the pollinator lives and gathers food. Attention is drawn to the decline in pollinator species diversity and the narrowing of the range of many species in Europe and North America. Actions to support pollinators and their habitats are becoming increasingly important. The use of agrochemicals threatens pollinators from multiple interrelated factors such as the spread of pathogens, changing climate, habitat loss, degradation and fragmentation (Bellamy et al., 2017).

1.4. Pollination Time

It requires year-round effort for successful pollination. The plants have evolved with different flowering times, which reduces competition among pollinators.

Continuously blooming flowers throughout the growing season provide pollinators with a constant source of nutrients.

Spring: Pollinators need early blooming plants to provide food after hibernation or migrations. During this time corms, spring ephemerals and spring blooming fruit trees are visited.

Summer: Our gardens reach peak bloom when many pollinators reach different populations. The long days of summer also provide maximum time for pollinators to seek nectar.

Autumn: Late blooming plants provide essential fuel to many pollinators before hibernation or for migration of pollinators such as monarchs and hummingbirds.

Winter: It may seem like there is no activity, but the pollinators are in the garden. Rotting plants may harbor insects that pollinate during the winter (Pollinator Garden at the National Museum of Natural History, 2013).

1.4. Ecological and Economic Importance of Pollinator Insects

Pollinators are vital because most vegetable, fruit, seed crops are pollinated by animals. Pollinators are a very important contribution to the continuation of life on earth (McGregor, 1976). Among the pollinators, especially bees are necessary for the survival of approximately 85% of all plants on earth. The annual economic contribution of bees, which has economic as well as ecological importance, is around 15 billion dollars, which does not include honey production, calculated by the American Department of Agriculture (Özbilgin, 1999).

In addition to the fact that plant species in the world need pollinators, it has been determined that 90% of human food worldwide is obtained from 82 plant species and 77% of them, that is, 63 species, are pollinated by the bees (Delaplane and Mayer, 2000).

Plants obtained as a result of pollination by pollinators constitute approximately 35% of human food (Buchmann and Nabhan, 1996). 1/3 of human food consists of plants that need pollinators directly or indirectly. Accordingly, when there is no pollination, there is a 30% decrease in plant production (Karadeniz, 2012).

The global economic value of wild and managed pollination services was US$215 billion in 2005. Calculated as the increase in crop production attributable to insect pollination, it represented 9.5% of the global food production value.

Globally, insects supply pollination services to approximately 75% of crop species, worth US$215 billion in 2005. It allows the reproduction of up to 94% of wild flowering plants (Vanbergen, 2013).

Honey bees contribute to the economy through pollination about 10-15 times more than honey and beeswax in Turkey, and this contributes 1.6-2.4 billion TL to our country's economy (Genç and Dodoloğlu, 2002).

Pollination is an important process in the sexual reproduction of angiosperm species, and more than 260,000 of them (88%) require animals for pollen transfer. In return, about 300,000 animal species visit the angiosperm flowers with their pollen and nectar rewards. Pollination mediated by animals also provides an important ecosystem service to society. About 70% of major crop species worldwide depend in part on animal pollination for efficient production, and account for 35% of global food production (González-Varove et al., 2013).

Pollinators are vital components of urban ecosystems. It supports the functioning and resilience of ecologically fragile and fragmented areas of urban green spaces by contributing to pollination, biodiversity and pest control. Pollinators, their interaction with flowers, provide a wide variety of direct and indirect benefits to people in cities. At the same time, it provides cultural and health benefits to society by providing interaction opportunities (Bellamy et al., 2017).

2. THE BASIC CAUSES OF THE POLLINATION CRISIS

Animal pollination is important to populations of many plant species and its global value for agriculture is estimated at US$235-577 billion (Baldock, 2020). Decreases have been reported for many pollinator groups, including bees, flies, and butterflies (Bartomeus et al., 2013). There is no single cause of pollinator declines. Land use intensification (and its accompanying effects) and diseases cause pollinator losses. Globalization and climate change may extend these effects to developing regions and increase the displacement of plants, pollinators, pathogens and pests worldwide (Figure 1) (Vanbergen, 2013). Pollinators have threats and opportunities for urban areas (Baldock, 2020). (https://doi.org/10.1890/120126)

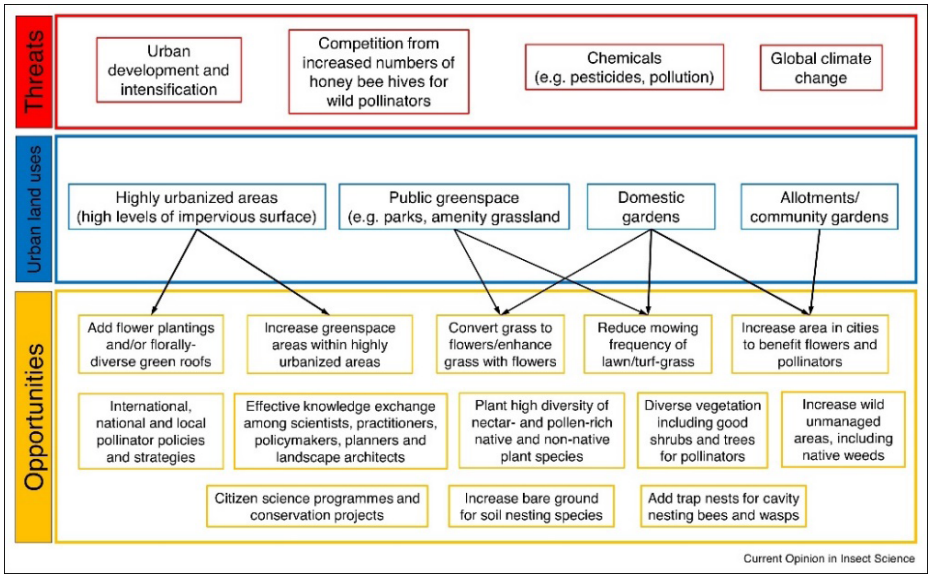


Figure 1: Threats to pollinators in urban areas (red boxes) and opportunities for pollinators to improve urban landscapes (yellow boxes). Arrows indicate which opportunities apply to which urban land uses, and opportunities without connecting arrows apply to all urban land uses (Baldock, 2020).

2.1. Effect of Insecticides

Insecticides, i.e. insecticidal chemicals, directly affect pollinators. Especially in agricultural lands, pesticides applied against agricultural pests cause the extinction of pollinators. The lethal effect of insecticides causes the extinction of the pollinator population. The sublethal (continuous low dose effect) effect of insecticides causes the extinction of pollinators over time and a decrease in efficiency in the functions of pollinators (Tirado et al., 2013).

2.2. Habitat Loss

Urbanization and increased agricultural intensification have destroyed many natural habitats that pollinators rely on for forage and nesting resources and have contributed to the decline of bee species (Ayers and Rehan, 2021). Many factors such as intense salinization, soil erosion, expansion of irrigation networks in the steppes, structuring of grasslands, forest fires, overgrazing, industrial and agricultural wastes, urban construction, and landscaping cause the change and destruction of natural habitats. Nests and mating areas of pollinator insects disappear, their life cycles change, population density and size decrease.

Therefore, especially natural flowering plants are directly affected by this situation (Aguilar et al., 2006).

2.3. The Impact of Industrial Agriculture

Agricultural areas, which constitute the largest ecosystems, constitute 35% of the earth's surface. In the last century, industrialization in agriculture has developed very rapidly, chemicals have been used in agriculture in large quantities, monoculture products have been preferred, and agricultural areas have been expanded. Extraordinarily harmful effects on agriculture, the environment and pollinators have been begun to be observed. The formation of industrial monoculture plants limits biodiversity, and irrigation, disappearance of wooded areas, and removal of nesting places of insects cause the extinction of plants and pollinators together. (Tirado et al., 2013).

2.4. Climate Change

Depending on the global climate change, changes in the amount of precipitation, increase in temperature, and constantly changing weather conditions have negative effects on pollinator populations. Plant and pollinator ranges are changing, causing changes in pollinator populations living at the margins of the climatic distribution of their species. Thus, it becomes more important against population declines and even extinction as a result of climate change (Vanbergen, 2013). Climate change can alter the synchronization between plant flowering and pollinator flight periods (Burkle et al., 2013). Factors such as changes in the distribution of pollinators and plants in geographical regions and changes in population genetics prevent the relationship between plant and pollinator. These changes cause the individual or collective extinction of pollinators (Vanbergen, 2013).

2.5. Measures to Protect Pollinators

Conservation measures in urban areas aimed at minimizing pollinator declines largely include increasing and maintaining green spaces throughout the urban area. It should adequately provide quality resources for a large number of pollinators, which may differ in resources depending on the field type (vegetation), and the needs of pollinators should be considered (Howes et al., 2017).

Humans have a significant influence on the choice of plant species, which are decisions that have aesthetic value. Conservation of green spaces not only benefits pollinators, but positive human health benefits have also been associated with the presence of green spaces. It is known that green areas are positively related to health factors, and that green areas have positive effects on physical activity and mental health. Green spaces such as city gardens can reconnect individuals with nature and enable the community to participate in green spaces with conservation goals (Sağlık et al., 2016a; Sağlık et al., 2016b; Ayers & Rehan, 2021).

Improving the choice of plant and seed mix placed in green areas also improves habitat quality. Mixtures of herbs and seeds applied in urban settings can attract pollinators. However, the types of plants included in such mixtures are also important. The inclusion of certain plant species can increase pollinator visits between habitats (Pawelek et al., 2007).

Parks, playgrounds, urban areas are managed by lawn mowers which cause the loss of most of the flowers. By reducing the frequency of mowing, or planting flowers, flower supplies in public green spaces can be increased. Some studies have shown that more frequent mowing is associated with less abundant pollinators in Germany. More and a variety of flowers should be planted to increase flower resources in green areas. Urban flower "meadow" planting areas have become more popular in England and other European cities. When planted to suitable green spaces, these plantings can greatly increase their flower supply. Small-scale and large-scale plantings also benefit pollinators (Ayers and Rehan, 2021).

In the last two decades, the decline of pollinators has become to be concerned increasingly. There has been increased interest in taking action to protect pollinators. Many local conservation projects have been developed to improve pollinator habitat in North American and European countries. It aims to create habitat in conjunction with conservation activities, independent projects of community groups, or national campaigns. For example, the Royal Horticultural Society's annual 'Bloom in Bloom' competition in the UK promotes wildlife-friendly horticultural initiatives. To benefit pollinators, the "Million Pollinator Garden Challenge" has enabled more than one million garden owners across the US to conserve and create the landscape network (Baldock, 2020).

Concerns about pollinator decline in the late 1990s were discussed under the United Nations Convention on Biological Diversity (CBD) program

'Conservation and Sustainable Use of Agricultural Biodiversity'. It allowed the development of national strategies, including the Welsh Government Action Plan, as well as regional pollinator initiatives. A global report on 'Pollinators, pollination and food production' was published by the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES) in 2016. Within this report, there are specific recommendations on pollinator protection in urban areas, including residential gardens and public green spaces. Some countries have created new laws to protect pollinators. For example, 110 new laws on pollinator protection passed by the US state between 2000 and 2017 were identified. However, it has been noted that effective pollinator protection requires policies at the national and international level that include monitoring programs to assess changes over time. In areas undergoing urban renewal, it will be important to consider how features that benefit pollinators can be incorporated into changes in the landscape (Baldock, 2020).

2.6. What Is Garden?

The garden is the open space outside the building and belonging to its immediate surroundings created with various types of grass, ground cover plants, flowers, shrubs, deciduous or evergreen trees, ornamental plants or natural vegetation, that meets the nature and basic needs of people, where ecological criteria are taken into account, the interaction of plants with each other is examined, and where the continuity of the ecosystem is ensured without disturbing the structure of nature while designing aesthetics according to family structure, wishes and usage habits, where many factors, local, regional and national dimensions are taken into account, as well as considering the flora-fauna relationship. (Şevik et. al., 2014; Yerli and Kaya, 2017; Turgay et. al., 2018).

2.7. Pollinator Garden

A pollinator garden is a pollination production facility that attracts insect pollination known as nectar and pollen, specially planted and designed. For a garden to be considered a pollinator garden, various nectar producing flowers and plants, shelters for pollinators must be provided. In addition, the use of pesticides should be avoided for insects that will provide pollination (Özdemir and Ulus, 2018).

3. EXAMPLES FROM THE WORLD

3.1. Plains Art Museum – Fargo

Environmental artist Cristine Baeumlar has designed a pollinator garden in downtown Fargo to help sustain populations of bee, butterfly and hummingbird species. The pollinator garden was developed in collaboration with museum staff, other artists such as Melissa Kossick, business people, gardeners, ecologists, landscape architects and youth. Baeumler's Pollinator Garden includes a cistern to capture rainwater, and areas that attract people and the pollinators that are challenging the declining numbers of pollinators critical to food sources (Figure 2) (Gardens and Folk Art, 2013).



Figure 2. Plains Art Museum (Gardens and Folk Art, 2013)

It has created an exemplary learning space that engages youth in learning, teaching, creating, maintaining and advocating for the livelihoods of pollinators in a healthy ecosystem (Gardens and Folk Art, 2013).

3.2. Pollinator Park of The European Commission – Vincent Callebaut Architectures

Designed as a wake-up call to humanity to restore its broken link with nature, the project aimed to protect ecosystems to stop the decline of pollinators such as bees, butterflies and hummingbirds. (Gardens and Folk Art)

The main motif of "Pollinator Park", designed for the European commission, is the tribute to nature; its organic design is directly bio-inspired by pollination, the sexual reproduction method of plants. Its structure is poetically quoted from that of a blooming flower. The central park of the project symbolizes the female organs of a plant and merges with all the exhibition areas (Figure 3).



Figure 3. Pollinator Park (Vincent Callebaut Architectures, 2021)

In terms of landscape, botanical greenhouses for display and agricultural production are protected by a large perianth. It consists of a 5-leaf calyx around Central Park and a 5-leaf corolla around Farmlands. Pollinator Park's organic architecture offers a unique visitor experience by animating how biomorphic architecture and green nature create ecosystems. In every setting, pollinator hotels are integrated into playful architecture (Figure 4) (Vincent Callebaut Architectures, 2021).

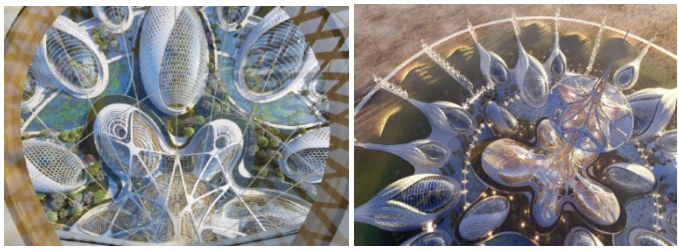


Figure 4. Pollinator Park (Vincent Callebaut Architectures, 2021)

In addition to circular economy and renewable energy, all greenhouses are designed from cross-laminated wood and recycled or recyclable bio-sourced materials, and frames distributed as efficient loops and short circuits (Figure 5) (Vincent Callebaut Architectures, 2021).



Figure 5. Pollinator Park (Vincent Callebaut Architectures, 2021)

In this biomimetic oasis inspired by the shapes, structures and feedback loops of natural ecosystems, the scenario experience focuses on the relationship between pollinators and food production. This gripping scenario aims to sensitize and poetically move old and young, to better teach them how to protect their natural fauna and flora heritage and therefore their health (Vincent Callebaut Architectures, 2021).

3.3. Trabzon Eco-Park Bee Otel

In order to raise awareness and contribute to our country both economically and ecologically on this issue, which is not yet known and whose importance is not understood enough for our country, a special garden consisting of special species in the project area, which will provide food and shelter to pollinator species with their pollen and nectar ratios; in addition, a bee hotel, which is especially suitable for the wintering of bees, and which can be found in the city parks of the world's major cities, has been designed (Figure 6).



Figure 6. Trabzon Eco-Park Bee Otel
(Ecopark Landscape Application Project, 2016).

The garden and hotel in question do not pose any problems in terms of user safety. First of all, the garden in question is not a bee farm, but a natural biotope modeling where bees and butterflies roam the plants as we see them in nature (Ekopark Landscape Application Project, 2016).

3.4. Example of Roof Pollination Garden (United States)

Increasing biodiversity in urban areas also increases the quality of life of people living in these areas (Savard et al., 2000; Korkmaz, 2016).

The fact that pollination gardens are designed together with many garden types allows urban areas to be transformed into pollination gardens. The landscaped gardens support biodiversity and enable pollinators to maintain their lives in urban habitats more easily. Thanks to these gardens, the visual quality of the city will be increased, and observation and photography opportunities will be created for the residents of the city. (Figure 7) (Ulus and Özdemir, 2018).



Figure 7. Example of Roof Pollination Garden (United States)
(Roof Pollinator Garden, 2017)

4. ELEMENTS TO CONSIDER IN POLLINATION GARDENS

4.1. Field Properties

When choosing the area of the pollination garden, attention should be paid to the sun exposure. Because pollinators are cold-blooded, pollination gardens should be placed in a sunny area and should receive at least 6-8 hours of sunlight per day (Landis et al., 2014). South and southeast directions are ideal for this. Intense windy areas should also not be preferred. Because wind limits the flying ability of pollinators. The wind affects the flight of the bee and prevents flower visits. Wind barriers or fences can be used for such areas (Ulus and Özdemir, 2018).

For the shelter needs of pollinators, piles of dry branches, stumps, dead trees or pollinator hotels can be located in the garden. Urban areas, home gardens, mass housing gardens, parks, school gardens, roof and terrace gardens, roadside, bevel and intersection areas can be preferred for the establishment of pollination garden (Ulus and Özdemir, 2018).

4.2. Plant Selection

Pollinators pollinate and evolve with native plants that are well adapted to seasonal, climatic and soil factors. The native plants of the region have adapted to the climate, soil and geography. They become more resistant to harsh climatic conditions, thirst, diseases and pests, and unnatural plants. When planning, considering the natural species in and around the area, species that grow together efficiently and that have the potential to attract the attention of pollinators should be preferred (Ulus and Özdemir, 2018).

Different pollinators are active at different times of the year. Therefore, it is necessary to provide a source of nectar and pollen throughout the season. Plants emerging at the beginning of spring provide feeding opportunities to developing pollinators. Plants in the fall season are important to support pollinators during the winter months. Arrangements to be made should be planned by ensuring continuity in the flowering periods of all plants in the garden. Plants with different flower shapes, colors and scents attract pollinators to the garden (Ulus and Özdemir, 2018).

4.3. Water Resources

Insect pollinators need water for hydration as well as a source of dissolved minerals. Some pollinators, such as a few Osmia spp., need water for the mud structures they make to raise their larvae (Landis et al., 2014).

It is important that pollinators are close to water sources, especially during the spring and summer periods when they are most active. If it is not close to water sources, artificial water sources should be created in the gardens. A shallow water source, bird pond or muddy pond to be placed in the garden will provide a source of water to many pollinators, including butterflies (Figure 8) (Ulus and Özdemir, 2018).



Figure 8. Oxford Bee Garden (Ulus and Özdemir, 2018).

4.4. Insecticide Use

Insecticides, insecticidal chemicals, pollinators directly affect insects. Especially in agricultural lands, pesticides applied against weeds are also effective in the extinction of pollinating insects (Bağrıaçık, 2017).

These drugs can be in the form of directly killing pollinators or influencing their behavior and life span (Ellsworth, D., 2014).

Protecting the pollinating garden from insecticides and other practices harmful to pollinators is critical. It is crucial to prefer biological control instead of spraying (Ulus and Özdemir, 2018).

If pesticides are required, pesticides should not be used during the flowering period of the plant, and the pollinators should be less damaged by applying in the pre- or post-flowering periods when the pollinators are less active (Ulus and Özdemir, 2018).

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CHAPTER XXVII

THE 'METHOD' APPROACH FOR ACADEMIC STUDIES IN THE LANDSCAPE ARCHITECTURE DISCIPLINE

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1. Introduction

When looking for an answer to the question of "what is the discipline of Landscape Architecture", first of all, it is necessary to evaluate and learn the landscape phenomenon. Turkish Language Association Contemporary Turkish Dictionary (TDK) (2021) stated that the concept of landscape is of French origin and made two different definitions. According to this definition, the first meaning was "the picture of the countryside" and the second meaning was "the natural appearance of a place".

When asked what the landscape is, many people think of the backyard in mind. However, it would be more correct to look out the front door (Waterman, 2012). Landscape is a concept and is wherever there is open space. The landscape is a whole structured according to its own composition rules and constitutes the symbolic scheme of our close contact with nature. The birth of the landscape was dated to 1415 (Cauqelin, 2016). His presentation of his own general structure as a perspective in order to realize a special articulation between image and reality has been the result of rhetorical evaluation in the concept of landscape. The emerging perspective states that artificial elements are carried over natural elements (Cauqelin, 2016). Landscape architects perform the placement of artificial elements on natural elements. Landscape architects are professionals, artists and scientists who shape the earth or the environment in cities, towns, rural areas, everyday spaces, scientific and historical places (Waterman, 2012).

An important name plays an important role in the process of combining the concept of landscape with the concept of architect. Frederick Law Olmsted is the first person to use the title of "landscape architect" (Figure 1) (Gültekin, 1988; Maumi, 2020). Olmsted introduced his romantic nature, using the title of "landscape architect", with his landscaping works by combining his writing and drawing power (Gültekin, 1988).

The plans prepared for Central Park in 1858 by Frederick Law Olmsted and his partner architect Calvert Vaux were accepted and won the design competition. In this process, there is no landscape architecture profession in the United States yet (Brown, 2002). In a letter he wrote to his friend, he stated "If a fairy had shaped (my career), it could not have fitted me better" for the title of landscape architect (Izzo, 2007). Olmsted enabled the concept of landscape to enter the terminology as the view between buildings (Jorgensen, 2016).

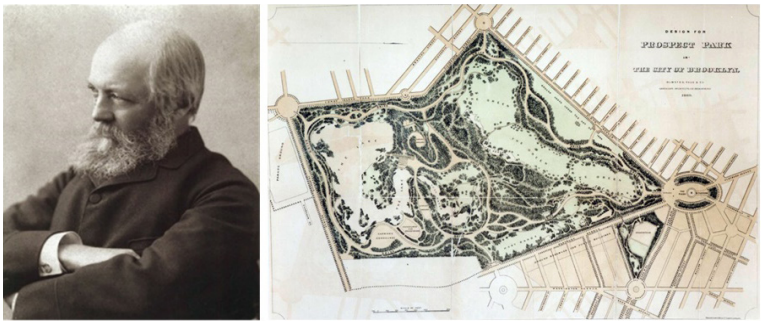


Figure 1. Frederick Law Olmsted; Landscape Architect, Author, Conservationist (1822–1903) (Url 1); Central Park Project (Url 2).

Olmsted defined the mission of landscape architecture in designing the view between the buildings as, above all, providing human-oriented socialization and improvement (Maumi, 2020). Landscape architects, who play an important role in producing sustainable solutions for current problems for the world that is deteriorating, damaged and polluted day by day in the century we live in, are broad thinkers who take strength from the big picture created by the discipline (Çakır, 2016; Waterman, 2012).

It was Olmsted's efforts that brought the profession of Landscape Architecture to a more serious dimension with the wide scope it brought and created the need for special education. From the 1850s until 1895, Olmsted's office served as a school for those who would practice this profession.

Landscape education was institutionalized in 1909 with the establishment of the Department of Landscape Architecture and Urban Planning within the Harvard University School of Architecture (Evyapan, 1993). At the beginning of the 20th century, Landscape Architecture developed as a profession in the USA under the leadership of Olmsted, while simultaneously some developments were observed in Europe and other parts of the world (Gültekin, 1988). The development of the profession in the historical process has been as shown in Figure 2. Landscape architecture, which moved away from traditionality in the 1920s and after, has been influenced by modern art movements today. Modernism in landscape design; it was influenced by modernist ideas and practices in architecture, urbanism and painting, but it also managed to preserve its characteristic structure (Sağlık et al., 2016).

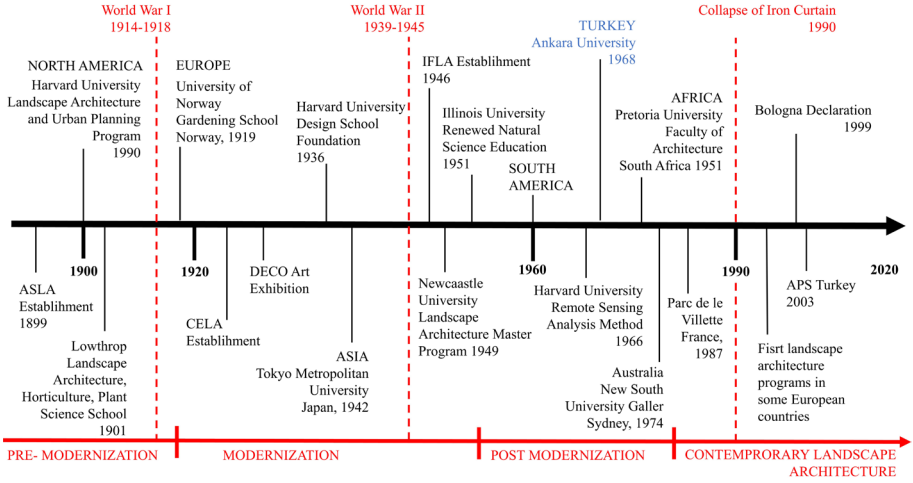


Figure 2. The development of the landscape architecture profession in the historical process (Güzel and Erdem Kaya, 2020).

Landscape architecture provides the best arrangement of land, water, plant forms and structures. While making this arrangement, it works together with various professional disciplines such as architecture, engineering, art and botany as it is a contextual discipline (Jorsengen, 2016; Lohmann, 1963). Frederick Law Olmsted Jr. emphasized that cities are affected by many parameters and said that unexpected problems can grow like an avalanche in plans made without taking these into account. For this reason, he opposed the plans to be made by a single unit and advocated that many groups effective on a region should carry out the plan work together (Brown, 2002).

In the professional discipline of landscape architecture, social, cultural, environmental and historical factors constitute the multi-layered manifesto. With this manifesto approach, it is ensured that the balance is maintained by constantly evaluating both the details and the general appearance (Waterman, 2012).

The spatial solutions it creates while maintaining the balance are formed by the combination of art and science. The concept of art, defined by TDK (2021), as "all of the methods used in the expression of a feeling, design, beauty and the like, or the superior creativity resulting from this expression" is an important component in the landscape architecture profession. In landscape architecture, representations are provided through drawings, models, digital images and texts. Basic design elements such as line, color, texture, size and form are used in the formation of these representations. These elements create communication between the designer and the user in the landscape architecture discipline. There is a dynamic process in the delivery of the landscape design product, which is read or evaluated through communication, to the user. In this process, the landscape architect starts the design process by determining the needs and requirements determined by the user, the characteristics of the area to be designed, and the function expected from the area. These steps, which direct the process of reaching the design from the idea, are the basic method approaches followed in the preparation of the landscape design project. Determining the success of the landscape project is possible by observing and reading the user's preference for that area in his daily life.

The basic element in the landscape architecture discipline is the concept of landscape, the change of the concept over time is graphed by Antrop (2013) as shown in Figure 3.

The discipline of landscape architecture encompasses diversity and everything that turns the world, and in this context, it is a suitable career field for natural leaders who can use their extensive knowledge to manage large projects, introduce new approaches to the discipline, and train qualified individuals to practice this profession. Every step that constitutes the anatomy of the landscape design project in this field is transferred to the professional practitioners of the future by the academician.

In time, an academic platform where knowledge and experiences are shared has been needed for the promotion and definition of the profession. In this direction, the "Journal of Landscape Architecture", which was initiated by

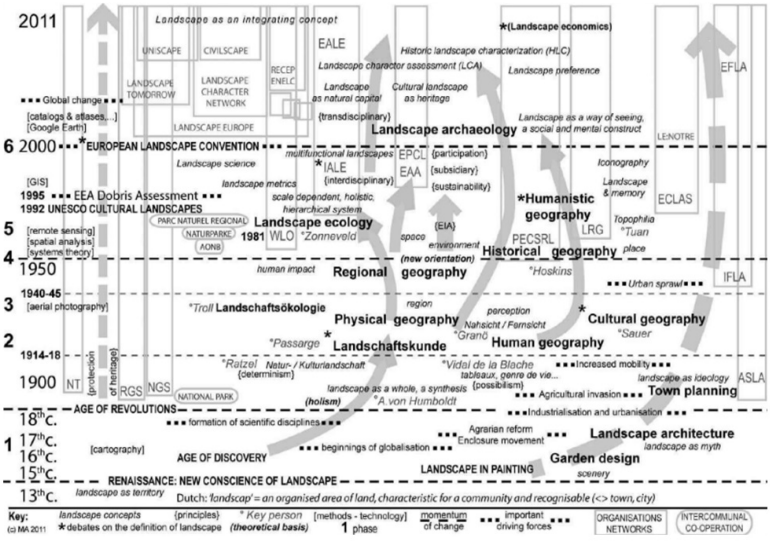


Figure 3. The development of concepts that guide landscape research.

three architects who graduated from the Department of Landscape Architecture at Harvard University, started its publication life. Firstly It was published quarterly, then continued monthly. The journal started its publication life in the period when Landscape Architecture was defined as both a profession and an academic field (Brown, 2002).

The aim in the discipline of landscape architecture is to design a good and quality open space. While performing this design, a correct composition of natural and structural elements must be exhibited. A good understanding of the nature of each component, what can be changed and how it can be changed should be appreciated when creating the composition. In this context, approaches to understanding the nature of place through art, science and cultural research should be exhibited (Jorgensen, 2016). With these approaches, socio-cultural data about the field is collected and efficiency is ensured in reaching the goal.

2. "Method" in Landscape Architecture Academic Studies

Since landscape architecture is a multi-layered discipline and cooperates with different disciplines such as engineering, architecture, botany and art, scientific studies have been made and continue to be made at various and different scales.

Scientific studies are carried out with the aim of clarifying any subject, revealing and developing unknown events or factors, bringing a solution to a problem, and reaching certain concepts, theories or laws (Yazıcıoğlu and Erdoğan, 2011). Science is done with scientific knowledge. Scientific knowledge is regular, consistent, valid, systematic, provable and testable knowledge that the human mind obtains through research by focusing on a certain subject (Tutar, 2019). Okumuş (2010) defines scientific knowledge as the result or results that emerge in consequence of the systematic procedure, style, method used in reaching the truth, the truth about objects, events, phenomena and thoughts. In this context, the element that will give the studies the quality of scientific work is the "method". The scientific method is a set of ways that enable the solution of a problem, an event, in accordance with the necessary scientific characteristics, and that its certain activities are predetermined (Yazıcıoğlu and Erdoğan, 2011). These methods, which are used to reach information and produce new information, can be divided into two as quantitative and qualitative methods with a general classification. Quantitative and qualitative methods show various differences in their purpose, scope, design and application processes (Yaraş, 2019).

The scientific methods used vary according to the discipline and subject of the study. In this study titled "The 'Method' Approach For Academic Studies in The Landscape Architecture Discipline"; scientific study was expressed as academic study; different method approaches are discussed. These approaches were discovered while examining previous studies. It is expected that the methods used in disciplines other than landscape architecture will provide practical and academic benefits for future academic studies. In this article, the phenomenological approach, interpretive walk, and rhythmanalysis were the "method" approaches discussed in the study.

2.1. Phenomenological Approach

Phenomenology, which is a self-ontology, is at the foundation of all sciences (Ertürk, 2019). Phenomenology has been defined as a "görüngü (i.e. phenomenon)" by TDK (2021). The same source explained the concept of 'görüngü' as everything that can be perceived by the senses, phenomenon, noumena. According to Tuan (1971), phenomenology is the definition and clarification of phenomena (Mata-Andrades, 2008). Based on these statements, it is possible to evaluate phenomenology as a method approach. Thus, in the phenomenological method

approach, any object, event, place, situation or experience that a person can see, hear, touch, smell, taste, feel, sense, understand, or live can be a legitimate subject for phenomenological research (Seamon, 2000). The phenomenology approach ensures that research projects are interactive. Phenomenology, also referred to as "phenomenological analysis"; It is a study method that aims to investigate phenomena that are known but for which we do not have a detailed understanding. The behavior of the individual is determined by environmental conditions, biological impulses in the organism, desires, needs. What shapes an individual's behavior is the way he or she makes sense of himself and the environment at that moment, in other words, it is the phenomenon at that moment (Yazıcıoğlu and Erdoğan, 2011). In phenomenological research, data sources should be individuals who experience the subject of the research and can express this phenomenon.

Phenomenology illuminates the position of creativity between universality and individuality (Alangoya, 2015). This approach allows spatial work to gain a human-oriented dimension, contributing to the researcher's perception of the environment he is in as a part of an experience beyond a physical space (Suman Buruk, 2019). Spatial phenomenology takes place as an experience of grasping in the world through textures / colors / smells / sounds (Alangoya, 2015).

Every study conducted within the scope of the basic field of architecture has the feature of being an experience study like phenomenology. Seamon (2000) put forward the assumption of phenomenology as a radical empiricism in person and place as part of a whole, as the basis of a phenomenological approach. In this context, it is possible to conduct research using the spatial phenomenology approach in many areas such as urban, rural, housing, health and education.

Norberg-Schulz (1980), in his phenomenological experience in Prague, first evaluates the city with its images. He tried to visualize the city with the information in his memory, through the novels he read and with his instant experience, and conveyed the emotions he created in himself. With this work, Norberg-Schulz presents a place analysis method based on his own phenomenological experience. While performing the analysis, he evaluated the natural environment of the city, its built environment, the historical, political, geographical and social aspects of its location, the character that all these brought to the city and the spirit of the place that emerged as a result of the relations between them (Ertürk, 2019).

Seamon (1992) used the phenomenological approach to understand the uniquely expressed character of the home of the American landscape artist Frederic Church. He experienced the space by looking and walking, taking notes and drawing sketches, trying to empathize and describe the architectural, environmental and human qualities that make Olana a special place. Within the scope of this research, the researcher with the flaneur philosophy experienced the city firsthand by walking and analyzed the notes he took during the walks using the 'interpretive phenomenology' method (Suman Buruk, 2019).

Rezeanu (2018) used a phenomenological approach in determining micro-sociology in urban, residential residential areas and interior spaces. By focusing on how space relates to macro-social phenomena; in order to understand how spaces are formed, he tried to answer the questions of how to live in space, daily life, spatial contexts, do they form the micro-foundations of social actions. At this point, he tried to interpret the usability of phenomenology in experiencing daily life in urban, residential areas and indoor spaces.

In spatial environmental design, the data related to the environment and its content, and the physical, biological, psychological and spiritual characteristics of human beings play an important role in the perception of the environment. For this reason, the phenomenological approach emerges as a qualified method in the academic evaluation of spaces designed in the discipline of landscape architecture or natural spaces that are not designed. In order to reveal the semantic richness of the space, the user and/or the researcher should be able to use the phenomenological approach with the role of phenomenon.

2.2. Interpretive Walk

Interpretive walks are included in the qualitative methodology. It is used in studies on urban research in disciplines such as geography and city planning. This concept was first defined by Thibaud (2001) (Meissonnier and Dejoux, 2016).

In urban research, the act of walking is important in order to make sense of different dimensions such as the form, arrangement, use and perception of urban space (Layeb and Hadj Salem, 2014). Interpretive walks are a method approach that will enable to identify users' needs and better understand their mobility behavior within the scope of design for everyone (Meissonnier and Dejoux, 2016).

Within the scope of the interpretive walking method, visitors to the 'Green Lanes Community Gardens' in Haringey, London, stated that the perception of the space differed according to the route, being old and disabled, and gender (Pink, 2007).

The basis of the interpretive walking method is based on the "think aloud" technique developed in the USA by Alan Newell and Herbert Simon (1972) (Meissonnier and Dejoux, 2016). This method approach was popularized by the Sonic Space & Urban Environment (CRESSON) research center for urban studies at the School of Architecture of Grenoble. Miaux (2008) likened it to a journey of real-time storytelling (Meissonnier and Dejoux, 2016).

In the article "Walking" written by Thoreau (1968), walking, described as loitering or wandering, is the action we take to transition from the map to the land, to the field, to the city, to the streets of the city. Walking by looking and resting with notebooks, pens and cameras constitutes the framework of the interpretive walks method (Tarlo and Tucker, 2017).

Research on the concept of walking has moved the space from experience to the dimension of a research, activation and design tool. At this point, the Italian group Stalker considered a method of walking as a form of collective expression as well as a tool for mapping the city and its transformations, collecting stories, reviving memories and experiences, immersing yourself with others. Henrik Schulz, on the other hand, considered walking as a tool in large-scale design studies (Wit, 2016).

In landscape studies, besides considering the landscape as an object or view, it has gained importance to detect and identify with walking activity (Adevi and Grahn, 2012; Macpherson, H., 2016). In this context, environmental design perception and experiences emerge when interpretive walks are considered in terms of landscape architecture. Thus, interpretive walks are read as an improved participatory approach methodology that includes perception and experience. Therefore, through this method, it gives the opportunity to not only pass through the environmental space, but also to the space to be discriminated with strong observations (Macpherson, 2016). In order to capture this opportunity in the space, it should be ensured that the method of interpretive walks is included in the teaching process in landscape architecture programs. During the teaching process, students are expected to make environmental design project situation plan, section, view and detail drawings. They should take into account the changes that the plants, which are the living elements of the design, exhibit

throughout the year and that the perceptual situation in the space differs with these changes. The prerequisite for achieving this is to follow the changes in the space throughout the year, a region/place/landscape selected within the scope of the course, throughout the year or semester (Jenkins, 2020). Thus, the student becomes responsible for the environment besides being a spectator to the environment.

Thibaud (2001) planned to do the interpretive walk with three variable states at the same time. These are walking, perception and identification. Walk; he stated that we draw a way to describe what we feel and perceive. The walking person has a momentary temporary perception of the environment in motion. It is the situation in which he uses all sensory forms such as visual, acoustic, tactual, heat, olfactory, kinesthetic, the ambiance of the space while on the move (Thibaud, 2013). In order to be able to define the situation, the start and end point and the duration of the walk are determined on the path chosen for the walk. Spatial signs are regularly given on the walking axis, and our comments are recorded on a piece of paper or recorded as audio comments while we are on the move (Layeb and Hadj Salem, 2014).

Meissonnier and Dejoux (2016) focused on cognitive or mental illnesses and conducted a study with the interpretive walking method to experience daily movements and challenges in the city. With this study, it reveals the effectiveness of the interpretative walks methodology, in the sense that it can be as meaningful as language in discovering the reality and details of the problems faced by people with disabilities, and in describing the problems of people with difficulty in expression.

Layeb and Hadj Salem (2014) revealed the relationship between the interpretive walks method in the city center of Tunisia and the urban space and sound stress.

According to Thiboud (2013), this method approach can generally be used in various areas such as neighborhoods, streets, shopping malls, museums, train stations, transportation centers, underground public spaces and urban projects. However, it will be difficult to use in small-scale areas as it will create a border on the walking route. Therefore, the interpretive walks method approach is suitable for perceptually and experientially examining urban environments.

2.3. Rhythmanalysis

Another method approach for landscape architecture studies to be carried out on an urban scale is the rhythmanalysis method. The basic concept of

the rhythmanalysis method is the word rhythm. The word rhythm, defined as 'dizim' by TDK (2021), is of French origin. Oxford Dictionary (2021) defines the word rhythm as a regular pattern of change or event; as a strong regularly repeated sound or movement pattern. Today, rhythmanalysis is often referred to as Henri Lefebvre (Brighenti, & Kärrholm, 2018). However, it was first studied by Lúcio Alberto Pinheiro dos Santos (1889–1950), a Portuguese philosopher interested in material, biological, and psychological rhythms (Lyon, 2019), and later on by Gaston Bachelard. Later on, Henri Lefebvre developed this concept by transforming it. He used this analysis mode as a tool to understand structures and relationships, and to bring up the issues of change and repetition (Quinlivan, 2016). Thus, with this method, the rhythm phenomenon and its components formed the basis of the analysis for spatial studies at different scales. There are several different aspects to the concept of rhythm (Wunderlich, 2008). These;

First, from a physical and sociological point of view, rhythm is abstractly a regular repetition ('recurring at regular intervals') or movement in which strong and weak elements follow one another in an orderly fashion; also, defined as a loop, an interval in which repetition occurs, or in other words, a regularly recurring sequence of events.

Second, from a linguistic point of view, rhythm (speech rhythm) is the measured flow of words and phrases in verse or prose, determined by the arrangement of spoken words alternating between stressed and unstressed elements, or by various relationships, long and short, or stressed and unstressed.

Third, from a biological standpoint, rhythm is the various biorhythms that form the basis of the human body experience from the heartbeat.

Since Henri Lefebvre is concerned with the organization of everyday life, he discovered the role of rhythm in connecting different forms such as body, society, time and space. He used the connecting point rhythm where forms such as time and space, public and private spaces, state-political and personal life space come together (Dimitrij, 2010; Wandeler and Dissanayake, 2013). According to Lefebvre, daily life consists of repetitions (Chen, 2013); the possibilities of rhythm analysis are characterized differently in different times and places. The key words used by Lefebvre for the rhythm phenomenon in the development process are Linear rhythm, Cyclical rhythm, Polyrhythmia, Eurhythmia, Arrhythmia, Isorhythmia and Dressage and defined as shown in Table 1 (Lyon, 2019).

Tablo 1: Lefebvre's vocabulary of rhythm – summary of key terms

Linear rhythm	Quantified and fragmented time, imposed by technology, industry and consumption The time of the city and urban life Closer to repetition than rhythm per se, for example dripping of water, the beats of a hammer In musical terms, measure and beat
Cyclical rhythm	The time of nature, 'cosmic and vital', evident in seasons and day and night In biology and the body, for example heart beats and eye movements Characteristic of rural life – cyclical rhythm is destroyed by capitalism Includes repetition and difference In musical terms, melody and harmony
Polyrhythmia	A multitude of rhythms; the effects of different configurations of rhythm
Eurhythmia	When rhythms combine smoothly, for example in good health
Arrhythmia	Discordance between rhythms, being 'out of step'
Isorhythmia	An 'equality of rhythms' beyond eurhythmia, for example in the coordination of an orchestra
Dressage	Process of bodily entrainment and repetition through which rhythm is learnt and becomes evident in the body over time, for example in military drills

Resource: Lyon (2019)

Rhythm groups emerging in urban scale and in daily life (Wunderlich, 2008);

a. repetition of movements, gestures, actions, situations, differences
b. interventions of cyclical and linear processes
c. The rhythm manifests itself in three ways: progress from birth to growth and peak, then decline and end.

In his Rhythmanalysis (1992) on space, time and everyday life, Henri Lefebvre (2017) says that in order to comprehend and analyse rhythms, one must be positioned both outside and inside them, because only "a certain externality enables the analytical mind to function." In order to understand rhythms, we need to immerse ourselves in the flow, production, melody and duration of the rhythms (Lefebvre, 2017). The answer to the question of how to be both inside

and outside the rhythm of daily life and the street is "in front of the window or on the balcony!" (Tuncer, 2017).

Urban rhythms occur with both daily life and spatial rhythms. It is possible to define rhythms wherever people are, in their activities and in urban life. In this context, rhythms take concrete forms. Daily life rhythms are social, natural and physiological/biological regularities. These rhythms interact and mix, harmonize with each other and give rise to the bundles of rhythms that characterize everyday social-spatial environments. Urban places are polyrhythmic spaces that are a combination of various daily life and spatial rhythms. Everyday life and space create rhythmic organizations within themselves. Examining rhythms in daily life spaces perceived as regular temporal patterns of events/activities/practices interacting with natural and biological cycles provides important insights into everyday urban life problems (structural, sociological, psychological) (Elden 2004). Urban rhythm can allow micro-sociology of everyday practices, especially in the urban area, and contribute to the imagination of a spatial and temporal architecture (Revol, 2019). In urban-oriented studies, it is expected to discover the structural, sociological and psychological values that interact with time, which provides the formation of urban rhythm with the rhythm analysis method.

The study by Nash (2018) on how the rhythm analysis method is applied in urban-oriented built environment studies can be given as an example. He chose large-scale public spaces that contain multiple rhythms in urban life as material and tried to analyse the rhythm between urbanite-space on these areas. Nash basically started by observing and interpreting the city, as Lefebvre did, to identify the qualities that define the public space. Then, he interpreted the written expression of a group of citizens about their field experiences. He tried to analyse the spatial change of polyrhythmic situations with arrhythmias.

It would be a correct approach to use the rhythm analysis method in the context of examining the effect of urban rhythm, urban elements that play a role in the process of producing public spaces, transforming effect of urban spaces that contain more than one rhythm, the task they add to the city, the dynamic effects created by this task and its contribution to urban sociology. It is possible to read the determinant situation of the rhythm, which is formed depending on the daily speed in the city and fed by the daily life practices, in public spaces with the method of rhythmanalysis.

3. Instead of Conclusion

Various method approaches are used for the data collection phase in the study to be carried out in a specific field in the Landscape Architecture discipline. Generally, data for the study area is obtained through questionnaires, which is a quantitative data collection method. With the questionnaires, the researcher requests evaluation from the people who use the field rather than his own observations and experiences. In this article, as an alternative to user evaluations, method approaches in which the researcher himself is involved in the process have been tried to be explained. The researcher uses his own experiences to understand the phenomenon, the place. The researcher can be both the observer and the observed during the research.

"Landscape", which is the basic material of landscape architecture, is a multidimensional and interactive phenomenon. It is sensitive to temporal change, transformation, and adaptation. The scales of work done within the scope of landscape architecture vary. In this context, using method approaches in which the researcher plays an active role in reading, analysing, interpreting, and scripting the landscape in landscape-oriented research will add a different dimension to the studies.

Landscape architecture products are an important part of the daily life of the urbanites. Landscape architecture in urban spaces, which are the scene of daily life, is based on daily experience and living. The houses we were born and raised in, the schools we go to every day, the urban spaces, the streets used, the parks, the landscapes we see, the stops we use, the benches we sit on, the trees we rest in the shade of… Cities that contain all of these, while encompassing the lives of each individual, are shaped around landscape architecture.

Landscape architecture experience, which is included in daily life, can be considered as a part of architects, and later designed urban architecture. In this context, this article contributes to environmental awareness in exploring the landscape architecture experience and what qualities this experience encompasses and how it plays a role in the research process. As a result of the study, the macro-micro relations that make up the city are considered in the context of daily life, and the phenomenological approach, interpretive walk and rhythmanalysis method approaches are presented to the landscape architecture literature by blending with the knowledge of different professional disciplines.

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CHAPTER XXVIII

EXAMINATION OF PEDESTRIAN SPACES IN URBAN MAIN ARTERIES IN TERMS OF ACCESSIBILITY AND VISUAL QUALITY; ATATÜRK AVENUE (RİZE) CIRCULATION

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1. Introduction

In cities, which are one of the living spaces created by people on earth, the transportation pattern, which has an important place in the planning of cities, should be arranged in the best way suitable for both pedestrians and vehicles so that people can continue their daily lives with the highest level of benefit. The transportation texture, which is the backbone of the city, also carries the feature of a structure that provides integrity between the land use decisions in the city. The most important users of this structure are the people in the city, that is, the pedestrians in the city transportation (Sahin, 2017).

Rapidly changing cities, along with human needs, have led to an increase in vehicle, bicycle and pedestrian routes, which are different modes of transportation, and to enter into a constant change. The need for pedestrian areas has increased in order to maintain the vitality of the city centers and to improve the quality of life (Ortac, 2019).

1.1. Description of the Problem

Today, pedestrian zone studies come from the idea of increasing urban walking areas, green areas and strengthening the declining social life. "Pedestrian zones"; These are the pedestrian facilities and areas created to meet the pedestrian transportation demands directed to the city centers where urban functions are concentrated by emerging throughout the urban area and which are free from motor vehicle traffic types except for emergency and service traffic, or to enable pedestrians to benefit from urban functions (Cinar, 2017).

The purpose of a good street is undoubtedly to enable individuals to easily reach the materials they want and to facilitate their movement from one place to another. In a normal roadway, individuals cannot communicate much with their environment because they use their vehicles, but on a well-designed pedestrian road, it is possible for individuals to have one-to-one contact with workplaces, residences and the natural environment in the best way. For this reason, it is necessary to determine the goals and objectives in detail when making arrangements for pedestrian ways. Pedestrian roads are specially designed for those who prefer to reach their destination or the closest point on foot, all of which are reserved for pedestrians, equipped with services that may be needed by walkers, do not intersect with motor vehicle traffic as much as possible, are reliable, clean, well-maintained, have a unique infrastructure lighting, telephone, etc.) is an alternative transportation infrastructure system (Altunbaş, 2006).

Today, when urban planning, urban design and implementation studies are evaluated, it is seen that motor vehicle transportation is still considered as a priority over pedestrian transportation. Pedestrian regulations and regulations are absent or very inadequate in most of our big cities. Necessary importance should be given to pedestrians and pedestrianization practices in urban transportation as soon as possible taken.

1.2. Purpose and Scope of the Research

The study area is parallel to the Rize Black Sea coast road, in the direction of Artvin, from the Portakallık Mahallesi point; In the direction of Trabzon, the line up to the Boğaz Mahallesi point and its immediate surroundings; Considering the livable city model within the scope of the research; along the main artery (Atatürk Street) used by pedestrians and vehicles in line with the concepts of visual quality assessment, pedestrian accessibility, and walkability;

- ❖ Is there a land use based on walking? How are their connections with pedestrian areas? If there is no continuity, what are the reasons? What could be the suggested solutions?
- ❖ What are the strengths and weaknesses of the transportation system along the designated line? Where are the nodes? And what is the current usage at these points? Is it enough? If not enough, what suggestions can be developed?
- ❖ Sidewalks, public transport stops, garbage cans, signs, mobile parking, etc. What is the status of compliance with standards?
- ❖ Detection of active busy points during the day along the street line (square-park-pedestrian-vehicle relationship)
- ❖ Whether the current existence of urban furniture is sufficient (all materials used by pedestrian spaces)

and all these were evaluated in terms of visual quality with photographs obtained from the area.

2. Concepts

2.1. The Concept of Livability

Lennard et al. (1995), as a result of observations made in many cities of the world,

They listed the features expected from a city in order to be livable in 9 items. According to this study, a livable city is:

- "having spaces that help public life for social coexistence and communication,
- with architecture suitable for the history of the city and the region,
- maintaining its traditions, markets and civic folk festivals that enrich daily life,
- have a tradition of involving children in urban planning and community activities,
- adopting housing policies that do not discriminate by income level and link residences, shops and services,
- envisaging walking access and walking-based land use policies,
- with transportation policies that support widespread use of public transportation and partial use of automobiles,
- have ecological foundations for architecture and urban design,

Poetic monumental structures that are meaningful for the citizens are defined as settlements that invest in small-scale, interactive and qualified folk art.

Lennard (1997) defines the livable city as follows:

- "The opposite of the dead city, where people are isolated and separated from each other;
- Dialogue is important;
- It has public environments with celebrations and festivals that bring all the living together;
- Offering social learning and socializing spaces for children and young people;
- Have aesthetic values;
- A city where everyone's knowledge is appreciated and used". (Beyazit, 2007)

2.2. Walkability Concept

In order for walking to be a mode of transportation that benefits urban and social life, some improvements should be made in conditions where the current situation is not sufficient. One of the detailed studies on walkability criteria was done by the local government of Kansas City, USA. In this study, the walkability criteria are divided into five and listed under the following headings:

- Directness,
- Continuity,
- Street Crossings,
- Visual Interests And Amenities And
- Safety (Beyazit, 2007).

In the report, Pedestrian Areas Planning and Design Guide, the general characteristics of a walkable environment are determined as follows:

Connected: Does the road network allow pedestrians to easily reach the point they want to reach? Do the roads connect to public transport axes and other road networks in the surrounding area?

Readable: Is the network of footpaths clearly indicated by road signs and signage, and is it plotted on local maps? Can visitors find their way? Do users intuitively understand how to access accessories?

Comfortable: Are the roads free of excessive noise and exhaust fumes? Are the width and slope of the pedestrian paths acceptable? Is there enough equipment to pause or rest?

Relevant: Are the roads continuous? Are there any disturbances or congestion on the roads that would hinder walking?

Tasteful: Are pedestrian areas pleasant places? Is it interesting, calm and clean? Does it encourage social interaction?

Safe: Are the dangers of vehicle traffic felt when crossing the roads? Does the road have a material that becomes slippery when wet?

Safe: Does the walking space encourage antisocial and criminal psychology?

Universal: Are the fittings suitable for visually impaired pedestrians, offering conveniences such as visual contrast, auditory and contact features, and low slope?

Accessible: Are there popular routes within easily accessible distances? (Ozer, 2014)

2.3. Visual Quality and Accessibility Concepts

A pedestrian is a person who walks a certain distance in the city. In addition to this, it is also defined as "person who travels on foot" or "person who travels by running or walking". In the old times, the pedestrian was defined as a person walking on the road, but today, due to the vehicles taking over the roads in the cities, the pedestrian has changed to the person walking on the sidewalks or in the spaces reserved for pedestrians (Sahin, 2017).

Pedestrian zones are not pedestrian-centered and prohibited areas, but areas where controlled circulation of vehicles is ensured, and human elements created as a result of good observation of pedestrian density, movements and activities are highlighted (Fig.1) . Pedestrian zones built on the right dynamics by identifying priority areas such as areas where commercial activity is intense, touristic areas and historical textures that need to be protected are of vital importance for the city to breathe properly. The application of pedestrian zones, which is an analytical and regulatory factor in pedestrian and vehicle traffic in the region for local governments and a factor that increases the quality of life for the whole city, is a tool that should be applied correctly within the urban planning discipline (Senkaynak, 2010).

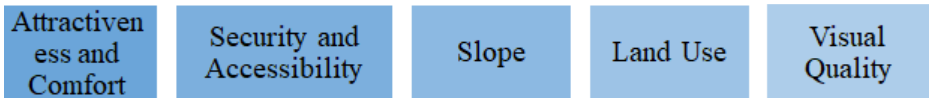


Figure 1: Variables of Pedestrian Spaces

According to the source directory compiled by Garbrecht, studies on pedestrian movements can be grouped under certain headings (Garbrecht, 1971):

- Image, imaginary map (subjective map), orientation.
- Behavioral characteristics of pedestrian movements; volume, density, walking distance.
- Origin-destination surveys, distribution of pedestrians on the street network, road networks.
- Crossings, pedestrian safety.
- Mathematical models, simulation.
- Observation methods.
- Criteria for the design and planning of pedestrian movement systems, separation of pedestrians from vehicular traffic, fully pedestrianized areas, continuous shopping centers.
- Examples and projects of shopping malls and pedestrian areas (Ozer, 2014).

One of the most important elements of traffic in city centers is pedestrian traffic. For this reason, it is important to make city regulations in accordance with the use of pedestrians in order to ensure safe and comfortable transportation within the city centers, and to determine the streets and avenues that pedestrians use most, and to close them even to vehicle traffic if necessary. Moreover, pedestrian axles also differ according to the intended use of pedestrians. Therefore, arranging pedestrians to serve their intended use will increase the effectiveness of the design. In this context, pedestrians have a decisive role in the design of the city they live in (Alhafez, 2016).

The urban main arterial system carries most of the travels in and out of the urban area, and mostly transit movements to the city centre. In addition, it provides mobility and access services between central business districts and outlying residential areas, between intra-metropolitan communities and between large suburban centers. Due to the nature of travel offered by the arterial system, almost all and partially controlled access facilities are usually part of this functional class (Haidary, 2020).

The concept of artery here is used for the circulation of Atatürk Street. The main artery is connected to other streets in the city, namely the small arteries, and accommodates an intricate pedestrian and vehicle traffic. As mentioned at the beginning of the study, if we talk about accessibility and visual quality;

Accessibility; The ability of people to reach other people, activities, services, or places. Accessibility increases or decreases according to the quality and intensity of environmental factors. The accessibility of open spaces directly affects the use of the space. An easily accessible area will also have many users. It will increase the user potential of the area if the employees can easily reach the area during their lunch breaks, those who live in the vicinity whenever they want, and those who live far away by means of a vehicle (Kaya, 2015). One of the most important features of a public space is that it is accessible. Any square, courtyard, street or park must be directly and physically accessible.

The second type of accessibility is social accessibility. Any public space should be accessible to different classes and groups, for example the poor, or the disabled, or children. The third form of accessibility is visual. If the citizens can see inside any public space, that space is visually accessible (Kaya, 2015).

Visual aesthetic quality is very important in terms of psychological and physical health of people in living spaces (Özhancı; Yılmaz, 2017). It is known that the landscape should be considered not only in terms of its visual characteristics, but also with the concepts of space and time, including the senses such as hearing, smell, taste and touch. However, studies proving that 87% of landscape perception is based on 'visual perception' emphasize the importance of 'visual analysis' in land use decisions.

The main components of the landscape, natural features such as 'landform', 'vegetation', 'water', 'wildlife', 'built structures', 'changes in vegetation and land plastic', and human impacts; it is possible to divide them into three groups as aesthetic qualities, which are the indicators of the perceptual reactions of the viewer on the basis of 'line', 'form', 'color', 'texture' and 'scale'. In this context, visual analysis of the landscape; It includes the principles of defining the important natural and man-made elements that make up the landscape, analyzing the elements in terms of design elements and principles (Form, Line, Color, Texture and Size, defining visually prominent units in the landscape (Çağlayan Kaptanoğlu, 2007). The visual effect of an area is the effect of the environment. It has a direct effect on whether it is perceived as good or bad and,

accordingly, on whether the users enjoy this area or not (Erdönmez, Çağlayan Kaptanoğlu, 2007).

In order for the city center or centers to survive, there are trade, certain business lines, the economic activities of the city are maintained, and the service opportunities are at the highest level; Ensuring pedestrian access between these places, which are called urban business centers, and keeping the negative effects of both pedestrian and vehicle traffic in business centers with high density at the lowest level, requires new searches in today's contemporary urban planning and urban design understanding (Surat, Yaman, 2014). In Cities In this context, in the sample area of Atatürk Street, one of the liveliest pedestrian and vehicle axes of Rize City Center; uninterrupted walkability, accessibility, criteria that can meet all the visual and physical needs of the users are considered as the most important objective in this study.

3. Materials And Method

Within the scope of the study, first of all, literature review was made. In order to see the connection between Atatürk Street, which is the area we examined, with other open spaces and streets, satellite photographs were used by using the Google Ear interface. The obtained 1/1000 scale Environmental Plan and satellite photos were used on AutoCad and Photoshop programs to display avenues, streets, squares, parks, etc. used for processing. Atatürk Street, which is the study area, is divided into 7 regions (Rize State Hospital Front, Kale Yolu Entrance, Square, Municipality Park, Akbank Front - Muratoğlu Lights, Sts front- Upper Street, Overpass Front) and the density of the regions is determined at the active points of the day. and dynamic maps were created. Photographs of the areas were included, and urban equipment such as pavements, signboards, stops, etc., and all pedestrian elements were gathered under one heading and evaluated in terms of standard and visuality through the photographs**.**

4. Working Area

Rize is in northeastern Anatolia; It is located in the east of the Eastern Black Sea coastline, between 40º-22' and 41º-28' east meridians and 40º-20' and 41º-20' north parallels. Surrounded by of Trabzon from the west, İspir of Erzurum to the south, Yusufeli and Arhavi of Artvin to the east, and the Black Sea to the north (Fig.2). Rize has an area of 3920 km^2 excluding lakes (Rize Provincial Directorate of Agriculture and Forestry, 2021).

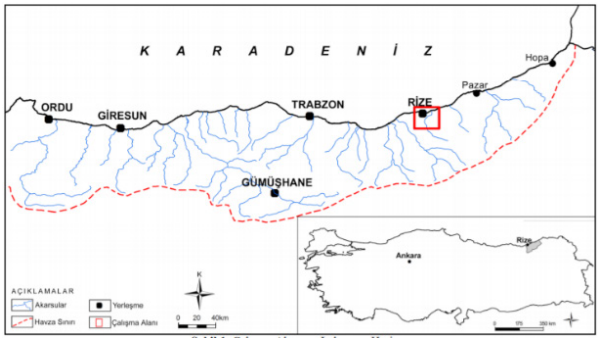


Figure 2: Geographical Location of Rize (Polat, Sunkar, 2017)

5. Findings

5.1. City Center Pedestrian Spaces

The wide coverage of the mountains prevented the establishment of large cities and caused the cities to be close to each other and small on the coast (Fig.3). Due to natural conditions, most of the population is concentrated on the coast. The interior is not as densely populated as the coast.

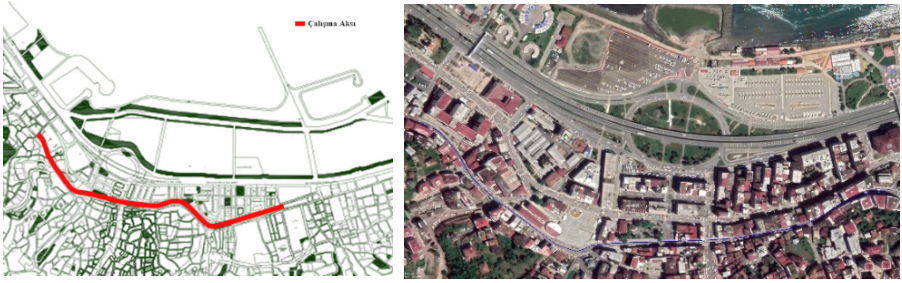


Figure 3: Working area

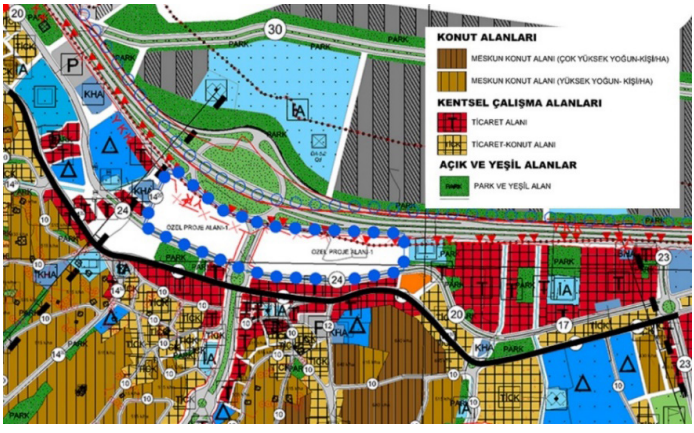


Figure 4: 1/5000 Master Plan

1/5000 scale master plan of the study area was obtained (Fig.4). Residential areas, open green areas and urban areas, including the study area, were evaluated in the plan.

5.2. Roads and Links

There are 14 pedestrian crossings throughout the study area.Also, 4 stop poınts are determıned throughout the axle of the workıng area. These determined points are shown by marking on the map (Fig. 5).



Figure 5: Pedestrian crossings and stopping points throughout the study area

5.3. Focus Areas

The concentration-distribution points on the working axis were determined by marking them on the map (Fig. 6). Gathering dispersal points are the most heavily used areas throughout the study area.



Figure 6: Aggregation-dispersion points on the working axis

5.4. Urban Accessories Used in Pedestrian Spaces in Rize City Center

The urban equipment located on Atatürk Street, which we determined as the research area, was divided into 7 regions and examined. In the existing area, there are lighting elements, garbage cans, traffic signs, traffic lights, direction lines, fountains, limiting elements, floor coverings. The study area is divided

into zones in order to see the evaluation criteria we have determined in terms of visual quality along the entire axis.

1. Region: In front of Rize State Hospital



Figure 7: Pedestrian crossings in front of Rize State Hospital

Chart 1: In front of Rize State Hospital evaluation criteria

A \ B	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness		Standard				In an inconspicuous area				(Personal) dispersedly located	Not available
Comfort		Not available							Not available		
Harmony			Standard			Standard					Not available
Aesthetic		Classical	Classical		Classical					(On axle) Not	Classical
Design		Municipal Type	Municipal Type		Municipal Type	Municipal Type					Standard
Accessibility		Provided		Provided	Provided	Provided		Partly	Partially Provided		
Appropriate Standard			Spacing and length (250 cm)	Width min. 180 cm	Appropriate			Appropriate	Suitable for width, but not suitable for code.		Partly
Safety				Provided				There is risk in crossings in terms of viewpoints.	Improvable	Not available	Not available
Maintenance		Easy but maintenance free	Easy and clean	Easy but maintenance free	Easy and clean	Easy but maintenance free		Most fields deleted	Neglected		Neglected
Material Structure			LED feature	(Easy to find) cubestone	Plastic and pipe profile foot sheet	Casting			(Easy to find) cubestone		Cast or concrete
Appeal to All Users				No tactile surface available				No tactile surface available	No tactile surface available		
	A: Evaluation Criteria					B: Accessories on the Pedestrian Axis					

Zone 2: Castle Road Entrance



Figure 8: Castle road entrance pedestrian crossings

Chart 2: Castle Road Entrance evaluation criteria

B / A	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate						Not available				Not available
Comfort											
Harmony			Standard								Not available
Aesthetic	Classical		Classical		Classical		Classical				Classical
Design	Locally Suitable		Municipal Type		Municipal Type		Standard				Standart
Accessibility				Provided	Provided						
Appropriate Standard	Appropriate		The intervals are appropriate and the height (375 cm)	Width 200cm	Appropriate		Appropriate	Not available	Suitable for width but not suitable for code		Partially
Safety				Partially				There is a risk at crossings in terms of viewpoints	Can be better		Not available
Maintenance	Appropriate		Easy and clean	Easy but maintenance free	Not clean		Neglected	Most places are blurry in some spots completely unclear	Neglected		Neglected
Material Structure	Wood look		LED feature	(Easily available) cube stone and concrete	Plastic and pipe profile foot sheet				(Easily available) cube stone and concrete		Cast or concrete
Appeal to All Users				No tactile surface available	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria						**B: Accessories on the Pedestrian Axis**				

Zone 3: The Square





Figure 9: Square area pedestrian paths

Chart 3: The Square evaluation criteria

B / A	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate	Standard	Appropriate	Appropriate	Sufficient and clean		Not available			Enough	Not available
Comfort		Not available							Not available		
Harmony	Standard		Standard							Classical	Not available
Aesthetic	Appropriate	Classical	Classical		Classical		Classical			Standard	Classical
Design	Locally Suitable	Municipal Type	Municipal Type		Municipal Type		Standard				Standard
Accessibility		Provided		Provided	Provided			Partially			
Appropriate Standard	Appropriate		Suitable for spacing and height (375 and 250 cm)	Width 210 and 320 cm	Appropriate		Appropriate	Not available	Suitable for width but not suitable for code		Partially
Safety				Appropriate				Partially	Can be better		Not available
Maintenance	Appropriate	Easy but maintenanc e free	Easy and clean	Easy but maintenance free	Not clean		Neglected	Some places are blurred	Neglected		Neglected
Material Structure	Wood look		LED feature	Cube Stone, Andesite, Basalt and Plaque Stone	Plastic and pipe profile foot sheet				Cube Stone, Andesite, Basalt and Plaque Stone		Cast or concrete
Appeal to All Users				Partially	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria						**B: Accessories on the Pedestrian Axis**				

Zone 4: Municipal Park



Figure 10: View of the Municipal Park Area

Chart 4: Municipal Park evaluation criteria

B / A	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate						Appropriate			Appropriate	Not available
Comfort									Appropriate		
Harmony			Standard								Not available
Aesthetic	Classical		Classical		Classical		Classical			Classical	Classical
Design	Standard		Municipal Type		Municipal Type		Standard			Standard	Standard
Accessibility				Provided	Provided			Appropriate			
Appropriate Standard	Appropriate		Spacing and length (375 and 250 cm)	Width 210 and 650 cm	Appropriate		Appropriate	Appropriate	Appropriate	Appropriate	Partially
Safety				Appropriate				Appropriate	Appropriate	Appropriate	Uygun Değil
Maintenance	Appropriate		Easy and clean	Easy but maintenance free	Not clean		Well maintained	Well maintained	Well maintained	Well maintained	Neglected
Material Structure			LED feature	Cube stone	Plastic and pipe profile foot sheet				Cube stone		Cast or concrete
Appeal to All Users				Partially	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria						**B: Accessories on the Pedestrian Axis**				

Zone 5: Akbank Front - Muratoğlu Lights



Figure 11: Akbank Front - Muratoğlu Lights

Chart 5: Akbank Front - Muratoğlu Lights evaluation criteria

B / A	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate						Appropriate			Appropriate	Not available
Comfort									Appropriate		
Harmony			Standard								Not available
Aesthetic	Classical	Classical	Classical		Classical		Classical			Classical	Classical
Design	Standard	Standard	Municipal Type		Municipal Type		Standard			Standard	Standard
Accessibility		Appropriate		Provided	Provided			Appropriate			
Appropriate Standard	Appropriate	Appropriate	Spacing and length (375 cm)	Width 215cm	Appropriate		Appropriate	Appropriate	Appropriate	Appropriate	Partially
Safety		Appropriate		Appropriate				Partially	Appropriate	Appropriate	Not available
Maintenance	Appropriate	Easy out maintenanc	Easy and clean	Easy out maintenance	Not clean		Well maintained	Neglected	Well maintained	Well maintained	Neglected
Material Structure			LED feature	Cube stone	Plastic and pipe profile foot sheet				Cube stone		Cast or concrete
Appeal to All Users				No Tactile Surface Available	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria					**B: Accessories on the Pedestrian Axis**					

Zone 6: In front of Sts- Upper Street evaluation criteria



Figure 12: District: In front of Sts - Upper Street

Chart 6: In front of Sts- Upper Street evaluation criteria

A \ B	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate						Appropriate			Appropriate	Not available
Comfort									Appropriate		
Harmony			Standard								Not available
Aesthetic	Classical	Classical	Classical		Classical		Classical			Classical	Classical
Design	Standard	Standard	Municipal Type		Belediye tipi		Standard			Standard	Standard
Accessibility		Appropriate		Provided	Provided			Appropriate			
Appropriate Standard	Appropriate	Appropriate	Spacing and length (375 cm)	Width 350 cm	Appropriate		Appropriate	Appropriate	Appropriate	Appropriate	Partially
Safety		Appropriate		Appropriate				Appropriate	Appropriate	Appropriate	Not available
Maintenance	Appropriate	Easy but maintenance free	Easy and clean	Easy but maintenance free	Not clean		Well maintained	Well maintained	Well maintained	Well maintained	Neglected
Material Structure			LED feature	Cube stone	Plastic and pipe profile foot sheet				Cube stone		Cast or concrete
Appeal to All Users				No Tactile Surface Available	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria					**B: Accessories on the Pedestrian Axis**					

Zone 7: Overpass Front





Figure 13: Overpass Front

Chart 7: Overpass Front evaluation criteria

B / A	Direction Signs	Station	Lighting Element	Sidewalk	Trash	Fountain	Traffic Signs / Lights	Pedestrian Crossings	Ramp	Billboards	Manhole Covers
Attractiveness	Appropriate						Appropriate			Appropriate	Not available
Comfort									Appropriate		
Harmony			Standard								Not available
Aesthetic	Classical	Classical	Classical		Classical		Classical			Classical	Classical
Design	Standard	Standard	Municipal Type		Municipal Type		Standard			Standard	Standard
Accessibility				Provided	Provided			Appropriate			
Appropriate Standard	Appropriate		Spacing and length (375 cm)	Width 210 and 350 cm	Appropriate		Appropriate	Appropriate	Appropriate	Appropriate	Partially
Safety				Appropriate				Appropriate	Appropriate	Appropriate	Not available
Maintenance	Appropriate		Easy and clean	Easy but maintenance	Not clean		Well maintained	Well maintained	Well maintained	Well maintained	Neglected
Material Structure			LED feature	Cube stone	Plastic and pipe profile foot sheet				Cube stone		Cast or concrete
Appeal to All Users				No Tactile Surface Available	Appropriate			No Tactile Surface Available	No Tactile Surface Available		
	A: Evaluation Criteria						B: Accessories on the Pedestrian Axis				

6. Conclusion And Recommendations

Urban transportation is a component of urban life regarding transportation infrastructure and superstructure, from pedestrian and vehicle movements to land use. Therefore, the planning of urban transportation is related to various transportation researches and designs at different scales, from the transportation master plan of a city or the transportation decisions of the zoning plan to the planning of a pedestrian area, an intersection, and the results are written in articles by comparing them with the questions asked at the beginning of the study, Suggestions were made with supporting literature.

In order to ensure uninterrupted / unhindered circulation of pedestrians in the area and to reduce visual pollution, sales materials should be prevented from occupying the road. Restaurant, patisserie, etc. protruding from the pedestrian path. Sunshades, umbrella stands, seating areas or areas of shops and works of art and works of art should not pose a problem for the movement of persons with disabilities. Restaurants, patisseries, notice and advertisement signs, urban furniture on pedestrianized roads should not prevent pedestrian flow, at the same time, narrowing and narrow passages should be avoided in pedestrian ways. Similar items such as floor grids, garbage cans, fire hydrants, mailboxes, poles, trees, flower beds and rest benches in pedestrian ways and squares should be covered with concrete tiles to warn the disabled and should be considered as structural elements that warn the disabled. The use of patterned and textured

flooring materials will give a natural look to the pedestrian axis, while the use of flower boxes of different sizes will add aesthetic features to the applications. It is of great importance to include resting places (urban furniture) and lighting elements and units that can meet the mandatory requirements to be applied along the route. These applications will add functionality to the pedestrian axis.

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CHAPTER XXIX

SQUARES IN HISTORICAL PROCESS AND URBAN IDENTITY

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1. Introduction

Urban space is a place where common or personal needs are met as a result of collective life in cities, and which differentiates over time depending on the socioeconomic and cultural structure of the society (Özaydın et al., 1991). In other words, urban space is the structured and unstructured areas that form the settlement texture of cities (Çubuk, 1991). As a necessity of social life, people come together and socialize in urban public spaces. Throughout history, societies created market places, spaces for sacred celebrations, and public spaces for local rituals (Carr et al., 1992). Squares, one of the urban public areas, are democratic platforms, where people from all parts of the city meet and mingle, as they are the intersection points of transportation axes in cities and are the centers of the cities (Manisalı and Demir, 2000). The quality of public spaces, especially squares and streets, which are the most important places of a city in terms of democracy, have a significant role in forming the identity of the city (Erdönmez, 2014).

The word square derives from the Latin word “Platea” meaning open space (Önder and Aklanoğlu, 2002), The words “place” in English and French, “plaza” in Spanish, and “piazza” in Italian are terms used for squares (Aykurt, 2010). Squares are surrounded by architectural elements, with urban fabric that has social functions and intertwined with urban fragments (Çakılcıoğlu et.al., 2010), or in other words, is a constrained three-dimensional volumetric arrangement with horizontal and vertical volumetric elements that surround it, which create a sense of integration and ownership, where people perform their actions (Öztan, 1998; Öztan, 2004). According to Keleş (1989), the square is defined as “a wide flat area around or near important buildings, generally closed to vehicular traffic, made suitable for everyone to sit and rest, and where those who wish can hold political meetings if necessary”.

Urban identity is a mechanism that can change over time by incorporating human and natural features along with spatial features, and develop with sociodemographic, natural, and man-made environmental factors (Birlik, 2006). It is very difficult to separate the relationship and interaction between the natural, social, and man-made environment (Suher et al., 2004), which are the components that make up identity and differentiate it from others. While it is inevitable that the basic natural structure such as the geography, climate, and topography in which the city is located, affect the lifestyle and social structure, it is inevitable that the man-made environment produced by the social structure shapes the natural structure (Ünlü, 2017).

According to Keleş (2005), every city has some distinctive elements in its identity. Many of the factors that give the city its identity both physically and abstractly are directly related to the cultural structure of that city.

Urban identity constitutes a whole that is shaped by physical, cultural, and socioeconomic aspects that every city carries from the past to the future (Güler et al., 2016). The development of a city with an identity is shaped in accordance with its identity. The use that will harm this identity is avoided, quality is sought and the society raises a sensitivity to the city (Demir, 2006). A city with an identity also gains meaning through sensory experiences and allows the citizens and visitors to grasp it with their perceptions and intuitions and visualize it in their minds (Doğan and Özçevik Bilen, 2019). A unique form or layout can be utilized to establish the relationship between identity and physical arrangements. In this way, memorable and remarkable places can be created. However, originality alone is not enough to build identity.

A meaningful city identity is formed, especially by meeting the needs of the people living in the city and by making people attach a value to that place (Tekeli, 1990).

Lozano (1990) classified the man-made environment elements of a city at the settlement and symbolic elements scales, and evaluated the buildings/structures, roads, squares, open spaces, and equipment at the settlement scale (Birlik, 2006). According to Sherman (1988), the open spaces and squares evaluated in this scale are evaluated as one of the indicators of urban success if they are structured in a way that will allow people to use the space (for eating, drinking, sitting etc.), allowing formal or informal meetings, as well as including commercial areas (Montgomery, 1998). Zucker (1959) also stated that one of the basic principles of creating successful and quality city squares is that squares should have an identity (İnceoğlu and Aytuğ, 2009). It is important to analyze these uses one by one in order to determine their place in the urban identity as well as their contribution to it (Önem and Kılınçaslan, 2005). However, in today's urbanization, squares are generally crossroads that have become more of a service for vehicular traffic than pedestrian traffic. According to Kevin Lynch, the elements that contribute to the readability of a city are gathered in five groups and crossroads are also included in this group (other elements are landmarks, edges, paths, and districts) (Lynch, 2010).

The identity of a city relies on preserving the past together with maintaining today's culture. The social interaction that provides the formation of space has been accepted as a means of integration of the city. Having an identity distinguishes a city from others and makes it known (Türk and Seyidoğulları, 2018). The city squares, which are shaped by natural, man-made, and social identity components, reflect the history and common culture of the city.

Function and form are two equally important criteria in classifying squares. The function of a square is important for the square's life and visual appeal. According to Zucker (1959), there are five types of square forms; closed, superior (dominant), group forming, amorphous, and nucleic (Bilgihan, 2006). However, the lack of open space due to the increase in population in the cities brought negative interventions to the squares and changed the form and function characteristics to a large extent.

In this study, the squares that contribute to the identity of the city were examined and evaluated in the historical process.

2. History of Squares

As seen in historical settlements, such as in Hittite settlements 6000 B.C., societies lived in houses around courtyards due to their desire to get together (Figure 1). Courtyards with large cloisters were built in Hittite settlements. Roof tops also functioned as places where kings delivered speeches (Kuntay, 1994). Positioning the houses around the courtyard was the first product of the effort to create a common space. In the following periods, the creation of city squares that appeal to the whole city can be seen as the development of this space creation process that started with the courtyards (Şahin, 2006).

When the squares are evaluated in the historical process, the first examples of squares are seen in the form of agoras in Ancient Greece. Agora, which is an expression used for as city squares, derive from the word "ageiro" meaning "gathering, coming together" in Greek, which then turned into "agora" meaning "gathering place" (Çelgin, 2018 as cited in Candur, 2019). Agoras are places located at the center of the cities where the ancient people gather to meet all their social and commercial needs (Figure 2). Commercial buildings, temples, and buildings such as the city council are located in the Agora. The Agoras, the socializing places of cities, turned into forums in Rome (Korkut et al., 2010). Over time, it has become a forum, a place where political meetings are commonly held.

In the Middle Ages, the square was shaped as church squares where religious and worldly affairs were carried out together in the areas formed by the expansion of the narrow streets of the cities surrounded by walls.

In the Renaissance, which was the period of resurrection after the Middle Ages, people began to question their relations with the environment and the universe as individuals and as a society (Suher, 1998). In the Renaissance squares, symmetry and magnificent plastics were used to symbolize power, and the dimensions of the buildings and differentiated from the human dimension.



Figure 1. 6000 B.C., The Settlement of Houses
Around the Courtyard in a Residential Area in Çatalhöyük (Kuntay, 1994)

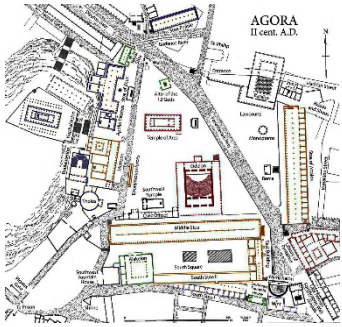


Figure 2. Agora of Athens in Ancient Greece (ASCSA Digital Collections, 2021)

When the 17th-18th century French squares are examined, it is seen that landscape architecture also gained importance. Besides, instead of the small and closed typical Renaissance squares, it is seen that the squares called place royal have developed which reflect the spirit of the Baroque period in France in terms of size and proportions (Dağıstanlı 1997 as cited in Aykurt 2010). Squares, which have become a part of the urban transportation system, have been the transition areas where many radial roads are knotted. In the 19th century, the scope of the public spaces changed with the influence of capitalism. Squares were closed forms with architectural structures around them for a long time until the 19th century. The square form, which was based on the continuity of the facades, started to change, especially with the isolated building form that emerged with the influence of modernism and the spread of the residences that form the historical squares to the suburbs (Fauole, 1995). The population of cities increased due to external migration after the Industrial Revolution in 1760. In this period, as a result of the increasing population and traffic, city squares began to become a part of the urban transportation system (Sennett, 2002).

The functional changes in the cities in the 20th century also influences different forms and functions of the squares. In this context, squares are designed as open public spaces where functions such as traffic, shopping, games, meetings, religion, and trade are carried out (Giritlioğlu, 1991).

The positioning of cities around social centers is also seen in old Turkish settlements (Önder and Aklanoğlu, 2002). It is also mentioned that in Ottoman cities, the functions of the square were divided into different spaces. Mosque courtyards and complexes, bazaars, and recreation areas are the places where these functions are divided (Bilgihan, 2006). The courtyard surrounding the mosque was used as a meeting and gathering place by the people (Öztan, 1998; Pamay, 1978). In the traditional Turkish urban fabric, the first thing that comes

to mind when the square is mentioned is the neighborhood square. Other spatial features that give this area an identify as a square are fountains, mosques, monumental trees or coffee houses. The trade function of the neighborhood is also included in this place.

Squares are important landmarks for cities in revealing the urban identity and defining the image of the city. Many cities abroad, with one or more squares, are imagined in the minds of people on an international scale and are significant in terms of tourism.

3. Important Squares Around the World

3.1. Saint Peter's Square (Piazza San Pietro – Rome, Italy): The square, located in front of St. Peter's Basilica in Vatican, was designed by Gian Lorenzo Bernini between 1656 and 1667, inspiring from Corpus Christi Feast, one of the popular public events at that time. Today it is used for sacred rites and ceremonies. On the northern side of the square, there is a fountain with a diameter of 8 m, by Carlo Maderno (1613). Bernini, who designed the square, had the fountain in the south built in 1675 to create symmetry to this fountain. In the middle of the square, there is a 25.31meter obelisk brought from Egypt by Emperor Caligula (St. Peter's Basilica Info, 1987) (Figure 3). Bernini surrounded the square with columns in order to make the square easier to perceive. In this way, by entering the square from different points, the focus was drawn to the center, and at the same time, a wall effect was created in the space (Trancik, 1986 as cites in Şahin, 2006).

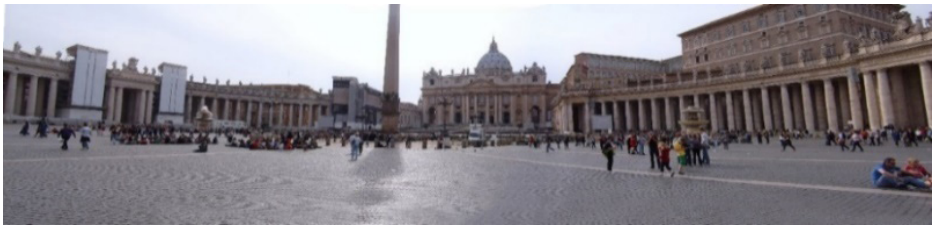


Figure 3. Saint Peter's Square (Original)

3.2. Navona Square (Piazza Navona – Rome, Italy): The area where Navona Square is located was used as an arena until 86 B.C. and served as a market place and playground for public use in the 15th century. The transformation of

the area was initiated by the Pope in 1645. Between the 17th and 19th centuries, an artificial lake was built on the site every weekend for the nobles' horses to relax and people to have fun (Sami et al., 2020). The most important feature of the square is the exhibition of various activities and Bernini's fountain. The place, which is heavily preferred by people, is suitable for shopping and resting purposes. The square in the center is within easy reach of important centers and other squares (Figure 4). The edges of the square are about 1/5. Three fountains along the long axis add rhythm to the area. There is an obelisk on a pedestal in the fountain located in the center. By drawing attention to the fountains, Bernini wanted to prevent people tear through the area (Moughtin, 1992 as cites in Şahin, 2006).



Figure 4. Navona Square (Original)

3.3. San Marco Square (Piazza San Marco – Venice, Italy): San Marco Church, one of the most ornate churches in Italy, is located at the focal point of the square, also giving its name to the square (Figure 5). The square, which is the transportation, trade, and entertainment center of Venice, is among the most beautiful squares in the world. The entire square is a transitional space between the dense structure of the city and the openness offered by the Grand Canal (Rubenstein, 1992). "Piazza S. Marco", which was built as a small square in the 9th century, was greatly enlarged in 1174 (Ruol et al., 2020). It falls into the category of grouped squares formed by the intersection of the axes of two squares, one small and one large, in different directions to form an angle (Aygün Öztürk, 2009). Arcades were used in the square and a wholeness effect was created by combining the space with the floor coverings (Trancik, 1986 as cited in Şahin, 2006).



Figure 5. San Marco Square (Original)

3.4. Plaza Real (Plaça Reial – Barcelona, Spain): It is a square decorated with palm trees surrounded by historical buildings on all four sides and located in the Gothic Barri district of Barcelona. There is a circular decorative pool in the middle (Figure 6). It is the only arched square in the city. It was designed by Francesc Daniel Molina Casamajó in the 19th century as a square where wealthy families would live. After its complete renovation in 1982, it became a more popular square preferred by people for recreation and shopping. Every year since 1871, on September 24, "La Fiesta de la Virgen Merçè" (Feast of the Virgin Merce) is being held in this square (Barcelona Home, 1990). It is not only a touristic area but also has been important for the local people with the old stores in the square (Bosschaert, 2005).

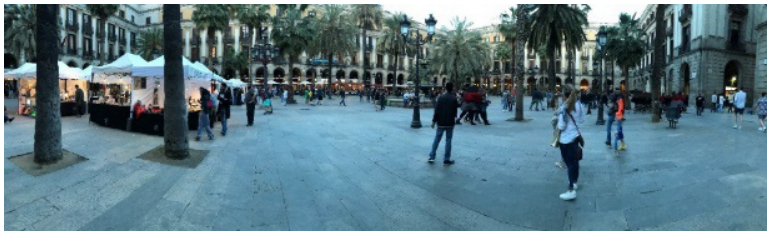


Figure 6. Plaza Real (Original)

3.5. Catalonia Square (Plaça de Catalunya – Barcelona, Spain): It is an important transportation point as it intersects with the busiest promenades of Barcelona (Roca-Rosell and Roque, 2013). The square, which remained in a rural area behind the city walls until the middle of the 19th century, became a part of the city after the defensive walls were destroyed in 1858 (Sh Barcelona, 2020). Located in the center of Barcelona, the square has a circular structure surrounded by trees and is closed to traffic (Figure 7). There are decorative pools with animated water shows in the square. Various and interesting sculptures are featured, such as the Francesc Macià' statue, built by local sculptor Josep Subirachs to honor the former head of the Catalan government, and the statue of a female figure created by Josep Clara (Sh Barcelona, 2020).



Figure 7. Catalonia Square (Original)

3.6. Concorde Square (Place de la Concorde – Paris, France): Concorde Square is the most prestigious venue in the city of Paris. It is the important link of the long axis that starts from the Louvre Palace and goes to the Champs-Elysees Boulevard, the Arc de Triomphe in Charles de Gaulle Square, and from there to Defense and the Arch there (Tümer, 2000). Covering approximately 18.8 acres (7.6 hectares), the square was designed by Ange-Jacques Gabriel. The square is octagonal in shape due to its sharp corners. Eight giant pedestals were built around the square, on which statues representing state capitals were placed. In the square, which was designed to glorify King Louis XV, various royals were guillotined during the French Revolution, including Louis XVI (Lewis and Bhutia, 2017). Between 1833 and 1846 the square was redesigned by Jacob Ignaz Hittorf and two fountains were added to the square (Bekar and İsmailoğlu, 2018). A few name changes were made to the square and it took its current name in 1830. The obelisk, an Egyptian artifact of 22.83 meters high, built in 1300s B.C., was placed in the middle of the square in 1836 during the reign of Louis-Philippe (Lewis and Bhutia, 2017) (Figure 8).



Figure 8. Concorde Square (Original)

3.7. Times Square (New York, USA): Times Square, which was a quiet area known as Long Acre Square, was home to carriage shops and lively stables and

got its current name after the New York Times newspaper moved its offices there in 1904 (Project for Public Spaces, 2002). Times Square is one of New York City's most iconic landmarks. It is a commerce-heavy square known worldwide for its electronic billboards, theaters, and nightlife (Gutierrez, no date). Squares that do not attach much importance to the quality of the space and that form an urban opening due to the intersection of traffic flow generally fall into the category of "shapeless square". Times Square also falls into this category. It is possible to come across such squares especially in the 19th century (Aygün Öztürk, 2009). As the width of the sidewalks in Times Square is not sufficient, pedestrians often have to cross the area quickly using the traffic lanes or the outside of the sidewalks. In this respect, it is unsuccessful in activities that will allow people to spend time in the area. In a study, users stated that there should be more sidewalks in the square (Anonymous, no date). The fireworks celebrations, initiated by the New York Times Newspaper and become a tradition, bring thousands of people together in the square every New Year's Eve (Figure 9).



Figure 9. Times Square (Original)

3.8. Heroes' Square (Hősök Tere – Budapest, Hungary): There are two city sides on the Danube River; Buda and Pest. Heroes' Square, is located on lowlands at the center of Pest, in the south of the Danube River. There are statues of important heroes in Hungarian history and two large pedestals facing each other, as well as the Statue of Gabriel on the 36-meter Millennium Monument rising in the middle of these pedestals (Figure 10). The buildings around the square are architectural examples reflecting the artistic understanding of the period (Kayahan, 2013). The Millennium Monument was established in the late 19th century during the celebration of the 1000th foundation anniversary of the state. During World War II, both the Millennium Monument and the statues of heroes

were damaged. The Millennium Monument was renovated between 1929 and 1956, and the statues of the heroes were renovated in 1956 (Harlov, 2015). In the middle of the square, there is the **"tomb of the unknown soldier"** in an iron cage in front of the monument. This symbolic mausoleum was built in memory of the soldiers who lost their lives in Hungary's struggle for independence.



Figure 10. Heroes' Square (Original)

4. Important Squares in Turkey

4.1. Taksim Square (Istanbul): Located between Beyoğlu and Beşiktaş Municipality borders, very close to the Bosphorus, the Historical Peninsula and the Golden Horn (Aygün Öztürk, 2009), the square is at a point where it can be easily reached from many places on both the Anatolian and European sides. Taksim Square is a transfer center with dense pedestrian and vehicle traffic, located on important transportation routes, hosting urban service areas and other functions (Özkan Özbek, 2021). The square got its name from Taksim Cistern, where Galata-Beyoğlu water was shared out in the past. The Republic Monument, located in the middle of the square, was built by the Italian sculptor Pietro Canonica and placed in its place in 1928 (TMMOB, 2012). Taksim Square, located at the entrance of Istiklal Street, which is also a cultural, entertainment and large shopping center, hosts various festivals and celebrations (Figure 11).



Figure 11. Taksim Square (Bianet English, 2021)

4.2. Beyazıt Square (Istanbul): It is located in the center of the Historic Peninsula, which was the largest forum of the city in the Byzantine Period and a palace square in the Ottoman Period. Located between cultural and religious buildings, the square has a heavy pedestrian traffic as it is close to hotels and trade centers (Bağbaşı, 2010). The important structures of Beyazıt Square are the Beyazıt Mosque, Beyazıt Madrasa, University Gate (Bab-*ı* Serasker), Faculty of Dentistry Building (Serasker Office), University Building (Old Palace), Istanbul University Central Library, and mansions on both sides (Dökmeci and Dülgeroğlu-Yüksel, 1996 as cited in Yıldız, 2007) (Figure 12a, b, c, d).



Figure 12a. 1900 (Yıldız, 2007)



Figure 12b. 1930 (Yıldız, 2007)



Figure 12c. 1960 (Yıldız, 2007)

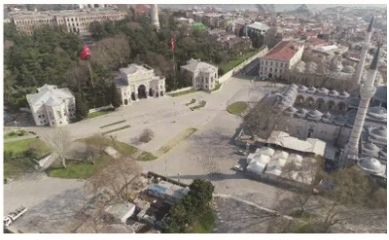


Figure 12d. 2020 (CNN Türk, 2020)

4.3. Sultanahmet Square (Istanbul): Sultanahmet Square is an open-air museum where the oldest and most intense underground and above-ground cultural assets of the Historic Peninsula are located and many important historical events took place (Aksoy and Yıldız, 2013). This square, which dates back to the Roman period, was not originally designed as a square. It was a hippodrome that was started during the reign of Emperor Septimus Severus and completed during the reign of Constantine I. It was also known as "Atmeydanı" during the Ottoman period (Tümer, 2000). This place hosted many different events in history. This magnificent square, developed around the Blue Mosque, with centuries-old plane trees on one side and palaces and fountains on the other, is a place visited by domestic and foreign tourists at all hours of the day both in summer and in winter (Figure 13).



Figure 13. Sultanahmet Square (İstanbul Travel Guide, 2021)

4.4. Kızılay Square (Ankara): Located at the intersection of Atatürk Boulevard, one of the busiest streets of Ankara, with Ziya Gökalp Street and Gazi Mustafa Kemal Boulevard, the square is one of the important commercial centers of the city. The square, which takes its name from the Red Crescent institution, has connections with both Metro and Ankaray. The square, which is crowded and lively every day of the week, hosts various celebrations and shows.

Kızılay Square has changed depending on the development of the city in the historical process. In the first years of the Republic, between 1923 and 1930, the bureaucratic and political center of the city was Ulus. Kızılay did not show a center feature in this period. The big square where Havuzbaşı was opened was named as Kurtuluş Square in 1927 and the building of the Red Crescent Headquarters, which gave the square its current name, was established as an expression of the national solidarity approach of the period. After the construction in 1929, Havuzbaşı, the square, and Yenişehir were started to be known as Kızılay Park, Kızılay Square, and Kızılay respectively (Sahil, 1990 as cited in Bayraktar, 2013) (Figure 14a, b, c, d).

Between 1930 and 1950, Kızılay began to gain importance as a new bureaucratic and political center. Between 1950 and 1980, the city started to move away from its modern appearance and Kızılay shined out as a new bureaucratic and political center financially, culturally, and commercially. Since 1980 to the present, where the city has been shaped by the consumption policies, Kızılay has continued to maintain its financial and commercial importance despite losing its cultural significance (Bayraktar, 2013).



Figure 14a. 1927 (Bayraktar, 2013)



Figure 14b. 1930 (Bayraktar, 2013)



Figure 14c. (Bayraktar, 2013)

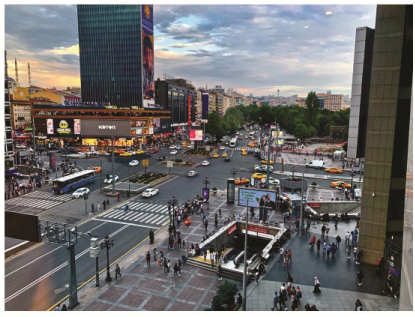


Figure 14d. (Reddit, 2021)

4.5. Konak Square (Izmir): According to Atay (1978), Konak Square was first included in the city map prepared by Thomas Graves, who was in charge of the British Navy between 1836-1837, and this plan showed the two open areas between the Government House, Sarı Kışla, the seaside, and Sabunhane Caddesi (Nadir Nadi Street) in those days (Malkoç, 2008). The square, which contains historical and symbolic elements such as Kemeraltı bazaar, Government House, Clock Tower, First Bullet Monument, witnessed various demonstrations (Figure 15a, b, c).



Figure 15a. 1940 (Archive of Old Turkey Photos, 2021)

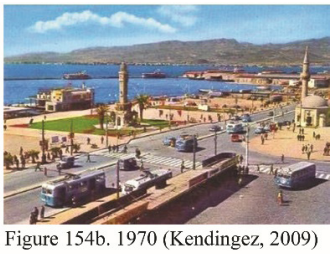


Figure 154b. 1970 (Kendingez, 2009)



Figure 15c. (Wikipedia, 2020)

5. Conclusion

Squares are important urban areas for people to get together and socialize. Being located in a place where people from all walks of life can easily access plays a key role in the function of a square. With the change in lifestyles from the past to the present, changes have emerged in the functions of the squares, some of them have preserved their characteristics, while others have been reshaped according to the changing conditions and turned into open spaces that serve for traffic, shopping, and meetings.

Squares are also among the priority spaces in creating or contributing to the identity of the city with their physical and socio-cultural characteristics. Squares in a city with an identity become more perceptible and memorable for visitors with their usage characteristics. This can be interpreted as an urban success.

When the important squares in the world are examined, it is seen that they generally have functions such as being convenient for transportation, creating a focal point in the area, and ensuring that people come together for various purposes (sitting, resting, shopping, ceremonies, festivals, entertainment celebrations etc.). The use of sculptures, water elements and obelisks are the common point of their designs. While designing the area, being inspired by the important events, architecture or people of the history increases the belonging of the square to the region where it is located, and also contributes to the identity of the city. It is seen that the designs of the examined sample squares are based on past events which strengthen the sense of belonging to the area. Besides, the traces that these squares leave in memories well-integrate the regions they are located in.

In our country, the most distinctive feature of the squares examined within the scope of the study is that they are located in focal points where transportation is easily provided, just like other examples around the world. This means that the number of visitors is always high. In addition to the different nature of the squares, the fact that their being integrated and in harmony with the cities increases the sense of belonging to the area. Important cultural artifacts and sculptures draw attention as common design features. However, over time, they have undergone morphological changes due to reasons such as the use of urban space, social structure, changing transportation systems, and political approaches.

The research shows that the open spaces where urban users can socialize most easily are the squares. Together with their physical features, they have

become more important places that make positive contributions to the city, as they have started to be adopted more and more by the city and its inhabitants, thanks to the sociocultural functions it has over time, and leaving a mark in the memory for visitors. However, the changes in the needs as well as the functions of the square over time, serving for vehicular traffic rather than pedestrian use, mean not only a loss in the identity of the city but also a great deficiency in the sociocultural life for t**he citizens**.

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CHAPTER XXX

SOME LESSONS TO BE TAKEN FROM A BEAUTIFUL, AESTHETIC, LIVABLE, GREEN CITY PRAG

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In this paper it is aimed to explain the principles we can say "Beautiful City Principles" by considering "Prague" (Czechia) and "Ankara" cities comparatively and to explain urbanization, urban landscape and historical environment protection, transportation. It aims to show examples and develop suggestions on the issues such as urban design, conservation planning and landscaping.

As an important purpose in this paper, to make some planning and project design proposals for Ankara based on the UNESCO World Heritage City of Prague.

1. Aims and Comparison of Two Cities

Prague, one of the most beautiful cities in Europe, is a city renowned as an indispensable holiday destination, by combining history, nature, art and romance. Having renewed its historical environment with constant maintenance and repairs since the early 1980s, Prague has been extraordinarily successful in preserving the historical environment, transforming the historical city into a living and vibrant tourist center. Prague has been able to preserve its characteristics of being the most beautiful thematic historical city center in the world with its historical urban texture, old center and all other monumental works and landscape values.

Ankara has hosted various civilizations starting from the Bronze Age; it is an important settlement with its history of Hittite, Phrygian, Galatian, Roman, Byzantine, Seljuk and Ottoman periods. Together with the Republic, Ankara is also a pioneering model as "Building a Capital City". One of the few planned capitals established in the 20th century is Ankara. Due to its modern architectural heritage, it has a place in the world literature. With these features, it is a laboratory for planning, architecture, landscape architecture, civil engineering, and other relevant vocational education; It is a rich research area that is a source for national and international academic studies.

It is thought that the UNESCO's World Heritage City (1992) of Prague will set an example for Ankara in the fields of city planning, city protection, landscape architecture and urban design, and may result in friendship and information exchange that can go as far as being a sister city for Prague.

The city of Ankara has been the cradle of different civilizations. Different civilizations have designed spaces adorned with certain symbols in which their own cultures and social memories are embroidered. The city is not just a place of stone and concrete. The city carries the collective memory. It reflects the cultures, lifestyles, communication styles of the people living in it, and even more so, the collective fears, joys, sorrows, triumphs. While wandering in the big squares of a city and watching the sculptures in the square, the story of a society is read. In the cities, streets, squares, open and green areas, working spaces, social and cultural spaces, industrial and production spaces all together form "Urban Environment".

Every aesthetic structure / building element made in the architectural and urban environment has arisen from the need for self-expression of the society, the need to communicate with the present and future generations. No society wants their experiences to be forgotten by future generations. It is a whole with the memories and cultures from the past to the present. In this context, while dealing with the environment, it is planned and organized in an aesthetic, functional and usable order with its memories, past traces, nature, stone, water and tree, historical artifacts (Aytekin, 2020).

The most important factor that creates urban aesthetics has been the natural environment. In Prague, the Vltava River has been the subject of compositions, poems, and literary texts (Figure 1), and Petrin Hill is famous for its historicity and scenery.



Figure 1. With Bridges over the River Vltava Is a Rich Landscape for the City of The Prag (Source: https://en.wikipedia.org/wiki/Vltava)

Many rivers of Ankara that existed at the beginning of the Republic were unfortunately contaminated first, and then the important natural values of the city were destroyed by covering them. (Bendderesi, İncesu stream, Hatip Stream, Kirazlıdere etc.) (Figure 2)

Vegetation, topography, geomorphology and climate are also the elements that make up the natural environment. These elements play an important role both in the selection of the places where the cities are established and in the shaping of the cities.

It was emphasized that these elements should be compatible with each other in terms of urban aesthetics. It was established on both sides of Prague Vltava and around the Castle in Ankara in direct connection with the Hatip and Ankara Creek, İncesu and İmrahor creeks.

The urban environment consists of buildings with architectural aesthetic and historical value and the outdoor spaces defined by them. The harmony and relationships between them determine the character of the urban aesthetics and the "Beautiful City". Roads come together to form the urban fabric, historical dead-end streets and squares, namely outdoor spaces.

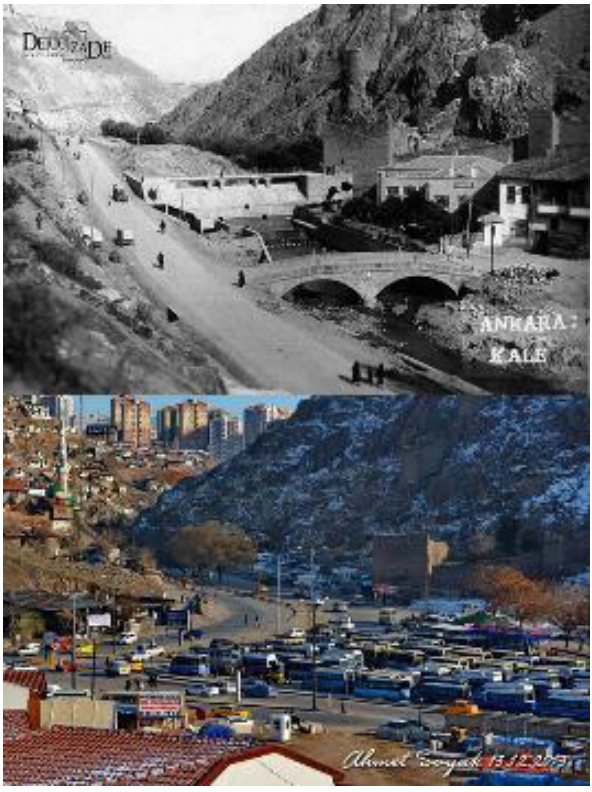


Figure 2. The Roman Period, Which May Be A Rich Cultural and Natural Landscape In Ankara, Itself And Bendderesi, Destroyed With All Its Bridges (Photo: Soyak, A., 2013)

Parks are divided into soft and hard landscapes. They are grass areas that are peaceful with its green color, which we call the carpet of the landscape in soft landscaping. Grass areas seem to be an advantage to us in many respects, but they increase the cost because they need too much water.

On the other hand, the tranquility of sitting in the shade with trees, the ability to clean the air, the oxygen production, the trees struggling with the greenhouse effect, the trees that cool the city and the streets, prevent erosion, and the trees with many endless features are of great importance.

Lines forming the surfaces of negative and positive elements; texture, material, color, that is, the facades of buildings and exterior coatings, sculptures, are important elements of urban aesthetics (Figure 3). In the historical city center of Prague, the architectural features of the buildings give a very rich urban image with the decorative elements on the façades, metallic decorated

balconies, sculptures, and reliefs (Figure 4). Roads and squares are parts of the circulation system, breathing spaces of structures such as courtyards, front gardens and side gardens, and green areas are parts of open spaces.

The area should be considered as a whole, not a piece, and should make parks according to the needs and demands of the citizens. Otherwise, as if it were an idle area, we help the creation of nature-animal-oriented places, rather than nature-animal and human-oriented, and we help the formation of unplanned city parks in material and spiritual terms. It is important to consider each quality component such as activities and uses, accessibility, comfort and image, sociability separately in park planning and design process. However, with the right location, right planning, right design, correct application and catching the right maintenance standards, quality urban park environments that can be used by the city people will be created. The safety of the parks is an important factor in the perception of the comfort and image of the park by the users.



Figure 3. Vrtba Garden (Vrtbovská Zahrada) (Photos: Aytekin, Ö., Tunçer, M., 2019)

Apollo with Bow, Mercury, Diana and Dog, Juno with Peacock, Minerva with Shield, Jupiter with Eagle, and Vulcan with Hammer in Vrtba Garden. There is a pavilion with a decorative facade fresco by Rainer (Figure 3).



Figure 4. The Prague Streets are Repaired, Aesthetic, Monumentary Buildings and Modern But "Beautiful" Structures (Photo: Tunçer, M., 2017)

Security starts around the park. Feeling the control over the area, seeing the area, being able to escape easily in case of danger and getting support from the environment makes that place feel safer. It is necessary to provide security personnel, telephone access and first aid units for safe parking areas. Having open viewing areas in the park is also effective in perceiving security (Aytekin, 2018).

In Stare Mesto (Old Town), parks, baroque palace gardens, along with pedestrian paths planned to wander each other on foot form the principles of the "Beautiful City". This is the principles of "Green city" and "Pedestrian city" (Figure 5).

Accessibility is the safe and independent access and use of buildings, open spaces, transportation, and information services by everyone, including the disabled citizens. The exterior lines that make up the building facades, the proportions of doors and windows, horizontal and vertical lines, building material, color, and decoration elements. The aesthetic items found outdoors are the floor coverings, urban and natural landscape materials, and urban furniture. All these elements come together to form the macro form and silhouette of the city.



Figure 5. Vrtba Garden (Vrtbovská Zahrada) (Photo: Aytekin, 2019)

The beauty of the whole city in Prague depends on the beauty of the city's parts as well as their relations with each other. These are the applications that have gone through the design process that has been handled as a whole, from floor covering to cut stone covers, to the decoration of tree bottoms (Figure 6).

The historical cities where human beings live are the most important indicators of the social, political, cultural, and spiritual wealth of a community.



Figure 6. Respect For Trees And Conserving Their Natural State
(Photos: M. Tunçer, 2019)

2. Research and Findings

Urban aesthetics, urban identity and, ultimately, the "Beautiful City" starts with the common life culture, that is, the aesthetic production, shaping, transformation of public spaces and carrying them into the future as aesthetic value. While

humans are connecting with the past, they need to feel themselves belonging to their age. The city should experience changes and ensure that today's perception meets the urbanite through contemporary art and architecture.

The most important urban and architectural accumulation, aesthetic architecture, and environment creation practices of Ankara in the 20th century became synonymous with the Republic after 1923. Ankara has been planned as the Capital City of the Atatürk's Republic, next to an old and tired town. There is a rich cultural accumulation in Ankara, and it is the place where the ideal of creating a contemporary, modern "capital city" of the Republic of Turkey is realized (Tunçer, 2015).

3. Beautiful City Principles

3.1. A Brief Comparison of The Historical Text of Prague and Ankara

Prague, the magnificent Capital City of the Czech Republic, is known as the "Kafka City" and was added to the UNESCO World Heritage List in 1992. St Vitus Cathedral, Charles Bridge (Karlov Most), gothic houses, monumental buildings, Old Town Square, Astronomical Clock, Town Hall and other monumental structures, the city texture has been preserved. Prague still preserves its potential as an (open air) city museum today and it will be passed to future generations (Figure 7).



Figure 7. Czech National Museum (Narodni Museum)

Prague is one of the most romantic and beautiful cities in Europe, with its charming streets lined with Renaissance, Gothic and Baroque architecture, the magnificent atmosphere of the old town square, sculptures adorning all sides, and the Vltava River, where you can take a boat ride under the lights reflected

from the castle in the evening. The Vltava River comes to life in Prague and then flows into the Elbe River. Boat tours are held on the river every day. Prague is also known by names such as “Golden City”, “Fairy-Tale City”, “Mother of Cities” and “Heart of Europe”.

3.2. Prag, The Music and Art City

Art is a body of understanding that has very important contributions to the progress and modernization of a society. It is observed that individuals who have completed art education and use the fineness of art in their approach work happier and with performance in every field.



Figure 8. Prague Is a Famous City with Its Monuments (Photos: Tunçer, 2017)

Prague is remembered for Bedřich Smetana’s unique work of the Vltava (Die Moldau) river, My Homeland (Má Vlast / Mein Vaterland). The capital’s historic center, more than ten centuries old, enchants residents and visitors with its unique combination of architectural monuments and houses (Figure 8).

3.2.1. Old Town Mala Strana

Having renewed its historical environment with constant maintenance and repairs since the early 1980s, Prague has been extraordinarily successful in preserving the historical environment, transforming the historical city into a living and vibrant tourist center (Figure 9).

In the historic area of 866 hectares, the unique urban community of Malá Strana (Lesser Side), including Prague Castle and Hradčany, Karlův most (Charles Bridge), Staré Město (Old Town) and Josefov (preserved part of the

old part) Jewish Town, Vyšehrad and each of the monuments in these areas are located. Malá Strana was named after King of Bohemia II in 1257. In the Middle Ages, the district was inhabited by ethnic Germans in Prague. The right bank was where the more bourgeois and more Czechs lived, and it also contained many noble palaces



Figure 9. General View Of The Historical Texture Of The Prague City (Photos: M. Tunçer, 2018)

3.2.2. Prague Castle and St. Vitus Cathedral

Another feature of Prague is that it was not badly damaged in World War II. In this way, it houses many historical houses and places. These places also include St. Vitus Cathedral. In the field of tourism, this place has been very popular in recent years. Prague Castle, one of Europe's largest castles, is home to the "city in the city" Schwarzenberg Palace, the Archbishop's Palace, the Historical Royal Palace, St. George's Basilica and the most magnificent architectural treasure - St. Vitus Cathedral (Figure 10). The historical center is also the biggest manifestation of medieval urbanization (Tunçer, 2018).

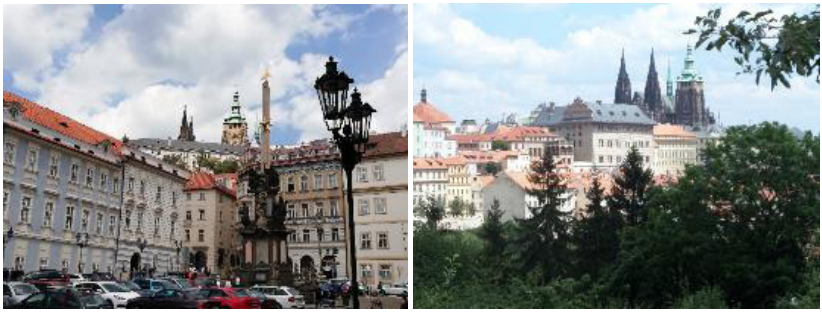


Figure 10. Malostranské Náměstí (Lesser Town) Square
And St. Vitus Cathedral (Photos: M. Tunçer, 2018)

3.2.3. Petrin Hill and Ankara Castle

Petřín, Czech Republic, is a hill in the center of Prague. It is 327 m above sea level and 130 m above the left bank of the Vltava River. The hill, which is almost completely covered with parks, is a favorite recreation area for Prague residents. Like Ankara Castle, one of the most important symbols of the capital Ankara for centuries, offers a unique view to its visitors in the heart of the city (Figure 11).



Figure 11. City Panorama from Petrin Hill and Ankara Castle
(Perge Photo: Tunçer, M., 2019, Ankara Photo: Konur, T.)

3.2.4. Eating and Drinking Culture (Gastronomy)

Tredlnik is sold on almost every corner in Prague, a traditional food product comes with ice cream, shockella and plain (Figure 12). It is necessary to consider what can be made from the local cuisine products of Ankara (Ankara döner, pan, baklava, börek etc.). The very rich gastronomic culture of our Ankara should be put into service in certain places, especially in pedestrian areas within the historical environment.

In addition to these, about 40 kinds of food, desserts and appetizers are among the important traditional values of the Ankara region.



Figure 12. Food and Drink Culture of Prag Especially Tredelnik is Very Famous (Photo: M. Tunçer)

3.2.5. Squares in Prague and Ulus in Ankara

Squares are focal places where different functions exist together in cities, especially in historical city parts, and allow many people to come together for specific purposes. There are many "beautiful" and "human scale" squares in Prague. One of the most important of these is Namesti Republiky (Town Hall Square) (Figure 13). From history, squares have been the meeting place of the city's people or visitors, in short, multi-purpose spaces where the citizens can have a break from the hustle and bustle of the city, find the opportunity to relax and rest, people watch each other, socialize, and share what is happening in the city.

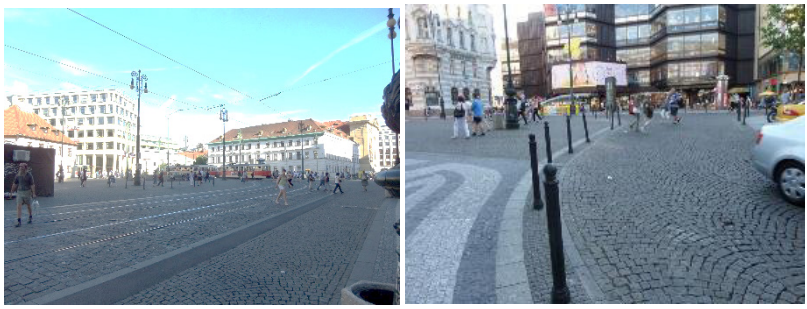


Figure 13. Namesti Republiky (Municipal Palace Square) (Photo: M. Tunçer, 2019)

Squares play a very important role in ensuring that a city is people oriented. The squares should be easily accessible with different transportation alternatives. Squares should be protected from vehicle sovereignty. A balance between open and closed areas should be established throughout the settlement, including pedestrian zones and squares.



Figure 14. Haci Bayram Mosque and Augustus Temple and the Queen of Inscriptions (Photos: Cambaz, M. and Soyak, A.)

With the arrangements made as a continuation of the *"Ulus Historical City Center Conservation Plan",* a city square was created in front of the Hacı Bayram Mosque and the Augustus Temple (Figure 14). While the square was being built, the booksellers' bazaar built in the square and the shops under the square chose new places for themselves in the newly built bazaar blocks for the property owners and tenants of the bookstores in 44 buildings that were previously destroyed.

This area was included in the UNESCO World Heritage Preliminary List in 2016. It is argued by academic circles that the reconstruction of Old Ankara Houses, most of which were built from scratch, was not in accordance with

the "Venice Charter" and "Restoration Principles", and that "New-historical Artifacts" were created around the Hacıbayram Mosque (Figure 15). The striking point here is that almost all the buildings were demolished and increased by one or two floors and constructed as reinforced concrete, giving the buildings an image of old buildings with curtain walls (Tunçer, 2016).



Figure 15. New-Historical Buildings Around
The Hacibayram Mosque (Photos: Soyak, A., 2016)

The Victory Monument, which was built in 1927 in the middle of the square in Ulus district, was the famous Victory Monument of Krippler (Figure 16), which gave its name to the square, where the Turkish Grand National Assembly continued its existence during the Turkish War of Independence, and after the first parliament building was here in Turkey after the declaration of the Republic.



Figure 16. Ulus Monument and Ulus Square (Photo: Taşkın, M.)

Today, there are works such as the Roman Bath, the Julianus Column, the Roman Theater, the Augustus Temple and the recently discovered Roman Road around the square located opposite the First Grand National Assembly, which is now the

War of Independence Museum. These should be evaluated and by preparing the plan of the Roman Period Archeology Master Plan, they should be displayed in a travel itinerary.

3.2.6. From Prague Castle to Ankara Castle



Figure 17. Prag Castle (Prague Hradcany)
From Petrin Hill 1930 (Photo: M. Tunçer, 2019)

Prague Castle, which is one of the largest castles in the world, is the most important in Prague, a complex of monuments visible from all sides of the city and rising above the historical city with its majesty (Figure 17).

Ankara Castle; perhaps it is much older and more imposing with its historicity and history dating back to Roman and Byzantine times. However, the Castle is no longer visible from all parts of the city and its surroundings are surrounded by multi-storey blocks.

Attaching great importance to the perception and protection of the castle from every corner of the city, Prof. Hermann Jansen said in this plan report. Ulus and Kale are far from delivering what is longed for with their present situation. Some of the practices described in the previous chapters tended to demolish, let alone protect the old city, and were screened by constructions that would prevent it from being perceived, seen and noticed from all sides of the city, not "KALE" (Figure 18).



Figure 18. Surroundings Of Ankara Castle Multi Block Structures
And The East Section Is Surrounded By Squatters. (Photo: Tunçer Archieve, 2000)

In the capital city Ankara, "Urban Identity" has gradually changed, an "Urban Identity" that is not "so modern" has been formed with slums, unplanned urbanization, concretization phenomenon, vehicle traffic confusion, parking problems. However, there are still historical parts that preserve their identity and newly developing contemporary urban parts. With applications that can be called arabesque in some places, it has the appearance of a city that is "looking for its identity".

In Ankara Castle, especially in the Outer and Inner Castle, there are still textures that preserve their traditional characteristics and Old Ankara Houses. These have been handled and repaired in recent years. It is necessary to continue these studies and to be transferred to the future in a way to realize the principles of "Beautiful City" by preserving the traditional inns and museums around Kaleiçi (Koç Museum, Erimtan Museum, Chess Museum, etc.).

Prague Castle; According to the Guinness Book of Records, it is the largest ancient castle in the world. Indeed, when you reach Prague Castle, which has five main entrances, if you do not have a comprehensive map presenting the buildings and building groups, you can only visit St. You may have to settle for that by reaching the Vitus Cathedral directly (Figure 19).

It can be easily reached from all parts of the city with the public transport system and there are tramvay and metro stops close to both entrances (Figure 19). In the south-east, near the old castle stairs, there is the Malostranska Metro stop. At this point, there are tram stops above the ground. After getting off here,

if you turn left, you will reach Valdstejnsky Palac directly from Valdstejnska street.

Today, it is home to the Czech Parliament. Prague Castle is 570 meters long and 130 meters wide. In Prague Castle, the kings of Bohemia and the Holy Roman Empire and the heads of states of Czechoslovakia and the Czech Republic kept offices in this place. The establishment of the first parts of the castle goes back to the 9th century (870).



Figure 19. Prag Castle Entrances, Courses, Building / Building Groups (Scheme) (Source: https://www.praguecityline.com/prague-castle)

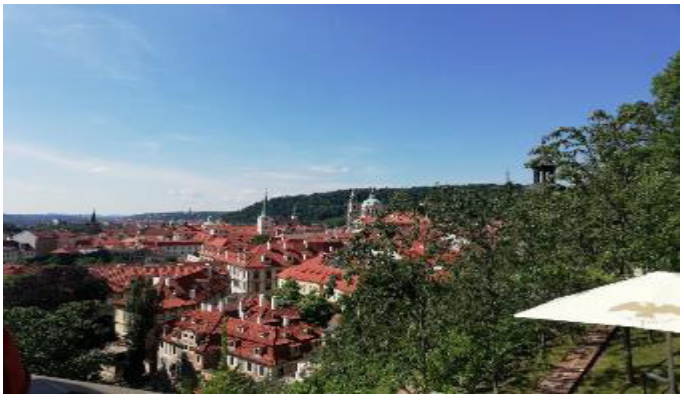


Figure 20. Exit to The Prag Castle Overview of The Petrin Hill According To The Pedestrian (Photo: M. Tunçer, 2019)

Prague Castle has one of Prague's most beautiful and expansive sights and sights. It is possible to admire the magnificent preserved view of the city of Prague from every point (Figure 20).

It is very easy and beautiful to perceive the city from every angle, as it is not surrounded by multi-storey ugly concrete apartments like Ankara Castle. One of the beautiful city principles is the separation of the historical texture of the city from the new city, and the exclusion of buildings in the old city that are incompatible with the historical environment (Figure 21).

The houses in Prague Castle, which are paved with smooth parquet stones, the slope of which is well adjusted, and the houses seen while leaving a scenic stairway are 4-5 floors, they are structures that are in harmony with the traditional texture in terms of architectural style and have been restored to a great extent. The roofs are well-maintained and repaired with the same type of tiles, creating an aesthetic view with skylights. There are no warehouses, bowls, TV antennas, solar panels, hanging laundry, etc. on the roofs.

While visiting Prague Castle, it is necessary to learn not only Prague's main landmarks, but also the deep-rooted and rich and interesting historical past of this section.



Figure 21. Main Axle with Steps Leading to the Prag Castle (Photos Aytekin, 2019)

Much of the history of the Czech Republic has been created precisely in Castle. Compared to the magnificent basalt structure of Ankara Castle and the medieval construction techniques, we see that the Prague Castle is not very strong.

Georgios Basilica and St. Vitus Basilica was built in the 10th century. Later, churches were built inside the Castle, the first being the Church of Virgin Mary and St. George and St. Other churches dedicated to Vitus were built in the first half of the 10th century.

Since the 10th century, Prague Castle has been an administrative center where the head of state, the prince and later the king lived. Apart from the heads of state, it was also the seat of the Prague bishop, who was the highest representative of the church.

Kaleiçi residences, which have been left alone in Ankara for almost 100 years, have recently been repaired. The Metropolitan Municipality, "Department of Cultural and Natural Heritage" started to implement the *"İçkale 1st Stage Street Improvement Project"* in order to repair 91 buildings in Ankara Castle, Inner Castle. In addition to this, the maintenance and repairs of 77 buildings are planned to be carried out without losing their originality. These implementations will be the most comprehensive repair work carried out in the Inner Castle for the last 40-50 years, even since the beginning of the Republic (Tunçer, 2020, information from Head of Department Ödemiş, 2020) (Figure 22).



Figure 22. Repair Works Continue In Ankara Inner Citadel (**İçkale**) (Photos: Ayyıldız, S.)

4. Conclusions and Recommendations

Throughout history, people have sought beauty, artistic and aesthetic qualities in the physical environments they create as well as in the buildings they live in, and with this concern, they have sought to organize their environment. Cities shaped by the combination of natural and human-made cultural elements are wholes with different qualities from the parts that make up them. Both single buildings and the environment created by the combination of buildings and open green areas should not only meet the biological needs of the human being, but also have aesthetic qualities that meet the psychological and intellectual needs.

The cities of the Ottoman period were the most beautiful and magnificent cities of the period with the highest aesthetic value as a result of the kneading of architectural works with art. Magnificent mosques, inns, baths, covered bazaars and complexes were built in cities such as Istanbul, Edirne, Bursa, Kayseri, Konya also Ankara etc., as an indicator of development.

These buildings, with the residential buildings around them, have created livable, healthy and well-equipped cities, beautiful and aesthetic cities. However, unfortunately, aesthetic and beautiful applications could not be made in Ankara, especially in the historical urban fabric. Compared to the Prague historical urban texture, it is seen that there are many more planning and practices that need to be done. First of all, it was necessary to prepare the *"Ulus Historical City Center Conservation Plan",* which was canceled in the 1990s until 2005 and was canceled afterwards, although it was made twice.

Conservation Plans and urban design and landscape projects should be prepared for Ankara Kaleiçi and its surroundings in line with the principles of "Beautiful City" and historical environmental protection and improvement.

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CHAPTER XXXI

THE APPROACHES OF URBAN OPEN SPACES DURING THE COVID-19 PANDEMİC

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1. Introduction

Cities are the localities where the communities and people, individuals of all sorts of classes and various ethnic groups live together, socialize and interact with each other (Erdönmez and Akı, 2005).

Such unique and idiosyncratic way of life and culture of each city, the integrity of the emptiness and spaces that make up the city, and their relations with each other define the character of that city (Önal, 2014). One of the important components that ensure integrity in cities, urban open spaces (Çorbacı and Ertekin, 2017). These are outdoor spaces that are open to people's free access (Madanipour, 1999; Nasution and Zahrah, 2012; Bayramoğlu and Yurdakul, 2019), spaces where people live their beliefs, share their thoughts and trade commercially or simply rest and have fun (Gehl, 2010). Urban open spaces are areas that have a great importance in the daily life of people living in cities (Woolley, 2003). The large number of people using these areas reveals the value given to urban open spaces, and this is due to the diverse functions they provide (Hernandez Garcia, 2013). Functions can be described under the following main

headings: This unique way of life and culture of each city, the integrity of the occupancies and clearances making up the city, and their interrelationships define the character of that particular city (Önal, 2014; Demirel and Bayramoğlu, 2019; Öztürk et al., 2018). One of the substantial components ensuring the integrity in cities is the urban open spaces. These refer to the open outdoor spaces available for the free access of the people (Madanipour, 1999; Nasution and Zahrah, 2012; Alpak et al., 2019; Düzenli et al., 2018) in where people practice their religious rituals, share their thoughts and perform commercial exchanges or simply relax and entertain themselves (Gehl, 2010). Open urban spaces are areas having a great importance in the daily lives of the people living in cities (Woolley, 2003). The large number of people using these areas reveals the value attributed to the urban open spaces, and this is due to the comprehensive variety of functions provided thereof (Hernandez Garcia, 2013; Alpak et al., 2018). Functions can be described under the following main titles:

Environmental and ecological functions: climatic improvement, noise reduction, impact on the hydrological cycle, providing habitat for wild plants and animals.

Social and societal functions: providing places and opportunities for recreation, facilitating social contact and communication, developing the spirit of being a community, accessing and experiencing nature, influencing the physical and mental health of the people.

Structural and aesthetic functions: Defining and associating the urban texture, improving the legibility of the city, creating a sense of space and raising the image of the city.

A certain part of the open spaces forming the cities is consisted of the urban green spaces. These spaces are very important for their psychological, physical and mental health by providing opportunities for the people living in the cities to benefit from the active and passive use of green spaces and fulfill their recreational requirements, as well as providing opportunities for the people to establish connections with the nature.

Following the Covid-19 pandemic, one of the substantial functions of urban green spaces has become prominent once more. This functionality refers to the necessity of urbanites to use green spaces to alleviate the crisis caused by the pandemic. The Covid-19 outbreak is not the first epidemic in where the cities and the urbanites thereof start to enjoy the green spaces to reduce the impacts of epidemics. The indicative of this condition along with the cholera epidemic

of the past has led to the creation of the Victoria Park in London (Waller, 2000), Central Park in New York City, Emerald Necklace in Boston and the green and large recreational and excursion boulevards surrounded by trees in Paris (Savitch, 2014; Lu et.al., 2020; Allam and Jones, 2020; Herman and Drozda, 2021).

During the pandemic of the influenza, clean air, sunlight and mild exercise were determined as treatment methods; it has been revealed that the number of infections and deaths decreased in open-air hospitals. In addition, research has shown that severe patients the treatment of whom was performed in the fresh air recover faster than those at home (Roberts and Tehrani, 2020; Herman and Drozda, 2021). These have made green spaces an integral component of the urban environment. The availability of urban green spaces in greater quantity and size can improve the ability of the cities to cope with possible pandemics. Because green areas will constitute spaces for the residents of the city in the situations where people feel the need to physically distance themselves from each other as well as during the closures where leisure opportunities are limited. However, as urban growth accelerates, the number of green spaces is being reduced in cities around the world, despite the health benefits they provide to city dwellers. The COVID-19 pandemic is reintroducing the significance of urban green spaces as a key quality of life element in sustainable cities (Kleinschroth and Kow**ari**k, 2020).

2. The Concept of Pandemic and The Impact on Human Life

Pandemic is an epidemic disease spreading rapidly all over the world which becomes effective in a short time. Epidemics have occurred many times in the history of the world, resulting in the death of millions of people. A pandemic is defined as an epidemic of an infectious disease spreading beyond a certain area and affecting almost the entire population (URL-7, 2020). The epidemics which have started with the plague in the 14th century and continued with cholera in the 19th century proceed with the flu in the 20th century as a viral disease constantly changing its shape. Spanish flu, the first major pandemic to emerge during World War I in the 20th century, is one of the largest epidemics in society's history and caused the death of around 50 million people in 18 months, through the infection of more than 500 million people (Temel, 2015). However,

unfortunately, the world has not been prepared for viruses in the course of time. As a matter of fact, the coronavirus epidemic that started in Wuhan, China and spread to the world in a short time has clearly revealed this situation. Reasons such as the ease of transportation and the excessive density of the population of the cities facilitated the rate of transmission of the virus. As a result, the number of cases reported globally currently exceeds 179 million, with approximately 4 million cases of COVID-19 resulting in deaths (WHO, 2021). Thus, the pandemic process directly affected human life and changed the way of life in a visible manner (Cumming et al. 2015). As this process has been prolonged, the number of people in contact with the virus has increased. Therefore, strong impacts of the virus have been observed not only in the biological sense, but also in the social, environmental and economic sense (Muhammad et al, 2020; Venter et al, 2020).

2.1. Economic impacts

During the pandemic process, radical measures have been taken globally to reduce the rate of transmission, and the result of such measures affected the economy the most. The negative impacts experienced through the supply-demand relationship have led to a worldwide crisis. First, the countries closed their borders and then restricted the outflow of their citizens, primarily to restrict transportation and public mobility (Musselwhite et al, 2020; Venter et al, 2020; Honey-Rosés et al., 2020). Travel restrictions created due to this situation, strict measures taken in the social field and curfews have directly affected the economy negatively. On the other hand, the lessons learned through such restrictions and the idea of the possibility of contagion of the virus drove people away from the "streets" where they spent a long time and lingered in the past. This situation indirectly affects the economy negatively. Because the potential rents of commercial real estates in city centers are determined by the density of pedestrians spending time on these streets (Honey-Rosés et al., 2020). However, according to the assessments announced by the Organization for Economic Co-operation and Development (OECD), it has been predicted that the economy will shrink by at least 2.4% globally in 2020 (OECD, 2020). The closure of food and beverage establishments, transportation restrictions such as land air and railways, social support payments, 70-80 % cessation of tourism and sports activities, expenditures in the health and public sectors have caused

serious economic problems all over the world. It is stated that the increase in the cost of travel restrictions and the decrease in international tourism income cause an additional cost of 30-50 billion dollars to the economy of the countries (URL-8, 2020).

2.2. Social Impacts

One of the other problems of the pandemic, which affected the whole world, is the issues in the social field. Cities around the world have taken various social distancing measures as the most effective way to reduce the spread of the virus (Wilder-Smith and Freedman, 2020; Lu et al., 2020). This situation led to the understanding of individuality to become prominent and social isolation has become a way of like due to the distance in social relations (Gierueld et al, 2006). Secondly, activities such as celebrations, meetings, neighborhood relations, gathering out and dining out for were limited in this period and individuals have lived in an isolated manner from social life which damaged the sense of being a society. The obligatory use of masks, social distance and hygiene rules have led to the disappearance of actions expressing sincerity such as hugging and shaking hands. A new lifestyle has begun to be adopted in the society along with the epidemic and due to physical restraint and limited contact, our old habits have been replaced by new behavior patterns and habits. This creates the concern that such new experiences will cause permanent changes on people's sense of place and space. It has been observed that when urban dwellers go out of their homes, they engage in unusual and distant social interactions. This situation further strengthens the idea that social relations occurring in public spaces it may change (Honey-Rosés et al.,2020). However, the presence of people in a public space and their social interactions are interpreted as an indication of the functionality and healthiness of the public space (Gehl, 2010). The pandemic may change past habits in cities and require a reorganization of pedestrian models and socialization models based on historical data. The manner we collect and interpret data on socialization in public life may also change after the post -pandemic process (Rosés et al.,2020).

2.3. Environmental Impacts

With the onset of the epidemic, partial reductions in air, water and environmental pollution have been observed. While the epidemic process had devastating

effects on the one hand, it has also led to positive developments, causing some balances to change, on the other hand. The isolation of people at home and the decline in tourism, trade and the economy created positive impacts on the environment. Due to the decrease in the number of vehicles in traffic, significant improvements have been made in the atmosphere. The nature has been left to its own devices the air has beome cleaned and nature has found the opportunity to renew itself. Partial and full closures experienced in the epidemic have positively affected the environmental quality of the world by reducing harmful gases in the atmosphere (Lal et al., 2020). The positive environmental impacts of Covid -19 can be summarized as follows (Zambrano-Monserrate et al., 2020):

- Decreased concentrations of NO_2 and $PM_{2.5}$
- Clean beaches…
- Reduction of environmental noise level
- Increased waste
- Reduction in waste recycling

Attention was also drawn to air pollution during the pandemic period. It has been revealed that the survival time of the virus in the air is prolonged in spaces where the air pollution is intense. In this context, it has been observed that the density of air pollution, facilitating the virus uptake, is positively correlated with the number of patients in areas where it is high in some studies (Tamosuinas et al, 2014). On the other hand, serious pollution has started through the disposal of the masks that are required to be worn around the world in the environment and in the waters. In this process, the wastes generated using the chemical cleaners such as excess detergent and soap has threatened the environment. The release of such intense chemicals into the environment through wastewater causes intense destruction. In addition, the home isolation of people and the excess of domestic and medical solid wastes caused by excessive consumption have become a problem.

3. Effects of the Pandemic on Urban Open and Green Space Use

The urban open and green spaces are places where people engage in recreational activities in their spare time, have the sense of belonging to the society they live

in and express themselves in the best manner. The society of the 21st century prefers urban open and green spaces as an escape area from the hectic business life, stress, traffic and crowded population. People consider such spaces as a peaceful environment where they can be alone with nature and away from noisy city life. The point triggering such desires and expectations of those living in urban spaces is the normality and customary nature of urban life. In terms of psychological and physical sense, such spaces provide people with many recreational activities such as trekking, running, cycling, picnicking, observing animals or sunbathing and they heal the residents of cities physically and psychologically (Güngör and Öner, 2020).

The concept of urban open and green space expresses continuity; it is dynamic. It expresses the bond between people; it is the difference, and it is the whole of opportunities. In the light of all these, especially green areas should be designed with a focus on spending crisis periods under better circumstances. Thus, livable, sustainable healthy cities can be created. The processes directly affecting the living conditions in every sense, such as pandemics, have increased the significance of the concept of urban open and green spaces. Across the world, such changes shift the manner of using urban spaces while altering the wants and needs of the people living in the society (Örselli and Akbay, 2019). It has been observed that especially urban open spaces with green texture have been given more importance in this period and revealed that there is an increase in the use of green spaces in cities where controlled social distance measures are implemented (Lu et al., 2020; Karl et al., 2022). Because it is a human instinct to escape from harsh conditions and infectious disasters to nature (Tuan, 1998). Therefore, during the pandemic, the increase in the use of green spaces is a way for urban residents to cope with the pandemic. This raises the question of whether urban green space, including public parks, natural vegetation, and peri-urban forests, plays an important role in the way citizens adapt to pandemic containment measures. In a study conducted by Venter et al. (2020) in Oslo, Norway, it has been found that recreational activities had increased significantly during the restrictions of the pandemic period. It has been revealed that especially these activities take place mostly in green areas and in areas far from the city. In addition, the benefits of green areas during the pandemic process are stated as follows in the said study (Holmes et al. 2020; Venter et al., 2020):

- Green areas allow the citizens to spend time outdoors by following the social distance rules.

- Green areas provide opportunities for sports activities that are prohibited indoors.
- Green spaces allow individuals to escape from stress during restraint.
- Green spaces can slow the spread of the virus by facilitating to follow social distancing rules.
- Green areas are important for the relief of people who have psychological pressure under pandemic conditions and for easing said pressure.

In another study, the health benefits of using urban green spaces during the pandemic were stated as follows (Lu et al., 2020; Karl et al., 2020):

- It allows to maintain physical activity, with widely applied social distance measures, there is a net decrease in the physical activity level of many people. Therefore, the people adopt a sedentary lifestyle. However, urban green spaces can provide a suitable environment for people to continue their physical activities.
- It allows to reduce the use of electronic devices, the approach of working from home causes people to use electronic devices for daily work and communication. Long-term use of electronic devices can increase the risk of depression and feelings of loneliness. Therefore, visiting green spaces can provide a break from electronic device use.
- Helps to reduce stress, people feel stressed during the pandemic, especially when they are in closed environments. Visiting green spaces during the pandemic can offer opportunities to connect with nature and reduce stress.
- Provides avoidance of home stresses, due to prolonged stay at home people are prone to potentially harmful interpersonal stimuli, including domestic violence, disrupted family relationships, and a sense of crowding. Urban green space visits can reduce exposure to such negative stressors.
- It allows to increase socialization; it is possible to maintain social contacts in green areas and still comply with social distance measures. It is recognized as central to social interaction in visual communication, as found in neuroscience and cognition studies. Therefore, seeing others in green spaces provides socialization. The pandemic process has changed the shape of the equipment contained in the urban green areas, the design of the green areas and, in short, the spatial organization and enabled designers to develop a new perspective.

4. The Impact of The Pandemic Process on The Equipment Elements in Urban Green Areas

The entire elements designed and used in an urban space or a landscape area to satisfy the requirements of users such as entertainment, comfort, protection, circulation control and information are defined as “furniture element” or “urban furniture” (Chiesura, 2004).

With the removal of the restrictions in the form of partial periods, people consider green spaces as places where social distance would be maintained and they sought a place where they could breathe, spend pleasant and quality time, and stay in touch with nature.

In accordance with such requirements, there has been an increase in the quantity, creativity and popularity of outdoor social equipment elements in recent years. During Covid 19, people were most concerned about health and safety measures. The crisis and uncertainty period that occurred at the beginning of the pandemic first forced short-term solutions. Afterwards, innovative solutions were produced so that the society could enjoy safe areas while maintaining physical and social distance. Due to Covid 19, transformations have been carried out in almost entire areas, namely benches and seating groups, children’s playgrounds, bicycles, pedestrians and highways so that people can safely perform their recreational activities. Despite all kinds of restrictions, equipment and structural elements suitable for use in the pandemic process have been produced, such as benches with a social distance of 1.5 meters, which can provide comfortable spaces for people, suitable bicycle paths, minimum contactless play elements for children, functional and distance walking paths.

A healthy and safe system-order has been established for the people to adapt to the new situation such as sitting benches ensuring social distance and shadow elements, disinfectant stand, disinfectant booths and mask and glove waste boxes (Fig. 1-2).



Figure 1. Sitting element (URL1-2020)



Figure 2. Disinfectant stand (URL2- 2020)

Within the framework of all these reasons, designers produce safe solutions within the scope of social distance rules by re-associating the society with outdoor spaces and equipment in accordance with the requirements of people. When we look back at the point we have reached, we observe an urbanization in which a planned and healthy city concept is tried to be created and the old and the new are blended.

5. The Impact of The Pandemic Process on The Design of Urban Green Spaces

The impacts of coronavirus continue in the world. With the implementation of radical decisions such as curfews, social distance, mask use and many bans, people have now accepted the new concept of normalization. From the mask-distance-hygiene slogan to the 'life fits at home' practices, the society has now started to adapt to the new normal way of life. All this has led to the requirement to redesign the spaces, to socialize and to make physical activity suitable. These practices can be illustrated as follows; the restaurant of an art center in Amsterdam welcomes its guests outdoors by transforming the pentagon-shaped greenhouses they used in different projects before the pandemic into dining rooms for 2 people (Fig. 3). Thus, while making people feel safe with the transparent structures placed along the river, it individualizes a pleasant dining experience.



Figure 3. Outdoor space of an art center restaurant in Amsterdam (URL3-2021)

Social distancing rings in outdoor green urban spaces are also a good example of safe use of green spaces during the pandemic. Social distancing rings, the first example of which were seen in Brooklyn, are 1.8 m. at intervals of 2, m. diameter, is based on drawing circles on grass (Fig. 4).

With the social distancing rings that started to be implemented in Izmir and Mersin after Istanbul, it is aimed for users to live the time they will spend in green areas in a controlled, safe and comfortable manner. (Fig. 5).



Figure 4. C'entro by Blengini Ghirardelli (URL4-2021)

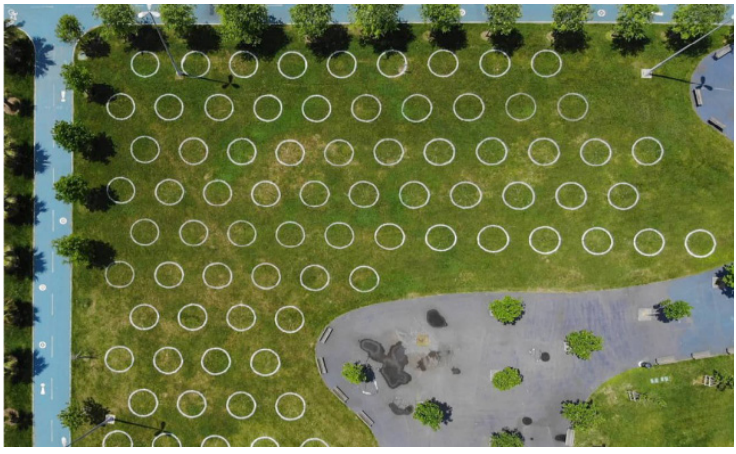


Figure 5. Orhangazi City Park; Maltepe,İstanbul (Courtesy of İstanbul Metropolitan Municipality, Directorate of Parks, Gardens and Green Spaces) (URL5-2021)

The Giotto Piazza in Italy has been rearranged to ensure social distancing in the public domain. The floor of the piazza was painted in white in grid system, taking reference the distance of minimum 1.8 meters determined for the Tuscany Region (Fig. 6). Thus, it is ensured for the users to benefit from the piazza while maintaining the social distancing.



Figure 6. The rearrangement of Giotto Piazza
in Italy in accordance with the social distancing (URL6 2021).

As it can be understood from these practical solutions emerged, COVID-19 compels the societies to think, act adopt rapidly while producing new models of use.

We have been increasingly endeavoring and producing solutions on the public open spaces during the recent years. In other words, our works in this scale are in a more apparent state naturally more than the others.

The urban open spaces can be an excellent starting point to observe the potential change within the world in the post-pandemic period. It is evident that the parks, coasts, streets and squares are to be empty for a while. But this will not last long. Humankind intrinsically is not a living-being suitable to be locked down at home. When the danger of pandemic no longer exists or the risk is decreased, people maybe act cautiously more than ever, but they shall definitely go out and occupy the public domain.

Urban green spaces allow individuals to socialize and interact as an important part of their social lives. Urban green spaces are suitable environments to get away from the urban rush and relax, sit under a tree, touch the ground, walk or watch the sunset. Besides, such spaces further offer an experience in where people reestablish the tie with the nature which has been lost long ago within the urban life. Therefore, the process of pandemic in which the freedom is restricted and the social distancing is of utmost importance requires the green spaces to be explored once in terms of both the design and the intended use.

6. Conclusion

If a "right of city" is available as stated by Lefebvre (1995), it is required to be considered that accessing to the public domain and ability to live in this space is a "right" entitled. In this case, the space is used not only individually, but collectively, that is, publicly (Koch and Latham, 2012). Therefore, we are required to be prepared for the process of pandemic in order for the common life to sustain in the cities. It is required to be ensured that green spaces, having many benefits for the individual, serve as spaces in which the urbanites can socialize, relax and get to know their surroundings, also serve common life during the pandemic period. In today's world, where there are minimal communication facilities with the exterior, which is locked downed to homes, urbanites need areas where they can have a good time, except the prohibitions.

As a result of the studies conducted, it has been observed that people increasingly require to use green spaces during the process of pandemic and throughout the normalization period (Venter et al., 2020). Because contact with the nature provides a set of positive welfare effect and enables to maintain the social distancing.

The short- and long-term benefits offered by accessing to nature within the city can be summarized as such; it ensures to maintain the metal and physical health, social relations and communication with the natural world in the short-term and in the long-term, it ensures for the opinions to be produced regarding how the right to access to nature is to be regulated and how these areas are to be constructed accordingly.

However, limited number of green spaces as a result of the intensive urbanization may lead to certain issues during the process of pandemic. Because the increase in activities in urban green spaces in the course of time can make green spaces overcrowded and therefore social distance cannot be maintained. For this reason, it is required to design potential solutions and create social mechanisms and policies matching with the recreation models. In this context, green spaces are required to be provided with a wider scope within the planning processes and green justice is required to be ensured within the society. In other words, access of the individuals to green space should have a similar distribution (Wendel et al, 2012).

COVID-19 is neither first pandemic encountered by the world nor shall be the last one and certainly not the first one in which the urban space planning

and design are focused for improvement for the urbanites. However, during this process caused by this pandemic, politicians and urban planners are able to focus on preserving the current green spaces and increasing the amount of limited green spaces.

Developing innovative but low-budget strategies by the executives in the municipalities is required to be among their substantial duties for the purpose of increasing and boosting the use of urban nature (Herman and Drozda, 2021). Thus, it shall be feasible for the users to benefit from these spaces by complying with the social distancing rules.

Pandemic should serve as a beneficial tool to remind the requirement of establishing policy to preserve the remaining open spaces and create new green spaces and transform such into a governmental action. This condition is required to draw attention to the requirement to reconsider their thought of selling the public lands in their possession due to budgetary deficits of the local authorities (Rodge**rs, 2020).**

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