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Natural Urban Design In Sustainable City Model

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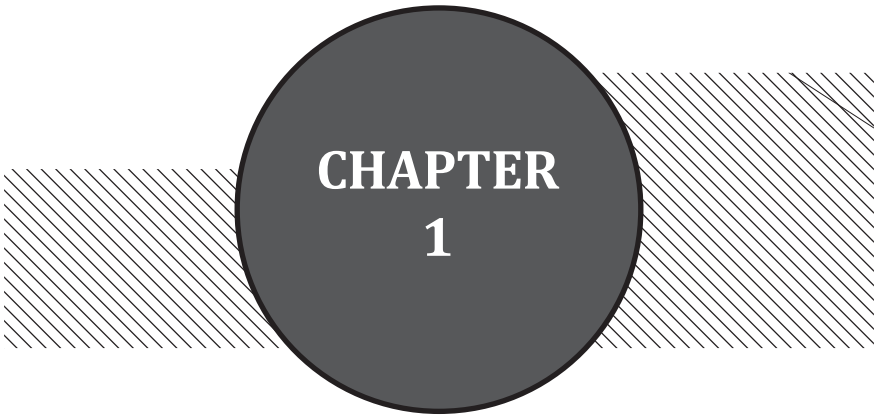

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1. INTRODUCTION

Cities are a dynamic structure with different meanings and concepts during the time depth of all historical periods (Topal, 2004). In fact, it is a way of life integrated with social, political, administrative and economic areas exist for people life. Furthermore, it has a life quality value that must be defined in all dimensions surrounding and affected by itself (Hayta and Alkan, 2016). The city, with the general definition, is settlement consisting of small units where the needs of society such as settlement, shelter, work, recreation and entertainment come together under the city identity (Altuntaş, 2012). It is a settlement that consists of small units where the needs of society such as settlement, shelter, work, recreation and entertainment come together under the city identity (Altuntaş, 2012). Cities are not only physical, but also social, political, cultural and economic social areas that benefit society (Altay, 2007). Cities have always taken an important place for human life because civilizations and trade begani developed and advanced in cities as soon as urban life began. In this context, cities are the living space of people, as well as being inherited for future generations (Durguter, 2012). The distorted balance of cities between nature and human can be rebalanced within the framework of sustainability principle (Altuntaş, 2012). Cities are self-renewable innovative centers (Toprak, 1998), but also have a sociological structure that includes traditional and unchanging elements (Bal, 1999). However, as a result of the rapid development and change of cities, the concept of sustainable cities has emerged in addition to innovative and traditional cities.

According to Geray (1998), rapid population growth in today's cities has led to the emergence of sustainable urbanization and urban quality of life concepts (Üstün Topal et al., 2016). Sustainable urban means that the sustainability of communities. Because of this fact, city' people are affected by the place where they should live. For this reason, sustainability can only be achieved by ensuring the continuity of the quality of life of the living and future generations. Sustainable urbanization is a measure taken by the experts due to the environmental pollution caused by the urbanization that comes with technology, fossil fuels, the increase of greenhouse gases, deforestation, the pollution caused by the production and consumption. Because of this reason, the aim of sustainable urbanization is to create habitable cities for today and future, in addition, to establish a healthy relationship among human-nature-economy (Aslı et al., 2005). Today, a nature-centered design approach based on urban design ecological approaches should be preferred within the framework of the city concept.

1.1. Sustaınable Cıtıes

The sustainable concept started in the 1980s and it was not only a determinant of environmental policies but also integrated with economic and social development (Mengi and Algan, 2003). Especially, the United Nations Environmental Conference was held in Stockholm to develop the concept named ecologically sensitive cities in 1972. Firstly, sustainability concept was included in the World Natural Charter document by IUCN in 1982. According to this, people should protect the ecosystem, organisms, land, sea and atmosphere resources in their life (Tosun, 2013). This concept was widely used after the report named "Common Our Future" held in 1987, which was prepared by United Nations Environment and Development Commission (Kayıkçı, 2012). This concept is the starting point of the concept of sustainability, which has also come up in the context of the Environmental Development Conference held in Rio in 1992. It is focused on preventing environmental problems arising in line with economic and technological developments and protecting the ecosystem (Korkut et al., 2017). Sustainability is the continuity of quality and quality life of today and in the future. In this context, the definition has an economic, social and ecological content (Akkoyunlu Ertan, 2007). However, environmental,

economic, political, social, institutional and cultural objectives, which are the elements of sustainability development, can be considered as part of the urbanization process (Satterthwaite, 1997). The sustainable urbanization approach examines the interrelation of all environmental (built environment / natural environment), social and economic factors that affect urban development and urban expansion. It also aims to integrate economic and social development with environmental protection and improvement. This development should be decided by participatory processes (Karakurt Tosun, 2009). In this context, sustainable urbanization approach includes issues such as urban design, housing, transportation, environmental protection and restoration, equality and environmental justice, economic development and population issues (Wheeler, 2004). The objectives of sustainable urban development based on the determined principles can be listed as the use of increasing the quality of life, resisting poverty, providing biodiversity, following the developments in technology, eliminating the risks, preferring the renewable energy sources.

1.1.1. The Sustainability Of Urban-Nature Relationship

The widespread urbanization effect destroyed the natural areas and thus the natural areas were transformed into a congested built environment in the 19th century. The urbanization became widespread in rural areas in the 20th century. In this way, the movement of restoring nature to the cities has increased through the modern agriculture movement in rural areas. Then, because of the reverse migration movement that started from the cities to the rural areas, the abandoned areas in the cities gained suitable habitat potential for wildlife (Nicholson-Lord 1987). The relationship between human and nature is the reason for existence. In this background of this relationship, human beings are living in nature dependent on existence. It means that nature and natural elements, which are important for living, must always be together with the person who is still alive like themselves throughout life (Gül, 2013). The relationship between changing technology and nature-man has also changed in the course of time. Understanding the change of this relationship is the landscape theorist John. As B. Jackson says, it is through understanding the basic conditions of our identity about our existence in the world (Höfer and Trepl, 2010). People actually need a healthy natural environment for surviving. All kinds of raw materials required for the production of industrial products are also found in nature. In addition, most of the recreation activities occur in nature (Kraus, 1971).

1.1.2. Nature Based Design And Advantages İn The Sustainable Cities

Urban designs began to emulate and imitate nature in the recent years. Rural experience in cities was first presented to the Rehovot Urbanization Conference in Israel in 1971. According to the report, Weitz stated that it was not only possible but also a necessity to prevent agglomeration in the urbanization process. This concept is also referred to as a rural city with a combination of social-economic units (Durguter, 2012). Urban planners and designers prefer urban style designs. Planners can create places in the city to remind people of green and nature without going to rural areas. In this context, the concept of design in natural style was defined by Hitchmough (1994) and later developed by Kendle and Forbes (1997). They have argued that the urban designs integrated with natural style have positive effects. In this way, landscapes can maintain their original characteristics, create low-cost landscapes, and increase the value of spaces in terms of environmental protection, environmental education and recreational use and thus, it may be possible to have a voice in landscape design (Özgüner, 2003). According to Kendle and Forbes (1997), nature-centered designs create a search for solutions to achieve the objectives of nature conservation, environmental design, environmental education, aesthetic quality and management objectives.

Economically: Nature-centered designs in urban areas are more economical than classical and formal designs. With the spaces designed according to classical methods, more energy and technological intervention is required to create the desired effect. However, the natural landscaping systems that provide their own maintenance provide economical and minimum cost and sustainable service (Dunnet and Hitchmough, 1996). According to Bradley (1982), natural systems in cities offer the opportunity for transition to low-maintenance landscaping systems. Similarly, Kendle and Forbes (1997) state that the classical practices of urban design in complex style are more economical. It is known that the maintenance works in the natural style areas reduce the cost (Corder, 1986; Yates and Ruff, 1991).

Aesthetically: Aesthetic landscape design and planning is a quite important design principles case. In applications of natural design style, it is positive in terms of creating dynamic and different places in terms of imitating nature (Yates, 1991) because the natural landscape attracts the attention of people creates attractive places. In addition to this, it has proved that this kind of landscape as aesthetically beautiful because of his stimulating characteristics and cultural and symbolic importance (Kaplan and Kaplan 1989).

Designers should offer qualified living spaces in sustainable urban areas and be able to meet the expectations of users. It is impossible to ignore the natural, physical, social and economic characteristics that determine the quality of the space in these successful designs. For this reason, it is necessary to utilize topography and climatic data from natural elements in urban designs.

1.1.2.1 Using Topography

Topography is a science detecting land properties, shape and height and transferring them to paper. People from ancient times to today have positioned their cities to the topography for centuries. The topography using in all civilizations is the most important factor in the culture of the place and emerges as a result of the relationship between human and nature. Topography provides the connection of landforms with different levels. It is an effective design tool that gives information about underground and above and has a continuous and dynamic structure. In Çatalhöyük, one of the first settlements, the buildings were placed at different heights of the hill (mound). Thus, it provides the necessary light for all houses and also helps to store the heat (Yürekli, 1993; Köse, 2010). Topography can be used in different ways in different cities, Topographic data with elevation differences of bumps and pits can also be used by individuals with different characteristics (Figure 1).

Figure 1. Using topography (URL, 1; URL 2)

According to the principle of accessibility in cities, it should be ensured that people can reach other activities, services, information and places (Lynch, 1984). Elevation

differences of topography can be solved by stairs and at the same time they can be organized in the form of seating steps to create a variety of activities. The steps of the stairs built in the green areas are both natural and functional. These kinds of steps also allow the user to perform activities such as sitting, reaching and watching at different height levels. People sitting at different height levels have the opportunity for users to observe other people and how they look at the environment (Whyte 1979). These such design applications provide to create sloping green surfaces in urban areas, offer flexible use, and allow freedom of movement for users (Figure 2).

Figure 2. Using topography in recreation areas (URL, 3; URL, 4)

1.1.2.2. Using Climate Data

Climatic data is one of the most important factors that affect directly the designer and planner to make healthy decisions for the place. The temporal change of the climate data in the region is quite important for the comfortable using. Using of dominating climate data of region can also be effective way for the success of the design principles because this data allows the user to find and feel comfortable by improved the quality of the space. For this purpose, in order to design compatible spaces integrated with nature in urban areas; the average temperature of the year, the average number of hours of sunshine, average rainfall, the average number of days of drought, the lowest and highest temperatures felt, the level of humidity during the year, the direction and strength of the wind should be reached with sufficient data (Beer, 1990). Wind, daylight-radiation, humidity and temperature are interrelated, and these data are important climatic factors affecting human comfort. Depending on the climatic structure, these data should be evaluated, precautions should be taken to protect against harmful effects and positive effects should be utilized to design more useful and comfortable urban spaces (Şahin and Dostoğlu, 2007).

- **Using the sun light:** Sun is a natural element as climatic data which is preferred in winter but is not preferred in summer. For this reason, it is necessary to use the sun as much as possible in the cities and protect them from the damages in summer. In this context, landscape elements and building forms can change the climate to a great extent. Planted areas can be used for climate control and they are preferred due to absorbent and reflective features. Trees create cool shadows and reduce the ambient temperature in summer and provide to reach of the heat of sunlight in winter. Furthermore, it provides a cooling effect thanks to the evaporation on the leaf surfaces (Oktay 2001).


Figure 3. Using climate data with sun light (URL, 5; URL 6)

- **Using the wind:** The wind in the climate data is actually not preferred in urban open spaces. Because generally, users avoid places with wind. For this reason, designers often create wind screens by using natural elements or cover elements to traduce the wind speed. In fact, it can be easily used wind as a natural data and in energy production. Wind turbines provide a clean and inexpensive energy sources and also offer a visually aesthetic image.


Figure 4. Using climate data with wind (URL, 7; URL, 8)

- **Using the rain:** Especially, the seasonal rainfall in some regions caused the urban planners to take new design decisions in recent years. Due to the impermeable surfaces in the cities, the surplus of precipitation water passes to the surface flow and creates image pollution and problems for citizens. The rain water can be directed to permeable surfaces, decreased its speed and purified to solve the destruction of rain in impermeable surfaces of the cities by designing rain gardens, landscape swales, constructed wetland and vegetated roofs.

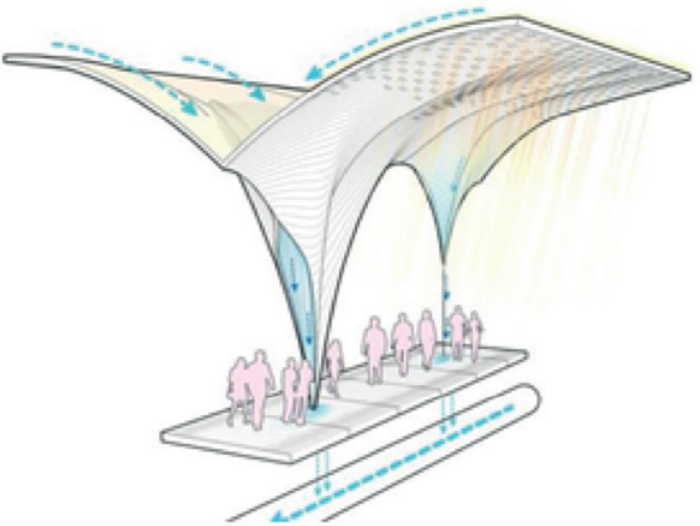

Figure 5. Using climate data with rain (URL, 9)

CONCLUSION

Nature offers unlimited positive activities to people. People's relation with nature is a necessity that they must always be together throughout their lives. This unity is shaped according to the needs of people and changes according to the nature of using. Because of this situation, people tried to search for a piece of nature in their environments.

In recent years, the decrease in the amount of green areas in cities has led to a decrease in healthy livable cities. For this reason, planning of green areas integrated with nature is a first step for the provision of sustainable city administrations. In this context, necessary legal arrangements should be made in order to protect the green areas more tightly and necessary arrangements should be made to increase the green areas per population in urban administrations.

The integration of natural elements with the urban design and planning approaches can enable the production of appropriate solutions to such issues as nature protection, community participation, environmental education, sustainable development, aesthetic quality and lower cost. In this context, many environmental planners argue that natural design should be used intensively in urban green spaces. Thus, natural design can always be preferable for urban design and planning. Natural design may not have advantage in every environment and time. For this reason, although the natural design tendency in the cities can be accepted positively, it is not completely true that different design styles should be not included in the urban green spaces design.

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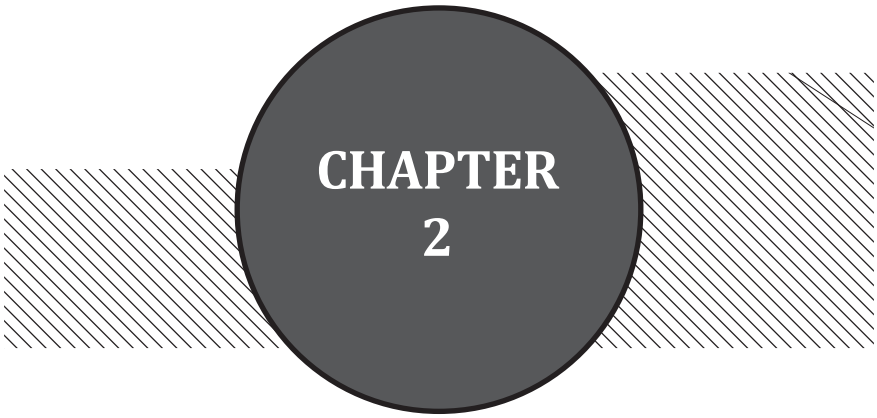
A Mathematical Model Proposal On The Parameters Of Urban Transformation Zoning Practices

Halil İbrahim POLAT[1]



[1] Dr.

1. INTRODUCTION

Successful world examples of urban transformation practices that the city, low-income groups live under bad economic and physical conditions are as follows: Danbara, Solidere, Rio de Janeiro 55. At the same time, the transformation has been the implementation of projects that will contribute to the economic development of the city in the old empty port and industrial areas in the residential areas where the population is lost and social solidarity is lost [1]. In other words, in order to find a solution to the problems of the cities, it is a comprehensive activity in order to provide a fundamental solution to the social, physical, economic and environmental conditions of a region undergoing change [2]. Therefore, improving the living conditions without changing the demographic structure of a project area forms the basis of the transformational spirit. In this context, the structural and regional data of a place to be transformed should be examined in detail and the road map should be drawn accordingly. The analysis of the present situation in an area subject to transformation, the current situation analysis, the demographic and socio-economic structure of the region, geological and geotechnical analysis, earthquake risk, physical structure analysis (structure functions, floor quantities, building types, structure quality, density), property situation, upper scale planning and investment decisions, 1/5000 scale master plan, 1/1000 scale implementation zoning plan, transportation, technical infrastructure, expectations of the households, surveys which will take a picture of the current situation, the study sheets should be in the feasibility and research reports where the problems of the region will be detected in the future. These reports should therefore form the base of a mathematical model.

Mathematical modeling is the attempt to mathematically express the phenomena and relations between events in the most general meaning of mathematics. It is the process of revealing mathematical patterns in these events and phenomena [3]. The Draft Urban Transformation Model (DUTM) is a model in which all the parameters related to each other in a transformation area act together and give results.

In this study; it is tried to explain the methods of zoning in urban transformation regions by defining the relationship between the existing transformation region and the project transformation zone.

Based on the current practices and regulations, national and international boundary conditions have been read and a suggestion has been made on how to make zoning parameters in a transformation model.

2. ZONING PARAMETERS

As it is indicated in the zoning diagram in Figure 1 for the zoning data, the current status database of the selected region was created when designing the model's writing and expression system. Within the framework of the urban transformation approach, an account and analysis method was developed within the framework of national, international and recommendation limit values.

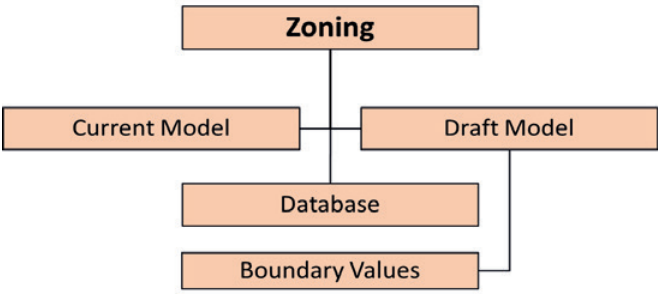


Figure 1. Zoning diagram [4]

The aggregate data index of the group which is subject to the model is examined under the current and draft model headings as in Table 1.

N.	Current (C)	Draft (D)
1	Current gross residential building area (m^2)	Draft population (person)
2	Coefficient of decrease in non-floor areas ratio	Draft residential population (%)
3	Current net residential building area (m^2)	Draft residential population (person)
4	Current gross commercial building area (m^2)	Draft net residential construction area per person (m^2 / person)
5	Current net commercial building area (m^2)	Draft net residential building area (m^2)
6	Current gross residential + commercial building area (m^2)	Draft commercial population (%)
7	Current net residential +commercial building area (m^2)	Draft commercial population (person)
8	Current net building area (m^2)	Draft net commercial construction area per person (m^2 / person)
9	Current population (person)	Draft net commercial building area (m^2)
10	Current net residential construction area per person (m^2 / person)	Draft residential + commercial population (%)
11	Current residential population (person)	Draft residential + commercial population (person)
12	Current net commercial construction area per person (m^2 / person)	Draft net residential + commercial construction area per person (m^2 / person)
13	Current commercial population (person)	Draft net residential + commercial building area (m^2)
14	Current net residential + commercial construction area per person (m^2 / person)	Draft residential development area (m^2)

15	Current residential + commercial population (person)	Draft residential FAR (coefficient)
16	Current total net construction area per person (m^2 / person)	Draft commercial development area (m^2)
17	Current residential (zoned) area (m^2)	Draft commercial FAR (coefficient)
18	Current residential $FAR_{(Real)}$	Draft residential + commercial development area (m^2)
19	Current commercial (zoned) area (m^2)	Draft residential + commercial FAR (coefficient)
20	Current commercial $FAR_{(Real)}$	Draft coefficient of increase in aboveground construction
21	Current residential + commercial (zoned) area (m^2)	Draft residential increase area in aboveground (m^2)
22	Current residential+ commercial $FAR_{(Real)}$	Draft commercial increase area in aboveground (m^2)
23	Current total $FAR_{(Real)}$	Draft residential + commercial increase area in aboveground (m^2)
24	Current residential building coverage area (m^2)	Draft coefficient of increase in underground construction
25	Current residential $BCR_{(Real)}$	Draft residential increase area in underground (m^2)
26	Current commercial building coverage area (m^2)	Draft commercial increase area in underground (m^2)
27	Current commercial $BCR_{(Real)}$	Draft residential + commercial increase area in underground (m^2)
28	Current residential + commercial building coverage area (m^2)	Draft total gross area of construction (m^2)
29	Current residential + commercial $BCR_{(Real)}$	Draft total net area of construction (m^2)
30	Current total $BCR_{(Real)}$	Draft gross/net construction area coefficient
31	Current residential parking lot (quantity)	Draft residential BCR
32	Current residential parking lot ratio (quantity/m^2)	Draft residential building coverage area (m^2)
33	Current commercial parking lot (quantity)	Draft commercial BCR
34	Current commercial parking lot ratio (quantity/m^2)	Draft commercial building coverage area (m^2)
35	Current residential + commercial parking lot (quantity)	Draft residential + commercial BCR
36	Current residential + commercial parking lot ratio (quantity/m^2)	Draft residential + commercial building coverage area (m^2)

37	Current total parking lot (quantity)	Draft residential floor quantities
38	-	Draft commercial floor quantities
39	-	Draft residential + commercial floor quantities
40	-	Draft residential average floor height (m)
41	-	Draft residential Hmax (m)
42	-	Draft commercial average floor height (m)
43	-	Draft commercial Hmax (m)
44	-	Draft residential + commercial average floor height (m)
45	-	Draft residential + commercial Hmax (m)
46	-	Draft residential parking lot coefficient ($1/m^2$)
47	-	Draft residential parking lot quantity
48	-	Draft commercial parking lot coefficient ($1/m^2$)
49	-	Draft commercial parking lot quantity
50	-	Draft residential + commercial parking lot coefficient ($1/m^2$)
51	-	Draft residential + commercial parking lot quantity
52	-	Draft unit parking lot construction area (m^2)
53	-	Draft total parking lot construction area (m^2)
54	-	Draft shelter area per person (m^2 / person)
55	-	Draft shelter construction area (m^2)
56	-	Draft other underground area coefficient (%)
57	-	Draft other underground area (m^2)
58	-	Draft underground total area (m^2)
59	-	Draft total increase area in underground (m^2)
60	-	Draft usage of construction underground (%)

Table 1. Zoning data index [4]

In the zoning database section of the current model, the data obtained from the feasibility studies of the region to be transformed are shown in the variable input column and the data that the variable inputs (VI) establish mathematically with each other in the dependent input (DI) column and the calculation and analysis results are shown in the output (O) column (Table 2).

According to this;

- 37 current types,
- 16 variable inputs (obtained from feasibility studies),
- 6 dependent inputs (determined by the relationship between variable inputs),
- 15 output data (as a result of the equation factors in the parameters section) are obtained.

N.	Type	VI	DU	O
1	Current gross residential building area (m^2)	x	-	-
2	Coefficient of decrease in non-floor areas ratio	x	-	-
3	Current net residential building area (m^2)	-	-	x
4	Current gross commercial building area (m^2)	x	-	-
5	Current net commercial building area (m^2)	-	-	x
6	Current gross residential + commercial building area (m^2)	x	-	-
7	Current net residential +commercial building area (m^2)	-	-	x
8	Current net building area (m^2)	-	x	-
9	Current population (person)	-	x	-
10	Current net residential construction area per person (m^2 / person)	-	-	x
11	Current residential population (person)	x	-	-
12	Current net commercial construction area per person (m^2 / person)	-	-	x
13	Current commercial population (person)	x	-	
14	Current net residential + commercial construction area per person (m^2 / person)	-	-	x
15	Current residential + commercial population (person)	x	-	-
16	Current total net construction area per person (m^2 / person)	-	x	-
17	Current residential (zoned) area (m^2)	x	-	-
18	Current residential $FAR_{(Real)}$	-	-	x
19	Current commercial (zoned) area (m^2)	x	-	-
20	Current commercial $FAR_{(Real)}$	-	-	x
21	Current residential + commercial (zoned) area (m^2)	x	-	-
22	Current residential+ commercial $FAR_{(Real)}$	-	-	x

23	Current total $FAR_{(Real)}$	-	x	-
24	Current residential building coverage area (m^2)	x	-	-
25	Current residential $BCR_{(Real)}$	-	-	x
26	Current commercial building coverage area (m^2)	x	-	-
27	Current commercial $BCR_{(Real)}$	-	-	x
28	Current residential + commercial building coverage area (m^2)	x	-	-
29	Current residential + commercial $BCR_{(Real)}$	-	-	x
30	Current total $BCR_{(Real)}$	-	x	-
31	Current residential parking lot (quantity)	x	-	-
32	Current residential parking lot ratio (quantity/m^2)	-	-	x
33	Current commercial parking lot (quantity)	x	-	-
34	Current commercial parking lot ratio (quantity/m^2)	-	-	x
35	Current residential + commercial parking lot (quantity)	x	-	-
36	Current residential + commercial parking lot ratio (quantity/m^2)	-	-	x
37	Current total parking lot (quantity)	-	x	-

Table 2. Zoning data of the current model [4]

In the zoning database section of the model, the data determined according to the need of the region to be transformed is shown in the variable input (VI) column, in the legend (L) of the zoning column, the data that the variable input data have mathematically correlated with each other are shown in the dependent input (DI) column and the calculation and analysis results are shown in the output (O) column.

In addition, the values created from national and international criteria and recommendations, in which the adequacy of these outputs are determined, are in the boundary value column and the relationship between whether these outputs are within the limit value (LV) standards is found in the conditional (C) and appropriateness (A) columns (Table 3).

N.	Type (D)	VI	L	DI	O	C	LV	A
1	Draft population (person)	-	-	x	-	-	-	-
2	Draft residential population (%)	x	x	-	-	-	-	-
3	Draft residential population (person)	-	-	-	x	x	x	x
4	Draft net residential construction area per person (m^2 / person)	x	-	-	-	-	-	-
5	Draft net residential building area (m^2)	-	-	-	x	x	x	x
6	Draft commercial population (%)	x	x	-	-	-	-	-
7	Draft commercial population (person)	-	-	-	x	x	x	x
8	Draft net commercial construction area per person (m^2 / person)	x	-	-	-	-	-	-

9	Draft net commercial building area (m^2)	-	-	-	x	x	x	x
10	Draft residential + commercial population (%)	x	x	-	-	-	-	-
11	Draft residential + commercial population (person)	-	-	-	x	x	x	x
12	Draft net residential + commercial construction area per person (m^2 / person)	x	-	-	-	-	-	-
13	Draft net residential + commercial building area (m^2)	-	-	-	x	x	x	x
14	Draft total population (person)	-	-	x	-	-	-	-
15	Draft net total building area (m^2)	-	-	x	-	-	-	-
16	Draft residential development area (m^2)	-	-	x	-	-	-	-
17	Draft residential FAR (coefficient)	-	-	-	x	x	x	x
18	Draft commercial development area (m^2)	-	-	x	-	-	-	-
19	Draft commercial FAR (coefficient)	-	-	-	x	x	x	x
20	Draft residential + commercial development area (m^2)	-	-	x	-	-	-	-
21	Draft residential + commercial FAR (coefficient)	-	-	-	x	x	x	x
22	Draft total FAR (coefficient)	-	-	x	-	-	-	-
23	Draft coefficient of increase in aboveground construction	x	-	-	-	-	-	-
24	Draft residential increase area in aboveground (m^2)	-	-	-	x	x	x	x
25	Draft commercial increase area in aboveground (m^2)	-	-	-	x	x	x	x
26	Draft residential + commercial increase area in aboveground (m^2)	-	-	-	x	x	x	x
27	Draft total increase area in aboveground (m^2)	-	-	x	-	-	-	-
28	Draft coefficient of increase in underground construction	x	-	-	-	-	-	-
29	Draft residential increase area in underground (m^2)	-	-	-	x	x	x	x
30	Draft commercial increase area in underground (m^2)	-	-	-	x	x	x	x
31	Draft residential + commercial increase area in underground (m^2)	-	-	-	x	x	x	x
32	Draft total gross area of construction (m^2)	-	-	x	-	-	-	-
33	Draft total net area of construction (m^2)	-	-	x	-	-	-	-
34	Draft gross/net construction area coefficient	-	-	-	x	x	x	x
35	Draft residential BCR	x	-	-	-	-	-	-
36	Draft residential building coverage area (m^2)	-	-	-	x	x	x	x
37	Draft commercial BCR	x	-	-	-	-	-	-
38	Draft commercial building coverage area (m^2)	-	-	-	x	x	x	x
39	Draft residential + commercial BCR	x	-	-	-	-	-	-
40	Draft residential + commercial building coverage area (m^2)	-	-	-	x	x	x	x
41	Draft total building coverage area (m^2)	-	-	x	-	-	-	-
42	Draft residential floor quantities	-	-	-	x	x	x	x
43	Draft commercial floor quantities	-	-	-	x	x	x	x
44	Draft residential + commercial floor quantities	-	-	-	x	x	x	x

45	Draft total average floor quantities	-	-	x	-	-	-	-
46	Draft residential average floor height (m)	x	-	-	-	-	-	-
47	Draft residential Hmax (m)	-	-	-	x	x	x	x
48	Draft commercial average floor height (m)	x	-	-	-	-	-	-
49	Draft commercial Hmax (m)	-	-	-	x	x	x	x
50	Draft residential + commercial average floor height (m)	x	-	-	-	-	-	-
51	Draft residential + commercial Hmax (m)	-	-	-	x	x	x	x
52	Draft residential parking lot coefficient ($1/m^2$)	x	-	-	-	-	-	-
53	Draft residential parking lot quantity	-	-	-	x	x	x	x
54	Draft commercial parking lot coefficient ($1/m^2$)	x	-	-	-	-	-	-
55	Draft commercial parking lot quantity	-	-	-	x	x	x	x
56	Draft residential + commercial parking lot coefficient ($1/m^2$)	x	-	-	-	-	-	-
57	Draft residential + commercial parking lot quantity	-	-	-	x	x	x	x
58	Draft total parking lot quantity	-	-	x	-	-	-	-
59	Draft unit parking lot construction area (m^2)	x	-	-	-	-	-	-
60	Draft total parking lot construction area (m^2)	-	-	-	x	x	x	x
61	Draft shelter area per person (m^2 / person)	x	-	-	-	-	-	-
62	Draft shelter construction area (m^2)	-	-	-	x	x	x	x
63	Draft other underground area coefficient (%)	x	-	-	-	-	-	-
64	Draft other underground area (m^2)	-	-	-	x	x	x	x
65	Draft underground total area (m^2)	-	-	x	-	-	-	-
66	Draft total increase area in underground (m^2)	-	-	x	-	-	-	-
67	Draft usage of construction underground (%)	-	-	-	x	x	x	x

Table 3. Zoning data of the draft model [4]

Here;

- 67 draft type,
- 20 variable inputs (assigned by the designer),
- 3 legend (1 variable, 2 dependent),
- 15 dependent inputs,
- 32 output data,
- 32 conditions (24 of them less than or equal (≤), 5 of them greater than or equal (≥) which determine the relationship between output, and boundary value;
- 32 limit values,
- 32 eligibility criteria (positive (√) or negative (x) status of the condition relationship between output and limit values are reflected in the database, negative (x) conditions are tried to be converted into positive (√) by means of variable inputs).

Table 4 contains the international and national value references of the input data of 20 types in the zoning database (FAR, BCR, parking lot, etc.) and the recommendations of the DUTM (limit value) are included.

N.	Type	International	National	Suggestion
1	Draft residential population (%)	-	-	√
2	Draft net residential construction area per person (m^2 / person)	-	√	√
3	Draft commercial population (%)	-	-	√
4	Draft net commercial construction area per person (m^2 / person)	√	√	√
5	Draft residential + commercial population (%)	-	-	√
6	Draft net residential + commercial construction area per person (m^2 / person)	-	-	√
7	Draft coefficient of increase in aboveground construction	-	√	√
8	Draft coefficient of increase in aboveground construction	-	√	√
9	Draft residential BCR	√	√	√
10	Draft commercial BCR	-	√	√
11	Draft residential + commercial BCR	-	√	√
12	Draft residential average floor height (m)	-	-	√
13	Draft commercial average floor height (m)	-	-	√
14	Draft residential + commercial average floor height (m)	-	-	√
15	Draft residential parking lot coefficient (1/ m^2)	√	√	√
16	Draft commercial parking lot coefficient (1/ m^2)	√	√	√
17	Draft residential + commercial parking lot coefficient ($1/m^2$)	-	-	√
18	Draft unit parking lot construction area (m^2)	√	√	√
19	Draft shelter area per person (m^2 / person)	-	√	√
20	Draft other underground area coefficient (%)	-	√	√

Table 4. Limit value references for input data [4]

The output data, which are the results of the equations of each data in the draft model, were limited in the same context to the international and national standards and limiting conditions were proposed and recommendations were made (Table 5).

N.	Type	International	National	Sugegstion
1	Draft residential population (person)	-	-	√
2	Draft net residential building area (m^2)	-	√	√
3	Draft commercial population (person)	-	-	√
4	Draft net commercial building area (m^2)	√	√	√
5	Draft residential + commercial population (person)	-	-	√
6	Draft net residential + commercial building area (m^2)	-	-	√
7	Draft residential FAR (coefficient)	√	√	√
8	Draft commercial FAR (coefficient)	-	√	√
9	Draft residential + commercial FAR (coefficient)	-	√	√
10	Draft residential increase area in aboveground (m^2)	-	√	√
11	Draft commercial increase area in aboveground (m^2)	-	√	√
12	Draft residential + commercial increase area in aboveground (m^2)	-	√	√
13	Draft residential increase area in underground (m^2)	-	√	√
14	Draft commercial increase area in underground (m^2)	-	√	√
15	Draft residential + commercial increase area in underground (m^2)	-	√	√
16	Draft gross/net construction area coefficient	-	√	√
17	Draft residential building coverage area (m^2)	√	√	√
18	Draft commercial building coverage area (m^2)	-	√	√
19	Draft residential + commercial building coverage area (m^2)	-	√	√
20	Draft residential floor quantities	√	-	√
21	Draft commercial floor quantities	-	-	√
22	Draft residential + commercial floor quantities	-	-	√
23	Draft residential Hmax (m)	-	√	√
24	Draft commercial Hmax (m)	-	√	√
25	Draft residential + commercial Hmax (m)	-	√	√
26	Draft residential parking lot quantity	√	√	√
27	Draft commercial parking lot quantity	√	√	√
28	Draft residential + commercial parking lot quantity	-	-	√
29	Draft total parking lot construction area (m^2)	√	√	√
30	Draft shelter construction area (m^2)	-	√	√
31	Draft total increase area in underground (m^2)	-	√	√
32	Draft usage of construction underground (%)	-	-	√

Table 5. Limit value references for output data [4]

3. CONCLUSION AND EVALUATION

This article; in the light of national and international criteria and recommendations, in order to assist in a regional based planning study, the DUTM proposal is discussed in the context of zoning parameters (current and draft). According to this; the analysis is carried out via 307 parameters, including 104 types, 36 variable inputs, 21 dependent inputs, 47 outputs, 3 legend, 32 conditions, 32 limit values and 32 appropriateness criteria.

The Draft Urban Transformation Model (DUTM) tried to contribute to the accounts and assessments related to methods that should be followed in the new urban transformation studies planned or to be planned within the framework of the mathematical model designed for urban transformation applications.

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The Determination Of Bıoclimatic Comfort Zones: A Case Study Of Tokat (Turkey)

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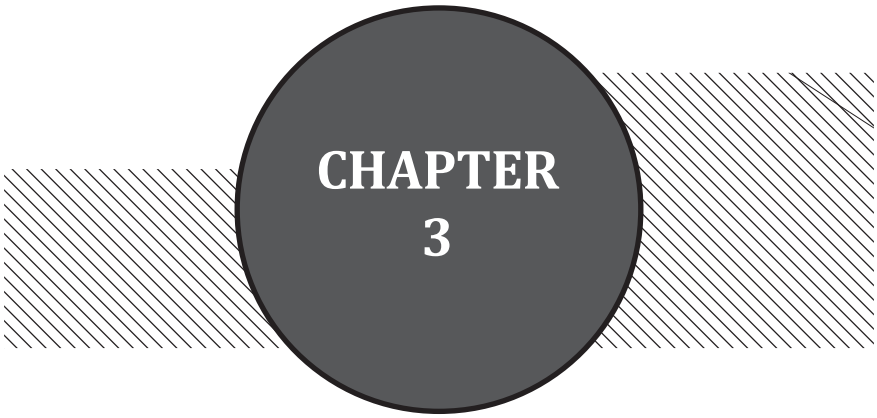

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INTRODUCTION

Landscape planning is a method which creates ideas and models to research the nature itself -which is directly in connection with our lives- and it's ecological power, so that it can be harnessed for extended periods of time in an efficient manner. The most important factor when determining the natural landscape and revealing the ecological power of the nature is the climate (Afshari, 2012). It is only possible to create the most efficient models for planning and design, and to make the best decisions regarding thereof, by conducting detailed analyses for climate, and evaluating these analysis with a measurable method. Climate data, settlement locations for new zones, establishing recreational areas, and the planning of the agricultural and open-green areas should all be considered during the processes of their usage in the landscape design and determining their positioning (Gümüş, 2012; Yazici, 2015)

Humans live in a specific environment and the properties of this environment have strong influences on all the activities. Momentary weather conditions and climatic factors are amongst these properties, and they can be particularly effective in human activities from time to time. Based on this fact, the climatic, topographic, and orographic conditions and the presence of vegetation and animals are not only indicators for various evaluations but also act as limiting and controlling factors over these activities (Rudel et al., 2007;Öztürk and Kalaycı, 2018). The establishment of temperature comfort is an especially important and necessary subject for outdoor environments. That being said, thermal comfort is either partially or completely disregarded during the planning of urban environments. Creation of thermally comfortable urban environments can only be possible if the thermal comfort conditional of outdoor environments are understood and evaluated properly, and only if ample green areas are reserved for during the planning and design stages of urban projects. This is due to the fact that open green areas can act as shading sources and humidity providers, and may provide a balance for the climate components in urban environments where the natural structure has already been altered strongly. Outdoor site planning represents an area of interest for the landscape planning occupational discipline, and since it's important to know the utilization density of an area based on the seasons, the comfortable periods for a given site should be determined beforehand when conducting landscape planning. Another advantage of having information regarding the comfort periods of a site is that it helps establish a list of options of activities for such outdoor sites. This situations leads to the fact that it's possible to determine the land utilizations of a site based on its comfortable periods (Gümüş, 2012).

In this study, a multitude of outdoor environment comfort calculation and prediction software like the Rayman and ArcView GIS™ 3.2 were used to create climate maps over GIS. Rayman software was preferred as it was one of the leading ones (Matzarakis et al., 2000; 2007; Matzarakis and Rutz, 2005). The data transferred to the GIS environment was then used to determine the areas suitable for bioclimatic comfort.

LITERATURE REVIEW

The first studies regarding the determination of bioclimatic comfort and utilization of it in landscape planning processes lead back to the late 1960's. In 1969, Berköz has worked on a method that could be used in the determination of the ceiling height appropriate for the bioclimatic comfort. Sungur, on the other hand, has conducted a study on Turkish people in order to determine the optimum temperature level for them and reported a subjective temperature range of 16,7 and 24,7 (Toy and Yılmaz, 2009).

Ali-Toudert and Mayer (2007) investigated the vertical slice, vector, and positioning of the causeways in urban environment to the bioclimatic comfort of the settlement. The researchers used the 3D model program ENVImet 3.0 and the PET (physiologically

equivalent temperature) index for this research. The results have revealed that certain factors influenced the comfort levels, and the causeway vector and presence of plants were found to be the most influential factors in that regard.

The bioclimatic factors have 6 important parameters. Some of these are related to the climatic conditions like the average temperature, relative humidity, and average wind speed (Steadman, 1979; Synnefa et al., 2007). Humans generally feel healthy and dynamic in a specific band of environmental properties like temperature, precipitation, and wind. When these properties are in that particular band, this state is called bioclimatic comfort. Iın the middle latitudes where Turkey is located, the temperature level determined to be the most appropriate in terms of bioclimatic comfort is between 17 and 24,9 °C, based on relative humidity and wind speed (Koçman, 1991). In his study, Altunkasa (1990) reports that if all other conditions are normal, 21-27 °C temperature and 30-65% relative temperature together result in the comfortable environment.

Humans spend a certain amount of energy to reach the bioclimatic comfort state, or to adapt themselves to the environment they are in. As Çınar (2004) reports off of the study of Berköz (1969), the state of bioclimatic comfort can be defined as the environmental conditions in which the humans can adapt to using the least amount of energy. One of the methods most widely adopted in the determination of the bioclimatic comfort zone is the utilization of the "Bioclimatic Comfort Chart" developed by the Olgyay (Evans, 2003; Toy et al., 2005). According to Olgyay (1973), the bioclimatic comfort value is 21,0 – 27,5 °C in open areas under the combination of 30 to 65% relative humidity and 5m/s wind speed, and were used in many bioclimatic evaluations (Çınar, 1999; Toy et al., 2005). In many ecological indexes, the status of the bioclimatic comfort has been evaluated by consideration of one or more of the temperature, humidity, and wind components. The criterion used the most in the evaluation of the comfort is the "apparent temperature". Thermal comfort is 80% effective in determination of the bioclimatic comfort. In that regard, bioclimatic comfort has been inspected as the "human temperature comfort" in many of the literature studies (Çınar, 2004). As Çınar (2004) reports off of the study of Hobbs (1995), the bioclimatic comfort state is a subjective value which is based on the apparent temperature and may change based on the individual, location, and time. In evaluations of this study, the value was determined considering an individual of a healthy, unmoving, normally clad 25 age who is indoor at an apparent temperature between 15,0 to 27,0 °C (*Table 1*). In outdoor environments, the temperature may be 5 °C lower or higher. There have been numerous studies to determine the lowest and highest climatic limit values that provide the bioclimatic comfort, and values that differ slightly from each other were obtained. It is possible to group the bioclimatic comfort indexes used today in two as simple and complex indexes. Simple indexes consider the partial or total effects of a one or two components (like THI, ET), while the complex indexes consider many factors like internal properties of humans, clothing etc. together with climatic components. Predicted Mean Vote (PMV), Physiologically Equivalent Temperature (PET), and Standard Effective Temperature (SET) can begiven as examples of complex indexes. As a result of the equations of these indexes a single bioclimatic comfort value is obtained, and naturally, this value differs based on the variables entered into the equation. The meaning of these values is obtained through the tables prepared off of them. For this reason, in order to grasp the meaning of the prepared index, a table must be prepared in which the properties involved are grouped together. For example, the bioclimatic comfort zone of the PMV index is between -0.4 and 0.5 °C, while it falls to between 18.1 and 23.0 °C for the PET index.

PMV (°C)	PET (°C)	Felt air temparature	Termal stres seviyesi
<-3.5	< 4	Hard air	Extreme cold stress
(-3.4) – (-2.5)	4.1 – 8.0	Cold air	Strong cold stress
(-2.4) – (-1.5)	8.1 – 13.0	Fresh	Medium cold stress
(-1.4) – (-0.5)	13.1 – 18.0	Shallow fresh	Light cold stress
(-0.4) – 0.5	18.1 – 23.0	Cosy	Not Thermal stress
0.6 - 1.5	23.1 – 29.0	Shallow mid	Light hot stress
1.6 - 2.5	29.1 – 35.0	Mild	Medium hot stress
2.6 - 3.5	35.1 – 41.0	Warm	Strong hot stress
3.5 +...	35.1 – 41.0	Too hot	Extreme hot stress

Table 1. Thermal stress categories of PMV and PET indexes (Matzarakis et al., 1999)

Çetin (2016); Kastamonu (Turkey) Cide bioclimatic comfort was done mapping of the coastline and thus aimed at building pad similar studies of a natural similar in the coastal areas. As a result, the most appropriate time and area for outdoor recreation ativities have been identified by thermal perception maps.

As the computer software techniques have evolved, many outdoor comfort calculation and prediction programs that are easy to use have been developed. These programs are also based on equations and indexes that have been formulated according to the factors that affect the comfort. Rayman software is given as a leading example amongst these (Matzarakis et al., 2000; 2007;2010; Matzarakis and Rutz, 2005; Toy and Yılmaz, 2008). In this program, all the environmental variables affecting the comfort were calculated using the three bioclimatic indexes (PMV, PET, and SET), and the effects of the trees' shadows can be displayed as ellipsoid or cone shapes in the final graphs

MATERIALS AND METHODS

Materials

The main material of the study is formed of the climate values of the city of Tokat and its nearby regions. The city of Tokat is located between the Black Sea and Inner Anatolian Regions, on the inner side of the Middle Black Sea region. It is surrounded by cities of Samsun in the north, Ordu in the northeast, Sivas in the south, Yozgat in the southwest, and Amasya in the west. It has a surface area of 10.073 km^2 and represents 1.3% of Turkey's total area. It has an altitude of 623 meters, and agricultural activities are conducted in the city between 230 and 1.500 meters of altitude. It has a population of 624.439, of which 57% lives in urban areas and the remaining 43% lives in rural villages. The economy of the city is mostly based on agriculture and agricultural industries. Due to its location, its climate is a transition between the climates of the Black Sea and Inner Anatolian regions (Figure 1). Geographical coordinates are as follows: 39^o 51' – 40^o 55' north latitudes and 35^o 27'- 37^o 39' East longitudes.

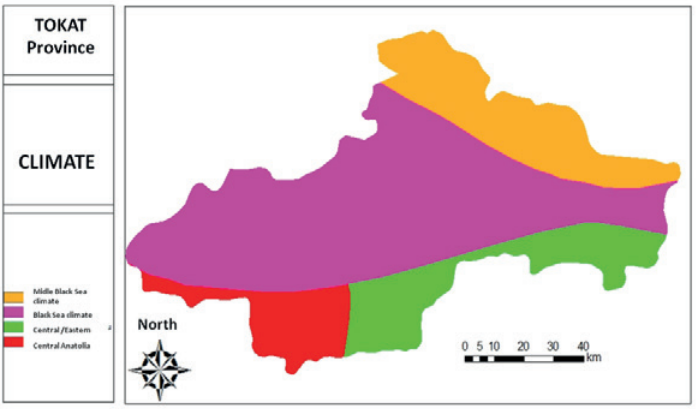

Figure 1. Climate map of Tokat (Turkey) (Yazici, 2015)

Rural and Urban climate potential of the study area of Tokat were studied based on the available meteorological data and other available information, and an attempt to determine the locations most suitable for offering the bioclimatic comfort for humans so that an evaluation could be made to support the climate-based landscape planning projects. To achieve this goal, data from meteorological stations within the city of Tokat were gathered.

In order to be able to create a database for the research data, the Esri Arc View GIS™ 3.2 software within the Geographical Information System (GIS) which is used to compute, display, place on the map, analyze, and model large volumes of data was used (Antenucci et al., 1991). Rayman program was also used in parallel, which offers ease of use in determining and prediction of requested properties. This program uses the three aforementioned bioclimatic indexes (PMV, PET, and SET*) to calculate all the environmental variables that affect the comfort.

Method

To achieve the specified goals, the climate data of the selected study area was first gathered from the meteorological stations of the city of Tokat. These values were transformed into maps considering their yearly averages. The yearly temperature, humidity and wind maps were created first. Considering the theoretical foundations of the study, the climate components of the city of Tokat were investigated. The evaluation of point-based climate data inside the GIS environment, and to be able to include the areas that lack meteorological data by extrapolating from nearby areas, is only possible through point interpolation techniques. These are the Inverse Distance Weighted (IDW), Spline, and Kriging methods (Üneri et al., 2006). The "Universal Linear" option under the "Kriging" interpolation of the Esri ArcView GIS™ 3.2 software was used in order to obtain the most accurate distribution of climate data for this study. The data obtained for Tokat and its nearby regions were then compared, and the zones suitable for the bioclimatic comfort were detected. In summary, the data were gathered from the meteorological stations, evaluated through Rayman 1.2 software, and moved to the GIS environment to produce the thermal maps.

FINDINGS

The inspection of temperature values of the city of Tokat reveals that the coldest average is at January with 1,9 °C, while the hottest one is in August with 21.9 °C (*Figure 2*).

The temperature increases above 30 °C for 43 days, and above 20 °C for 175 days along the year. The average temperature falls below 0 °C in 59 days. Yearly average precipitation for long years is between 381,8 – 586,8 mm. The average relative humidity, on the other hand, traces between 57 and 71% (Anonymous, 2002a; 2004). Average surface runoff efficiency is 4,65 l/s/km^2, and runoff/precipitation ratio is 0,31 (Anonymous, 2017a; Anonymous, 2017b).

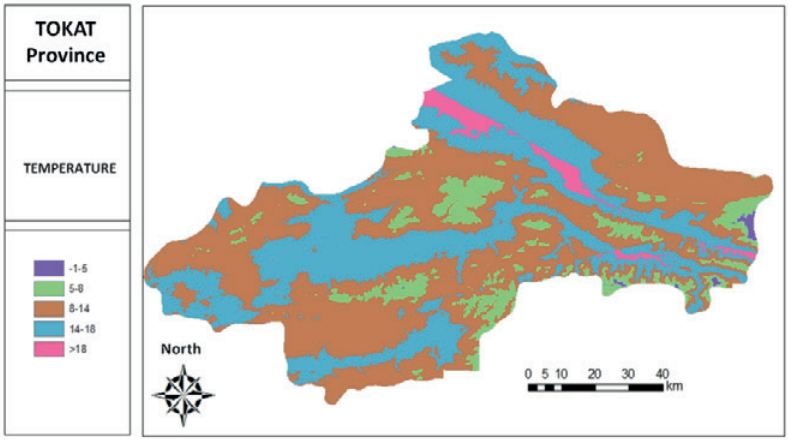

Figure 2. Temperature map of Tokat (Turkey)

The relative humidity varies based on temperature and evaporation levels and traces at lower levels during summers and daytimes, and at high levels during winters. The average relative humidity of Tokat is 62%, and the lowest humidity occurs during June, July and August, while the highest occurs in between November – February. It peaks during December, and both November and January have high humidity levels as well. This is no doubt related to the decreased temperatures during these months. The lowest average relative humidity (57%) occurs during July, while the lowest relative humidity occurred during May with 2% (*Figure 3*). According to this map charted in our study, the average relative humidity increases towards the center of the area. The highest humidity of the area occurs in the north and northeast regions, while the lowest occurs in southeast and northwest regions.

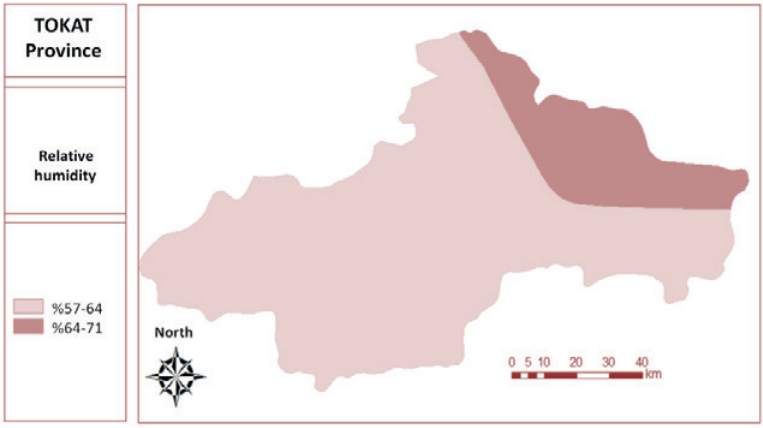

Figure 3. Relative humidity map of Tokat (Turkey)

The average wind values for the city of Tokat for 2000 – 2010 period is given in Figure 4. Higher average wind values can be observed in February and March (*Figure 4*) and the average for these months vary between 3 and 3.5 m/s (Emeksiz et al., 2016). The average yearly wind speed values for the study area vary between 2 m/s and 6 m/s. The average wind speed increases towards the northern portions of the central area, where the city center also lies in.

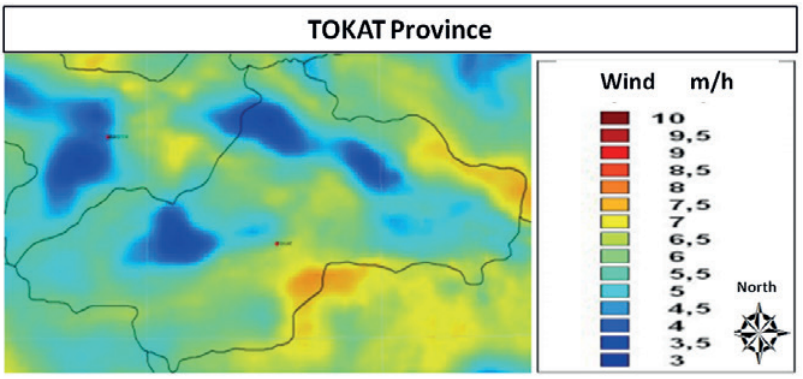

Figure 4. Wind map of Tokat (Turkey);(Emeksiz et al., 2016)

The temperature data was especially focused upon for the study, and annual temperature maps were prepared. As can be seen in *Figure 2*, the average temperature of the study of area increases towards the south. The average temperature varies between 13-14 °C. The average relative humidity data of the area was also turned into a map, as given in Figure 3. Accordingly, it can be observed that the relative humidity and temperature maps overlap somewhat accurately. The wind speed map of the region is given in Figure 4. Inspection of it reveals that a majority of the study area has winds speed averages of 2,6 and 3,5 m/s. Gathering all these findings, the bioclimatic comfort levels of the city of Tokat was inspected on these maps prepared with GIS software. In general, analysis of this final bioclimatic map reveals that the most suitable temperature, relative humidity, and wind speed values for the bioclimatic comfort are located in the district of Erbaa, and partially in Niksar and Turhal districts. The comfort maps prepared for the study area were grouped for each month of the year.

RESULTS AND DISCUSSION

It is possible to improve comfort conditions with the application of certain principles and measures during the landscape planning and design stages. Since the distribution of the land utilization in a balanced manner and reservation of ample amounts of space for open green sites are the basic aim in such plans and designs, the bioclimactic comfort conditions automatically get better in locations with a good landscape architecture and design (Toy and Yılmaz, 2008; Toy, 2009; Yılmaz et al., 2013).

In this study which was conducted to determine the bioclimatic comfort levels of the city of Tokat accurately, the maps created in GIS environment using average temperature, humidity and wind speed data were investigated in terms of bioclimatic comfort values.

Inspection of average temperatures ofthe area reveals that it falls within the appropriate gap for the bioclimatic comfort levels. Humidity levels are also appropriate for bioclimatic comfort, except for the places towards the north and northeast of the city, which have above 70% relative humidity levels. Inspection of wind speed averages also reveals them to be perfectly suitable for bioclimatic comfort.

In order to determine the bioclimatic comfort structure for the city of Tokat, the yearly average value maps of these climatic components were superimposed upon each other. Based on the results obtained from this combination, the settlement area within the borders of the city of Tokat was found to be within the climatic values suitable for human comfort. This is mostly due to the fact that temperature is the most contributing factor for this comfort, and the average temperature level of the area falls perfectly within the appropriate level gap, which is between 21 – 27 °C, in addition to the 30-35% relative humidity and 0 – 5 m/s wind speed. The city of Tokat, and most of its nearby areas were found to have climatic values all within these limits.

It is possible to further develop landscape engineering and planning by taking into consideration the bioclimatic comfort conditions and applying relevant principles and design criteria. On the other end of the spectrum, planning for wrong conditions and bad bioclimatic comfort design might lead to strongly unfavorable conditions. This study has evaluated the city of Tokat and its nearby areas in this regard, and the results indicate that a great majority of the inspected area is suitable in terms of bioclimatic comfort.

This study hopefully has created a database for the researchers that would be interested in landscape architecture and detailed bioclimatic comfort calculations for the province of Tokat. The idea in creating such a database was that it would make it possible to plan the energy usage, to reveal comfortable bioclimate areas, create climate-balanced planning criteria, and help determine the planning criteria for future studies.

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Determination Of Use Active Green Areas Of Urban Public And Requirements Of Open-Green Area İn Yozgat City/ Turkey

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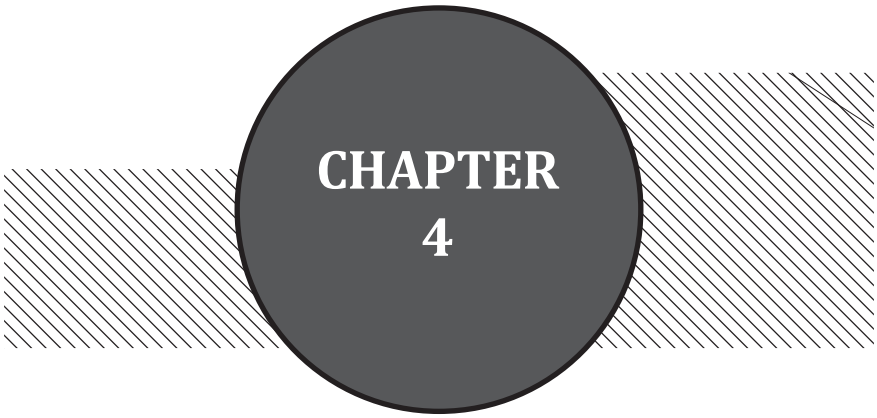

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INTRODUCTION

In our age, societies are going through a transformation. The most apparent indicator of this transformation in social structure is the growing urbanization (Yıldırım, 2004; Ankaya et al., 2017). Urbanization is a process of population accumulation causing changes, peculiar to cities, in social structure, human behaviors and relations (Yazici et al., 2017a). Recently, rapid population increase has led to rapid urbanization and, consequently, unplanned urbanization (Yeltekin, 2011). Unplanned urbanization is a phenomenon affecting societies economically, physically, socially and culturally and cause disruption of physical environments of the city-dwellers, increase in social, economic and environmental problems and decrease in level of life quality (Atik et. al, 2014; Aşur and Yazici, 2018; Yazici et al., 2017b). In order to increase the life quality of urban utilizers during urbanization, urban growth and development should properly be conducted and planned urban locations should be created in line with modern and inhabitable environments. Architectural structures, open-green areas, their interrelations and integrity designate the general characteristics of a city suitable for human life. Within this integrity, open-green areas, i.e. urban green areas, are significant in terms of balancing the disrupted relation between the humans and nature, improving urban life conditions and increasing quality of urban life (Gül and Küçük, 2001; Korucu, 2010; Gülgün et al., 2014; Yazici et al., 2018).

Urban green areas are defined as surface areas covered or combined with botanic elements of available open areas. They are categorized as green areas actively utilized in practice for recreational purposes and passive green areas (Karafakı, 2016;). Active green areas are playgrounds, parks and playareas and are important components of quality of urban life (Bağcı, 2010; Aşur and Alphan, 2017). They also have many functions in terms of economic, ecologic, social and physical (with regards to planning) aspects (Table 1).

Despite all these functions active green areas have, competence of green areas in terms of quality and quantity is not valued enough within the framework of current growth trend of the cities; and the parcels remained from the housing are made use of green areas within the scope of urban planning which is firstly carried out for the purposes of eliminating housing deficit (Doygun et.al, 2015; Karafakı, 2016).

The Functions of Active Green Areas			
Economic	**Ecologic**	**Social**	**Physical**
Providing Energy Conservation	Oxygen Production	Providing Opportunities for Educational and Cultural Activities	Circulation-Access Function
Value of Property	Providing Clean Air	Providing Opportunities for Recreational Activities	Area Conservation
Providing Tourism and Business Opportunities	Coolness and Heat Effect	Contributing to Social Development	Scale Function
	Effect on Relative Air Humidity	Reducing Crime Rate	Aesthetic Function
	Reducing Greenhouse Effect	Conserving Public Health	Buffer Function
	Soil Conservation and Providing Hydric Balance		Conserving History
	Ecologic Restoration and Biological Diversity Conservation		Architectural Effects
	Noise Attenuation		

Table 1. The functions of active green areas (Önder ve Polat, 2012)

At this point, the concept of "the amount of active green areas per capita" kicks in and green areas are conserved by the help of laws and regulations. In accordance with 3194 Law on Land Development Planning and Control enacted in 1999, the amount of active green areas per capita in urban areas were determined as 10 m^2 (Bolatoğlu and Özkan, 2013). Active green areas have many ecologic, physical, psychological, etc. functions and ornamental plants are the most important elements which display the vanity and appeal of these areas. However, efficient utilization of ornamental plants is temporary if landscaping are carried out negligently without any planning. Therefore, studies and plantings carried out by paying attention to the ecologic needs of plants and design rules are quite significant in terms of both phytosanitary and benefits for the utilizers in the environment (Yazıcı and Aslan, 2017).

Yozgat is one of the Anatolian cities accelerating its urbanization process with the recent developments (education, industry, transportation). Within this study, the amount of active green areas and quality and quantity of available active green areas in Yozgat will be designated and a survey has been conducted in order to determine the level of awareness of city center utilizers regarding the active green areas and utilization and requirements regarding these areas. The purpose of this study is to stress the importance of active green areas in increasing the life quality in Yozgat which is in urbanization process and contribute to correctly directing urban growth and development in line with the requirements and expectations of urban utilizers.

MATERIAL AND METHOD

The research area is the central district of Yozgat which is on a plateau approximately 1000 meters above the sea level, a region near the center of Central Anatolia Region in Turkey (Çatalbaş, 2016). Surface area of Yozgat city center is 2,054 km^2 and the map of the research area is available in the Figure 1. According to the data of Turkish Statistical Institute (TUIK), total population of Yozgat city center is 103.965 and 89.496 of those live in the city center and 14.469 people live in the villages. There are 26 neighborhoods in the city and the populations of the central neighborhoods are available in Table 2.

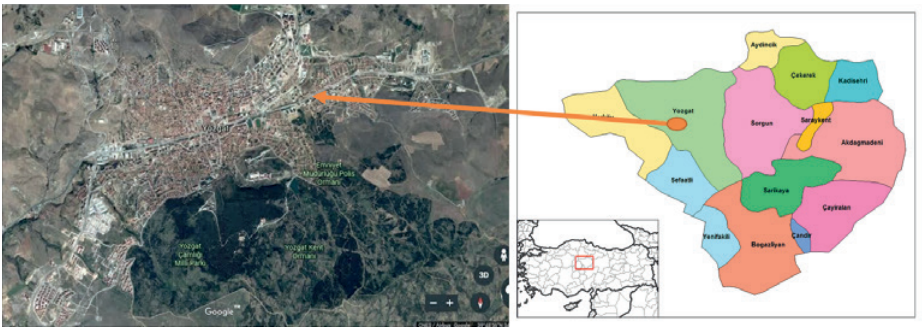

Figure 1. Map of research area (Google Earth, 2018)

Neighborhood's Name	Population	Neighborhood's Name	Population	Neighborhood's Name	Population
Çapanoğlu	11.774	Taşköprü	2.904	Fatih	4.473
Şeyhosman	8.846	Tekke	1.954	Karatepe	4.175
Aşağınohutlu	6.951	Mutafoğlu	1.694	Köseoğlu	4.150
Bilal Şahin	5.821	İstanbulluoğlu	1.423	Yukarınohutlu	3.915
Bahçeşehir	5.449	Aşağı Çatak	1.390	Yenicami	3.501
Erdoğan Akdağ	5.263	Tuzkaya	1.389	Eskipazar	3.473
M. Hulusi Efendi	4.700	Agahefendi	1.032	Develik	334
Sarıhacılı	168	Yukarıçatak	812	Divanlı	494
Azizlibağları	104	Medrese	3.307	**Toplam**	89.496

Table 2. The neighborhoods in Yozgat city center and the populations of those neighborhoods (TUİK, 2018)

A survey has been conducted in order to determine the thoughts, expectations and levels of awareness of the active green areas utilizers in the city center, as well. The random sampling method based on interviews has been chosen for the survey. While the said survey questions were prepared, Karafakı's study (2016) was benefited. The formula below was used while determining the number of subjects (Sandal and Karademir, 2013; Karafakı, 2016).

$$n - \frac{Z^2 NPQ}{ND^2 + Z^2 PQ}$$

n: Sample size

Z: Z value according to 95 %confidence interval (1,96)

N: Groundmass size

P: The possibility of finding the required feature within groundmass (95 %)

D: Percentage of accepting an error (5 %)

Q: 1-P

Since the purpose of the study was to display the impact of the active green areas in city center on the life quality of urban utilizers in Yozgat, the groundmass size from which the participants would be selected was determined as the population of city center in Yozgat. When calculations were made by paying attention to 95 % confidence interval and % 5 percentage of accepting an error, the survey was established to be conducted on 73 people. However, the survey was conducted on 150 people because increasing the number of participants would also increase the credibility of the survey. The survey was specifically conducted in different places and segments of the people in order to increase the level of representation of the whole society.

RESEARCH FINDINGS

The Amount of Active Green Areas in Yozgat

The data regarding the active green areas in Yozgat city center and the sizes of these areas are available below in Table 3. Erdoğan Akdağ Campus of Yozgat Bozok University, Yozgat Pine Grove National Park and Fatih Natural Park controlled areas of utilization were addressed as the others utilized as recreational purposes. According to the data collected, the total amount of active green areas is 627.073 m^2 and the amount of active green areas per capita was established as 7 m^2.

Active Green Areas	Area (m^2)
Parks and playgrounds	165.351
Player areas	151.584
The other areas utilized as recreational purposes	310.138
Total	627.073

Table 3. Active Green Areas in Yozgat

The Perspective of Yozgat Urban Utilizers Regarding Active Green Areas

Findings collected regarding the social, economic and demographic features (Table 4) of Yozgat urban utilizers participating in the research as well as their thoughts relating to the active green areas were displayed on percentage analysis and are summarized below as subtitles.

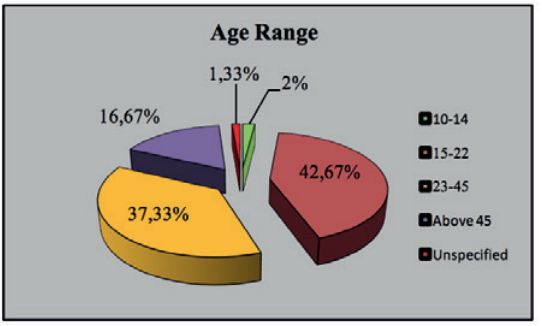

Figure 2. The age range of the utilizers in the survey

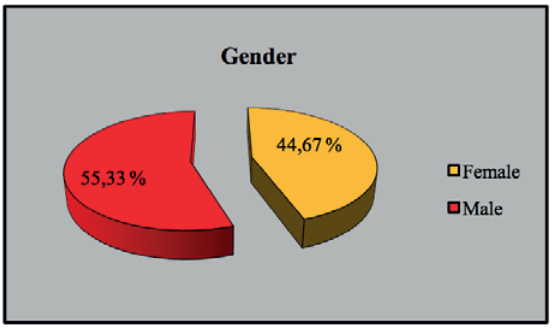

Figure 3. The gender of the utilizers participating participating in the survey

Looking at the demographic features of the participants, it has been revealed that 42,67 % of them were between the ages of 15-22 (Figure 2), 55,33 % were male (Figure 3), 69,33 % were single, 77,33 % were university graduates (Figure 5), 48 % were employed and 42 % had income below 1000 TL (Table 4). The responses given to the questions asked for the purposes of determining the impact of the active green areas in Yozgat city center on urban utilizers and their expectations and levels of awareness are given in Table 4.

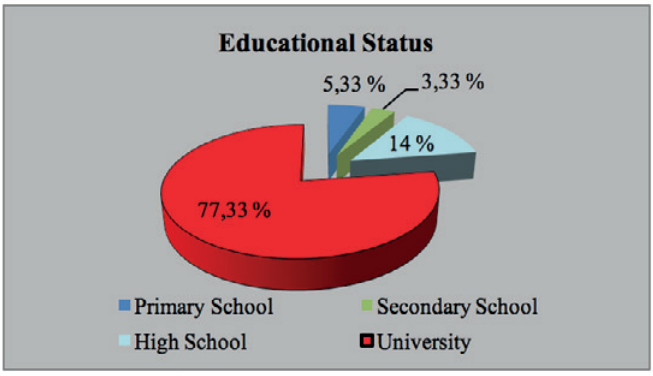

Figure 4. The level of education of the utilizers participating in the survey

When the results were evaluated, it was indicated that 82 % of the participants said Yozgat was not a green city (Figure 5), 90 % said the active green areas were not adequate (Figure 6), 61,33 % said the active green areas were not safe, 63,33 % said they were not familiar with the plant species in the active green areas, 80 % said they would not benefit from the active green areas at night, 53,33 % said the transportation was easy and 52,67 % said they found them partially adequate in terms of equipment (Table 4).

Age range	**n**	**%**
10-14	3	2.00
15-22	64	42.67
23-45	56	37.33
Above 45	25	16.67
Unspecified	2	1.33
Gender	**n**	**%**
Female	67	44.67
Male	83	55.33
Marital Status	**n**	**%**
Married	46	30.66
Single	104	69.33
Educational Status	**n**	**%**
Primary School	8	5.33
Secondary School	5	3.33
High School	21	14.00
University	116	77.33

Do you work?	n	%
Yes	72	48.00
No	23	15.33
Student	60	40.00
Economic Level	**n**	**%**
Below 1000 TL	63	42.00
1000-3000 TL	35	23.33
3000-5000 TL	22	14.67
Above 5000 TL	24	16.00
Unspecified	6	4.00

Table 4. The demographic features of the participants

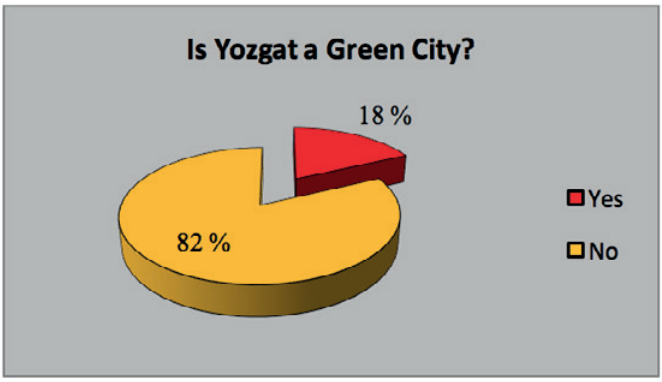

Figure 5. Participants' opinion regarding the city

According to Table 4, 84 % of the participants stated that they enjoyed Çapanoğlu City Park, 72 % Yozgat Pine Grove National Park, 60 % Yozgat Sports Valley and 54 % Fatih Natural Park (Figure 7).

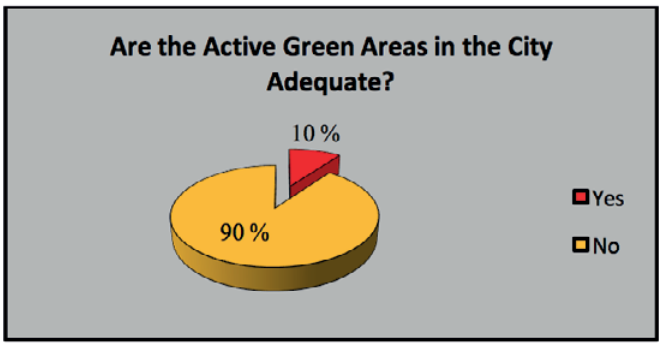

Figure 6. Participants' opinion regarding active green areas

To the question "Which one can be categorized as active green areas?", the participants replied, with 71,33 %, urban forest (Figure 9). This answer was followed by parks, with 59,33 %, and copse areas, with 42,67, respectively (Figure 8).

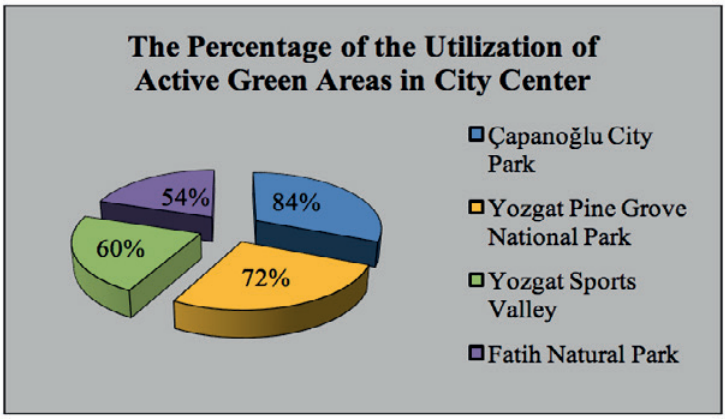

Figure 7. The percentages of utilization of the active green areas in the city center

To the question "Which one restricts you to enjoy active green areas?", the following answers were given respectively: the lack of equipment (46,67 %), food and beverage sales (44,67 %), pollution (40,67 %), scarcity of WC (36,67 %), security (32 %) and none (4,67 %) (Figure 9).

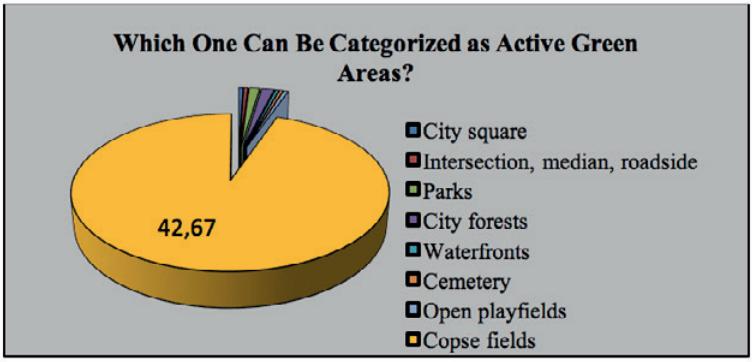

Figure 8. The areas regarded as green areas

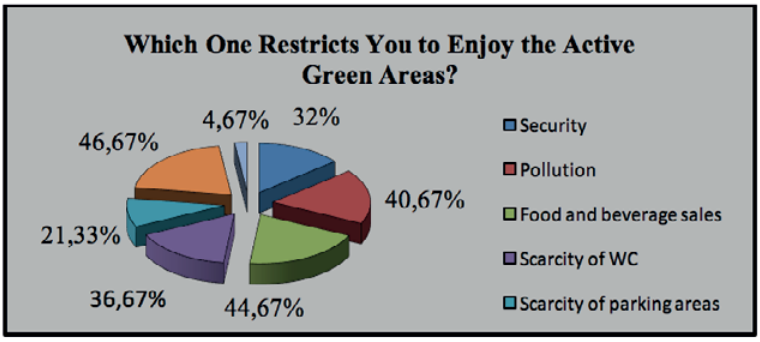

Figure 9. The elements affecting the utilization of green areas

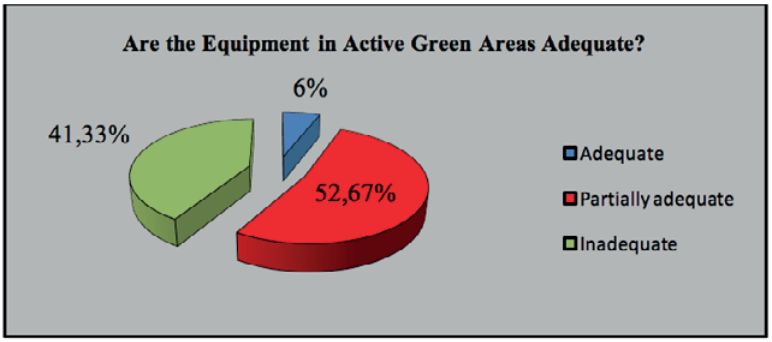

Figure 10. The adequacy of equipment in active green areas

To the question "Are the equipment in the active green areas adequate?" the following answers were given respectively: partially adequate (52,67 %), inadequate (41,33 %) and adequate (6 %) (Figure 10).

Survey Questions	Yes		No	
	n	%	n	%
Is Yozgat a green city?	27	18.00	123	82.00
Are the active green areas in the city center adequate?	15	10.00	135	90.00
Do you go to the Yozgat Pine Grove National Park?	108	72.00	42	28.00
Do you go to the Yozgat Çapanoğlu City Park?	126	84.00	24	16.00
Do you go to the Yozgat Fatih Natural Park?	81	54.00	69	46.00
Do you go to the Yozgat Sports Valley?	90	60.00	60	40.00
Are the active green areas in the city center safe?	58	38.67	92	61.33
Is it easy to reach the active green areas in the city center?	80	53.33	70	46.67
Do you know the plants in the active green areas in the city center?	55	36.67	95	63.33
Would you like to see different plants in the city center?	146	97.33	4	2.67
Are the active green areas in the center utilizable for day and night both?	30	20.00	120	80.00
Which one can be categorized as active green area?				

Table 5. The answers the participants gave to the survey questions

City square		Intersection, median, roadside		Parks		Urban forest		Waterfronts		Cemetery		Open play areas		Copse areas	
n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
35	23.33	35	23.33	89	59.33	107	71.33	30	20.00	29	19.33	40	26.67	64	42.67

Which one restricts you to enjoy the active green areas?														
Security		Pollution		Food and beverage sales		Scarcity of WC		Scarcity of parking areas		Lack of equipment		None		
n	%	n	%	n	%	n	%	n	%	n	%	n	%	
48	32.00	61	40.67	67	44.67	55	36.67	32	21.33	70	46.67	7	4.67	

Are the equipment in active green areas adequate?					
Adequate		**Partially adequate**		**Inadequate**	
n	%	n	%	n	%
9	6.00	79	52.67	62	41.33

Table 5. The answers the participants gave to the survey questions (follow)

DISCUSSION AND RESULT

Green areas among the concrete buildings in cities are important in terms of balancing the relation between the humanity and nature and improving the quality of urban life. However, housing deficit is firstly preferred to be resolved since irregular urbanization problem is gradually increasing at present and therefore the amount of green areas are gradually decreasing. But green areas are highly required for their physical, social, psychological, ecologic and economic functions and for their impacts on urban quality.

Availability of green areas in a city as well as its size, number, quality, etc. highly affect quality of urban life, as well. However, ideal forms and dimension of active green areas, their equipment and their dispersion in city are not taken into consideration since only their amount was specified in the Law on Land Development Planning and Control of Turkey. Indeed, many scientific studies conducted for the quality and quantity of active green areas support this case (Manavoğlu and Ortaçeşme, 2007; Yenice, 2012; Öztürk and Özdemir, 2013; Ortaçeşme et. al., 2015).

Within the scope of this study, there is no sufficient and regular information regarding the quality and quantity of active green areas on neighborhood level in Yozgat which has 26 neighborhoods. It has been determined by the help of limited information collected and area observations that the dispersion of active green areas on neighborhood scale is not homogeneous and most areas are scarce and lack of the equipment required. Indeed, the answers given by the participants of the survey support this case. While there is no active green area in the 3 of the total 26 neighborhoods, there are very few areas in 19 neighborhoods. Develik neighborhood is revealed to have the most active green areas in terms of size thanks to Yozgat Pine Grove National Park. It is important to remember that the area included as active green area in Yozgat Pine Grove National Park is actually a controlled area of utilization. On Bilal Şahin neighborhood, there are two significant active green areas, Yozgat Sports Valley and Çapanoğlu City Park, and so it is the superior compared to the active green areas in other neighborhoods in terms of quality and quantity.

When the survey result is evaluated, it is seen, according to the survey result conducted in Yozgat city center, that there is a youth population throughout the city center who are single, between the ages of 15-22, mostly students and have a monthly income under 1000 TL. Due to the growing number of the students thanks to Yozgat Bozok University, the number of young utilizers has increased. Therefore, there is a need for active green areas for this age group. Indeed, the availability of the active green areas for this age group has many advantages such as keeping them out of bad habits and canalizing them to sports and artistic activities. Apart from a few active green areas in Yozgat city center, there are no active green areas with quality and quantity suitable for the young population. The results of the survey which mostly university students took part in display that the amount of active green areas in the city center is not adequate. The fact that the active green areas are not adequate caused the urban forests to be evaluated under active green areas and this led urban forests to be perceived as city parks. The survey results also have shown that the active green areas are found to be inadequate in terms of not only area but also equipment. The survey participants state that the lack of equipment restricts the utilization of active green areas. Indeed, the most utilized active green area in Yozgat city center has become Çapanoğlu City Park thought to attract all generations with its equipment. Yozgat Pine Grove National Park, Yozgat Sports Valley and Fatih Natural Park follow respectively. These areas are highly utilized and the fact that the alternative active green areas in the city center are inadequate for the public to enjoy daily make it imperative for the people to walk around and have picnic in the national park. In the survey, it can be seen that the lack of equipment as well as security, pollution and food and beverage sales restrict the utilization of active green areas. In addition to the survey results, the results

of area observations also reveal that the active green areas in Yozgat are not safe, the food and beverage sales are limited and the areas are neglected. In Yozgat where the active green areas are also similar in terms of plant species, the participants have stated that they feel the need to see different plant species and be in different and unique locations even though they are not knowledgeable about the plant species. When the survey results are addressed generally, it can be concluded that urban utilizers are not satisfied with the available green areas.

As a result of the study conducted, in order to improve the life quality of the people in Yozgat and create a society comprised of healthy individuals, the followings need to be implemented:

- When the master and implementary development plans procured by the municipality are designed, ecologic, social, economic and cultural features of the city should be taken into consideration and these plans should be made and designed rationally, aesthetically and functionally according to present conditions,
- When the development plans are implemented, instead of political goals and tendencies to getting unearned income, scientific and technical criteria should be prioritized,
- In the planning and implementations to be made regarding the active green areas, social texture of the urban utilizers, their need for green areas, tendencies and expectations should be taken into consideration,
- Botanical materials utilized in active green areas should be used suitable for their aesthetical and functional intended usage and more efficient designs should be made by benefiting from the aesthetical and functional features of the plants,
- Landscape architects working in the related departments of local administrations should create efficient and sustainable active green areas within the framework of green area planning. The municipality should employ and if necessary increase the number of landscape architects and experts in growing ornamental plants,
- Regular maintenance and repair works should be carried out in active green areas and in this way a more efficient utilization should be provided,
- Sufficient number of equipment should be used in active green areas and in this way an opportunity to benefit from these locations should be provided,
- Plant species growing in the region should be detected. Alternative plant species which can adapt to the region should be used. The use of drought-tolerant plant species should be prioritized in terms of efficient use of water.

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The Importance Of Agricultural Landscape In Terms Of Visual Landscape Diversity: Van/Gevaş (Turkey)

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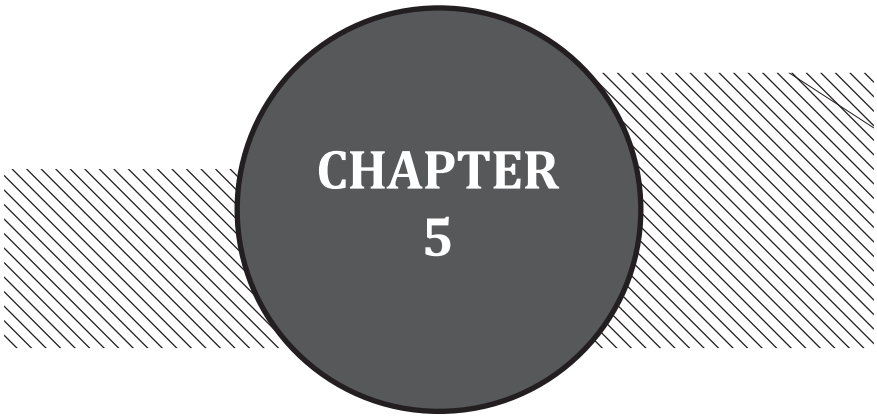

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INTRODUCTION

As a result of the advances in urbanization and industrialization, changes in the land utilization of a given region can show itself with dense structure development over the agricultural, forest, shoreline, and wetland areas, but it may also occur as agricultural areas applying pressure over natural ecosystems (Nas, 2016; Doygun, 2017). Uncontrolled or excessive changes in the utilization ways for a given area can result in the destruction of habitats and biotopes, destruction of the integrity of landscape, decrease of biological diversity, and loss of ecosystem products and service qualities (Kalnay and Cai, 2003; Veldkamp and Verburg, 2004; Kara and Karatepe, 2012; Sönmez, 2012; Akdoğdu, 2014; Gülgün et al. 2014; Yazici et a. 2018). Such changes may be limited to the location or spread to regional scales, and are amongst the causes of global warming which has world-scale influence. Since the urban and industrial structure development usually occurs around agricultural areas, the changes in land utilization show themselves in the transformation of agricultural areas first. This is a phenomenon with many solid examples present all around Turkey, in which 80% of the population lives in cities (Gürün and Doygun, 2006; Sümer, 2014; Şatıroğlu and Yıldızcı, 2014). Changes in land utilization and the rapid increase of population drive forward the importance of preservation of areas that are significant for agricultural landscape.

In short, the landscape is defined as the sum of natural and cultural elements that are within a certain viewport. Within this composition, the landscape elements are further classified into two groups as natural and cultural elements, both of which contribute significantly to the landscape variety all around the world (Şahin and Koç, 1999; Karahan and Orhan, 2008). The complexity indicators -which represent the variety and richness of a given landscape-, are determined by the density, quality, and complexity of the observed landscape elements (Tveit et al., 2006). The notion of landscape quality is often vital in determination of land utilization for tourism, agriculture, and even medical sectors. Furthermore, a high-quality landscape often includes the presence of water, oxygen, geomorphological formations, and a rich animal and plant variety, or the presence of educational or scientific purposes (Real et al., 2000; Glügün and Yazici, 2017). Thus, in order to obtain high-quality landscapes, the heterogeneity of the agricultural view options that are provided by the agricultural areas should be explored and preserved. The agricultural activities conducted in arable lands result in a significant variety of visual landscape elements, which contribute to these view options.

Agricultural landscapes are usually created as a result of profit gain efforts that serve efficiency purposes. Creation and allotment of farmland areas within the natural landscape, and formations like terracing, irrigation canals, village settlements, livestock facilities, natural forages and meadows, watermills, and orchards, represent parts of the agricultural landscape. Amongst the elements that enrich the agricultural landscape, copses, wetlands, marshes, solitary and decorative trees encountered within the fields can be given as examples (Şahin and Koç, 1999). Agricultural landscapes may cover entire lands in which a certain agricultural product is being cultivated, or may refer to small-scale agricultural areas like agricultural family establishments. Besides their economic aspect of providing various agricultural products, rural areas also provide the services and hospitability of farmers, which help reassess the role of agriculture for the society (Sayadi, 2009). Agricultural landscape areas, and traditional and non-traditional agricultural activities, also contribute strongly to the preservation of local biodiversity in addition to formalizing the properties of the rural areas (Tscharntke et al., 2005; Bratli et al., 2006; Alp, 2016, Alp, 2018). Another function of agricultural landscapes is their contribution to the ecosystem. The aesthetic values of the agricultural landscapes are also important, and the plant formations act as the building blocks of the structure and composition of agricultural landscape areas (Häfner et al., 2018).

While there are some studies that emphasize the relationship between agriculture and landscape, their numbers are quite low. Considering that the rural areas are also capable of serving as resting and recreational areas for the urban residents as suggested by the study of Sayadi et al. (2009), the importance of this study becomes more apparent.

In their study, Björklund et al, (1999) identified certain ecosystem related services, and estimated the agricultural landscape they generated under various production densities. Datasets from a low-density decade (1950) and a high-density decade (1990) were provided as examples. The researchers claimed that the changes occurring in land utilization in this manner had a significant effect on the ecosystem services generated by the landscape.

Gibbons and Boak (2002), on the other hand, conducted a study in which they assessed the importance of paddock trees in the preservation of woodlands in New South Wales' (NSW) South-west Slopes. The researchers utilized a holistic method in which they combined panchromatic Pour l'Observation de la Terre (SPOT) satellite images with models used for prediction of the original distribution of vegetation populations.

Gruehn and Roth (2010) also conducted a study in which they investigated various factors that influenced the variability in preference decision making processes for certain agricultural landscapes. The inspected landscapes included a variety of meadows, pastures, and arable lands. The inspected variance variable was analyzed and interpreted in relation to the level of preference and scenic quality, the potential group differences, and phytosociological typology.

In a study conducted in 2012, Grammatikopoulou et al employed a choice experiment to evaluate a program which aimed to create various landscape attributes in a typical agricultural area. The data they obtained from a municipality-level case revealed that the most important properties were "the renovation of production buildings" and "the presence of grazing animals". The findings of the research imply that it would be possible to integrate landscape planning into the agri-environmental measures. Such measures include support of organic livestock, which would mean that the animals would be present outside in the agricultural landscape by definition, and contribute to the second important property.

Häfner et al. (2018), meanwhile, conducted an expressed-choice experiment which utilized digitally calibrated images involving 200 residents and visitors and analyzed the preferences for different landscape properties. The highest general preference was for the green areas and linear elements. In this study, the crop variety and the presence of grazing livestock turned out to be less significant for the visual landscape value.

Agricultural landscape diversity, which is one of the 4 important components of rural landscape is; gardening agriculture, field farming, vegetable gardening activities, commercial growing of hothouse plants and livestock (Karahan, 2005).

The Gevaş district of Van mostly has a natural-form rural landscape composition. Inspection of the agricultural activities conducted in the area reveals a significant agricultural variety. The district is also an important recreational area since it's composed of agricultural lands, village settlements, and natural areas. The Van Lake Basin that contains the Gevaş District has the sight of a landscape fragmented into deep valleys by its river systems. Since the region mostly has sloped terrain it suffers from surface flow and erosion, particularly in the spring months. Its geographical position and micro-climate provide it with a wide variety in agricultural landscape elements and increased the diversity of agricultural activities (Anonymous, 2018). The most common agricultural products for the Gevaş district can be listed as barley, wheat, potato, corn, sugar beet, beans, apples, quinces, pears, cherries, apricots, oleasters, and walnuts. Most of these are produced with traditional production methods. The agricultural activities are conducted

in wide areas, and the local population mostly tries to meet their own needs with these, but in certain areas, agricultural activities are conducted for commercial purposes as well (Aşur, 2018). The aim of this study is to evaluate the effects of agricultural and livestock activities on the visual landscape diversity of the region. At the end of the study, suggestions were provided with hopes to help in preservation and emphasizing of the influence of the agricultural landscape in the region.

MATERIAL AND METHOD

The primary material of the study consists of the official information, photographs, and maps of the Gevaş district –which is one of the 12 districts of the province of Van-, and national and international researches and reports regarding the region that could contribute to the research. The Gevaş district is located between 42 degrees 40 minutes and 44 degrees 30 minutes east longitudes and between 37 degrees 43 minutes and 39 degrees and 26 minutes north latitudes (Figure 1 and 2).

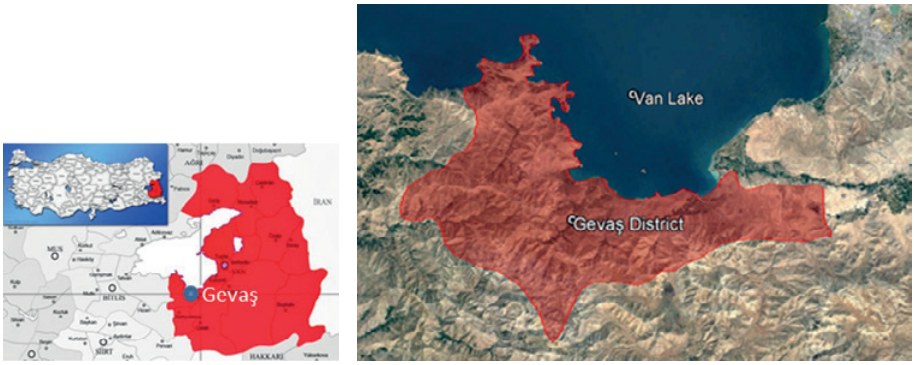


Figure 1. The geographical location of the study area

The district is 38 km away from the city center and has an elevation of 1.750 meters (Anonymous, 2018). The agricultural diversity is composed of activities like gardening agriculture, field farming, vegetable gardening activities, commercial growing of hothouse plants, forestry, trout growing apiculture and livestock. As part of the study method, in-person observations in the locations were conducted, and data were obtained from the Ministry of Agriculture and Forestry, Van Provincial Directorate (2017) regarding the distribution of the locations in terms of utilization.

Figure 2. General view of the work area

FINDINGS AND DISCUSSION

The Effects of Agricultural Activities on Landscape Diversity

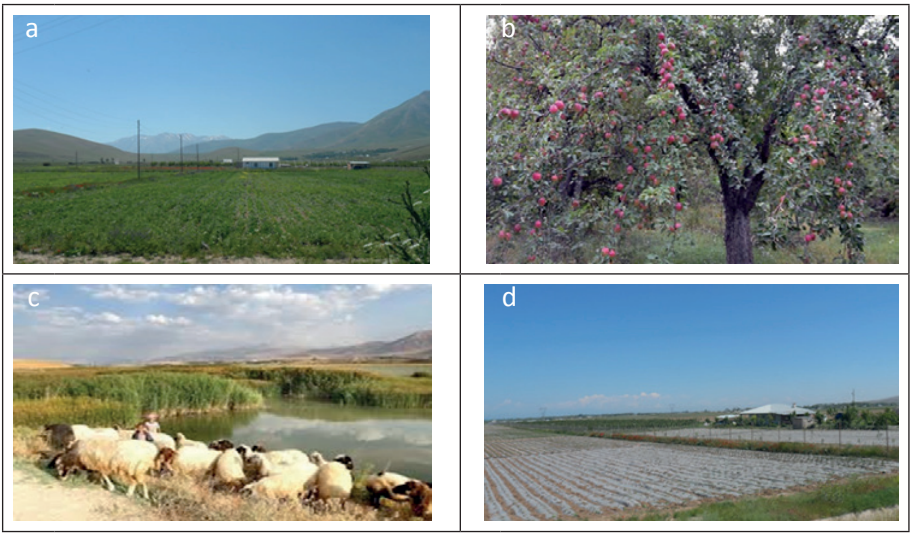
The district of Gevaş is established in the skirts of the Artos Mountain (3650 m), which is the highest of the Kavuşahap Mountains, an extension to the South Eastern Taurus Mountains. The old Van-Bitlis road passes right through the district, and the newer motorway traces around the north. While the settlement of the district is denser around the old road, it has also somewhat spread towards the agricultural areas around the district. Since the district is on the shorelines of the Van Lake, it has a milder climate compared to other locations of the region. The micro-climate effect of the Van Lake also causes significant differences between the climates on the northern and eastern skirts of the mountain (Gevaş Municipality, 2018).

Inspection of the potential of the agricultural fields reveals that the wide and open nature of the region makes them quite suitable for agricultural development. The surface area of the Gevaş district is 72,749.00 ha., and 66% of it consists of prairies and forages. Various agricultural activities take place in the Gevaş district (Figure 3 and Table 1). The district has 10,844 ha of meadows and 37.168 ha forages, which causes a significant visual landscape effect in terms of agricultural landscape. The district also has 6.046% forests and briers, and 17.43% non-agricultural and 10.52% agricultural land utilization. Of the agricultural areas in the district, 7.34% is covered by orchards and beverage and spice plants, while 1.98% is used for fallowing, 11.44% as vegetables, and 79.24% as cereals and other plants. The district has a total of 17.6 ha terrain that is suitable for agriculture which is not being utilized for that purpose (Ministry of Agriculture and Forestry, Van Provincial Directorate, 2017).

Figure 3. The locations of various agricultural areas

The locations of various agricultural areas in Gevaş

Inspection of the agricultural activities conducted in the area reveals significant agricultural landscape diversity. The elements that constitute the agricultural diversity can be classified as (1) agricultural and (2) livestock main categories, in which the agriculture is mostly vineyards and orchards in the valley bottom, and livestock is mostly conducted in the high-elevation areas.



a	Field farming	b	Gardening agriculture
c	Livestock	d	Greenhousing
e	Apiculture	f	Forestry
g	Walnut cultivation	h	Vegetable gardening
i	Vegetable gardening	j	fruit drying
k	Trout growing	l	Sales of fruit on the road

Table 1. Images from various agricultural landscapes in Gevaş

Images of various agricultural activities conducted in Gevaş

Due to the suitability of its ecological factors, Gevaş has significant economic importance in terms of agricultural production. In addition to having wide swathes of low-slope flat terrain suitable for agriculture, there are certain areas that are dominated by mountains and high-slopes. The general terrain status of the Gevaş district, the distribution of the land in terms of utilization, and the distribution of the agricultural areas in terms of their utilization is given in Table 2.

	Agricultural Areas	Decares
1	Orchards and Beverage and Spice Plants Areas	5.628
2	Fallowing Area	1.521
3	Vegetable Area	8.765
4	ornamental plants	0
5	Cereals and Other Vegetation Production Area	60.753
	Total	76.667

Table 2. The land distribution and utilization of Gevaş District

Irrigated fields of vegetables and orchards have a surface area of 6,503.6 ha, while the non-irrigated area is 1,035.2 ha (Ministry of Agriculture and Forestry Provincial Directorate of Van, 2017). It is possible to summarize various agricultural activities conducted in the Gevaş district and its vicinity with the following items:

Gardening Agriculture

Based on the 2017 data from the Ministry of Agriculture and Forestry Provincial Directorate, the Gevaş district has a total of 65,415 fruit-bearing trees (apples, pears, walnuts, cherries, quinces, oleasters, and apricots). Gardening agriculture has various effects over the visual landscape, and the most significant ones are summarized in table 3.

1	Offering a traditional model of the landscape in the gardens parallel to the valley floor,
2	In spring, the trees flower and provide alacrity to the visual landscape, and attract numerous visitors due to their beauty,
3	The traditional walnut and apricot processing and drying methods help include the human element into the landscape and alleviate the social life,
4	The landscape compositions formed by the change of color that occur in fall months in the orchards, and the effects of the eventual leaf cast,
5	Contrary to spring and summer seasons, the livelihood decreases during the winter and drives forth the calligraphic properties of the trees which define the landscape during this period.

Table 3. The effects of gardening agriculture on the visual landscape

Vegetable Gardening Activities

Based on the 2017 data from the Ministry of Agriculture and Forestry, Van Provincial Directorate, 8,765 ha of land is utilized for vegetable gardening activities in the district of Gevaş. Most common products obtained are tomatoes, cucumbers, green peppers, eggplants, zucchinis, onions, potatoes, beans, melons, and watermelons. The vegetable gardening activities conducted in the region bring in the characteristic agricultural landscapes of the region (beans, potatoes, zucchinis, corns, etc.). Other significant

characteristics of the area are the production of the Gevaş bean –which is considered a local value and holds an important place in the local economy-, the fact that local population does not use hormones or pesticides in their production, and the characteristic climate, sights, and slope and height of the terrain.

There are a number of family-scale establishments that sell local seasonal products on stalls placed on the Van-Gevaş motorway, which provide another visual landscape element. Other things that contribute to the visual landscape effects are the numerous types of products in different colors which create an effective horizontal landscape effect, and the fact that as the production ends in fall, the element of time is added to the landscape.

Field Farming

The activity that holds the major share in the Gevaş district in terms of land utilization is the field farming. According to the 2017 data from the Ministry of Agriculture and Forestry Provincial Directorate, the total area used for field farming is 60,753 ha. The sugar beet of Gevaş is a sought after product and is cultivated in a total of 5,669 ha area. Other products commonly obtained in field farming are barley, wheat, corn, clover, and trefoil. These arable fields are generally located in wide, open ranges, and usually have horizontal landscape effects.

Commercial growing of hothouse plants

Due to the long winters of Gevaş, the greenhouse cultivation activities are gaining popularity and keep developing, with the aim of extending the vegetation period and to achieve high yields. As new and modern greenhouses are being added each day, the district of Gevaş becomes a prominent source of greenhouse products, not only for the city of Van, but for other cities in the region as well. The increasing greenhouse cultivation activities became a factor that influenced the agricultural landscape texture of the district. Most of the greenhouses of the district have metal constructions with plastic sheets and are equipped with drip irrigation systems. According to TUIK 2018 data, there is 10 ha total area of greenhouses in the district used for cultivation. Personal observations have revealed that vegetable cultivation in greenhouses are particularly focused on 4 locations and are being conducted by private companies.

Forestry

There exists a Forest Management Department conjoined to the Provincial Forestry Management Directorate of Van. 6.046% of the city consists of forests and shrubbery. Juniper *(Juniperus oxycedrus* subsp. *oxycedrus* and *Juniperus excelsa*) and oak *(Oercus robur* subsp. *pedunculijlora* and *Oercus patraea* subsp. *pinnaüloba*) forests are present in Altınsaç and İn Köyü regions. The presence of the forests in the region increases the visual quality of the area in combination with the view of the lake. Unfortunately, none of these forest areas have been declared preserved areas. Especially in the winter months where the vegetation in the flatlands and pastures is scarce, the tops of saplings are being eaten by goats, or the branches of the trees are being cut to feed the animals. This situation harms the unique vegetation cover of the region and gives ground to future erosions.

Effects of Livestock Activities on Landscape Diversity

Ovine and Bovine Husbandry

Livestock activities are indicators of the agricultural landscape and are amongst the factors that influence the visual landscape of the area. While sheep-raising is the most common husbandry in the district of Gevaş, goats are also raised in the villages located in high-elevation areas. According to the 2017 data, there are 7,992 cattle, 53,300 sheep, and

10,600 goats in the district. In the Altınsaç and İn Köy regions of the district, the steep and uneven geography of the area steer the families towards raising goats as these animals can easily adapt such an environment and can make use of all kinds of green flora -including the forest areas- as a food source. Due to the traditional methods employed in the region in goat breeding, the goats eat the tops of the juniper saplings in juniper and arborvitae forests and prevent their natural growth process resulting in a geometric row-cut shape, which represents a serious problem. Due to this phenomenon, the most characteristic biological diversity element of the forest presence in the region gets suppressed by the pasturage. Under this constant suppression, these trees are unable to achieve natural juvenescence and face the risk of failing to sustain their presence within the ecosystem. The goats are not only harmful in terms of natural and artificial juvenescence and afforestation, but they also keep eating the tops off of the existing trees in the forest areas and cause them to stay short. On the other hand, most families in the villages of Gevaş see the goat-raising as the only economic income source, and believe that no other ovine species can survive in this particular terrain, so they keep the raising goats with traditional methods. In addition, some areas of the district (Engil Wetland and its vicinity) with wide spreads of forages also sustain forage destruction due to intense livestock.

Apiculture

Since the soil in the district houses a wide range of flora it's also quite suitable for apiculture activities. There are approximately 10 thousand beehives in the Gevaş district, from which an average of 168 tons of honey is obtained each year. The honey is organically produced and represents an important economic income source for the local population.

Trout growing

Trout growing facilities contribute to the agricultural land utilization change for the landscape composition of the region, and for the development of recreational activities. These facilities are growing in number, and have an approximate total annual trout growing capacity of 15-20 tons. A pearl mullet production facility built in Dereağzı quarter has recently begun its testing production. The pearl mullets are also caught from the Van Lake as well, which represents a further 4-5 tons of fish for the region. The pearl mullet hunting creates a different, water-based landscape effect in the region. Various fish stalls on the Gevaş-Van motorway increase the livelihood of the landscape structure of the shoreline.

SWOT ANALYSIS

The SWOT analysis is an effective way of evaluating multi-dimensional strategies, preparing for threats and focusing on opportunities and strengths in order to form a strategy for any product (Güngör and Arslan 2004).

As part of the analysis, the favorable conditions for the area in terms of the agricultural landscape was presented as strong points and opportunities, while the unfavorable ones were listed as weak points and threats (Table 4).

Strong Points	Weak Points
• The district has suitable levels of climatic properties like temperature and rainfall, • The district has arable lands, • The main occupation for the majority of the local population is vegetative production, which they lean towards, • The presence of the lake, slope, sights, and elevation properties that are suitable for agricultural landscape, • Sustained production with a diversity of local products • Local population lives off of agriculture • Presence of untouched natural areas	• Grade I and II areas suitable for agriculture are in a very small portion of the area, • Lack of organization in the production and marketing of the agricultural products, • Lack of publicity in an agricultural landscape • Migration from the district to other locations. • Economic challenges • The surplus products produced in the region are presented to the consumer with the personal efforts of the local people, lack of agricultural cooperatives • Lack of publicity
Opportunities	**Threats**
• The vegetable and fruit production conducted in the area is open to further development and invigoration, • Gevaş has better potential in terms of orchard and vegetable production compared to other districts, • Opportunity to publicize the local agricultural products to participants, • No chemicals being used in production, resulting in a potential for "good agriculture practices" • Opportunities for R&D projects • A wide range of agricultural products	• Environmental pollution • Usage of pesticides • Fields getting smaller due to inheritance system • Change of climate • Economic challenges • Migration from the district to other locations.

Table 4. The results of the SWOT analysis for Gevaş District of Van in terms of Agricultural Landscape

Evaluations based on the SWOT analysis revealed that the most significant constraints on the area in terms of the agricultural landscape are the suitability of the soil for vegetable and fruit cultivation, and the lack of publicity regarding the notion of "agricultural landscape".

CONCLUSIONS AND RECOMMENDATIONS

The study area is quite suitable both for providing the economic means for the local population and a chance to experience the agricultural traditions of the region to its visitors. In order to incentivize the sustainable development of the region, the agricultural activities should be continued, future migration off of the arable lands should be prevented, the deserted areas should be reclaimed, the landscape observation elements in the rural areas should be included, the existing recreational programs for the rural tourism should be supported, and the visual landscape potential should be harnessed to its fullest extent by the strategies employed by the authorities.

Presence of agricultural areas in the study area provides a positive contribution to it in combination with the view of the lake, which is a biophysical property of the visual landscape. All things considered, the preservation of the agricultural properties will also be a driving factor for the sustainability of visual resources.

When the agricultural activities are considered with regards to the above-mentioned properties, it is evident that they represent a significant diversity for the visual landscape. These activities can be grouped in two main groups as (1) Agriculture and (2) Livestock, where the agriculture in the region mostly consists of vineyards and orchards in the valley floor, and the livestock is mostly conducted in the high-elevation areas. While the agriculture, in general, is conducted for economic reasons in the valley floor and the landscape is still green and somewhat preserved, problems like (1) erosion and (2) deforestation can be encountered in high-elevation areas due to intense livestock activities. A series of projects for the application of the optimum level of agricultural activities and preservation of agricultural landscape diversity would be most appropriate for the region. These would be:

- Establishment of an arboretum near the Atalan Village and close to the Van Lake in order to preserve the local diversity,
- Introduction of the notion of "hobby gardening" in order to preserve, publicize, and produce local products,
- Conducting an inventory and documentation study regarding the agricultural cultivations in the vineyards and orchards that became too small due to inheritance or were deserted,
- Establishment of a Rural Life Museum as a major activity of a part of a tourism project,
- Revitalization and restoration of activities that would create economic opportunities, like organic farming, greenhouse cultivation, decorative plant cultivation, and sapling production.
- Determination of the capacities of trout growing facilities considering the architectural and landscape design,

We also present some suggestions for the design of agricultural policies and rural development strategies based on our findings regarding the aesthetical potential of the agricultural systems of the area:

- Observation and admiration of rural scenes should be included in the existing activity programs for the rural tourism of the region,
- Agricultural activities should be kept close to the population centers, due to the observed positive influence of this situation on the agricultural-architectural combinations,
- Further research should be conducted in order to analyze the preferences for other aesthetic criteria (biological, ecological etc.) in order to achieve other perspectives for sustainable development.

Due to excessive population increase -which is a major problem of modern times-, agricultural areas are being opened for settlement constructions and agricultural natural texture is being destroyed. This situation leads to irreversible urbanization and forces populations to live in artificial environments away from nature. Agricultural landscape character is very important for the district of Gevaş, for which the untouched town identity consists primarily of agriculture and livestock activities. When the landscape classification of the district was conducted based on the general landscape properties of the Gevaş district and its vicinity, it was revealed that the agricultural and livestock activities conducted in the region increase the richness of the landscape texture and diversity, and

that these activities are important for the sustainable landscape of the district. We also hope that the findings of this study will be useful for the related occupational groups that work in areas with similar properties.

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A Fuzzy Multi-Criteria Evaluation Method Proposal For Using In Building Element Design Phase

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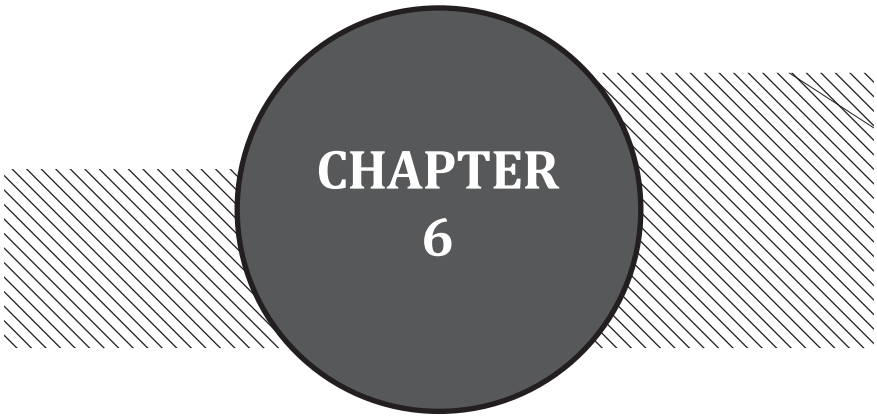

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1. INTRODUCTION

Buildings with basic function of providing the individuals' sheltering needs in required comfort conditions should be designed and applied in accordance with the factors. The detailing sub-phase is significant in predicting the discomfort causes that may arise during the use of buildings. It is seen that the product and solutions used in the buildings are developed in recent years. However, the increase in the options brings complexity and inadequacy in details about regarding the requirements. In preventing and reducing these results, it is thought that a systematic evaluation of the details in their design phase may be a solution. Therefore, it is proposed to evaluate the building element details in their design phase through a method based on a performance approach in this study.

Together with the fuzzy multi-criteria theoretical evaluation method proposed in this study, it is aimed to reach a numerical value to what extent the requirements meet by the last revealed detail product in design phase. For that reason, the performances of the building elements' layers are evaluated. The use of the fuzzy logic approach is considered because the resulting detail product has intuitive, abstract, concrete, measurable, immeasurable and indefinite specifications. Also, because criteria that are unitless and that have different significance will be evaluated together, simple weight method which is one of the multi criteria evaluation methods is used for the method proposal. During the concretization of the method, Fuzzy Logic and Simulink toolboxes that are within the MATLAB software are used. The method interface that is created in Simulink is named "BEE (Building Elements Evaluation) System".

2. PERFORMANCE APPROACH IN ARCHITECTURE

It is known that the architectural design is discussed independently from any specific method from past to now. In this type of design understanding in which the performances expected from the building could not be clear, the solutions related to the building, should be realized with the products that the designer is familiar with through an intuitive approach. With this type of solution, the requirements that the building needs to meet are not identified clearly and it is assumed that the product which is created because of the design meets these requirements.

It is discussed an increase in product and solutions and a complexification in production process by the technological developments. In resolving this option and solution plurality, it is observed that the traditional approaches are insufficient. Therefore, systematic design approaches are used during design process in recent years. These approaches aim to set forth the requirements and the resources clearly and to create the most appropriate solution depending to their interactions. Systems approach and performance approach are the most known of these approaches (Edis, 2006).

The performance concept that could be used as an evaluation tool during each steps of the building production system can be benefited in the development of the products or processes, in finding the new ones, in their evaluations and selections. In this context, a method based on performance approach is proposed in this study.

2.1. Performance Requirements of Building Elements

According to Özdemir and Altun (2010), the titles such as the functionality, visual effect, feasibility, cost and the related la w-regulation-standard are taken under consideration as various design criteria. The functionality of the building elements from the criteria is defined with "performance" and the others are discussed as the "expected qualities". The function, the requirement and environmental factors should be associated with each other for Balanlı (1997). The qualities are a result of the functions, the functions are a result of

the requirements and the requirements are a result of the environmental factors (Balanlı, 1997). In the roof element, it is necessary to determine the external and internal factors and to know their effects on the building to build a durable roof, to convey the loads safely onto the structural system, to create a comfortable indoor environment by fulfilling the necessary comfort conditions and to have a long life (Coşkun, 2006).

In this study, external factors such as user requirements and environmental factors are utilized. Internal factors such as material properties are also considered in the process of determining performance requirements. User requirements are covered in the biological, psychological and social requirements (Balanlı, 1997; Kaya, 2010). Environmental factors affecting the performance of building elements are limited as; static and dynamic loads, thermal factors, water, moisture (water vapor), sound/noise, fire, solar radiation, movements, durability, health and safety and the factors related with the usage process (maintenance and repair). It was considered that the factors such as economy and ecology would be excluded, and the functional performance of the elements would be evaluated in the proposed method. However, it is known that aesthetic concerns stand out in the design of building elements. Although it is not functional, the factors related to aesthetics are evaluated together with environmental factors in the study. User requirements and environmental factors were transformed into expected performance requirements of building elements as: Structural, thermal, water, moisture / water vapor, sound / noise, fire, sun radiation, movemental, durability, maintenance and repair and aesthetical performances.

2.2. Layers of Building Elements

Building elements are usually established by coming together one or more surfaces. These surface and surfaces, placed building element sections and named with “tiers” or “layers”, are responsible for various functions in the element that they created. The number of layers indicates the single or multiple layered of the building elements. In single-layered building elements, the element consists of a layer with all its functions loaded. Multi-layered building elements are formed from structural, controlling and covering (interior or exterior) layers in general. The number of layers or their order of assembly may vary due to the requirements of the multi-layered elements.

Structural or with other name core layers undertake the carrying function in the building elements (Deniz, 2011). Controlling layers determine the performance of building elements against environmental factors undertake various functions such as thermal, moisture (water vapor) and sound control. The number and order of such layers can vary due to the environmental features (climate, geographical region, etc.), the function and the materials of element and the construction system. The covering layers which can be named interior or exterior according to the spaces separated by the building element are the finishing layers forming the final tier of the building elements. Therefore, the features such as texture and visual quality, which are directed towards the architectural concept, are important in these layers.

2.3. Relations of Performance Requirements with Layers

	LAYERS	Structural	Controlling	Exterior Covering	Interior Covering 1	Interior Covering 2
PERFORMANCE REQUIREMENTS	*Structural*	√	X	X	X	X
	Thermal	√	√	√	√	√
	Water	X	√	√	X	X
	Moisture / water vapor	√	√	√	√	√
	Sound	√	√	X	X	X
	Fire	√	√	X	√	√
	Sun radiation	X	X	√	X	X
	Movemental	√	X	√	X	X
	Durability	√	√	√	√	√
	Health and safety	√	√	√	√	√
	Maintenance and repair	X	X	√	√	√
	Aesthetical	X	X	√	√	√

Table 1. The relations between the performance requirements and the layers

The building element layers and the performance requirements expected from them are associated with each other in Table 1. The relevance of the layers in the related performance requirement of the building element is questioned for the table. According to this, while layers associated with the requirements are shown by (√), non-associated ones are shown by (x) sign. The functionality (performance) of the layers is directly related to the performance of the building element, and the creation of building element type / layer relations is important in determining the functions that the layers will undertake.

3. EVALUATION IN ARCHITECTURE

Evaluation in architecture is described as defining the value, usefulness or strength of a goal-oriented solution (Pahl ve Beitz, 1988); a comparison phenomenon for an object or product with value criteria for that object or product (Tapan, 2004). The architectural evaluation, which can be carried out as the evaluation of the design process or the result product, aims to determine the rate at which the value criteria related to the pre-determined purpose are fulfilled in the final product (Gür, 2007).

3.1. Evaluation Methods Used in Architecture

Architectural evaluation methods used in building production are listed as methods based on utility theory, methods based on options' costs and multiple criteria evaluation methods (Deniz, 1999; Gür, 2007). In the methods based on utility theory; the achievement value of goals is explained as benefits. The main criterion used in the comparison of options is cost in the methods based on options' costs. Multiple criteria evaluation methods are defined within the framework of multi-featured and multi-purpose decision making methods. In these methods, in addition to the criterion values of the options, the degree of satisfaction of these values should be measured (Deniz, 1999; Gür, 2007).

It is known that the field of architecture carries within intuitive, abstract, concrete, measurable, immeasurable, unpredictable and uncertain features. The success of the design product is often influenced by multiple criteria having different units. During evaluation because of the design, all criteria have not the same importance (Palabıyık, 2011). When considered from these perspectives, the use of multiple criteria evaluation methods in the field of architecture is gaining importance. It is known that weighted evaluation techniques are used for this purpose in the evaluation of architecture. However, the use of fuzzy logic approach, which is one of the mathematical programming methods, has increased in recent years.

3.2. Fuzzy Logic Approach

The Fuzzy Logic Approach developed by Prof. Dr. Lütfü A. Zade in 1965 is defined as the application of the logic rules in a flexible and fuzzy way (Nabiyev, 2010; Palabıyık and Çolakoğlu, 2012). With the approach based on Fuzzy Set Theory which is a mathematical concept, it is aimed to model thinking and decision-making systems that enable people to make consistent and accurate decisions in the light of inexact and inaccurate information (Palabıyık, 2011).

In fuzzy sets, the membership functions (μ) are used to show how much the said elements are compliant to the concept that is represented by a fuzzy set A or how much they carry the set specifications. In these functions, real values are assigned to the elements at certain intervals (Karakaşoğlu. 2008), and membership functions are set up in various ways such as triangular (mostly), trapezoidal and bell curves. In membership functions the values are defined through words instead of numbers. These values called verbal variables may contain fuzzy sets such as not satisfying, mediocre, satisfying and very satisfactory for the function of a building (Palabıyık, 2011).

Fuzzy logic approach has three phases named as fuzzification, fuzzy inference system and defuzzification (Figure 1). MATLAB software with its toolboxes sampled as Fuzzy Logic and Simulink can be used in implementation of the approach.

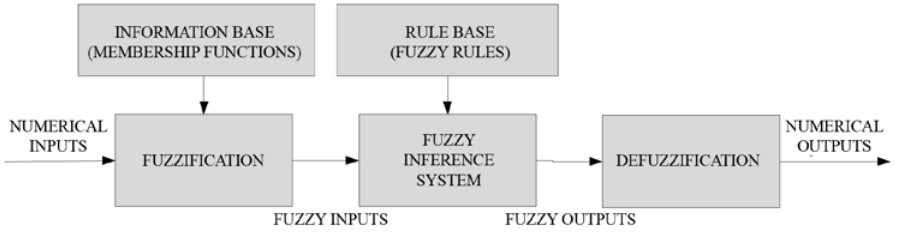

Figure 1. Fuzzy logic approach

In the "fuzzification" phase; values of the real world are transformed into membership functions in fuzzy sets (Alcı and Karatepe, 2002). The most common methods defined for this process, which can be performed by intuitive, algorithmic or logical means are determined as intuition, rank giving, angular fuzzy sets, neural networks, genetic algorithms, inductive logic and statistics (Pakdamar, 2009).

The system where the IF-THEN rules defined in the fuzzy rule base are converted into a fuzzy relationship defined in the input and output space, is named the "Fuzzy Inference System". In the system, it is possible to express human knowledge and experiences by using IF-THEN rules. With these rules, controlling systems can be provided (Alcı and Karatepe, 2002). Various fuzzy set operations can be used during the definition of the rules. Union, intersection and integration that are the frequently used ones of these operations, correspond respectively to OR, AND, NOT operations.

The modeling and calculation of the fuzzy information and the concept of drawing a conclusion from these differs from adapting these results into the real world. Even though the heaps of information encountered every day are blurred, most of the decisions and processes are perceived and applied by people and machines through binary logic (1-0 logic), in a traditional way. At this point, a need for turning the fuzzy results from a fuzzy set analysis into classical results emerges. Translating a fuzzy set into a classic monovalent quantity to meet this need, or the result of the classicization operation of a fuzzy number is described as "Defuzzification" (Pakdamar, 2009).

4. EVALUATION METHOD PROPOSAL AND SAMPLE APPLICATION

As it is seen in Figure 2, the proposed theoretical method is conceptualized in analysis, synthesis, evaluation and decision phases. While analysis and synthesis phases are static, evaluation and decision phases are developed in a dynamic structure. Because of this, the first two phases of the sample application is designed to enable the evaluation of the "wall" element. In the later phases, a pre-designed "exterior wall typical area detail" is tried to be evaluated through the method.

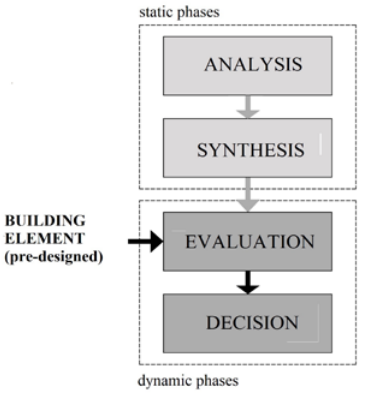

Figure 2. The phases of the proposed method

4.1. Analysis Phase

Analysis phase is the phase where the data directed at the evaluation of the building elements through a fuzzy approach are collected and organized to be used in the synthesis phase. The conditions to be used in the evaluation phase are also determined at this phase. It consists of the following steps:

1. The definition of the building element performance values,
2. The identification of the layers affecting the building element performance and their association with FIS (Fuzzy Inference System),
   - The determination of the importance weight of the layers,
   - The definition of the performance values of the layers,
3. The identification of the performance requirements of the layers and their association with FIS,
   - The determination of the importance weight of the performance requirements,
   - Conditions directed to the evaluation determination and the definition of the performance values,

4. The schematization of the requirement-layer-building element performance relationship of the identified requirements and layers within the context of FIS.

4.1.1. Definition of the Building Element Performance Values

The performance value of the building element is used in the proposed method. Within this respect, primarily the wall performance values are determined in the sample application. For these performances that are named as negative, average and positive, such 1, 50 and 100 values are respectively defined. The performance values are respectively limited with 0-25, 25-75 and 75-100 intervals [(4.1)].

$$0 < \text{Negative} < 25 \leq \text{Average} \leq 75 < \text{Positive} \leq 100 \quad (4.1)$$

4.1.2 Identification of the Layers Affecting the Building Element Performance and Their Association with FIS

The performance of the elements is directly related to the performance of the layers that compose it. For that reason, it is significant to know the layers and their performances that need to be present in building elements. The performances of layers could change such following various factors as numbers of layers or their orders that they are composed of, place of the element in the building, the construction system and the function of the area that it will be related to. In this context, type/layer relationship of the element is constituted in this step (Table 2). Codes are defined as W for walls in the sample. After that, the determined wall layers and wall performance relationship is shaped according to FIS (Fuzzy Inference System) (Figure 3).

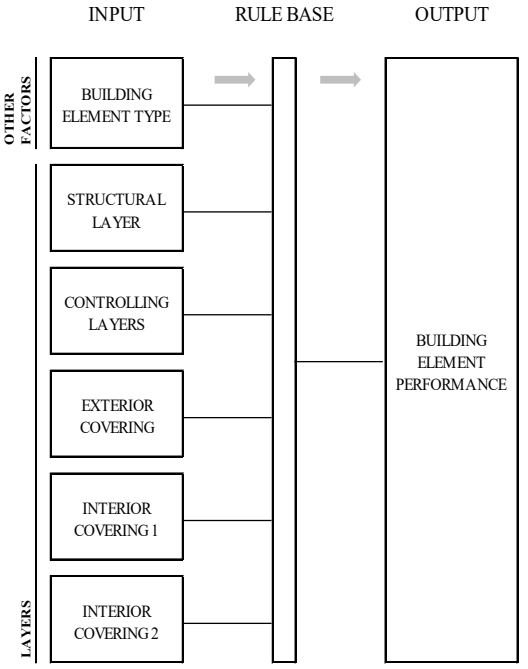

Figure 3. The relationship schema for FIS between the wall layers and their performances

MAIN B.E.	B.E. TYPE (1.)	B.E. TYPE (2.)	B. E. CODE	B.E. LAYERS				
				Structural	Controlling	Exterior Covering	Interior Covering 1	Interior Covering 2
WALLS	Exterior	Air Contacted	W1					X
		Soil Contacted	W2			X		X
	Interior	Room	W3		X	X		
		Neighbour	W4		X	X		

B.E. : Building Element Related X Not Related

Table 2. A sample for the relatioship between the wall types and the layers

The determination of the importance weight of the layers

In a multi-layered building element each layer has a distinct importance weight. For the method, the sum of these weights is equivalent to the importance weight of the building element performance and is accepted as 1. In weight determination operation the building element types should be taken under consideration (Table 3). GROUPING method is used during weight determination operation.

MAIN B.E.	B.E. TYPE (1.)	B.E. TYPE (2.)	B. E. CODE	LAYER (i)	IMPORTANCE VALUE (gi)	IMPORTANCE WEIGHT (a_i)
WALLS	EXTERIOR	AIR CONTACTED	W1	STRUCTURAL	5	0,42
				CONTROLLING	3	0,25
				EXTERIOR COVERING	3	0,25
				INTERIOR COVERING 1	1	0,08
				Σ	12	1,00
		SOIL CONTACTED	W2	STRUCTURAL	5	0,56
				CONTROLLING	3	0,33
				INTERIOR COVERING 1	1	0,11
				Σ	9	1,00

B.E. :Building Element

IMPORTANCE	VALUE
Very High	5
High	4
Normal	3
Low	2

Table 3. A sample for the importance weight of the layers for the wall types

The definition of the performance values of the layers

The sum of the multiplication of performance value and importance weight of each layer that forms the building element is equal to the multiplication of building element's performance value and importance weight. The layer performance values defined in this step are used to determine the performance value of the building element evaluated by defined equation above. They are defined verbally as negative, average and positive, and

respectively are valued as 1, 50 and 100. However, in such walls as stone walls that do not have a completed pre-design, there may be such as covering that are not conceptualized. In such cases; the performance value of the layers is considered negative and 1. Similarly, some wall types, such as interior rooms, do not have layers such layers as exterior coverings. In such cases the layers are defined by the value none and 0. The performance values for wall layers are shown in Table 4.

IMPORTANCE WEIGHTS OF LAYERS and PERFORMANCE VALUES THAT ARE DEFINED FOR LAYERS					
WALL CODE	LAYER (i)	IMPORTANCE WEIGHT (a_i)	PERFORMANCE VALUE		
W1	STRUCTURAL	0,42	POSITIVE:100	AVERAGE:50	NEGATIVE:1
	CONTROLLING	0,25	POSITIVE:100	AVERAGE:50	NEGATIVE:1
	EXTERIOR C.	0,25	POSITIVE:100	AVERAGE:50	NEGATIVE:1
	INTERIOR C. 1	0,08	POSITIVE:100	AVERAGE:50	NEGATIVE:1
	INTERIOR C. 2	X	NONE		

Table 4. A sample for the performance values of wall layers

4.1.3 Identification of the Performance Requirements of the Layers and Their Association with FIS

In this step of the method where the performance requirements of the layers are determined, the requirements of the building element are taken into consideration. At the same time, other factors such as wall types and climatic conditions are considered. As a sample: a W1 coded exterior wall can has structural, controlling, exterior covering and interior covering 1 layers. While the structural layer meets such performance requirements as structural, thermal, moisture/water vapor, sound, fire, movemental, durability, health and safety, the interior covering 1 layer can meet such performance requirements as thermal, moisture/water vapor, fire, durability, health and safety, maintenance and repair, aesthetical. After the operation, the identified requirements and layers are associated within the FIS (Fuzzy Inference System) (Figure 4).

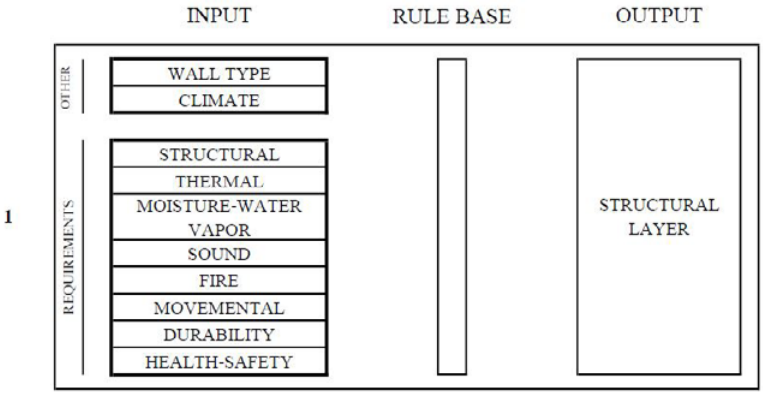

Figure 4. A sample of the relationship schema for FIS between the performance requirements and layers

The determination of the importance weight of the performance

requirements

Each layer performance requirement has an importance weight and these weights may vary due to the place of the element in the building, the function of the area that it is related to and the climate conditions of the building. This variable state affects the performance value of the layers and the building element, too.

In Table 5, the performance requirements and importance weights for the wall layers are described for the sample. During the weighting process carried out through the GROUPING method, the types of climates where the walls can be placed are considered.

WALL CODE	LAYER (i)	PERFORMANCE REQUIREMENTS (gp)	MILD-HUMID CLIMATE (İstanbul)	
			IMPORTANCE VALUE (gi)	IMPORTANCE WEIGHT (a_i)
W1	CONTROLLING	THERMAL	5	0,19
		WATER	5	0,19
		MOISTURE	5	0,19
		SOUND	4	0,15
		FIRE	4	0,15
		DURABILITY	2	0,07
		HEALTH-SAFETY	2	0,07

IMPORTANCE VALUE (gi)

5: High Imp.
4: Very Imp.
3: Normal Imp.
2: Low Imp.

Table 5. A sample of the performance requirements and their importance weights for the W1 coded wall layers where placed in a mild-humid climate.

The determination of the conditions directed to the evaluation and the definition of the performance values

To define layer performance values, the sub-categories and conditions that are efficient in providing each performance requirement should be determined. A table for the structural performance of wall layers is sampled in Table 6. The table also includes the relations of the conditions with the layers.

	EVALUATION PRINCIPLES	SUB-CATEGORIES	CONDITIONS	RELATIONS WITH LAYERS (√: ilişkili X: ilişkili değil)				
				SL	CL	ECL	ICL 1	ICL 2
STRUCTURAL PERFORMANCE	Designed according to project dimensions.	GENERAL PRINCIPLES	1. Use of connections and installations in accordance with the project	√	X	X	X	X
	Design of connections and fixings according to the project and material properties.	MATERIAL	1. Using materials in accordance with the project	√	X	X	X	X
	Selection of materials suitable for the project and specifications.		2. Using appropriate sized materials to the project	√	X	X	X	X
			3. Use of connections and installations suitable for selected materials	√	X	X	X	X

SL: Structural Layer, CL:Controlling Layers, ECL: Exterior Covering Layer, ICL Interior Covering Layer.

Table 6. A sub-categories and conditions sample table for the structural performance of wall layers

Following this operation, the performance values directed to the requirements of the layers in the walls are defined as positive (100), average (50) and negative (1) (Table 7). However, the wall requirements may not be included in the relevant wall type. In such cases; the performance value is considered negative and 1. Similarly, the performance value that is non-compulsory and could be neglected is defined as none and 0.

		STRUCTURAL PERFORMANCE VALUES		
		POSITIVE: 100	AVERAGE: 50	NEGATIVE: 1
WALLS	W1, W2, W3, W4	1. GENERAL PRINCIPLES 2. MATERIAL 3. LEGAL REGULATIONS To provide the whole conditions for number 3 from the sub-categories listed above related to the corresponding layer and to provide minimum most conditions close to all for number 1 and 2 from the sub-categories listed above. NOTE: If all conditions of each title are met, 100 value should be given; If most conditions close to all are met, 80 or 90 values should be given for the performance value between 75 and 100 values.	1. GENERAL PRINCIPLES 2. MATERIAL 3. LEGAL REGULATIONS To provide the whole conditions for number 3 from the sub-categories listed above related to the corresponding layer and to provide a half of conditions (especially about size and connections) for number 1 and 2 from the sub-categories listed above. NOTE: If most conditions close to half are met, 30, 40, 60 or 70 values between 25 and 75 should be given for the performance value.	1. GENERAL PRINCIPLES 2. MATERIAL 3. LEGAL REGULATIONS To provide none of conditions from the sub-categories listed above related to the corresponding layer or to provide only GENERAL PRINCIPLES conditions from the sub-categories listed above or not to provide minimum one condition of LEGAL REGULATIONS from the sub-categories listed above. NOTE: If very little conditions are met, 10 or 20 values between 0 and 25 should be given for the performance value.

Table 7. A sample table for the structural performance values of wall layers

4.1.4 The Schematization of the Requirement-Layer-Building Element Performance Relationship within FIS

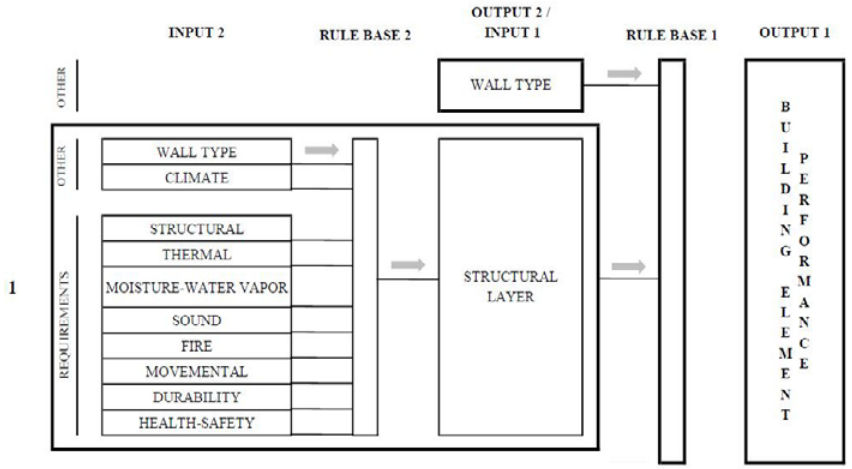

Figure 5. A sample for the schematization of the relationship in FIS

As it is seen in Figure 5, the performance requirement-layer and layer-building performance charts created in the analysis phase are combined in this step of the method to be used in the FIS.

4.2. Synthesis Phase

In the synthesis phase, Fuzzy Logic and Simulink toolboxes of the MATLAB are used. It consists of the steps listed below:

1. Establishment of Layer-Performance relation in FIS,
   - Consideration of the layers as "input" and building element performance as "output", the establishment of "membership functions",
   - The establishment of the "rule base" of the layer-performance relation.
2. Establishment of Requirement-Layer relation in FIS,
   - Consideration of the requirements as "input" and layers as "output", the establishment of "membership functions",
   - The establishment of the "rule base" of the requirement-layer relation.
3. The establishment of Requirement-Layer-Performance relation on Simulink.

4.2.1. Establishment of Layer-Performance Relation in FIS

The FIS construct, schematized in analysis phase, is modeled in this step through MATLAB-Fuzzy Logic toolbox.

Modeling inputs, output and the membership functions of the relation in FIS

The layers are organized as "input" and the building element performance as "output" is modeled on MATLAB-FIS in this step. The layer-performance relation schema, sampled in Figure 3, is used during the modeling. The sample in which the wall element types (codes) and the wall layers form the "inputs" and the wall element performance form the "output" is provided in Figure 6. The sections situated on the left of the figure define the input sets and, on the right of it define the output sets.

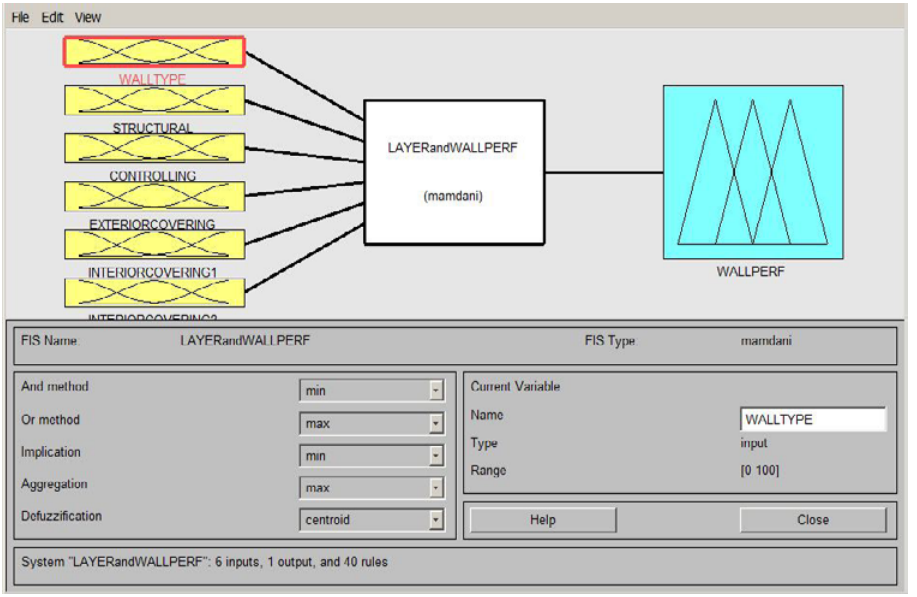

Figure 6. The inputs and output in the relation of layer-wall performance

After the definition of fuzzy sets, "membership functions" based on "each" input and output are established. During this operation, the starting point is the performance values directed to the layers and building element performance determined on the analysis phase. Similarly, in the creation of sample "membership functions", the wall layers' performance values given in Table 4 are used. The decisions of membership functions are also related to the chosen defuzzification method and the desired outcome.

The establishment of the "rule base" of the layer-performance relation

In this step, the rule base is established by using the importance weight of the layers. For the sample rule base, the data like Table 5 and 6 examples are used.

For the rule base the amount of the rules is the same as the result of the multiplication of the membership function numbers of "each" input with each other. Here, the "none" situation numbers that are present in membership functions belonging to inputs decrease the resulting rule number. "40" rule are established in the sample, because of the layer numbers that change according to wall element type and the increasing "none" situation number.

4.2.2. Establishment of Requirement-Layer Relation in FIS

The FIS relation of performance requirement-building element layers is modeled on MATLAB-Fuzzy Logic toolbox at this step. Also, the input, output and membership functions belonging to the relation are established.

Consideration of the requirements as "input" and layers as "output", the establishment of "membership functions"

During the requirement-layer relation modeling process, firstly other factors that affect the building element performance requirements and layers performance (building element type, climate etc.) are organized as "input". Then, the affected building element layer is organized as "output".The performance requirement and wall layer relation that is sampled in Figure 5 is used at this point. The sample in which the wall element types,

climate specifications and layer performance requirements form the “inputs” and the wall layers form the “outputs” is provided in Figure 8. Inputs and outputs for each layer are also defined in separate files ın the sample.

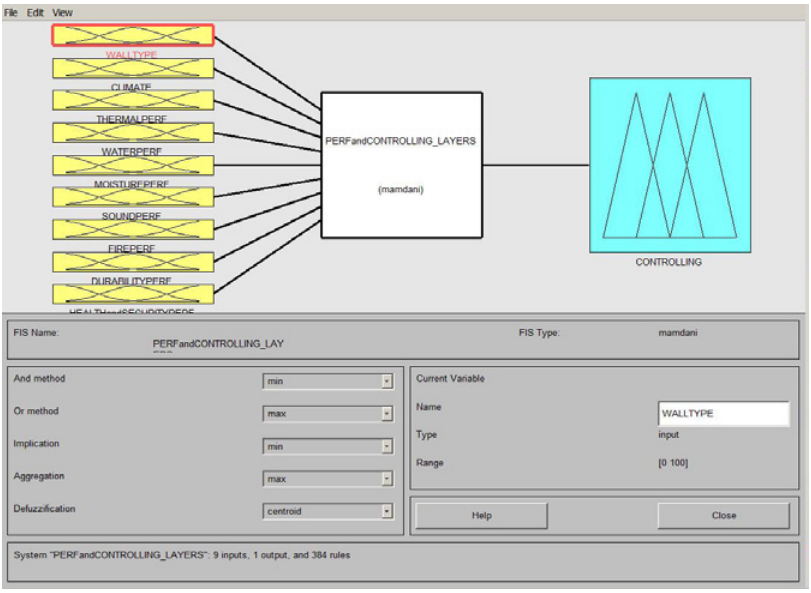

Figure 8. The inputs and output in the relation of performance requirement-controlling layers

In this step, the number of the established inputs is the sum of the amount of the performance requirements and other (building structure type and climate specifications etc.) factors for each layer. As it is seen in Figure 8; 10 inputs for the structural layer output, 9 inputs for controlling layers’ output, 11 inputs for exterior covering layer, 8 inputs for number 1 interior covering layer and 7 inputs for number 2 interior covering layer are defined for the sample application. The climate and building element factors are also organized as separate inputs.

After the definition of fuzzy sets, “membership functions” belonging to “each” input and output are established. At this phase, the performance values situated in Table 7 are used. Membership functions compositions are also related to the chosen defuzzification method and the desired outcome.

The establishment of the “rule base” of the requirement-layer relation

The rule base is established in this step by using the requirement-layer relation. At this point, the wall layers’ performance requirements and importance weights sampled in Table 5 are used. For the rule base the amount of the rules is the same as the result of the multiplication of the membership function numbers of “each” input with each other. Here, the “none” situation numbers that are present in membership functions belonging to inputs decrease the resulting rule number.

In the sample wall application situated in the study, 864 inputs for structural layer performance, 384 inputs for controlling layer performance, 1024 inputs for exterior covering layer performance, 608 inputs for number 1 interior covering layer performance and 96 inputs for number 2 interior covering layer performance are defined.

4.2.3. The Establishment of Requirement-Layer-Performance Relation on Simulink

In this step, the whole input-output and relations required for the evaluation of the element pre-designs from Fuzzy Logic toolbox are gathered in the Simulink interface entitled BEE (Building Elements Evaluation) System and the model's static sub-structure is completed. As it is seen in Figure 9, the first page of the BEE System includes layers and building element performance relation, which is of the sample application realized for the wall element. Under each layer performance the relations of the layers' inputs and output are situated (Figure 10).

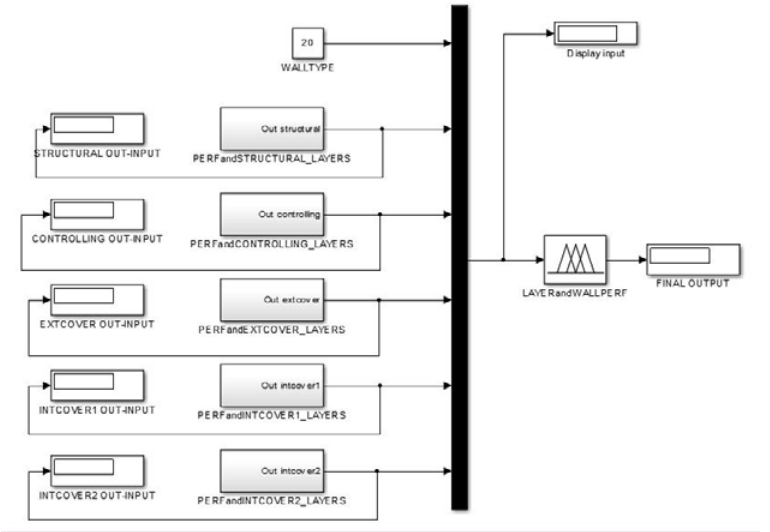

Figure 9. The relation of layer-building element performance in BEE system

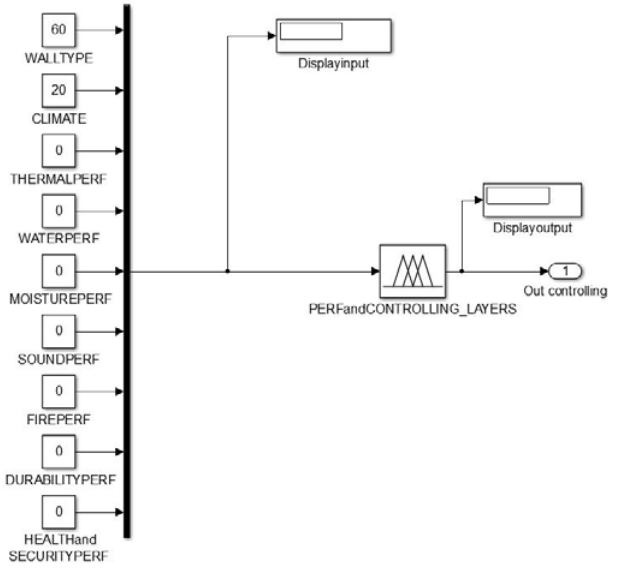

Figure 10. The relation of performance requirements-controlling layer performance in BEE system

4.3. Evaluation Phase

The evaluation phase which is mostly directed to the end user is the phase in which the pre-designed building element performance is obtained. This phase constituted from the below steps is described by the evaluation of the preliminary design of the exterior wall element in the study.

1. Acquisition of the building element data that is requested to be evaluated and the entry of them into the tables,
2. Creation of the performance list of the building element that will evaluated and the entry of the performance values to the list after the determination of them,
3. The entry of the performance values to "BEE System" and the simulation of the method.

4.3.1 Acquisition of the Building Element Data That Is Requested to Be Evaluated and Their Entry into the Tables

The basic data regarding the pre-designed building element is entered to the data table in this step. These data are combined to be used in determining performance values in the next step. Here, the presence of the projects that the element to be evaluated is included at the evaluator and the determination of the element code that is related to its function at the building are significant for making decision at the end of the evaluation.

4.3.2 Creation of the Performance List and the Entry of the Performance Values

A performance list including the performance requirements for the building element to be evaluated is used in this step. The data in the table constituted last step are used for the creation of the list. However, the data in the same table are compared with the sub-categories and conditions sampled in Table 6 and the performance values sampled in Table 7. The performance requirement values determined after the comparisons are entered in the lists. Such information as the wall code, the wall layers, the layer performance requirements and the climate are added to the performance list for the sample application. Following the comparisons, the values obtained for the wall element with code W1 are entered to the performance list to use for defining the layer performance in Simulink (Table 8).

CLIMATE			MILD-HUMID (60)
WALL CODE	LAYER	PERFORMANCE REQUIREMENT	PERFORMANCE VALUE
W1 (20)	STRUCTURAL	STRUCRTURAL	90
		THERMAL	50
		MOISTURE	100
		SOUND	10
		FIRE	90
		MOVEMENTAL	70
		DURABILITY	100
		HEALTH-SAFETY	100
	INTERIOR COVERING 1	THERMAL	50
		MOISTURE	30
		FIRE	50
		DURABILITY	100
		HEALTH-SAFETY	50
		MAINTENANCE-REPAIR	40
		AESTHETICAL	1

Table 8. A sample for the performance values of W1 coded wall element

4.3.3 Entry of the Performance Values to "BEE System" and the Simulation of the Method

The performance value of the pre-designed building element is reached by entering the performance values determined in the previous step of the method into the BEE System and simulating. As a result of the simulation for the W1 coded wall element in the sample application, the performance value is calculated as 50.

4.4. Decision Phase

With this last step in which the building element performance value is interpreted, a decision related to the evaluated building element pre-design is reached. The decision could be in the below situations. The relations between the decision and the building element performance value could be seen in Table 9.

- That the design is in a bad situation and should be considered detailedly once again - REPEAT
- That the design has inefficiencies and that the design performance could be increased by taking measures to eliminate these - CORRECTION (In this case, going back to the step for giving a performance value to the requirements and determining the necessary corrections are recommended.)
- That the design is complete and next step could start - DONE (OK)

BUILDING ELEMENT PERFORMANCE VALUE	DECISION
$0 < NEGATIVE < 25$	REPEAT
$25 \leq AVERAGE \leq 75$	CORRECTION
$75 < \text{POSITIVE} \leq 100$	DONE

Table 9. The decisions for pre-designed element in terms of the result building element performance value

In this step, the founded performance value of 50 for the sample application of W1 coded exterior wall design is compared with the performance values given in Table 9 to reach a decision about the design. Accordingly, the CORRECTION result is reached for the pre-designed wall. It is recommended to review the wall layers' performance requirements with performance values determined as 50 and to realize improvements to increase their performances during the correction process.

5. CONCLUSIONS AND RECOMMENDATIONS

Evaluating the details of the building elements during their design processes has great significance in eliminating the deficiencies that may be determined in details primarily in this process, decreasing and preventing the problems that may arise in buildings during following phases. Therefore, the details are needed to be controlled during the design process.

However, it is not easy to provide a control for the details of the building elements through traditional approaches in the complexity of an environment where the options in the products and solutions are greatly increased. For that reason, an evaluation method based on performance approach has been proposed and it is tried to explain the proposed method by a sample application which is used the method.

Following the evaluation of an exterior wall pre-design through BEE System established with the proposed method, a numeric value of 50 is reached for the pre-designed element. Because of this obtained value, it is decided that the pre-design is inefficient in meeting the exterior wall requirements. At the same time, it has been determined that the preliminary design can be corrected by revising the pre-design layers which especially include the requirements with high importance and low performance values.

The numeric value obtained because of the evaluation, showed that the modeled system is working. If the model is conceptualized following many specialist point of view and tested following many samples, it is considered that this increased the reliability of the evaluation results. The building element design process is a process that is influenced by environmental factors and such other factors as user requirements. Within this respect, it is recommended that the factors affecting the building elements are considered separately and the study is carried out through interdisciplinary associations.

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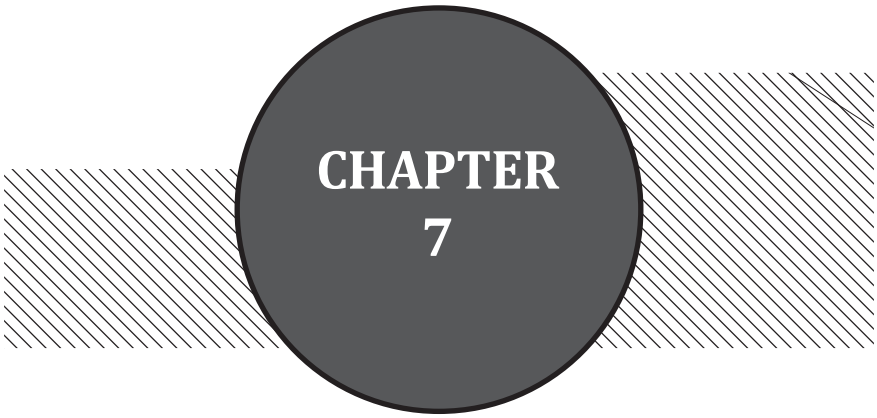
A Study on the Role of Expectations and Requests of Students towards Forming the Future of Furniture Design

Tuğba ANDAÇ GÜZEL[1]



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INTRODUCTION

Furniture is objects of applied arts intended for mobile and permanent furnishing of residential interiors. Among other things, it serves for storage, work, eating, sitting, lying down, sleeping and relaxing. Furniture can be used individually, in suites or sets (Smardzewski, 2015). According to Turkish Standard Intuition (TSE); Wooden furniture is either a stationary or mobile good, made from wooden materials, such as solid wood, particleboard, fiberboard, and plywood, that make it easy for people to sit, dine, study, rest, and other functions (TSE, 1985). Furniture belongs to the group of objects of applied arts, and many of them have similar structural, technological, functional, operational and esthetic features (Smardzewski, 2015). In other words, designing furniture relies on intuition, judgment, design skills, engineering principles, and knowledge in a broad range of disciplines helpful with problem solving. Designing furniture requires inspiration, a concept or idea, and the commitment to give pleasure to those who use it. (Postell, 2012). For these reasons, making a distinctive and obvious division of furniture is difficult. But, Classification is the arrangement of objects, including furniture, depending on the classes, sorts, types, forms and general features. By building a useful classification of furniture, it can be divided according to the following criteria: purpose (according to the place of use); functionality (according to the nature of human activity associated with this or other type of furniture piece); form and construction (defining the form and technical solutions of the furniture piece, their mutual influence on each other and on the surrounding environment); technology (determining the type of materials used, type of treatment, the method of manufacture of the product and the methods of finishing the surface), quality (characterising the most important requirements in the processes of design, construction, manufacture and exploitation of the furniture) (Smardzewski, 2015).

Even though it is difficult to classify the factors influencing furniture design, as explained above, fields including art, engineering and technology and some topics of these fields have an impact on it. To properly organize a design process and to create a desirable, producible and purchasable product lay a burden on designers. According to Lawson (2013), designers need a good understanding of materials and manufacturing parameters to communicate productively with engineers and ultimately to produce designs on brief and within budget for a client. (Lawson, 2013). According to Efe (1994), the abovementioned fields influencing the design of a furniture can be classified into some major categories. According to Efe (1994), there are three main fields of design to be considered when creating is a new furniture design; the first and most important is an esthetical design, functionality the second and engineering design is the third (Efe, 1994). These categories are broadly explained in the following.

The general meaning of esthetic (aesthetic) is concerned with beauty or the appreciation of beauty, while esthetic also is a set of principles underlying the work of a particular artist or artistic movement (Oxford Dictionaries, 2018). Esthetic design in furniture is an artistic process of creation of form, color, balance, texture and like is concluded under the influence of modern style and culture by addressing the demands of the customer (Efe, 1994). Anyone can express personal preference, but developing good esthetic judgment requires a high level of discernment that is acquired though years of experience and observation. Good design has no absolute formula; however, the successful use of esthetic principles (scale and proportion, rhythm, balance, emphasis and harmony) aids in decision making and enhances the designer's results. Integrity and simplicity are important elements in good design, along with consideration to the design's function and relationship to the environment and to people (Allen et al. 2004).

Functional design is the process of determining the expected functions of the furniture, and thus planning furniture according to these functions (Efe, 1994). Pieces

of the furniture are designed and fabricated to assist the many ways people sit and rest, work and play, organize or display items, and partition space. This view suggests a broad utilitarian framework, in which function is perceived to be the primary intended purpose of furniture. Although function, utility, and social use are important aspects of the performance of furniture, rarely does function alone inspire great design. Furniture includes a broad range of moveable objects organized in four main categories: human body support devices, surfaces and objects to support various activities, storage and display pieces, spatial partitions (Postell, 2012). In this context, in terms of functionality, furniture can be divided into the following groups: sitting and lounging, reclining, working and eating meals, learning, storage, multifunctional furniture and complementary furniture (Smardzewski, 2015).

Engineering design involves the basic calculations for the structure, as well as resistance and possible behaviors of the structure against different loads in use (Efe, 1994). The issues related are basically construction and construction technique. According to Harris (2006), Engineering design describes, a structure or the manner in which something is built (Harris, 2006). The constructional requirements of the designed furniture are as follows: simplicity of concept, rational selection of materials, satisfactory stiffness, stability and strength of the system, proper realization of joints and technology of machining. The simplicity of concept of a pieces of furniture, and its individual elements, joints and mechanisms affect the performance characteristics of the product and the technical and economic indicators of production (Smardzewski, 2015). According to Efe (1994), "furniture construction" stands for production techniques, it can be analyzed in two ways. The first is the general construction -functional or esthetic- design of furniture surrounded heavily by functionality and esthetics. The second is detail construction, or engineering design, which is deals with statics, dynamics and endurance. There is a strong bond between these two construction types, which are considered to be different, and that makes them meaningful together. Possible technical, economical and esthetic problems are minimized with correctly produced furniture (Efe, 1994).

Another important issue in furniture design is ergonomics. Ergonomics is the science of fitting the job to the worker and the product to the user (Pheasant, 2003). According to another definition, ergonomics is a science focused on the study of human fit, and decrease fatigue and discomfort through product design (Openshaw and Taylor, 2006). Anthropometry is the branch of use the human sciences that deals with body measurements, particularly with measurements of the body size, shape, strength and working capacity (Pheasant, 2003). Every furniture-design project requires some sort of research to establish or the confirm ergonomic or anthropometric parameters (Lawson, 2013). For example, ergonomics applied to office furniture design requires that we take into consideration how the products we design fit the people that are using them. At work, at school, or at home, when products fit the user, the result can be more comfort, higher productivity, and less stress (Openshaw and Taylor, 2006). It is fundamental to the study and improvement of ergonomics. Therefore, no design project should be undertaken without reference to personal research and scientifically validated ergonomic and anthropometric data (Lawson, 2013).

MATERIALS AND METHODS

Materials

Data collection

The subject of this research is on possible outputs of furniture design education. It is aimed through this research to understand the point of view and values of students,

who have taken courses on furniture design and production, regarding furniture as an industrial product and design education. It was also aimed to include all universities in Turkey into the scope of the research. However, due to time and budget limitations, the research was decided to be carried out in Kayseri Province. According to Özçelik (1981), the research that brings out the largest amount of information at a given time interval, effort and budget, is the best research. Collecting excessive information would result in waste in financial terms, whereas collection information less than required would prevent achieving the goals (Özçelik, 1981). In addition, a specific feature of Kayseri Province had influenced the decision to choose it for the research. Kayseri is one of the cities with the largest furniture industry in Turkey. According to Central Anatolia Development Agency (2016) (a governmental institution under Republic of Turkey Ministry of Development; abbreviated as ORAN), in Turkey, where 2% of world's furniture is produced, more than half of the furniture production takes place in Kayseri. 11 of the 20 largest furniture factories in Turkey are currently established in Kayseri (ORAN, 2016). University students in Kayseri are able to obtain perceptible information about the furniture sector either through jobs or internship, alongside theoretical knowledge they obtain at school. Kayseri has the potential to enable students to obtain a wide vision and experience regarding furniture design and production processes during and after their study, thanks to its high furniture production capacity. In this study, Purposive Sampling method was employed and it was aimed to evaluate a sample composed of students who had studied furniture design courses throughout their education and obtained knowledge and skills about the subject. According to Sencer (1989), Purposive Sampling, is to take a sample from a population by seeking a certain purpose or taking a segment of the population as the sample, instead of a representative sample. In other words, Purposive Sampling means investigating a certain segment of the population which is the most relevant one to the problem (Sencer, 1989).

Methods

Analysis procedures

As a result of a comprehensive literature search, a questionnaire was developed to be used in the survey with the students in the university. A variety of questions were included in the questionnaire in order to investigate students' point of view regarding furniture as an industrial product and design education. The questions developed were placed in the questionnaire form and addressed to students. In order to obtain comprehensive, high-quality and impartial data, it was decided to adopt face to face interview method. The number of students to be interviewed was determined by using Purposive Sampling method. This questionnaire was addressed to one hundred and fifty (150) students registered to Erciyes University who had taken furniture design course. Seven (7) of the questionnaires were canceled since they were improper. Eventually, one hundred and forty-three (143) students participated in the study.

The questionnaire was comprised of four different parts. The first part was about the demographic data of the participants. The second and third parts were on gathering and analyzing the ideas and Judgments of participants about the concepts of furniture design and furniture (Group II) and about the main factors affecting furniture design (Group III) by utilizing the Likert scale. According to Jupp (2006), a Likert scale is a summated rating scale using for measuring attitudes. The method was developed by Rensis Likert 1932. A Likert scale consist of usually five statement, and these are respectively: Strongly Agree (SA), Agree (A), Undecided (U), disagree (D), Strongly disagree (DA). Each statement is then scored according to meaning of statement. Where statement is favour of the attitude in question, the score will be 5 (SA), 4 (A), 3(U), 2 (D) and 1(SD) (Jupp 2006). The final

part was formed of questions on how participants believed design training should be conducted. In order to evaluate the responses from the students who took the survey, one-way ANOVA was employed in addition to descriptive statistical methods Tables were used to present the data obtained from the questionnaire. This study was conducted using a confidence interval of 95%. The data of this questionnaire were analyzed in the Weka 3.8 (Waikato Environment for Knowledge Analysis; abbreviated as WEKA) statistical software. Weka has general public license, and developed University of Waikato, New Zealand (WEKA, 2018).

Results and Discussion

Demographic findings

Demographical characteristics of the students who took education on furniture design were studied, for the purpose of determining the perception of furniture formed based on students' knowledge and experience obtained throughout their education. Demographical characteristics of the students are listed in Table 1. According to these data, the results are as follows; 42% of the students is female, 58% is male. The most frequent age interval is 20-25 (67.1%). Most of the participants are undergraduate students (60.1%) who are mostly architecture students (47.6%). These are followed by two-year Associate degree students from Furniture and Decoration department. Among the students who have professional experience, 22.4% is working part-time and 4.9% is working full-time. Most of the students live in Central Anatolia (79%) and 1.4% reside abroad.

PERSONAL CHARACTERISTICS			
	Percent (%)		**Percent (%)**
Sex		Student's Homeland Region	
Male	58	Marmara	1.4
Female	42	Central Anatolia	79
Age		Mediterranean	4.9
18 – 20	28.7	Aegean	2.1
20 – 25	67.1	Black Sea	2.1
25 – 30	2.1	Eastern Anatolia	7.7
30 – 35	2.1	Southeast Anatolia	1.4
Educational Status (pursuing)		Other country	1.4
Associate Degree	38.5	Working situation	
Bachelor Degree	60.1	Not Working	72.7
Masters / Ph.D.	1.4	Part-Time	22.4
Educational Department		Full-Time	4.9
Architect	47.6		
Industrial Product Design	15.4		
Furniture and Decoration	37.1		
Total	**100**		**100**

Table 1. Demographic features of participant students

Findings about analyses of judgments on furniture and furniture design (Group-II)

In this section, students' expectations regarding design, style, ergonomics, use, production method and even marketing of furniture were studied by use of statements developed based on factors/features affecting furniture design. Students' responses to these statements given below, were tested via Likert-type questions and outstanding

responses are given in Table 2. According to the results shown in Table 2, almost half of the participants (46.9%) believe that furniture has a significant place in human life. In the questionnaire, students' opinion on esthetics was questioned. The students believe that esthetics is important in furniture design (30.8%) and consider furniture as an object that requires to possess esthetical features (47.6%). Students reflect that furniture should have a certain style (44.8%) and they attach considerable importance to long lasting attractiveness of furniture in terms of esthetics (31.5%), in other words, being timeless (classic). In this study, it is determined that function is an aspect that is considered as important by the students in furniture design. For example, multi-functionality of furniture is important for the students (50.3%). Instead of designing esthetic furniture with single purpose of use (34.4%), they believe easy-to-use multifunctional furniture design is better (46.2%). The students believe that ergonomics is very important in furniture design (49.7%) and all furniture should be designed in ergonomic size (39.1%).

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The students care about the effects of developments of their age and technology on design (49.7%). Enhancing techniques with the enhancing technology and engineering has effects on furniture design and production processes. However, the students are impartial regarding the design of furniture only in line with the technical and engineering requirements (32.2%). Because, as this study reveals, the students are aware of the effect of factors such as function, ergonomics, etc. on design. Besides, students care about the producibility of furniture (54.4%). Producibility of a designed furniture is highly important in order to reach many costumers. In addition, the students believe that the price of furniture as a result of design and production costs should not be high in order not to exceed average purchasing power of society (53.8%). However, it is observed that for students inexpensive furniture does not mean low cost, low price, low-quality furniture (32.2%). According to them, an inexpensive furniture can be of high-quality, in other words, in students' point of view, price is not an indicator of quality (25.9%). The indicator of quality in furniture is the material used in production (44.1%). Durability of furniture, hence the material, and material's being environmentally-friendly (42%) are other significant aspects for the students.

JUDGMENTS	Percent of Value (%)					
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Furniture is an essential part of human life	46.9	32.9	15.4	2	2.8	100
Economy is a vital factor in furniture design and production	32.2	53.8	11.2	1.4	1.4	100
Affordable furniture is cheap	9.8	22.3	28.7	32.2	7	100
Price is the most important feature to represent quality	17.5	23.1	18.1	25.9	15.4	100
The most important type of design is the esthetic one	20.2	30.8	25.9	18.2	4.9	100
The most important type of design is the technical and engineering design	13.2	30.8	32.2	21	2.8	100
The most important type of design is the ergonomic one	27.3	49.7	17.4	4.2	1.4	100
All furniture design must be ergonomic	33.6	37.1	18.9	6.2	4.2	100
Having multiple function is a reason for preference in furniture.	21	50.3	20.3	7	1.4	100
Single-function furniture is more esthetic	12.6	18.1	34.3	30.8	4.2	100
Technological design is inevitable in our age	31.5	49.7	14.7	3.4	0.7	100
Producibility is a vital factor in furniture design	31.5	54.5	10.5	2.1	1.4	100
Ease of use is a vital factor in furniture design	43.4	46.2	8.3	1.4	0.7	100
Endurance is a vital factor in furniture design	47.6	42	7.7	0.7	2	100
Using quality material is a vital factor in furniture design	44.1	42	9	3.5	1.4	100
Furniture must be branded	11.2	19.6	33.6	23.8	11.8	100
Mass-manufactured furniture means consist of high quality products	9	14	43.4	25.2	8.4	100
Hand-made furniture means consist of low quality products	9	10.5	23.8	39.2	17.5	100
Furniture must be eco-friendly	42	39.9	9.8	5.6	2.7	100
Furniture must have esthetic features	39.2	47.6	8.4	2.8	2	100
Furniture must have a definite style	34.3	44.8	15.4	2	3.5	100
Furniture must be timeless	31.5	30.8	30	4.9	2.8	100
Furniture must have a modern style	20.3	40.6	27.3	9.8	2	100
Furniture must have a message	11.1	27.3	38.5	19.6	3.5	100
Furniture must represent social state	18.9	23.8	25.9	20.2	11.2	100

Table 2. Some results of analyses on judgments about furniture and furniture design

Findings about analyses of main factors affecting furniture design (Group-III)

In this section of the study, students' point of view regarding furniture as an object was examined. It was searched which essential factor/factors affecting furniture design is/are more dominant in perception of furniture shaped in students' minds through education or other ways. The relation between the demographic characteristics and the connection between the perception and factors were investigated. It was asked to students which characteristics they pay attention the most in a furniture, in other words which essential factor affecting furniture design they value the most. According to the responses, the first characteristic valued the most by the students is being durable (58.7%) and having material content non harmful to health (58.7%). These are followed by high-quality material content (%55.2), ease of use (%53.8'i), ergonomics (%49.7), natural material content (%43.4), functionality (%38.5), being light and portable (%35.7), being inexpensive 33.6%, technical properties (%32.9), and technological properties (%29.4). As understood from the results, the students pay significant attention to a furniture's material content to be natural and not to give harm to human health. In addition, students believe that the materials used in furniture production should be of high-quality, durable and long lasting. Besides, students are aware of the fact that ergonomics is more important than the style. The relation between the demographic characteristics and the connection between factors were also investigated. For example, 62% of the students who believe that furniture should have the right ergonomic and should be produced with material content non-harmful to health are among the ones pursuing Bachelor degree. Whereas, 55.3% of the students who believe that furniture should also have technical features are among the ones pursuing Associate degree.

Findings about furniture design education

Students were asked about their ideas on how the content of design education should be approached in terms of productivity and 85.3% of them responded that it should be both theoretical and practical. They also started that their (42.7%) biggest achievement was learning the connection between design and production. In addition, the most preferred material in design was (79.7%) wood.

Findings of One-way ANOVA analyses

In the following tables (Table 3), One-way ANOVA test results are demonstrated which was carried out with the data regarding students' choices of essential design factors in furniture design process (Group III). Moreover, a hypothesis (H_{01}) is established for this study. As per the results of the test performed at 95% confidence level, significance, i.e. p value, is found to be less than 0.05 ($p=0.014<0.05$). Significant difference was observed between (being ergonomic and being technically equipped) regarding the factors constituting the design group and (having natural and material content non-harmful to health and having material content of high-quality) regarding the material group. In this aspect, the hypothesis (H_{01}), i.e. the statement that "the students aim at designing ergonomic and technically equipped furniture made up of material of high-quality that is at the same time natural and give no harm to health".

One-way ANOVA					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	5.833	18	0.324	2.010	0.014
Within Groups	19.995	124	0.161		
Total	25.829	142			

Table 3. Findings of "One-way ANOVA" test

CONCLUSION

- The students consider furniture as an esthetical object. They believe that furniture should be designed as an object with a genre and style, in other words with an identity, preserving its attractiveness for long years with these esthetical characteristics.
- The students believe that furniture should be functional. Especially, they support the idea in spite of designing only esthetic furniture it is better to design multifunctional and easy-to-use furniture again incorporating esthetical features.
- The students find it very important to use materials that are not harmful to human health and as much natural as possible in the production of designed furniture. This demonstrates the fact that they pay attention to quality and environmental impact of the raw materials, hardware, accessories and various chemical surface application materials used in furniture production. Therefore, they especially prefer to use wooden materials when designing furniture.
- The students care about the effect of developments of their age and technology on design. The fact that they especially find important to design durable, high-quality and producible furniture, indicates that they have a positive approach towards new materials, methods and techniques brought about by the technical and technological developments of their age. But they also think that designing furniture only with technological technical details without an artistic spirit is not correct. The students who intensively study application based technical courses focusing professional practice, care about the technical developments more when compared to those who take such courses less.
- Regarding furniture design education, the students believe that only theoretical courses and only practical courses are not beneficial for them. As a result of this study, it is observed that general view among students is that in order to create a sound basis for furniture design education, theoretical and practical courses should be balanced equally and properly.
- Finally, the students aim at creating high-quality, ergonomic, technically equipped products in furniture design. They pay attention to material quality to make their design original. They especially have a positive approach toward environmentally-friendly materials. This leads the students to natural materials or materials that are not harmful for human health.

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Metro Museums and Evaluation of Samples

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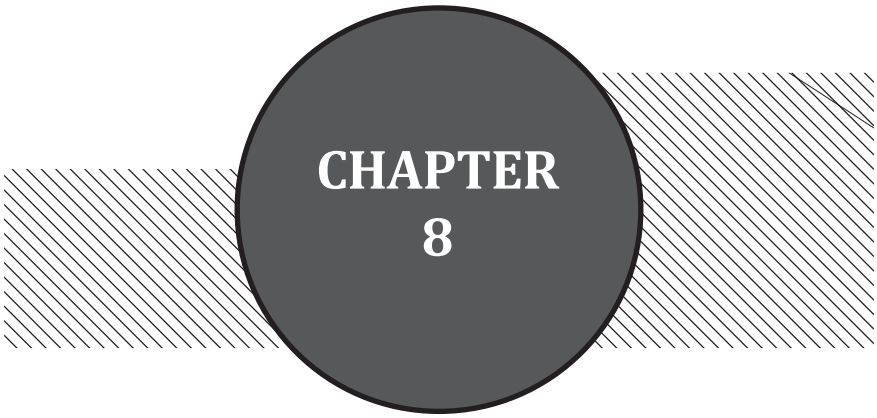

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INTRODUCTION

Individuals have always been in contact with transportation since prehistoric times to the present day in order to meet the certain needs and to discover the environment. In parallel with many developments in the world the developing transportation systems have geographically linked the cities, countries and continents; it has accelerated the transfer of knowledge and cultural interaction. Increasing the awareness of the metro systems which have become a transportation culture in the society and to ensure a cultural and scientific connection between the past and the future the metro museums are very significant where the people will be able to reach the various information, in addition, it is also important for sustainable social development and strengthening of cultural ties.

METRO MUSEUM SAMPLES

The term of metro museum, functions as integrated in metro systems or in metro systems, as the subject of the metro systems are identified as functioning places. Although there are many exhibition areas and museums in the world in the metro systems, the number of halls which can be defined as metro museum system is very limited. For this reason, it is considered that it would be appropriate to evaluate the application examples which are suitable for the definition of metro museum. The population of the metro museums to be evaluated, the cities they are located and the population densities of these cities will be compared. Metro museums will be examined in terms of architecture and content and the common features of these places will be determined. However, it is important to determine the metro museums to be accepted as an application example. The interactions of museums with visitors can be accepted as an indication of how the messages in museums provide a response in society. Therefore, while selecting the metro museums to be evaluated, the effects of the halls that are suitable for the ''metro museum'' definition on the visitors have been considered. Metro museums were searched through internet search results and social media platforms. Table 1 shows the most observed and interacting places on the visitors. In this table, the comparison of the popularity of the cities of the selected cities with the metro museum concept has been made.

The Ranking of The Search Results for ''Metro Museum'' By Google	The Ranking According to Social Media (Facebook) Users Shares
1. New Delhi	1. New Delhi
2. Tokyo	2. Tokyo
3. Shanghai	3. Guangzhou
4. St. Petersburg	-
5. Guangzhou	-
Notes: 1. These are the results of the research conducted on the metro museums that describe the metro. The museums with different contents but located in the metro systems are excluded from the research. 2. The popularity of social media users may vary due to usage prevalence or regional restrictions in different countries..	

Table 1. Results of Internet Popularity Survey.

In this way, the five metro museums that interact best with the community have been selected as an application example according to the internet search results and the shares of social media users about the museum. The population of the cities where the metro museums are located and the length of the metro network they have can be seen in Table 2.

The Evaluated Metro Museums	Population (Million)	The Length of the Metro Web (km)
New Delhi	29,4	226
Tokyo	37,8	304
Shanghai	22,9	588
St. Petersburg	4,9	113
Guangzhou	11,8	306
Notes: 1. The information for the population are based on 2014 datum. 2. The data for the length of the metro network is based on the 2017 datum.		

Table 2. Population of Selected Cities and Their Metro Network Lengths.

It has been clearly seen that the population of metro museums and metro network legths does not have a direct relevance on the popularity of the metro museums. As can be seen from Table 3, the popularity of metro museums is not directly related to museum entrance fees. The locations of the metro museums in the metro systems and the situation of the construction of the metro line in which they are located can be compared in the same table.

The Evaluated Metro Museums	Museums Entrance Fees	Location of the Museum by Metro	Structure Status of the Line
New Delhi	0,12 $	Inside the Station	Construction Continues
Tokyo	2$	Connection from the Station	Construction Completed
Shanghai	0.15$	Independent Building	(Independent Structure from the Line)
St. Petersburg	5.2 $	Inside the Station	Construction Continues
Guangzhou	Free	Independent Building	(Independent Structure from the Line)

Table 3: Entry Fees, Locations and Construction Status of Metro Museums.

Whether the museum is located in the metro system or the state of the construction process of the line may lead to differences in interest in metro museums and as a result of the data in the table, it is not possible to make a generalization. In addition to the quantitative data of metro museums the qualitative data should be evaluated as well. It is known that museums may have different interactions in societies in terms of form, function, structure and meaning. In addition, the exhibitions and exhibition techniques made in the museums can leave a different impression on the visitors. For this reason, the particular evaluation of the application examples of the metro museum in the designated cities, identifying prominent features and common points will enable us to analyze todays metro museums with a better point of view.

NEW DELHI METRO MUSEUM

The New Delhi Metro Museum which is one of these studies is located on the line of Patel Chowk Station, which is one of the most central points of the city. The Patel Chowk Station is located in the center of the city, accessible by pedestrians and close to public buildings. This station has a high circulation potential due to the fact that it is integrated with many other lines and is relatively close to the other lines. In parallel with the opening of the museum, the extension of the line on the other hand, transforms this hall into an operational museum in terms of both operation and construction. Thanks to the museum in a metro they use daily, visitors can access a lot of information such as ground formations, construction methods and tools used. At the same time, they can learn about the ongoing construction.

Figure 1. The Entrance Structure of Patel Chowk Station and the Beginning of the Museum's Exhibition Area. (URL-1)

The entrance structure of the Patel Chowk Station was built as an above-ground structure. Passengers / visitors who want to visit the metro museum on foot or using other means of transportation can reach the ticket hall after walking up a few stairs to enter the entrance structure with the help of escalators. The museum is located in a controlled area in the ticket hall linearly on both sides of the hall. A passenger passing through the metro turnstile can go around the metro museum on this linear axis or reach directly to the peron by stairs and elevators. The Metro Museum is positioned as any part within the whole station without leaving the other station locations. In fact, the museum entrance was not designed. The change of the place between the ticket hall and the metro museum was made to be felt with the signs placed on the columns at the corners of the stairs. The circulation areas of the museum is designed in a simple way without applying any special design, without changing the architectural preferences and details in the location of the station. The exhibition spaces needed for exhibition elements were provided with furnitures.

The New Delhi Metro Museum provides its popularity from its own collection that is exhibited inside museum. It is possible to reach many information about the metro system which is followed with curiosity by the society with the pieces and information boards selected among the collections. Some machines used during metro construction, machinery parts and trains / vehicles can be presented to the attention of the visitors as scale models. This can sometimes include bridges and viaducts through which the metro line passes, as in Figure 2.

Figure 2. Some Of The Models Exhibited in the Museum. (URL-2)

There are many elements that can be modeled in Metro museums. While these models are sometimes performed in order to have a closer examination of the machines or tools which cannot be understood visually in the normal scale, sometimes it can also be done to strengthen the sense of direction for places such as station structures and integration points. The walls in the station models are selected from transparent materials so that the interior can be seen. The making of the models as a section of the stations is carried out for the same purpose. Models are sometimes being produced movable and illuminated, thus, the working principles of machinery and equipment are made clearer. It is possible to give information about the traffic circulations by moving the trains, vehicles and other vehicles on the models.

Figure 3. The Other Exhibition Elements. (URL-3,4)

Despite its small area, the New Delhi Metro Museum has managed to bring together many exhibits in a variety of ways. In fact, as can be seen in Figure 3, it is possible to see the real scale "Tunnel Boring Machine (TBM)" (top left) in the exhibition area. In this area, visitors can have information about the working principle of the machine and the areas in which this machine is used. The rotating movement of the head allows us to have a closer understanding of the machine for the tunneling format under the ground. At the same time, the electromechanical parts needed to move the trains are exhibited with their actual dimensions. Considering that these parts actually constitute the whole, the multiplicity of materials used throughout the line is more understandable. In the museum, a control platform that provides information on how the metro systems are moved / controlled is animated with a controller in working. New Delhi Metro Museum, not only with its architectural elements, it has a strong connection with the visitors with various workshops and ceremonies through its operation method. There are also other important elements that make the museum even more famous such as the exhibition hall where the drawings of the kids with the topic of metro are exhibited.

TOKYO METRO MUSEUM

The Tokyo Metro Museum is very close to the Kasai Station. Since the metro is above the ground at this point, it is possible to reach their from the Kasai station through a stair. Considering the city's transport circulation, this station can be interpreted as having a low visitor potential but it is easily accessible because it is located in a line that is integrated with many other lines.

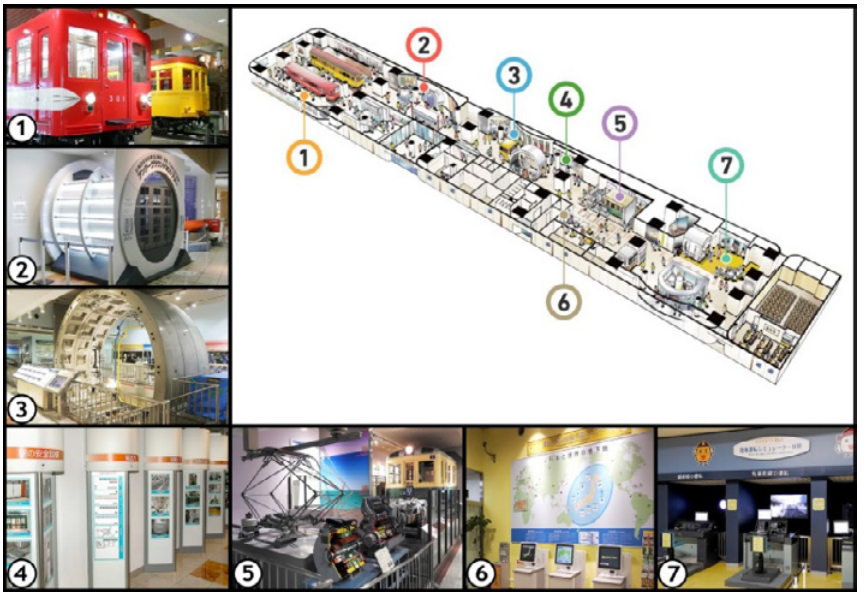

Figure 4. Tokyo Metro Museum Exhibition Areas. (URL-5,6)

The Tokyo Metro Museum has seven exhibition halls on different themes within the architectural program. Visitors entering the museum are first guided to the section of the history of Tokyo metro systems. Here, it is possible to see nostalgic trains with their special meaning for the metro system. Visitors who are informed about the history of the metro systems are directed to the second section, which provides information on how the metro was built. In this section, visitors are able to learn how metro systems are building by many disciplines through the real scale application sections. Tunnel construction methods, used tools and other technical informations are displayed in this section. The machines whose dimensions are too big to be exhibited in the museum but which are not fully understood without being seen with their actual size are exhibited here with their pieces. As can be seen in Figure 5, Tunnel Boring Machine (TBM), which is too big to be exhibited within the museum is exhibited with its head part. In order to better illustrate the movement of the machine in the soil, a ground formation installation was made at the back.

Figure 5. Tunnel Boring Machine (TBM) Head. (URL-5)

After this section, visitors who are familiar with the construction of metro systems are directed to the department where they can learn about how the metros are safely constructed and operated. This section presents all the materials used to complete the metro line on a real tunnel section complete with all the details. The visitors who meet with a lot of technical informations as a passenger is directed to a department that contains all the information that must be known about the metro system. Various informations about the station, metro line, other metro lines and the entire metro network are presented in this section. At the same time emergency escape plans, safe areas, integration points, transportation times, systems used etc. many subjects are edited in this section with various presentation techniques. The Tokyo Metro Museum has been enriched with exhibition areas where many interested people can reach the details. Visitors can be directed to the sections of the information boards, machine parts and models of how the trains are moved electromechanically. There is also a section where visitors can learn about metro systems in Japan and other countries around the world. In the Tokyo Metro Museum, game sections with driving simulations for all age groups are located.

Figure 6. Metro Network and Station Section Models. (URL-7)

In Tokyo Metro Museum, models in various scale are exhibited. The models are designed in such a large area that the city's metro network and other types of transportation can be seen at the same time. Visitors around the city model can easily observe the environmental connections of the metro stations. Moving objects, illuminations and sections are used to express the messages that are desired to be given more clearly. The details that cannot be understood when viewed from a distance are more noticeable as you walk around the model. Tokyo Metro Museum has been carefully combined with planning, content, information, collection and circulation and the cultural accumulation which is intented to be transferred is reflected from the perspective of many different aspects.

SHANGHAI METRO MUSEUM

The Shanghai Metro Museum is located close to the Ziteng Lu metro station which is located on a line away from the city center. The museum was built completely independent of the station. There is no structural link between the station and the museum. The area where the museum is located is also far away from other metro lines and is a region where pedestrian circulation is very weak and commercial functions are concentrated. The sparsity of the museum's working hours and its opening generally for group visitors shows that visitor circulation is not much.

Figure 7. The Entrance and Welcoming Department of Shanghai Metro Museum. (URL-8)

The museum building gives the impression of any commercial superstructure project when looking From the outside. The museum has a very similar architecture to the commercial structures of the automobile companies nearby. Apart from the signage at the entrance, there is no design evoking the metro museum. However, after entering, a counseling-security room is encountered. There is a gallery hall above this point where museum tickets are also provided. At this gallery hall there is a train model settled as a console about the same size of its original. As you move into the museum, there are many exhibition areas divided into various sections. The museum features a variety of exhibit elements such as interactive and technological works. While the Shanghai Metro Museum is sharing theoretical knowledge, as it can be seen in Figure 8, it prefers to offer various experiences to the users via digital means.

Figure 8. Exhibition Area and 5D Cinema Halls (URL-9)

In the presentation area, there is a huge standing flat LED display. The white background behind the screen acts as a screen for projectors during presentation. The ceiling trim is also designed to adapt to visual integrity during presentation. The 5D cinema is one of the most enjoyable places in the museum that is developed with the imagination of metro systems.

Figure 9. Simulation Areas. (URL-10)

The Shanghai Metro Museum is equipped with many simulation systems to enable visitors to know the metro systems more closely. Simulations are used in order to provide information on various subjects and to create awareness. Thanks to the vehicle driving simulation created by combining several screens and inserting a driving package, visitors can learn more about how metro systems are moved. In the museum there are also simulations that are equipped with special equipment to show how to exit the metro systems in emergency scenarios such as in case of a fire and trainings on how to respond to fires. In this part of the museum, there are touch screens with metro games. In addition to the information that is intended to be conveyed indirectly to visitors through simulations and games in the museum, there are sections where the visitors as a passenger can reach the information about the system.

Figure 10. Shanghai Metro Museum Information Section. (URL-8)

The information section consists of many screens, voice response systems and infographics in a similar way to that of the Tokyo Metro Museum. Designed in a very colorful way and with a variety of lightings, this section is positioned in a circular manner. In the middle of the hall, a semi-circular platform was placed where there is a map on and information about the line's route. This platform where a train model is placed at the center point, many chronological and instant information related to trains can be shared with spatial data.

In the information section, train hours, routes, integration points, other metro lines and the metro system, detailed information about the many issues can be learned. In addition to the digital elements that stand out in the museum, there are also places with models and souvenirs.

Figure 11. Exhibition Elements and Gift Items. (URL-8, 9)

Metro museums can be more enjoyable and understandable for some visitors to study an object as a solid mass no matter how much they are equipped with digital elements. The Shanghai Metro Museum has a collection of digital elements as well as models in this regard. In the museum, it is also possible to encounter quite a small model of the trains used in the scales or in the metro system that can revive the system details of the productions that occur during the construction process. There are also souvenir shops in the metro stations where visitors can buy from the museum and store them as souvenirs or have items that they can take with them as gifts. Shanghai metro museum, thanks to the gift shop located within, it provides visitors with a wide range of knowledge and experience from the museum, as well as a variety of items.

ST. PETERSBURG METRO MUSEUM

Russian metro systems stands out with their design uncovered in the stations. These designs are designed to add a monumental value to the metro stations and it manages to be met with great interest by visitors. The museum, not only with the structural requirements in the designs and aesthetic touches but it stands out with its collections and exhibition techniques that explain the metro systems.

Figure 12. Metro Museum Entrance and Circulation Halls. (URL-11, 12)

After arriving at the St. Petersburg Metro Museum with connection corridors and escalators, you can enter there through the turnstiles. After passing through the turnstile, the edges and corners are connected to a wide hall equipped with exhibit elements. It is possible to find stands, screens and boards that provide access to a lot of information about metro systems before starting museum tour.

Figure 13. Exhibition Elements of the St. Petersburg Metro Museum (URL-13).

Many of the exhibits at the St. Petersburg Metro Museum are exhibited in museum furniture consisting of glass showcases. However, the approach to the exhibition areas of the museum is not limited to this. Within the museum, there are also design elements that reinforce the idea to be conveyed.

Figure 14. Design Elements of St. Petersburg Metro Museum. (URL-11).

Although the St. Petersburg Metro Museum is small in spatial dimensions, it is able to express the messages that are required to be conveyed through the exhibition elements. While walking around the museum, although the manpower used in tunnel construction works has decreased considerably, it is possible to encounter an installation that reveals the difficult working conditions faced by a tunnel worker. The structural elements that stand out in the Russian metros, which has a monumental value with a real scale is also exhibited. Seatings are placed around this monumental piece, where visitors can relax and watch the hall better. The visitors who sit here look at the museum by taking the fragmented monumental element from the tradition of the past, the changes in the intervening time can be better understood in other parts of the museum. However, when it is considered to be massively stationary, in other parts of the museum it is possible to come across similar elements of design that can make a quick exchange between past and present. While passing the corridors through the tunnels it is considerable to see the tunnel sections. In addition, a real-scale tunnel section within the museum is designed with all the details and screens, boards, etc. that are needed in the museum is used with items. The continuous tunnel image projected onto the wall where the tunnel section ends and the inflatable boat placed in front of the wall is another example of thought-provoking work in the museum.

GUANGZHOU METRO MUSEUM

The Guangzhou Metro Museum was built as an independent structure, in a very close place to Wanshengwei Station. The station being the last stop of the line and being integrated with another line at this point can be effective in converting the passengers who want to ride from this station into a potential visitor.

Figure 15. Entrance to Guangzhou Metro Museum. (URL-14)

The Guangzhou Metro Museum is considered a museum that is easily accessible thanks to its routing signs that are successfully located after the departure from the metro station. In the small square in front of the entrance to the museum, there is a large signage and a welcome statue. These statues, which are the symbols of the Guangzhou metro, can be seen in many places. The entrance to the museum is defined by the canopy located above the entrance. When the museum's paintings, caricatures and welcome statue are taken into consideration, Although it seems like a colorful and fun place designed for children, it has collections that appeal to many adults. However, this design concept, which started at the entrance, continues within the museum. In the museum, it is possible to see mechanical parts, models and application sections as well as visual presentations.

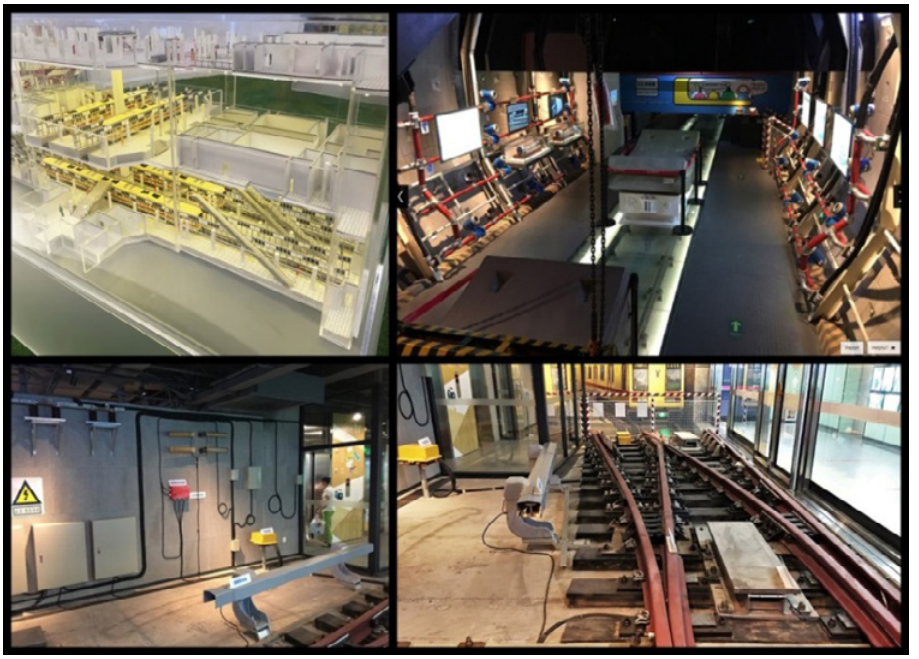

Figure 16. Station Model and Application Sections. (URL-15.16)

The Guangzhou Metro Museum can make visitors feel as if they are in a metro station where electromechanical and finishing works completed in detail. Many details such as lightings, electrical cables, pipes, warning signs etc. reinforce this feeling. In addition to the stations, the interesting features of the metro line are presented in the museum. In the museum, it is possible to make an application section of the scissor zones of the trains and to inform the visitors about the subject in this section. At the same time, concrete mold module, support elements and some mechanical parts are exhibited in these places. Some application sections are exhibited at various points of the museum as in Figure 17.

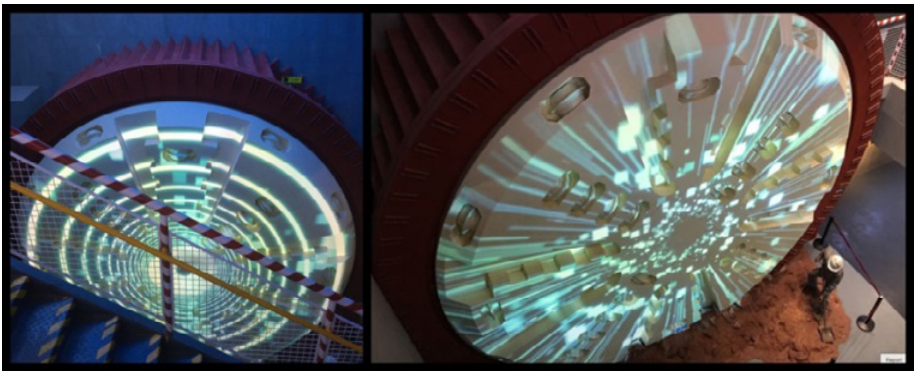

Figure 17. Tunnel Boring Machine (TBM) Installation. (URL-15).

The tunnel boring machine head, which is placed on the side wall of a stair in the museum, can be visualized with rotation effect thanks to the moving lights reflected on it. The real soil laid in front of the machine has increased the realism. Although the tunneling machines operate within the tunnels, a worker model working in front of the machine head is positioned so that the actual size can be understood in this installation. The same lighting system was applied on the train model which is seen in Figure 18.

Figure 18. Train Model and Digital Reflection Illustration. (URL-16, 17)

In the museum, there are train models produced in white in order to provide the best performance in the image to be transferred against the projection rays. These train models can be used as a room to be visited by visitors and provide a very realistic movement effect if they are illuminated. This technology, which attracts the attention of adults as much as children, can be used in many points of the museum.

Figure 19. Workshop and Simulation Training. (URL-17)

Another important content of the Guangzhou Metro Museum is the simulations and game devices. These systems where children want to spend longer times, it is possible for children and even adults traveling inside the museum to have a lot of information on how to operate the trains with simulation trainings. Another feature of the museum is the scheduled workshops for children. These studies can enable children to establish a closer connection with the metro transport culture. Thus, it becomes possible to transfer the knowledge and culture accumulation to the next generations as one of the targets of the metro museums.

CONCLUSION

Metro museums vary in terms of their location in cities and their relations with metro networks. The integration conditions of metro museums with metro systems

and their construction as underground or above ground cause structural diversity. In addition, the differences in the construction methods of the metro museums also affect many aspects such as form, lighting, circulation, exhibition, circulation and so on. When the application examples are compared, the effects of style and function-based elements on the museum-visitor relationship can be discussed. However, the elements that affect the most in museums are the exhibition and design elements. When compared with the evaluated application examples, it can be seen that the theoretical information about the metro systems, mechanical parts and manufacturing / application sections are displayed. However, there are differences between the exhibition techniques, forms and semantic values of all these halls. These differences directly affect visitor interaction in the metro museums. It is thought that souvenir shops, workshops (for children and adults), presentation areas, conference / cinema halls etc., which are not in all museums, can be useful in line with the targets of metro museums. These elements, which can be further diversified in the evaluated metro museums, will be able to effect culturing activity for the society, depending the design, display, interior design, lighting and other technical, functional and aesthetic elements affecting the architecture.

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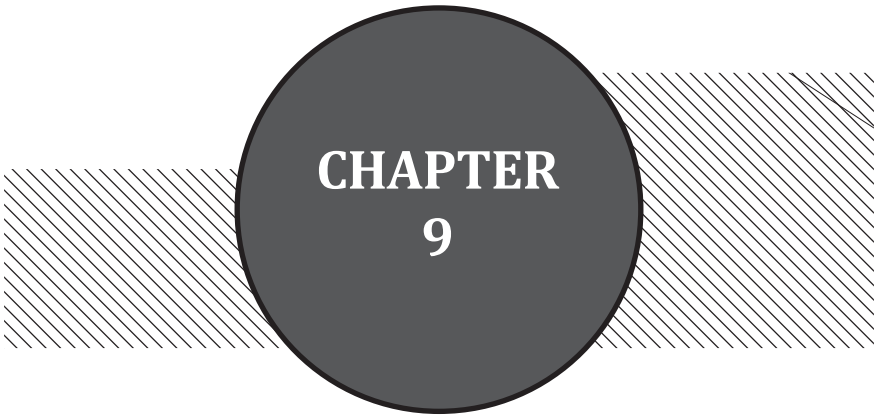
Assessing The Impacts Of Road Types On Roadside Ecosystems

Murat ATASOY[1]



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INTRODUCTION

Importance of roads to the ecosystem functionality

Roads and surrounding infrastructure patterns are one of the most influential components in an ecosystem. Indeed, the structure and dispersal of roads might also have prominent impacts on biodiversity (Wilkie et al. 2000). There are many ecological impacts caused by roads such as changes in wildlife habitat structures, habitat fragmentation, erosion, and spread of alien species (Tyser et al. 1998). Roads effectively disrupt the integrity of natural lands and create small disconnected patches, and approximately 20% of landscapes and surrounding ecosystems are affected by road constructions around the world (Wilkie et al. 2000). According to Keshkamat et al. (2012), roads are considered generally as environmentally destructive constructions. In the US, approximately 20% of roadside landscape ecology is negatively altered by roads and infrastructure (Saunders 2002). In addition, over time roads and the areas adjacent to them become unique biological systems with their multifarious composition of environments as a result of decades of disturbance (Spooner and Smallbone 2009).

Types of roads have prominent impacts on the level of disturbance to the ecosystem. Paved roads can cause more impacts to surrounding landscapes, and unpaved roads have less environmental degradation than paved roads (Fig.1) (Barbosa et al. 2010). Dust sizes are much smaller on areas near the unpaved roads than paved roads because of urbanization and high traffic density on paved roads, but unpaved roads can generate high dust accumulations than paved roads (Farmer 1993). Also, these dusts created by unpaved roads may result with reduction in fruit growth on trees, injuries to tree leaves and bark, and decrease in pollen germination (Farmer 1993; Barbosa et al. 2010). In addition, paved roads can provide many benefits to the forest economy. For instance, increasing the paved roads on Amazon forest lands can empower the investments of logging industry, promote for future timber harvest, create a potential to higher employment, and enhance forest management practices in Amazon forests (Nepstad et al. 2001).

Fig.1.a) Paved road

Fig.1.b) Unpaved road

Fig.1. Examples of road types (Midwest 2018).

Increase in population size, urban sprawl, and land practices has led to habitat fragmentations within roadside landscapes of urban settlements. As humans began rapidly migrating to explore new settlements and environments, roads and roadside patterns became more complicated and diverse in environment (Milesi et al. 2003). Due to humans who were searching available sources, transportation turned into a habitat segment which might be the prominent cause of land shifts (Wilkie et al. 2000). As the regulation process of ecosystems from human alterations and sprawl of roads consists of centuries, there might be time lags between habitat recovery and future of the environment. For this reason, designing and environmental impact of roads and roadside infrastructure have importance to sustainability of ecosystems (Spooner and Smallbone 2009).

Due to its social, cultural, and economic contributions to public life, roadside vegetation has been a significant component of roadside planning and design (Wolf 2006). Roadside landscape also facilitates a sense of place along with aesthetics and scenic beauty because it has been considered as public place shaping the local regions (Fathi and Masnavi 2014). The role of human disturbance on natural resources has been misinterpreted for several years including land use changes and land ownerships. After human settlements, habitat fragmentation started to affect natural environments dramatically by causing disturbances and land shifts in ecosystems. For instance, in highly populated regions of ecosystem, habitat fragmentation leads to small, isolated populations where many species refuse to live (Spooner et al. 2004). Furthermore, in order to peak the efficiency of agricultural lands, fertilization, tillage, and pesticides were implemented regardless of planning the sustainability of natural resources (Liiri et al. 2012).

The objective of this study was to compare paved and unpaved road ecosystems based on history of development, habitat fragmentation, pollution, vegetation changes and invasive species, and aesthetics approaches.

Pollution effects of roads to the environment

In addition to fragmentation, pollution is another impact of roads on surrounding environment in a landscape. Since the motorways were established, air, water, and soil pollution have significantly increased for years (Fig.2). This problem was stated in a study

by Bernhardt-Romermann et al. (2006) that the ecological impacts of roads have grown during the last decades, and it is also reported that some of the pollutants such as dust, salt on roads, heavy metal, polycyclic aromatic hydrocarbon particles (PAH) and volatile organic compounds (VOCs) can lessen improvements in biotic and abiotic interactions along the roadsides. As a result, the interactions among road structures and pollution can comprise another important part of habitat disturbance.

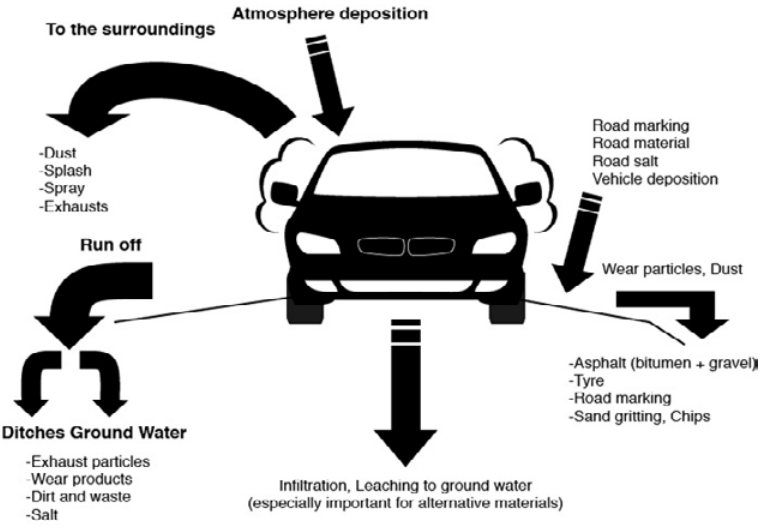

Fig.2. Illustration of pollution effects of vehicles (Roadex Network 2019).

Once the roads are constructed, they could be highly effective pollutants of water sources in a landscape. Since water transmits the particles from the surface land, it washes various types of materials including heavy metals, infrastructure remnants, oil and grease, fertilizers, and sediments to the water bodies. According to Environmental Protection Agency (EPA), rainwater and melting snow which wash the road surfaces, aggregate and transport contaminants directly to the lakes, rivers, streams, and oceans (EPA 2010). For this reason, water resources and their immediate area zones become more of an issue in today's natural ecosystem (Bernhardt-Romermann et al. 2006; Müllerová et al. 2011).

Another natural resource that has been polluted by road works is soil. Soil types and the nutrition levels which are extremely important for biotic and abiotic components of ecosystem, can reduce with expansion of impervious road surfaces and surrounding infrastructure. Several researches have been conducted through soil pollution as a result of road construction in worldwide. For instance, Müllerová et al. (2011) examined the impacts of roads on tundra vegetation and the soil types in Czech Republic. The objectives of the research were to delineate the effects of roads and changes by implementing GPS mapping and aerial data, look at the properties of soil through the study fields, and create solutions to alleviate the negative alterations in vegetation. The results of spatial and historical aerial data analyses, and vegetation sampling along transects show that there have been rapid shifts from low to high pH level where vegetation composition is abundant. Also, wide road establishments facilitate to poor nutrient level in soil which results with colonization of non-native species, high cover of synanthropic and herbaceous plants nearby the roads. They concluded that to prevent future damage, it is helpful to replace the alkaline gravel by granite on road constructions.

Furthermore, air pollution which is produced by automobiles on roads is another important subject which might have negative detrimental consequences in habitat (Fig.3). Ozone, carbon monoxide (CO), and nitrogen dioxide (NO_2) can cause environmental distortions around the roads and vegetative cover. In addition, according to Rodrigue (2013)'s study, air quality has decreased by most harmful air pollutants released by cars on highways such as Volatile Organic Compounds and Carbon Monoxide, and air pollution might be one of the most costly effects of roads due to rapid diffusion of contaminants in the air. In order to mitigate the distortions in environment, air quality might be significant indicators in ecosystem.

Fig.3. Air pollution and damaging effects of road construction (Roadex Network 2019).

CONVERSIONS IN VEGETATION COMPOSITION ON ROADSIDES

Importance of roads to vegetation

Roads are one of the most effective indicators of environmental changes including vegetative cover in ecosystems. More importantly, comparing broad scale of vegetation and climate became more practical by observing roads and roadside constructions and how effective they are on vegetation composition. Therefore, roads have been defined as better sources to examine environmental changes and species responses to those modifications (Isolde et al. 1995). Also, according to Forman and Deblinger (2000), 20% of land area in the United States has been ecologically influenced by roads and the infrastructure. For this reason, vegetative cover and its correlation with road construction has been studied all around the world as a common indicator of habitat degradation.

The history of land use changes might be an important source of current environmental damages. For instance, some of the clearing activities especially for agricultural aspects have led to loss of forest lands. Moreover, the changes in land use became more prominent due to lack of natural resources in ecosystems and their surrounding areas. Spooner and Smallbone (2013) argued on modified landscapes by claiming that most of the fragmented agricultural lands in Australia are results of past clearing activities which also developed small remnant patches, particularly around the road verges. Consequently, road establishment caused habitat fragmentation around the forested and agricultural landscapes.

Changes in vegetation around the roadside zones

Along with the roads and roadside zones, the vegetative cover plays an important role by reducing the effects of pollution, erosion, surface runoff, impervious surfaces, and urban heat islands in environment (Fig.4) (Azizian et al. 2003). Roadside vegetation also facilitates new aesthetic views, reduces the rate of accidents, and creates wildlife habitat for biotic and abiotic components. This was stated in a study by Spellerberg (1998) that trees and other vegetative forms considerably alleviate the impacts of heavy metals, reduce the airborne contaminants, and inhibit land slips on the roadsides. However, as plants around roads proceed to decrease the degradation, they may face with harmful physiological effects. An example for this is examined by Zeng et al. (2012) which stated that road contaminants might lead to physiological stress in some vegetation types and plants that become more vulnerable to pest interventions on roadsides.

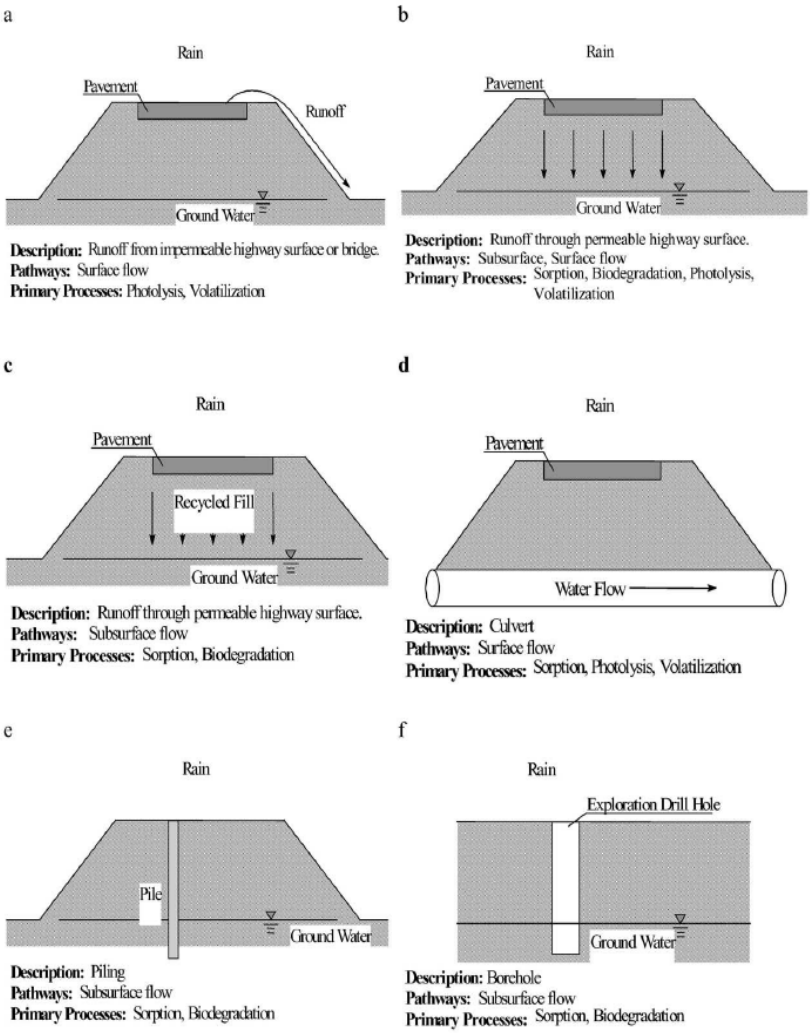

Fig.4. Infiltration illustrations of permeable and impermeable surface areas on highways (Azizian et al. 2003).

According to Zeng et al. (2012), most of the studies have indicated the substantial effects of spatial scale on type of vegetation and its distribution along road edges. Zeng et al. (2012) also reported that investigating temporal scales and age of the roads might be helpful to quantify the history of disturbance on plant compositions. In addition, the historical impact of roads was argued in Ament et al. (2008)'s research that during the 25 years, roads have increased the amount of endangered plant species and caused a significant loss of wildlife habitat in United States. At various scales of habitat like National Parks in U.S., most of the access points to these parks were connected with approximately 8855 kilometers paved roads and 7245 kilometers unpaved roads which might have resulted in loss of vegetation composition and species distribution on roadsides. Thus, vegetative composition may also vary at different scales depending on historical effects on motorways.

Invasive plants and roadside vegetation composition relationship

Roads also lead to introduction and dispersal of exotic species in a landscape which substantially changes the vegetative composition on and adjacent to roadsides. Trombulak and Frissell (2000) reported that road establishment can facilitate distribution of invasive plants by removal of indigenous species, disturbing the habitat, and boosting human alteration. Trombulak and Frissell (2000) also indicated that some invasive plants prefer to live in disturbed habitats near the roads which consequently results with spread of diseases, insects, and understory colonization on roadsides. Thus, introduction and prevalence of exotic plants is one of the other destructive effects of roadside vegetation change.

The spread of invasive plants along the road edges can be evaluated by different methods such as analyzing the road axis and edges. In a study by Christen and Matlack (2006), the spread of invasive plant species was modeled on roadside vegetative cover. The main objective of the research was to determine the potential conduction features of roads in relation to habitat and conduit functions. It was stated that in order to define and measure the spread of invasive species on roadsides, habitat will be confined by road axis evaluation. To expand the perspective, the authors suggested that a demographic method with species interaction will help managers to obtain the difference between zones parallel to roads and perpendicular to this axis. Also the differences between habitat availability and random spread of vegetation might be identified better by assessing various stem distributions of invasive plants on roadsides (Christen and Matluck 2006).

Furthermore, the characteristic features of invasive plants may also play a significant role rather than distance from non-invaded areas on roadside zones. To examine the effects of distance of roads to undisturbed lands, Craig et al. (2010) investigated the relationship between the distribution of invasive shrub species and type of road construction materials in the eastern Mojave Desert, USA. The aim of the research was to investigate the richness of vegetative cover types and how it was affected by distance from roadsides and the cover type of roads in the area. It was also indicated that while examining the possibility of distinction, the interspaces and microsite types were compared. As a result of the analyses and the surveys, it was claimed that distance from the roads did not have an impact on distinction between native and non-native species nearby the undisturbed areas. Also, the cover type and richness of vegetation were slightly altered by road edge proximity. Thus, it was indicated that the characteristics of invasive species and their history of their introduction should be considered for reliable results in the future.

Since it might be difficult to distinguish the disturbance in soil, water, and vegetative composition, some plants typically grow in different conditions and patches on and around road edges. For instance, some of the maritime plants are prolific on roadside verges because they are able to thrive in saline soils. In addition, some wild fruit trees can be

located along the roadsides due to littering of fruit seeds (Trombulak and Frissell 2000). Effects of various external factors such as altitude and climate were similarly pointed out by Arevalo et al. (2005)'s research which examines different altitudinal gradient roads in Gran Canaria and Canary Islands. In this study, richness and distribution of plants species, especially alien flora were evaluated at low and high altitudes of various habitat gradients. It was found that native, non-native, and endemic species prefer and settle in separate altitudes due to species' biogeographical features and climatic tolerances. More importantly, the roads which were close to urbanized landscapes were highly infested by invasive plants in research fields. Thus, both researches show that vegetative composition disturbance might be successfully alleviated by looking at analyses of external factors and how they are cooperating with each other.

Woody plant composition along the roadsides and public attitude

There are many benefits of plant compositions on public around the roadside vegetation including reduction in vehicle collisions, increasing positive psychological effects on drivers, and aesthetic view of the plants. For example, in Europe, using woody plants on two lane highways rather than open spaces with grasses significantly reduced the death rates caused by traffic accidents. Also, drivers on narrow roads speed down and they are more careful than drivers on wide highways, thus, woody plants planted along the roadside verges cause safety and scenic beauty against the scrub species with wide lawn landscape on roadsides (Forman and McDonald 2007; Atasoy et al. 2018).

Another study by Akbar et al. (2003) discussed the scenic beauty of roadside vegetation management and its effects on people. They conducted surveys based on public thoughts about landscape beauty of roadside vegetation in northern England. As a result of the research analysis, it was claimed that the landscape quality of roadside vegetation was found as the most important part of vegetation on roadsides. In other words, people consistently consider much more about scenic beauty of roadside plants and their management practices on highways. Therefore, it might be necessary to pay more attention on choosing attractive plant species on roadside plantation processes.

CONCLUSIONS

In this study, the paved and unpaved roadside vegetation has been compared and evaluated. Both paved and unpaved roads have different influences on roadside vegetation and adjacent landscape ecology in relation to density of roads, edge effects, species richness and diversity, and the level of deforestation along with paved and unpaved roads. Keshkamat et al. (2012) reported that absence of paved roads can lead landowners and rural settlers to create their own unpaved roads which can be considered as an environmental degradation in South America. In contrast, Auerbach et al. (1997) claimed that arctic tundra in northern Alaska was negatively affected by the dust and acidic surface run-off caused by paved roads. In addition, they also claimed that vegetative distribution adjacent to roadside was significantly lower than 100 m from the road. Saunders (2002) examined the impacts of paved roads on vegetative distribution and species richness in the Northern Great Lakes region around the northern Michigan, Wisconsin, and Minnesota, and they found that the density of roads and edge effects can cause fragmentation along the forested lands, and increase in paved road density can eliminate the species richness along with depth-of-edge in the area.

Based on the studies that have been reported so far, changes in vegetation composition on roadsides have been correlated with external and internal factors. Since roads were firstly established in environment, they have caused to habitat changes and replacement with new components. For example, when a new road construction is built, surrounding

natural resources such as water, soil, and air rapidly respond and they are negatively influenced. Therefore, vegetation composition and wildlife habitat might be substantially affected from these alterations.

According to the papers discussed on roadside vegetation and surrounding land responses, it can be drawn that most of the researches indicate the significance of roadside vegetation for people and wildlife habitat. Some of these researches have specifically pointed out the increase of impervious road surface establishment can alter the road verge landscape, and this disturbance consequently lead to biotic and abiotic distortions. There is an obvious consistency among those papers because in different observations and driven conclusions, the authors found that roadside plants and surrounding landscape are important parts of ecosystem conservation aspects and vegetation is the key factor for sustainability of roadside ecosystems (Atasoy and Guneysu Atasoy 2017). In addition, some papers agreed this idea by examining the effects of roadside vegetation's scenic beauty and the perceptions of public through this landscape (Saunders 2002; Guneysu Atasoy 2018).

Therefore, it can be assumed that the diversity in ecosystems which has been negatively altered by human disturbance might also have less resilience against future land degradation. For this reason, understanding a history of disturbance and road establishment plays an important role in predicting future human alterations in an ecosystem. Land managers must be able to evaluate potential ecosystem impacts of roads, both those established and planned, duration of change in biodiversity, history of roads and human settlers surrounding them can be taken under consideration for better estimations.

Furthermore, in some papers, instead of invasive shrubs and wide grass implementations, it was particularly claimed that woody plant applications on roadside should be considered and improved in further researches. Likewise, the researchers examined the mitigation rate of accidents and tall tree plantations along road corridors agreed on benefits of woody plants on roadsides and road verges. When roadside vegetation composition is considered, public attitude, sustainability of wildlife habitat, natural resource conservation and management practices are consistent with woody and native plant applications rather than sparse vegetation. As a result, minimizing habitat disturbance and replacing invasive shrubs with native plant communities were common solution proposals.

There are also some gaps in the literature on the other hand. For instance, while providing some surveys on public attitude to roadside vegetation composition and scenic beauty, there could be some activities to increase public participation to conserve plants, animals, and natural resources. Also, experts might provide comprehensive information about the significance of roadside vegetation protection and sustainability during these surveys. In addition, the discussion could also be preceded more through spread of urbanization and further degradations driven by increase in wide road constructions. As the urban settlement becomes more prevalent near roadsides, the transportation demands will also rise for adjacent residences. Therefore, urban planning and roadside ecology management practices might be more researched for better results.

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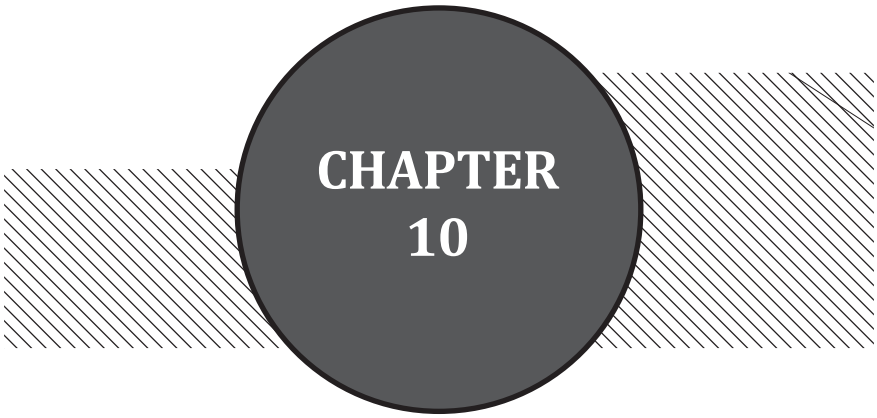
Sustainable Wooden Construction Technique: Kündekari

Özlem BOZKURT[1]



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INTRODUCTION

Wood is a material that can be used without harming nature, since it represents an organic, recyclable and renewable resource. It is perhaps the only construction material that does not harm the environment, and which contributes to natural life through its method of production. At the same time, it is a fairly durable and strong construction material for its weight. It is flexible, easily workable and aesthetically-pleasing, while also possessing good acoustic and insulating properties. As a natural, environment-friendly, easily processed, flexible and recyclable material wood represents one of the oldest construction materials used by mankind. With construction techniques suitable for its natural structure and characteristics, it is possible to render wood even more durable and long-lived. Owing to these features, wood has always been an important material in traditional Turkish buildings not only as a decorative element, but also as the main construction element.

The basic principles for the conservation of wooden elements in traditional Turkish construction culture involves the selection of a suitable type of wood; maintaining the wood dry; and using suitable construction techniques. The kündekari is a traditional construction technique developed based on this basic principle. The kündekari, which is a fairly sophisticated technique, has generally been used in public buildings such as mosques and palaces. It was especially preferred for the production of the large wooden panels used in doors, window shutters, mosque minbars and mihrabs.

The first examples of kündekari began to appear during Mamluk and early Seljuk periods. Although wood carving was used in the early examples of kündekari, in time the geometric designs came to be traced on blocks made from one type wood and then placed side by side. Broad walls or panels made of wood were covered with designs created using this method. However, with the approach in which blocks were first traced and then incised on wood, the blocks tended to separate over time, with deep cracks eventually forming between them. As a solution to the problem, the artists began to join wood of the same or different types of trees by dovetailing, and without using any nails or glue, which allowed them to create very large surfaces. Kündekari began to be employed all across the Islamic world during the periods of the Mamluks, Seljuk and Ottomans. It was especially used on doors, minbars and podiums in monumental works of architecture [1]. Appearing in the 12th century in Egypt, Aleppo and Anatolia, the kündekari technique was further developed during the time of the Turkish and Circassian Mamluks of Egypt [2]. Highly refined workmanship employing inlays consisting of fine ivory and mother-of-pearl strips is characteristic of works from these periods. The technique later reached its zenith during the Seljuk and Ottoman periods [2, 3].

In Anatolia, there are numerous examples of kündekari that have survived across the centuries. Some of the best examples of kündekari can be seen in the minbar of the Great Mosque in Siirt (1129); the mihrab of the Aladdin Mosque in Konya from the Seljuk period (1221); the prayer mihrabs of the Great Mosque in Malatya (1224); the Great Mosque in Divriği (1228); the Eşrefoğlu Mosque in Beyşehir (1299); the Sungurbey Mosque in Niğde (13th century); the Damsaköy Taşkın Pasha Mosque in Ürgüp (13th century); the Great Mosque in Birgi (1312); the Great Mosque in Manisa (1366); the Great Mosque in Bursa (1400); the Hacı Bayram Mosque in Ankara (1427); the Zağnos Pasha Mosque in Balıkesir (1461); the Beyazid Külliye in Edirne (1488); and the Süleymaniye Mosque in Istanbul (1557). The large majority of these works are still used in their original locations. Others are being displayed in important museums such as the Ankara Ethnography Museum and the Istanbul Museum of Turkish and Islamic Arts.

The Kündekari Construction Technique

The kündekari required highly skilled work, and was generally used for panels, doors, window shutters, minbars and mihrabs. In this technique, wooden strips and sections were fitted together into geometrical shapes on a wooden frame to form an interlocking strap work, with no adhesives being during the entire process. The separate pieces had to be joined together gradually and without warping; and after they were all fitted, the panel becomes a single firm unit. Due to its intricate nature, this technique required great skill and care for proper execution [4,5].

In the kündekari technique, small pieces of wood fashioned in various geometric shapes are joined with one another through interlocking with the aid of channels and slots, and without any nails or glue being used in the process. Although these pieces of wood produced by craftsmanship may all appear similar at first, they are slightly different from each other akin to the pieces of a puzzle. Each piece can only be placed and fitted into its respective place relative to the other pieces. Assembling all of the pieces together forms a complete kündekari wooden panel (Fig.1).

In some examples, the geometric pieces of wood are, as shown in Fig. 2, relatively simple and plain. However, in most examples of kündekari, each individual piece of wood is carved and shaped elaborately, resulting in a fairly complex and intricate panel. For example, the Birgi Great Mosque's minbar was completed in 10 years, and consisted of 300 walnut wood parts. A detail of this minbar is shown in Fig. 3.

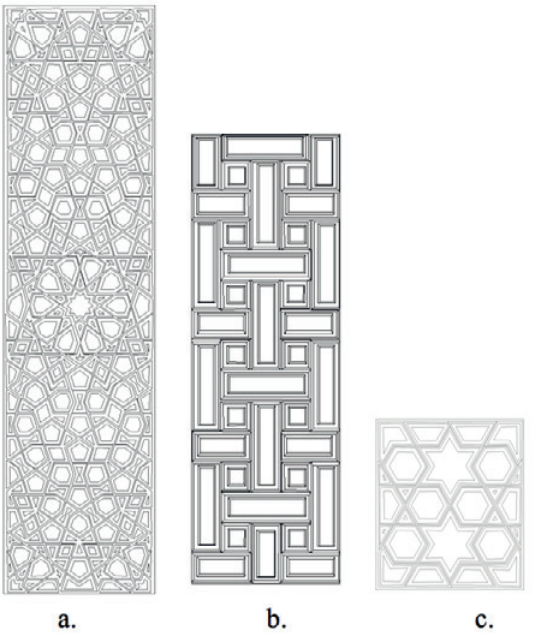

Figure 1. Rüstem Paşa Mosque door and window panels restitution drawing. 1.a. The main door top pattern; 1.b. The window shutter; 1.c. The main door bottom pattern.

Figure 2. The door and window shutters of the Rüstem Paşa Mosque, Tekirdağ, Turkey (1561)

The kündekari requires great expertise, and is made by joining together tiny interlocking pieces of wood cut in the form of polygons or stars, and decorated with "Rumi" designs or palmettos in relief. These pieces are then fitted together in an ornate geometric composition. Several different geometric shapes are used together at once, including stars (symbolizing eternity), octagons, decagons and lozenges [4]. The lateral side of a minbar constructed using this technique is shown in Fig. 3.

In certain examples, small plaques of different colors and made from various types of wood are placed in-between these geometric shapes to produce a composition that combines woodcarving with mother-of-pearl, tortoise shell and ivory inlays. Since the pieces are not joined with adhesive substances, they do not separate in the course of time. In some instances, a structural frame that is also made of wood is added behind the joined pieces to enhance durability. The detail of a pulpit decorated with mother-of-pearl is shown in Fig. 4.

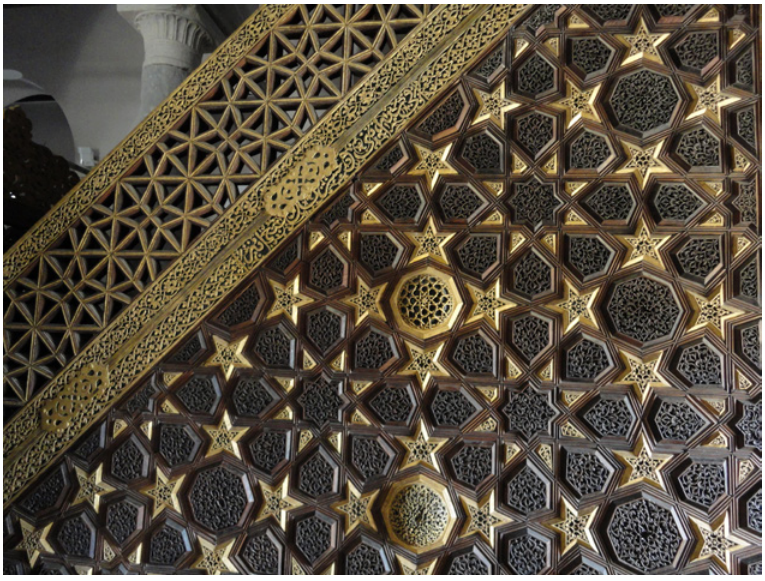

Figure 3. Lateral Side of the Birgi Great Mosque Minbar, İzmir, Turkey (1312)

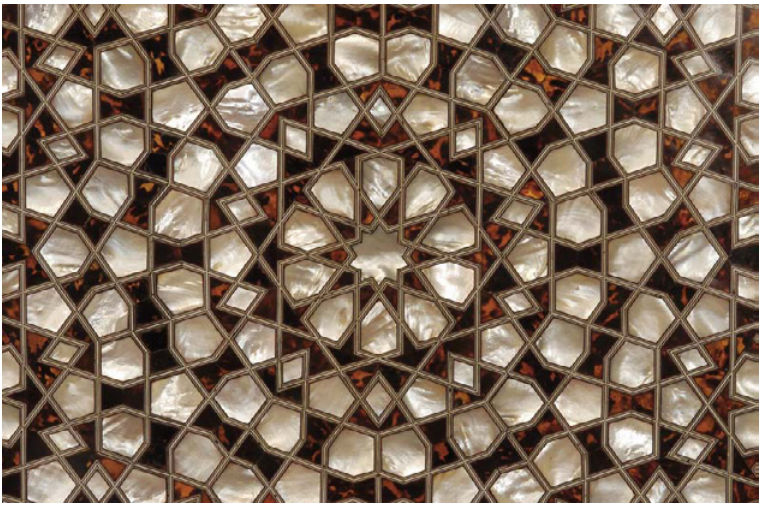

Figure 4. Detail of Fatih Mosque pulpit (photo Ege Zilci), İstanbul, Turkey

Why is the Kündekari Sustainable?

It is adaptable to changes in humidity. Wood is a hygroscopic material. Depending on the ambient level of humidity, it will either absorb or release water. This means that wood will expand during the rainy and humid winter months, and contract during the dry and warm summer months. This process of repeated expansion and contraction will, over time, lead to cracks in wood materials/elements assembled using poor or wrong construction techniques. Most wood elements in structures are assembled and fixed using fasteners such as nails and glue; for this reason, they generally begin to crack from the junctions where such fasteners were used. On the other hand; as the kündekari technique does not involve the use of nails or glue for assembling the wood elements, the wooden pieces can move independently from one another. As a result, the wooden material encounters no resistance when expanding or contracting, which prevents the formation of cracks. When the small pieces of wood forming the kündekari panel lose water and contract, they are able to slightly move and glide over the channels of the panel; this, in fact, can easily be felt when touching a kündekari panel. And when these pieces of wood absorb moisture and expand, they will become fixed even more firmly in their position. In this respect; it is possible to state that, rather than going against the natural structure and characteristics of wood, the kündekari construction techniques is quite compatible with them. Thus, kündekari panels are able to endure centuries of seasonal changes without being adversely affected or losing their durability.

It is resistant. With the kündekari technique, it is possible to produce large wooden panels that, otherwise, cannot be produced using a single piece or board. Moreover, the mechanical resistance of panels consisting of hundreds of small pieces is much higher than that of a panel made from a single piece. Differently from usual methods involving edge jointing or end to end-grain jointing, pieces in the kündekari technique are assembled not by using a single and linear jointing axis, but instead by using a complex system of indentations and protrusions. For this reason, the mechanical resistance of the system depends neither on a single method of assembly nor on the strength of fasteners such as glue. Moreover, the junctions between the pieces are not limited to horizontal and vertical axes; depending on the edge angles of the geometric shapes used in the panel, load can be distributed in any direction. Thus, all of the pieces forming the panel contribute to

its mechanical resistance in a multi-directional manner. If protected against earthquakes, fires and extreme humidity, a kündekari panel will remain durable for at least seven or eight centuries.

For ensuring resistance and durability with the kündekari technique, the choice of wood is as important as the technique itself. Woods such as walnut, boxwood, pear, cherry and mahogany are mainly used for interiors. On the exterior; more durable woods such as oak, mahogany, teak and ash that can withstand harsher weather conditions are preferred [6].

No need to use chemical treatment. Nowadays, one of the most widely used methods for the production and protection of wooden building materials is chemical treatment. However, due to environmental awareness, there are increasing discussions and concerns regarding the negative impacts of chemical treatment. The most common concerns regarding chemical treatments include the toxic effects of the chemical substances they involve; the risks associated with their application; the necessity to reapply them at certain time intervals due to their non-permanent effect; and their adverse effects on the mechanical resistance of old wood materials/elements, especially in buildings of historical value. The kündekari, on the other hand, requires no chemical protection, which makes it a more appealing technique. The kündekari proves that it is possible to produce durable and long-lived wooden panels without using any chemicals, solely through the selection of the correct materials and the use of the proper construction techniques.

Suitable for different designs. Kündekari works generally reflect the periodic characteristics of their times. For this reason, certain design and patterns have often been repeated in traditional kündekari art. The pieces of wood were sometimes left with a plain design, and sometimes they were intricately carved. Woods from trees of different colors were sometimes used for decoration purposes, and sometimes the pieces were decorated with mother of pearl. Star or polygon shapes were also used. For those researching the journey and evolution of the kündekari art through time, these periodic similarities are a source of great interest and pleasure. However, with the kündekari technique, it is still possible to produce innumerable different and new patterns, both traditional and modern. This means that it is possible to create new and contemporary designs through the inspiration provided by a traditional method, which is a very important with regards to sustainability.

CONCLUSION

Kündekari is a construction technique which is developed in course of time in the tradition of wood construction and helped to solve material or structural problems. For wood material it is an art that offers possibilities of the highest order. And it is sustainable not only as a material but also as a construction technique. A kündekari panel is completely organic origin. It does not contain a component or substance that cannot return in nature. Despite using any chemical the kündekari panels endure centuries. Moreover these durable wooden panels are also highly aesthetic.

The kündekari technigue which is occupies an important place in the tradition of Turkish building culture is compatible with wood instead of going against the natural structure and characteristics of wood. For this reason, kündekari panels are able to endure centuries of seasonal changes without being adversely affected or losing their durability. If it is protected against extreme risks like earthquake or fire, its durability will be centuries without chemical treatment.

What brings kündekari forth in the sense of sustainability is its ability to give inspiration to developed construction with wood's nature instead of opposing it. Numerous contemporary and traditional designs can be done with this inspiration as

much as possibilities geometry. Thanks to CNC technology these contemporary designs can be adapted easily to serial production system. And the resulting designs can be evaluated in many different areas.

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Cittaslow Cities: A Sustainable Approach To The Urban Life Quality

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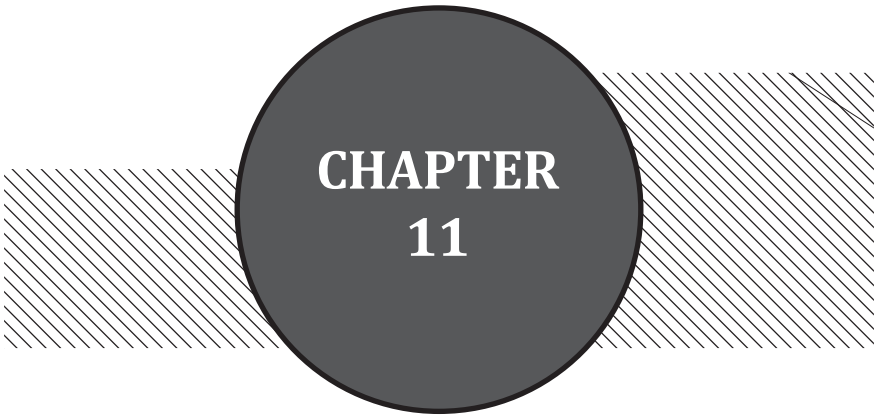

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1. INTRODUCTION

Especially during the last decade, parallel with the technological and scientific developments in the world, empirical researches have been conducted on the liveability in urban spaces, people's life quality and the development of the urban space quality, together with a general questioning of the concept of urbanization (İnceoğlu and Aytuğ, 2009). As in many branches of science, also in the discipline of landscape architecture, studies on quality of life have increasingly been carried out and the right to live in open spaces befitting the human worth has become as important as other basic human needs (Malkoç, 2008). These kinds of studies, which analyze the landscape features of settlements and reveal the quality of life, are carried out in order to achieve spatial improvements in response to the users' expectations. In addition, they have special importance in leading the physical planning, design, application and maintenance processes. Parallel to increased urbanization, as the quality of life in urban areas decreases, new urban concepts using modern technologies that increase the quality of life and performance have gained currency. One such concept is the Cittaslow, literally 'Slow City,' movement.

The Cittaslow movement was established in Italy in 1999 when a group of Italian mayors, along with Carlo Petrini, the leader of the Slow Food movement, decided to apply the principles of Slow Food to urban living. Cittaslow not only ascribes to the emphasis on local produce and food quality manifested in the 'eco-gastronomic' and environmentalist agenda of Slow Food, but also to a set of criteria for local urban governance aimed at improving local quality of life, maintaining local uniqueness and supporting sustainable urban economies (Pink, 2009). There are 252 Cittaslow cities present in 30 countries in the World (Cittaslow International, 2019). The acceptance of the slow city movement all around the world, and spreading in different continents in such a short time, is a result of the increase in the economic, social and cultural quality of life of people (Mutdoğan, 2010). Cittaslow's goals include improving the quality of life in towns by slowing down its overall pace, especially in a city's use of spaces and the flow of life and traffic through them (IAAC, 2018). These are ordinary places, but they are places that consciously seek to reinforce their own identity and to facilitate an unhurried and enjoyable way of life for their inhabitants. They are towns where pedestrians can stroll, untroubled by roaring traffic; towns with abundant and varied spaces in which people can run into one another, sit, talk and enjoy communal life (Knox, 2005). Slow city, striving to preserve its distinctness from the effects of globalization, is also a management model for local authorities (Baldemir et. al, 2013). It is actually town councils that become members of the Cittaslow movement. To achieve accreditation as a Cittaslow member, the town council must assess its town concerning its environmental and infrastructure policies, the quality of urban fabric, encouragement of local produce, hospitality and community, and creation of Cittaslow awareness (Pink, 2008).

With the purpose of preserving the local identity and values and analyzing the Sığacık Settlement, which is located within the boundaries of Seferihisar, this research aims;

- to make spatial assessments by revealing the natural and cultural landscape features of the settlement,
- questioning the quality of these open spaces in daily life in terms of the image of the city,
- enhancing the use of the space while increasing the life quality hence the attractiveness of the space,
- to be a reference to the analysis and evaluation of the spaces with similar characteristics.

2. MATERIALS AND METHOD

2.1. The Sığacık Settlement and its Environs

The main material for the study are the streets and the market place located within the boundaries of the old city centre of Sığacık, where the street and facade rehabilitation works have been carried out (Figure 1).

Today, Sığacık is a neighbourhood of Seferihisar, located 5 km to the east of the town centre, which has a settlement pattern which has expanded into the surrounding area from the walled city, which was built in the 16th century (Şahinkaya, 2010). Sığacık is located on the north side of Seferihisar Dilek Peninsula, near the bay of Sığacık (Atalan, 2014) and is within the settlement boundary of Teos, which is one of the 12 Ionian cities. According to 2018 data, Sığacık has a population of 3.320 people (TUİK, 2019) and is the central attraction of Seferihisar, which was the first Cittaslow city in Turkey.

In 2014, 12 streets and a market place inside the Old City were restored within the scope of the "Sığacık Old City Streets Improvement Project" and the place has greatly improved in terms of its spatial structure. In addition, the Teos Marina, which was established in 2010, and the creation of a market place for organic products in the same year, in order to support local producers, have helped to increase the popularity of the Sığacık settlement (Figure 2).

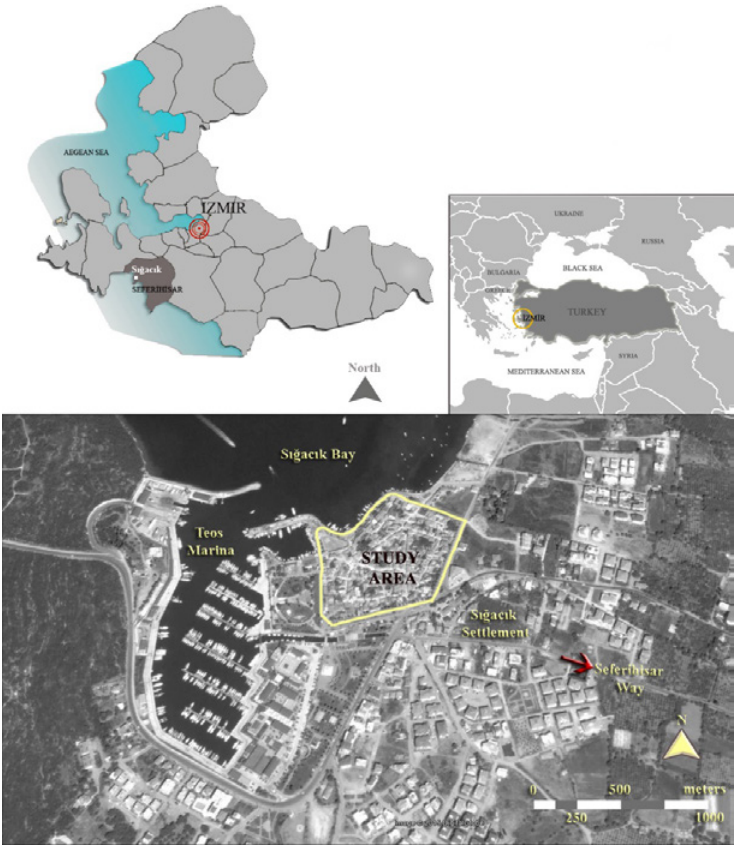

Figure 1. Location of study area

Figure 2. Photos related to the study area

2.2. Structure of the Study

The study was composed of four main phases, namely: conceptual framework, data collecting, findings and analysis, evaluation and synthesis (Figure 3).

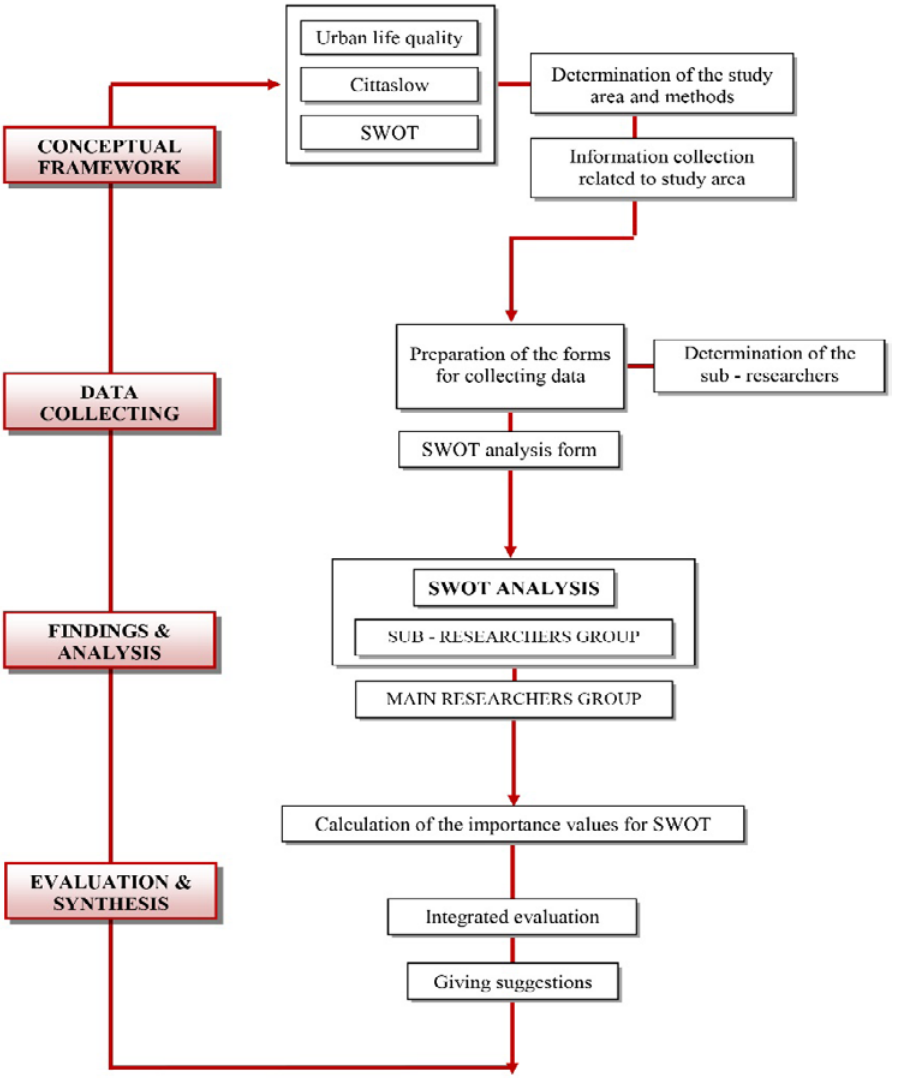

Figure 3. Method flow diagram

Conceptual framework: This was comprised of the existing literature studies and the preliminary observations related to the study area. In addition, internet information, photos and notes taken during the discussions with local people constituted this section of the study.

Data collection: Methods of SWOT analysis was used in this study. After the defining the subject and reviewing the literature studies, original SWOT analysis forms were prepared to analyze the spatial characteristics of the Sığacık settlement from the point of view of urban life quality. SWOT analysis was carried out with an expert group consisting of 10 landscape architects to determine the Strengths, Weaknesses, Opportunities and Threats to the Sığacık Settlement. For each analysis title, 10 evaluation criteria were determined and with the help of the experts, the study area was assessed. Impact factor "1" was set as the minimum while "10" was set as the maximum. For each evaluation criteria, the importance level was designated with the "Ranking Technique" and the priority values were calculated numerically (Yılmaz, 2006). SWOT factors were graded with "nine – point scales" (Figure 4).

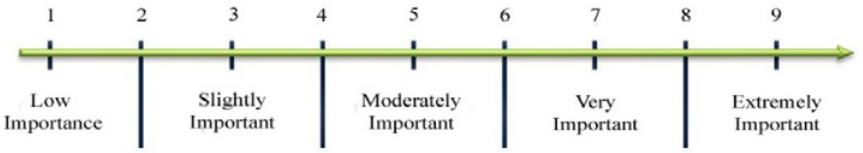

Figure 4. Nine - point scales used in ranking techniques

According to this scale, it was evaluated from "low importance" to "extremely important". In the evaluation, 2, 4, 6, 8 values were accepted as median values, and the totals of the impact factors and the importance levels of the criteria were ranked according to each criteria.

Results: Findings obtained from the literature studies, field surveys and observations, SWOT analysis were evaluated in terms of urban life quality.

Evaluation and Synthesis: The literature studies and the information obtained from the analysis were evaluated using a holistic approach. Finally, recommendations were made to improve the quality of urban life.

3. RESULTS

Criteria that could affect the viability of the Sığacık settlement and the sustainability of the traditional open spaces were determined and SWOT analysis was carried out with an expert group of 10 academicians from Ege University's Faculty of Agriculture, Department of Landscape Architecture. The results of the SWOT analysis are given below.

3.1. Strengths

The total impact value of the evaluation criteria related to strengths was calculated as 835 out of 1000. "Being a member of the International Cittaslow Association", with an importance level of 0,117, was found to be the biggest strength of the settlement. "Visual integrity of the sea, which completes the settlement (Importance level of 0,107)" and "Climate provides opportunities to use open spaces (Importance level of 0,105)" were also found to be important strengths of the settlement. On the other hand, "Existence of the marina (Importance level of 0,084)" was found to be the least important factor when compared to the other evaluation criteria (Table 1).

	EVALUATION CRITERA	Sum of Impact Value	Importance Level (%)
STRENGHTS	Being a member of the International Cittaslow Association	98	0,117
	Visual integrity of the sea which completes the settlement	89	0,107
	Climate provides opportunities for using the open spaces	88	0,105
	Having traditional street characteristics	85	0,102
	Having the distinctive characteristic of an Aegean coastal town	84	0,101
	The authentic structure of the houses	83	0,099
	Existing of the historical buildings	83	0,099
	Picturesque features	79	0,095
	Streets Improvement Project and applications	76	0,091
	Existence of the marina	70	0,084
	TOTAL	**835**	**1,000**

Table 1. Strengths of the settlement

3.2. Weaknesses

The total impact value of the evaluation criteria related to weaknesses was calculated as 795 out of 1000. "Lack of urban pattern integrity between the waterfront area and the market place" was found as the weakest feature of the settlement (Importance level of 0,113). The unrestored castle (Importance level of 0,112), and limited street improvement works (Importance level of 0,109) were the next main weaknesses of the settlement (Table 2).

	EVALUATION CRITERA	Sum of Impact Value	Importance Level (%)
WEAKNESSES	There is a lack of urban pattern integrity between the waterfront area and the market place	90	0,113
	Restoration works of the castle has not started yet	89	0,112
	Street improvement works are limited only with the Old City centre and the market place	87	0,109
	The presence of add-ons on the buildings disrupts the originality	85	0,107
	Pedestrian area is limited only with the ecological market place	81	0,102
	Selling stands and shade structures are not standardized	79	0,099
	Existence of buildings which are not renovated yet in the Old City centre and the market place	75	0,094
	Visual weakness of the relation between the gardens and the streets	73	0,092
	There is a lack of seating units	68	0,086
	There are limited access facilities	68	0,086
	TOTAL	**795**	**1,000**

Table 2. Weaknesses of the settlement

3.3. Opportunities

The total impact value of the evaluation criteria related to opportunities was calculated as 849 out of 1000. According to the expert group, the biggest opportunity for the settlement is being a Cittaslow city that creates situations for the protection of the settlement (Importance level of 0,111). The local people's tendency towards marketing their local products (Importance level of 0,110) and turning their cultural and natural properties into an opportunity (Importance level of 0,108) were respectively the other most important opportunities (Table 3).

	EVALUATION CRITERA	Sum of Impact Value	Importance Level (%)
OPPORTUNITIES	Being a Cittaslow city creates opportunities for the protection of the settlement	94	0,111
	There is a tendency for the local people towards marketing their local products	93	0,110
	Local people turn the cultural and natural properties of Sığacık into an opportunity	92	0,108
	Hospitality of the local people	90	0,106
	The positive contribution of the local people to the International Cittaslow Association membership process	88	0,104
	Presence of local food and beverages	88	0,104
	The settlement has been described as safe, relaxing, attractive and lively	80	0,094
	Settlement has a tourism potential / attraction centre in terms of tourism	75	0,088
	Presence of accommodation facilities	75	0,088
	The limited growth of the settlement becomes an opportunity for preventing the deterioration of the natural and cultural properties	74	0,087
	TOTAL	**849**	**1,000**

Table 3. Opportunities of the settlement

3.4. Threats

The total impact value of the evaluation criteria related to threats was calculated as 832 out of 1000. "Becoming crowded due to the increased recognition of the settlement (Importance level of 0,109) and "Real estate is seen as an opportunity for unearned income (Importance level of 0,109)" were seen as the main threats to the settlement (Table 4).

EVALUATION CRITERA		Sum of Impact Value	Importance Level (%)
THREATS	Becoming crowded due to the increased recognition of the settlement	91	0,109
	Real estate is seen as an opportunity for unearned income	91	0,109
	The quality and continuity of the products are not provided / There is not a standardisation	86	0,103
	Cars occupy the pedestrian priority spaces.	84	0,101
	Imbalance in the temporal distribution of user density	84	0,101
	The user carrying capacity occasionally exceeds	84	0,101
	Excess of the elderly population due to emigration of the young population	83	0,100
	Due to the increased recognition, life is more expensive than normal	78	0,094
	Sale of the products depends on the tourists / visitors' number	77	0,093
	Boats and the yachts disrupt the visual continuity and relation with the sea	74	0,089
	TOTAL	**832**	**1,000**

Table 4. Threats of the settlement

4. DISCUSSION

A well-designed social street is a great outdoor living room that is welcoming of people of all genders, race, ethnicity, age and socio-economic levels. It is a great opportunity to create vibrant places where people want to spend their time. The street can be a place that provides opportunities for social gathering by including a diversity of ways to engage with others and the larger community. Streets designed for social gathering also have the potential to reflect and exhibit the identity of their residents, businesses, historical occupants and visitors (Re: Streets, 2017). Making proposals for improving the traditional pattern of the Sığacık settlement and increasing the urban quality and maintaining the sustainability of the outdoor life were found to be the most significant points throughout this study.

According to this approach, the study area was evaluated on the bases of the SWOT analysis. Outdoor life has great importance in Sığacık and the traditional street characteristics of Sığacık standout as a strong factor, which helps form the identity of the settlement.

Social streets should accommodate a variety of people and abilities (singles, couples, families, people with disabilities, elders, pet owners, etc.) and in varying locations (sun / shade and exposed/protected). A well designed social space can also be the motivation for spending time outside reading on a bench or playing a game of pickup on the street (Re: Streets, 2017). In this context, according to the expert group, one of the strengths of Sığacık are the favorable climatic conditions, which provide opportunities for people to spend most of their time outside and use the open spaces for different activities.

In recent years, studies about the quality of life have been focusing increasingly on urban reality (Santos and Martins, 2007) and Cittaslow cities are good examples of livable cities. Although there have been some efforts to improve the urban life quality

in Seferihisar, there is a need to put forth more effort. For example, there is weak urban pattern integrity between the waterfront area and the market place which has not been solved by the new design solutions, the street improvement works have been limited and the fact that the castle remains unrestored was found to be the weakest aspect of the settlement according to the expert group. Becoming crowded due to the increasing recognition of the settlement and major disparities in property income are major threats to the settlement. Being a Cittaslow city should be accepted as an opportunity for the protection of the natural and cultural features of Sığacık, and the efforts of the local people to protect the daily traditional life of Sığacık should be supported.

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Figure 2 References

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Bioclimatic Comfort Analysis Of Tekirdağ City Center

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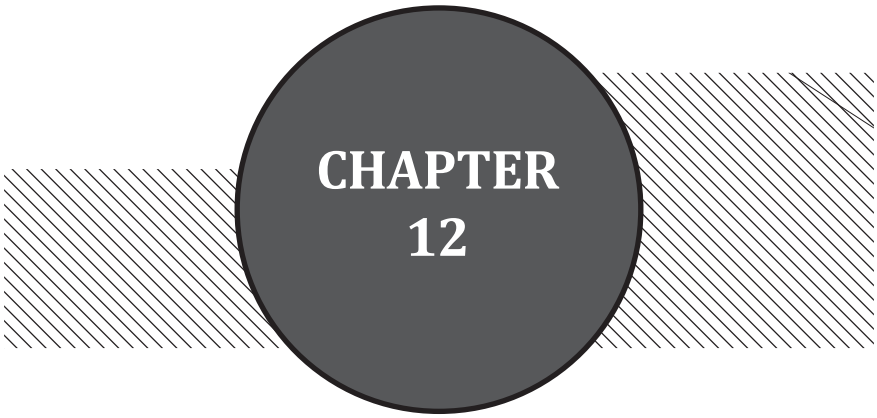

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INTRODUCTION

Climate is defined as the long term average of the effects that take place on a certain location in the world due to weather conditions (Türk Dil Kurumu [TDK], 2019). Climate is comprised of elements such as temperature, rain, pressure, wind and there are certain variables that affect these climate elements. Therefore, climate has a variable structure (Çalışkan, 2012, p. 19).

Climate determines the inhabitability of a certain geographical environment and is therefore of primary importance in the formation of the natural and socio-cultural environment since it combines both the natural and socio-cultural processes (Çetin, Topay, Kaya& Yılmaz, 2010, p. 84) (Figure 1).

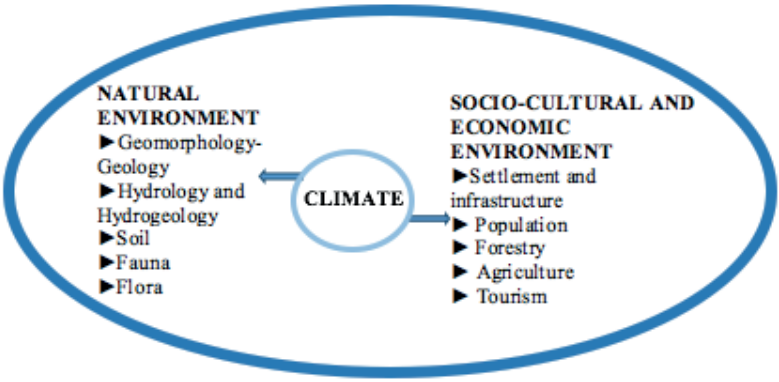

Figure 1. Natural, socio-cultural and economic environments (Topay & Yılmaz, 2004, p. 2).

According to Berköz (1969), people spend a certain amount of energy in order to adopt to the environmental conditions or reach a state of bioclimatic comfort. The conditions in which people are able to adopt to their environment by consuming minimum energy are defined as "Bioclimatic Comfort State" (Çınar, 2004, p. 2-3).

Temperature, humidity, wind and radiation conditions should be determined for a certain location in order to determine the bioclimatic comfort state of that location and analyses should be made with regard to the required climate values for providing the required bioclimatic comfort. In addition to these fundamental factors, the number of hot days, rain state, diseases due to weather events and air pollution, the amount of oxygen in the atmosphere also play a role on human comfort. The bioclimatic comfort state can be determined by taking into all these different effects (Topay & Yılmaz 2004, p. 3).

Mirza (2014) cites from Altunkasa (1987) that many studies have been carried out until now for determining the lower and upper limits of the climate conditions for bioclimatic comfort and different values have been determined with slight variations. However, the bioclimatic comfort approach of Olgyay (1973) developed for determining the bioclimatic comfort requirements of all people excluding those living at the Equator and the Polar regions is of significant importance (Mirza, 2014, p. 35). Studies that put forth the fundamental methods that are still valid today with regard to physical planning and design along with the first studies that generate the "bioclimatic chart" for a certain location were carried out by Olgyay (Çaçan & Zorer Gedik, 2013, p. 1990). This chart assumes the criterion that the perimeter of the comfort zone is defined by the conditions wherein the average person will not experience the feeling of discomfort, and it applies to moderate climate zones (Schiavon, Hoyt & Piccioli, 2014, p. 323). According to Givoni (1998), four parameters are considered in his representation: air movement,

vapor pressure, evaporation and radiation effect. Dry-bulb temperature is the ordinate and relative humidity the abscissa. The chart displays the comfort zone in the middle surrounded by curves that describe how climatic effects can be used to restore the feeling of comfort for conditions that fall outside of the boundaries. The bioclimatic chart is a powerful representation that combines several factors and considers their interaction and effects on thermal comfort (Figure 2) (Schiavon et.al., 2014, p. 323).

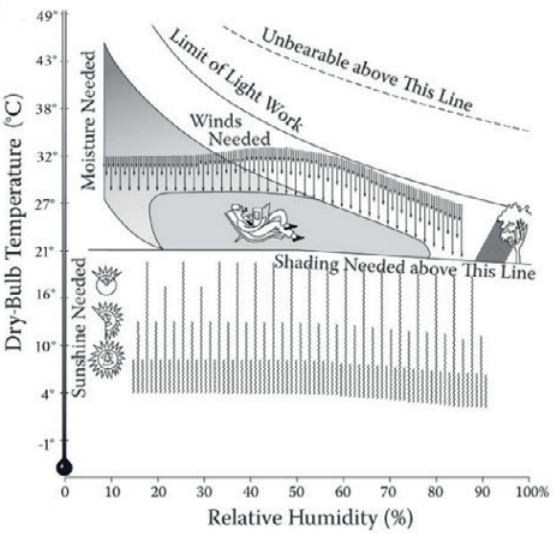

Figure 2. Olgyay (1973)'s Bioclimatic Comfort Chart (Schiavon et.al., adapted from Olgyay 2014, p. 323).

There are six factors impacting bioclimatic comfort. Four of these are environmental factors and the last two are personal factors. These are;

- air temperature
- wind speed
- radiation
- humidity
- metabolic rate

Clothing insulation (ASHRAE, 2004; Çınar, 2004; Toy, Yilmaz&Yilmaz, 200 5; Çetin et.al., 2010).

The factors impacting bioclimatic comfort apart from the environmental and personal factors are known as additional factors. The additional factors impact the personal factors and therefore they are only considered theoretically and no objective value related with these factors is mentioned during bioclimatic comfort calculations. Fanger (1970), Gagge et.al. (1971), Gagge et.al. (1986) and VDI (1998) determined some of these factors as adapting to the climate, height – weight ratio of the body, subcutaneous fat, age and gender. It is suggested in bioclimatic comfort studies that it takes at least six months for an individual to adapt to the environment of a new location, that thin people can be more comfortable in hot weather conditions in comparison with fat people and that elderly individuals are comfortable in narrower comfort intervals (Toy, 2010, p. 22).

2. THE IMPORTANCE OF BIOCLIMATIC COMFORT WITH REGARD TO HUMAN ACTIVITIES

The human body executes various thermo-regulatory behaviors in adverse weather conditions in order to balance the body temperature. These behaviors may sometimes lead to spending too much energy and diseases. People face severe health risks in excessive cold or hot weather conditions (Çalışkan, 2012, p. 14). For example, sensitive population groups such as sick, young and elderly individuals have a higher risk of heat stroke and death when they exercise outside in hot weather (Vanos, Warland, Gillespie & Kenny, 2010, p. 320; Bulğan, 2014, p. 15). Classifications are made in Figure 3 according to apparent temperature and Table 1 shows certain health problems that may arise in relation to this classification (Steadman, 1979, p. 862; Çınar, 2004, p.29).

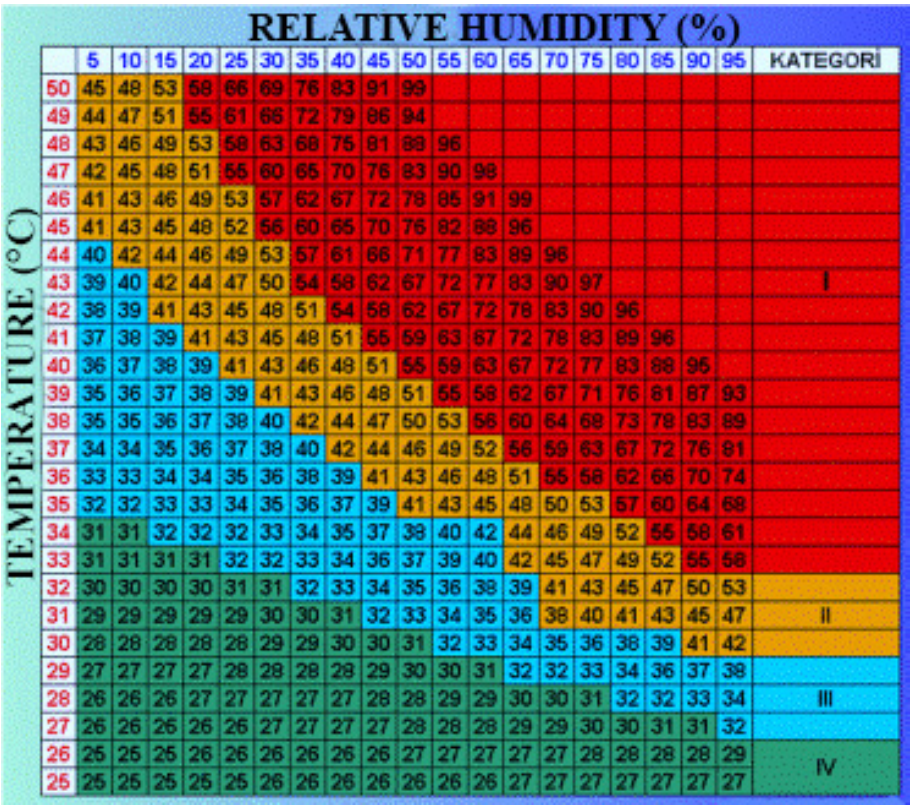

Figure 3. Apparent Temperature (According to Temperature and Humidity) (Steadman 1979, p. 862; Çınar 2004, p. 29).

According to Çınar (2004) citing from Steadman (1979); the red zone is the most dangerous zone with regard to 1st region health problems. Sudden thermal shocks may take place in this zone due to high temperature and related increases in relative humidity. The probability of thermal shocks in the other three zones is subject to the time spent in this temperature.

Class	Possible Health Problems
I	Thermal shock due to heat or sun stroke
II	Sun stroke, heat cramps or heat exhaustion, heat stroke due to physical activity and thermal stress related with the time spent under these conditions
III	Heat stroke due to strong thermal stress related with the time spent under these conditions, heat cramps and heat exhaustion
IV	Fatigue, irritability, disorders in circulatory and respiratory systems subject to the time of exposure

Table 1. Steadman Classes and Possible Health Problems (Steadman, 1979; Çınar, 2004, p. 29).

3. THE RELATIONSHIP BETWEEN LANDSCAPE PLANNING, LANDSCAPE DESIGN AND CLIMATE

Today, the relationship between landscape architecture and climate should be taken into consideration as the balance of landscape planning and energy with a goal of increasing the energy for human consumption in the related location. Such that; comfort may be provided and climate can be improved for living beings by way of a comfortable outdoor arrangement, parks, gardens and resting areas, recreation areas, aesthetic forestation and increasing agricultural products by way of windbreaks (Uzun, 1971, p. 10).

There are various factors at play regarding the formation of traditional home and city architecture. Even though these are different factors such as culture, living habits, environment and structural materials used, climate (macro and micro) has always been the most effective factor with regard to their design (Toy & Yılmaz, 2009, p. 134).

Even though each location has a unique climate, there are also certain planning characteristics suited to that climate. Climate is the most important factor for landscape architects when selecting locations and creating comfortable areas. It can be observed when settlement areas of the past are examined that the plans made are in accordance with the climate. Majority of the villages in Anatolia are located on slightly sloped areas looking south. Moreover, it is observed that cool air circulation is attained by way of narrow streets, houses built opposite to each other and bay windows (Uzun, 1971, p. 13). Rapoport (1969, 2006) states that a compact geometry along with heat insulating materials such as adobe, stone, mud are used taking into consideration shadow formation for using the heat collected during the daytime at night in areas with high temperatures during the day and excessively low temperatures during the night. The windows used on the structures were small with relatively low numbers in addition to thick walls and lighter colors. The element of water was used in the courtyards forming green areas which have positive psychological impacts in addition to micro-climate effect. Solutions that provide maximum shadow and minimum heat were preferred in areas with high humidity and rainfall which are subject to high amounts of radiation. Contrary to hot-dry areas, walls with a minimum thickness were used along with darker colors to make use of radiation (Şahin & Dostoğlu, 2007, p. 34).

Altunkasa and Gültekin (1991) report that climate is among the most important parameters for planned urbanization which enables the selection of proper locations with regard to human health thereby leading to improved quality of life (Çetin et.al. 2010, p. 84).

Bioclimatic comfort is among the subjects taken into consideration in studies carried out on the relationship between climate and people. Bioclimatic comfort studies generally

aim to determine the annual distributions of comfort levels at a certain location. Comfort periods are determined based on the acquired results and it is suggested to perform outdoor activities such as recreational and touristic activities during these periods. When comfort periods are determined, the popular seasons are determined for the areas that will be subject to landscape planning and design. In addition, area use is also arranged according to comfort periods by putting forth outdoor activity options (Toy & Yılmaz, 2009, p. 138).

4. MATERIALS

The main material of the study is the Süleymanpaşa district in the province of Tekirdağ (Figure 4). Süleymanpaşa district covers the city center of Tekirdağ and was made into a district in 2013 after the province of Tekirdağ became a Metropolitan. The district covers an area of about 108,252 da.

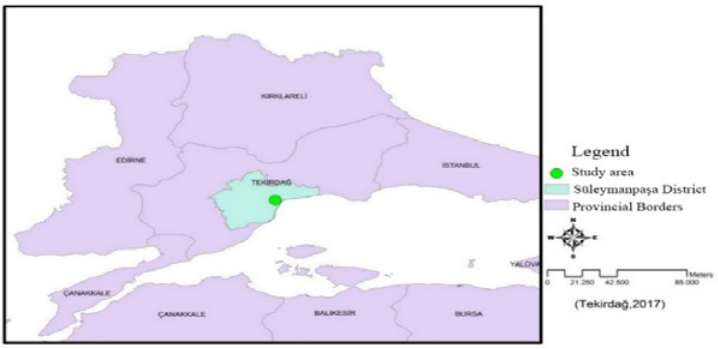

Figure 4. Location of the study area.

Based on the study subject, a total of 19 locations were selected randomly from the city center after which temperature, humidity and wind measurements were carried out at these locations with the acquired data used afterwards as study material (Figure 5). Urban units such as street, avenue, open area, green area and square were used as selection criteria for the locations included in the study.

Figure 5. Study area

In addition, Ms Excel and ArcGIS 9.3, a Geographical Information Systems software was used for data evaluation and arrangement.

5. METHOD

Based on the study subject, a total of 19 locations were selected randomly from the city center. Urban units such as street, avenue, open area, green area and square were used as selection criteria for the locations included in the study. Temperature, humidity and wind measurements were carried out at these 19 locations one day every month during 08.00-10.00 in the morning, 12.00-14.00 at noon and 16.00-18.00 in the evening. Handheld climate measurement devices (Mini Humidity&Temp.Meter (LYK 903) and Spectrum 45158) were used to take one minute recordings at each measurement point and the study was continued for a period of 12 months. The one minute recordings were monitored and the acquired data were entered in the Microsoft Excel software after which their averages were calculated. The data average was then transferred to the Geographical Information Systems software and maps were generated via Inverse Distance Weighting – IDW method. The maps generated in GIS environment were classified according to bioclimatic comfort values and overlaid. The comfort values considered during this procedure are given below (Çetin et.al., 2010, p. 93; Cetin, Adiguzel, Kaya&Sahap, 2018, p. 370):

Temperature 15-27 °C

Relative Humidity 30 - 70 %

Wind speed 0 - 5 m/s

6. STUDY RESULTS

General temperature map of 2016 was generated for the Tekirdağ city center using the data acquired from measurements made at the study area for 12 months (Figure 6). According to this map, the highest temperature average in Tekirdağ city center for the year 2016 was observed at point 19 (22,79°C) whereas the lowest temperature average was observed at points 2 (19,56°C) and 4 (19,33°C).

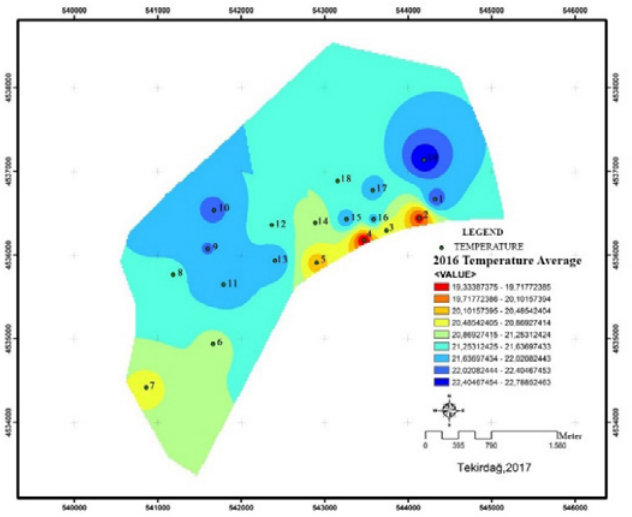

Figure 6. 2016 average temperature map

It was determined based on the measurement results that the highest temperature in 2016 was 31,79°C in July, while the lowest temperature was 3,16°C in January (Table 2).

2016 TEMPERATURE VALUES (°C)			
POINT	**POINT BASED 12 MONTH GENERAL TEMPERATURE AVERAGES**	**MONTH**	**MONTH BASED GENERAL TEMPERATURE AVERAGES**
1	21,39	January	3,16
2	19,56	February	16,05
3	20,48	March	23,13
4	19,33	April	22,85
5	20,27	May	27,35
6	21,16	June	29,08
7	20,76	July	31,79
8	21,56	August	26,37
9	22,05	September	25,24
10	22,13	October	22,41
11	21,94	November	15,44
12	21,44	December	12,83
13	22,02		
14	20,95		
15	21,99		
16	21,82		
17	21,88		
18	21,37		
19	22,79		

Table 2. 2016 temperature values

General humidity average map for the year 2016 was generated for the Tekirdağ city center using the data acquired from measurements made at the study area for 12 months (Figure 7). According to this map, the highest humidity ratio was observed at points 4 (49,65%) and 5 (49,23%). Whereas the lowest humidity ratio was observed at points 9 (40,86%), 10 (40,35%), 11 (40,92%) and 19 (40,34%).

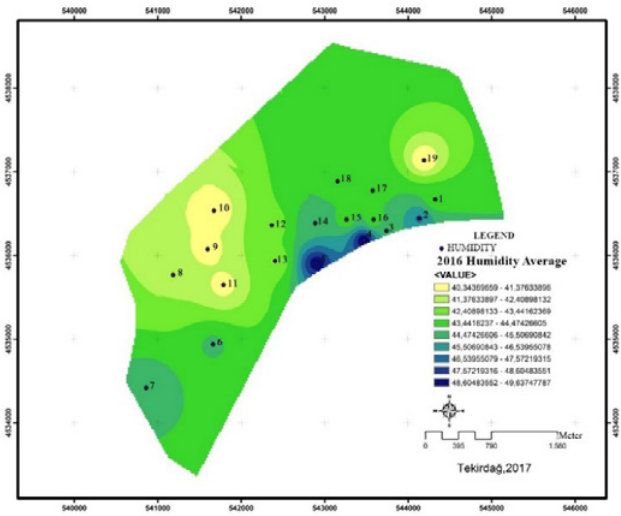

Figure 7. 2016 average humidity map

It was determined based on the measurement results that the highest humidity ratio in 2016 was observed in October with 52,97%, while the lowest humidity ratio was observed in January with 31,48% (Table 3).

2016 HUMIDITY VALUES (%)			
POINT	**POINT BASED 12 MONTH GENERAL HUMIDITY AVERAGES**	**MONTH**	**MONTH BASED GENERAL HUMIDITY AVERAGES**
1	43,56	January	31,48
2	46,68	February	50,27
3	45,27	March	50,30
4	49,65	April	39,35
5	49,23	May	49,74
6	44,67	June	38,77
7	45,27	July	46,29
8	42,18	August	41,21
9	40,86	September	51,35
10	40,35	October	52,97
11	40,92	November	40,80
12	42,80	December	34,27
13	42,36		
14	45,19		
15	43,76		
16	43,51		
17	43,91		
18	43,60		
19	40,34		

Table 3. 2016 humidity values

It was determined based on the 2016 Tekirdağ city center wind average map generated using data acquired from the study area that the lowest wind speed was observed in the region where point 1 is located (0,22 m/s), while the highest wind speed was observed at the region where points 5 (1,23 m/s) and 8 (1,15 m/s) are located (Figure 8).

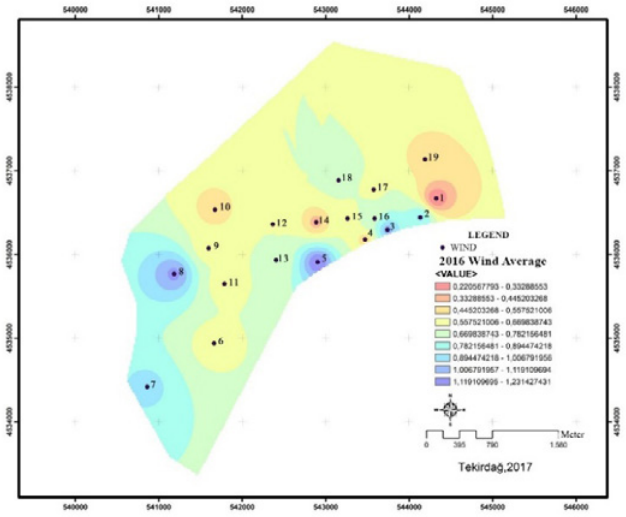

Figure 8. 2016 wind average map

The results obtained from the measurement results show that the highest wind speed in 2016 was 1,92 m/s in August, while the lowest wind speed was 0,29 m/s in February (Table 4).

2016 WIND VALUES (m/s)			
POINT	**POINT BASED 12 MONTH GENERAL WIND AVERAGES**	**MONTH**	**MONTH BASED GENERAL WIND AVERAGES**
1	0,22	January	0,38
2	0,91	February	0,29
3	1,06	March	0,91
4	0,51	April	1,13
5	1,23	May	0,58
6	0,60	June	0,92
7	0,93	July	0,63
8	1,15	August	1,92
9	0,59	September	0,30
10	0,48	October	0,53
11	0,60	November	0,36
12	0,67	December	0,41
13	0,68		
14	0,40		
15	0,60		
16	0,77		
17	0,63		
18	0,74		
19	0,49		

Table 4. 2016 wind values

The maps developed in GIS environment for temperature, humidity and wind elements were classified based on bioclimatic comfort values and overlaid (Figure 9) in this study carried out for accurately determining the bioclimatic comfort values of the areas located inside the Tekirdağ city center. The comfort values taken into consideration during this procedure are given below (Çetin et.al. 2010, p. 93, Çetin et.al. 2018, p.370): Temperature 15-27 °C, Relative Humidity 30-70%, Wind speed 0-5 m/s

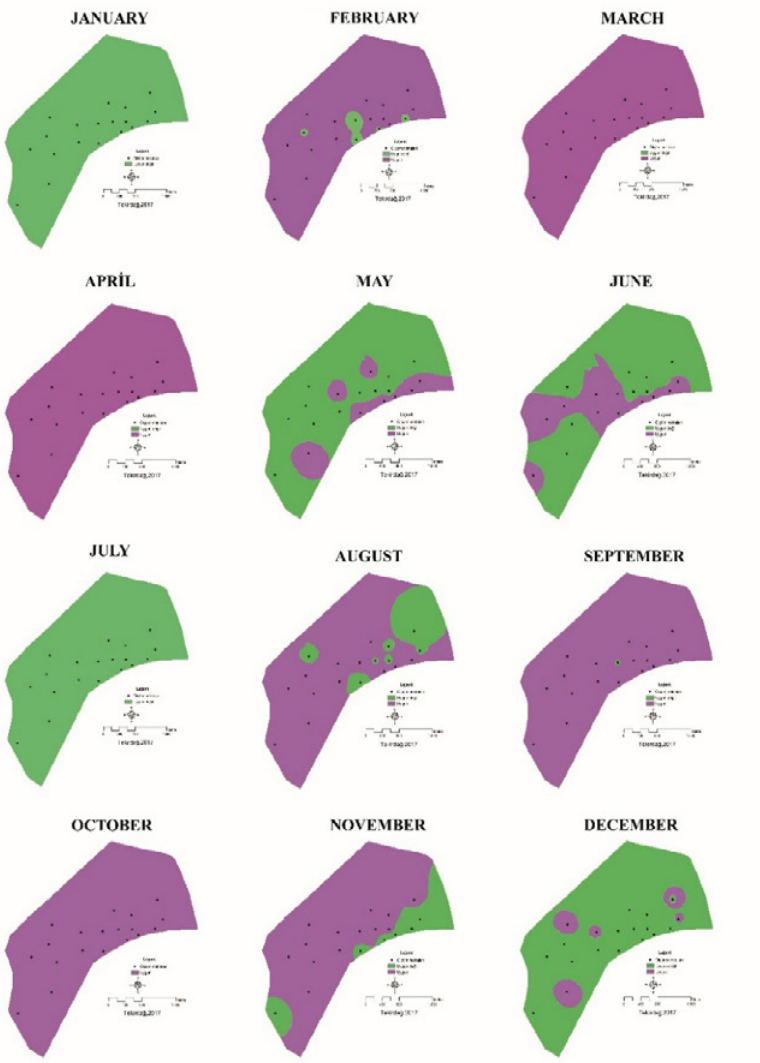

Figure 9. Comfort areas subject to overlaid climate parameters.

When the overlaid areas in Figure 9 are examined, it was first observed that the months of March, April, September and October were the best in terms of comfort. These were followed by the months of February, August and November with moderate bioclimatic comfort. Overlaying procedure was not applied for the months of January and July since no temperature value was determined in these months which fit the bioclimatic comfort values and it was determined that none of the areas provide a good fit with regard to bioclimatic comfort.

7. CONCLUSION

It was determined upon examining the areas following the overlaying procedure carried out based on bioclimatic comfort values that the months of March, April, September and October are the most comfortable months. February, August and November were determined to be within the comfort values but were less comfortable (moderate comfort) in comparison to the aforementioned months. Overlaying procedure was not carried out for the months of January and July since there were no temperature values in the pre-determined bioclimatic comfort interval. It was observed that the temperature average was 3,16°C in January and 31,79°C in July. Since overlaying procedure could not be carried out, the study results suggest that none of the areas are suited with regard to bioclimatic comfort during these months.

The city of Tekirdağ where the study was conducted is a coastal city where different climates are intertwined. Therefore, it is of significant importance to make use of climate data in order to put forth good results in planning and design.

Climate values have to be taken into consideration as one of the most important parameters in decision making processes for the zoning plan changes that will take place especially in the city center after Tekirdağ became a metropolitan city in 2013. Accordingly, the impacts of climate data have to be taken into consideration in selections for the location and size of open and green areas.

The results from this study suggest that temperatures are high in some areas with values that are outside the comfort interval. It is necessary to increase the number of green areas inside the city which act as coolants and modulate the climate.

Wind is one of the most important factors resulting in the changes in climate throughout the city. Wide urban corridors should be formed and the already existing urban corridors should be arranged in order to make use of the positive impacts of wind on climate.

There is one meteorological station in the Tekirdağ city center which is also the study area. Hence, the values taken from the station do not accurately represent the microclimate characteristics of the city center and the study area. It is suggested to increase the number of meteorological observation stations to obtain more accurate results and to repeat this study using handheld climate measurement devices in 2016 for long years to come. The studies carried out are of significant importance for landscape planning and design.

In conclusion, the use of natural data in landscape planning and design studies is very important. Climate data which is one of the important parameters of natural data have been used as averages in studies for many years but fail to represent the microclimate of the study area. Climate data acquired from climate stations should be integrated and interpreted together with climate data measured at the study area.

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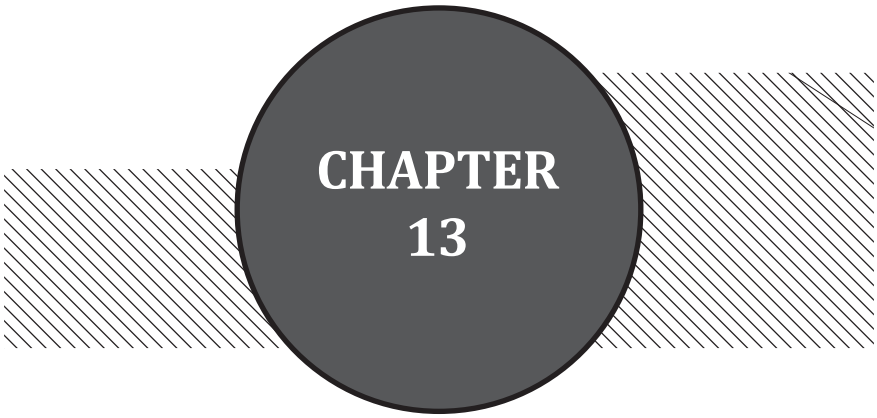
The Structural Systems Used in The Traditional Houses in Anatolia

Eti AKYÜZ LEVİ[1]



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1. INTRODUCTION

The societies which lived in Anatolia – that has unique natural and historical beauties – in the historical process paved the way for the origination of various types of houses. From time to time, the resulting buildings concerned also influenced their successive examples.

A large number of factors such as environmental conditions, location, land structure, climate, family size and structure, construction technique, material, economy, social structure and culture, construction conditions, and limitations are known to affect the formation of architecture in general and of house architecture in particular. A view, a classification and an evaluation in the context of the effects of materials and the structural system have been taken as the basis in the study.

The study aims to group and make a comparative evaluation of the construction systems of the traditional houses in Anatolia. The study is essential in terms of revealing the similarities and differences in the construction systems seen in different pieces of geography in Anatolia and making comments on their connections with other countries (e.g. solid houses, timber frame houses, composite houses, carved houses, houses with a tüteklik, and corbelled houses).

In this study, the subject is addressed by focusing on the construction system and the factors leading to the origination of the construction system concerned are discussed.

2. ANATOLIAN HOUSES IN THE CONTEXT OF THE STRUCTURAL SYSTEM AND MATERIALS

2.1. In the Context of the Construction System

When the traditional houses in the Anatolian geography are scrutinized in terms of the construction system, it is possible to speak of four main systems as timber frame, masonry, composite, and carved systems. The timber frame system is realized with the timber material in traditional houses. In the traditional houses in Anatolia, the timber frame system is mainly applied in two different orders: infill walls half-timbered with brick bonds and unfilled timber frame construction.

In the infill wall system, the spaces among timber posts, tie-beams, and braces are filled with such masonry materials as stones, mudbricks, and bricks. The system in question is described as "*hımış*" (post and pane).

In the unfilled system, however, the timber construction built with timber posts and tie-beams is clad with lags on both sides. This system is called "*bağdadi*" (timber frame). On the other hand, the wall built by cladding the timber construction in the system in question with wide corbelled timber panels on both sides instead of thin lags is called *yalı baskısı* (bevel siding).

The masonry system may be stone, adobe, brick, and timber depending on the material used. There are also examples in which two or more of the materials concerned are used in alternate order in the walls. In addition, it is seen that brick or timber lacing courses are used at specific intervals in the stone walls. Such features as the occupied/unoccupied order, openings, and the distance of the openings from the corner in the use of masonry materials in the masonry system have been indicated in the Earthquake Regulation.

Although the use of the timber material in *çantı* (log house) system is not very suitable for its nature, such practices are considerably seen at the Western Black Sea locality.

2.1.1. The masonry construction system

The system in which such building elements as stone, brick, adobe, and timber create an integrated structure with mortar and their own weights by being placed one on top of the other is called *masonry* (Gerçek, 1979).

Çantı is the system which is formed by stacking those trunks used in the places rich in forest resources up one on top of the other (Gerçek, 1979).

The houses of Tillo, Siirt can be given as an example of the masonry construction system. The houses of Siirt reflect a characteristic quality depending on the building material and the climatic conditions. They were built in the masonry construction technique and with rubble walls. The walls thin out upwards. The wall thickness ranges from 80 to 120 cm. The thick walls allow providing favorable climatic conditions in the interior space every season. The houses are light gray. The walls are rendered with the coarse plaster called *cas* and obtained by kiln drying and grinding gypsum – one of the important elements of the locality. Cas dries and takes form easily, which provided an opportunity for the use of any type of stone (Gökhan Baydaş, 2002).

2.1.2. The timber frame system

The timber frame walls are in a frame system which is built by placing those timber posts that measure about 10cm by 10cm at 1- to 1.5-meter intervals and by putting horizontal and diagonal elements in between. The order in which the construction concerned is clad on both sides with lags that measure 2 to 3 cm is called the *bağdadi* (timber frame) construction system, whereas the technique in which the spaces in the construction are filled with masonry materials is called *hımış* (post and pane).

Besides the intensive use of the bağdadi (timber frame) system in houses, it might be stated that it is applied in the construction of *serander*s – the crop stores likely to be described as an integral part of the houses at the Black Sea locality. In the buildings in question, a structure is built over timber posts in order to prevent the crop from being affected by moisture and pests and the access of rodents to the store is prevented by means of the conical cap details used on the post and called *teker*s.

The order in which the spaces between the main vertical bearing posts are considerably narrowed by placing secondary posts when building the timber house construction despite the presence of no structural requirement is seen at the Eastern Black Sea locality. In this system, the order in which the timber elements are kept close with decorative concerns rather than the bearing task and in which the resulting geometric order creates square honeycombs is called *göz dolması*, while the order in which it creates triangular empty spaces is called *muskalı*. Both systems concerned are generally used in the hımış (post and pane) order; furthermore, the spaces between the timbers are filled with white stones and it is intended to create a contrasting effect through the darkening of timber in time.

The houses of Göynük can be given as examples of the timber frame system. The houses are lime mortared and have a rubble foundation. The actual living floor of the building, the middle floor and its mezzanine floor are in the timber frame order except for the fireplace walls. The timber frame is established onto the timber lacing courses placed on the main stone walls. The principal beams resting on the posts are 16/16 and 18/18 cm in dimension and referred to as *hepçeken* (Erdem, 2001).

Figure 1. A sample of timber building – Mudurnu

2.1.3. The composite construction system

In traditional Anatolian houses, the composite construction system is generally employed in three different ways.

a. The construction system which differs in the context of floors

- (e.g. masonry foundation and downstairs as well as timber frame upstairs).

b. The construction system which is different in the context of building elements

- (Stone or adobe masonry exterior walls and timber frame interior walls).
- (The application of an integ rated system in the bearing walls).

c. The use of different construction systems in the building mass.

(One of two adjoining units is in the masonry technique, while the other one is in the timber frame technique. For instance, the houses of Alanya – different construction systems in summer and winter units).

The differentiation in question may be as follows:

- Coexistence of masonry and timber frame systems
- Coexistence of masonry and carved systems.

Figure 2. A sample of masonry (downstairs) and timber frame (upstairs) system – Kula

Kula district, affiliated to Manisa province in Western Anatolia, can be given as an example in the context of the traditional houses in which the composite construction system is employed. Stone walls were used at the foundations and in the downstairs, which included the service spaces. The type of stone is granite at the foundations and karataş, hewn köfeki stone, and slate in the main walls. The structural system on the upper floors consists of timber posts and beams. The fillers are bricks and köfeki stones in the infill partition walls and they were rendered on both sides. The generally unfilled interior walls were clad on both sides.

In the houses of Beypazarı, Ankara, however, the downstairs is made of coarse freestones which are 90 to 100 cm in thickness, whereas the upper floors are built as a timber frame. Nevertheless, the stone walls at the bottom are not bearing elements and the timber posts with a diameter of 30 cm and at two-meter intervals near the wall carry the upstairs. The exterior walls are infill walls, while the interior walls are bağdadi (timber frame). In the infill walls, the material varies depending on the direction of the façade; moreover, the filler is adobe in the north but timber in the other directions (Aksulu, 2001).

2.1.4. The carved construction system

The system in which spaces carved, hewn, and embedded in rocks are created by carving the rocks is called the *carved* system. This system can be employed in the places where nature allows. Our country has the richest examples of the carved system on earth (Gerçek, 1979).

The traditional houses at the Cappadocia locality are examples in which the carved system, the masonry system and the masonry with carved systems are seen. Square or rectangular spaces are carved in the houses with an organic plan in the carved construction system when required (Ulusoy Binan, 1994: 91).

Figure 3. A sample of carved system – Cappadocia

2.2. In the Context of Materials

It is known that the material is procured from the most nearby environment in local architecture. When the Anatolian geography is considered in this context, the use of timber in the Black Sea Region in parallel with the rich forest resources, of stone in Eastern and South-eastern Anatolia, of adobe in Central Anatolia and of composite materials in the Marmara, Aegean, and Mediterranean Regions in traditional house architecture draws attention.

3. BUILDING ELEMENTS

3.1. Walls

In traditional houses, the walls may be either masonry (stone, adobe, brick or stone and brick) or timber in the context of materials. On the other hand, they qualify as bearing walls or partition walls in the context of the bearing task. A bearing wall may not only have a quality which is formed by appropriately putting the masonry materials one on top of the other but also take form in the order formed with such elements of the timber frame construction as posts, tie-beams, and braces. While there is a superficial bearing element in the former, a system formed by bar elements is present in the latter. The bearing walls in the masonry system can less often be built with timber materials as well.

The walls, which are continuous vertical bearing elements, are built with masonry or timber materials in the traditional building. Masonry walls are mainly divided into two as stone-based and earth-based (adobe and brick). Stone walls are applied in the form of rubble or freestone walls. Rubble walls are built in an order either with or without lacing courses. Timber-based walls are in çantı or timber frame system. Infill timber frame walls are built with brick, adobe, stone, timber, and basketwork infill depending on the material, whereas those with weatherboards are built by being clad with lags or with timber in a

different technique. Those clad with lags are rendered and described as being lath-and-plaster (Tayla, 2007). The houses where the spaces in the timber frame are closed in the form of basketwork with thin tree branches and plastered on, are carelessly constructed village houses (Günay, 1998).

Claddings are made either horizontally (bevel siding and louvred) or vertically. The wattle-and-daub timber technique, which reflects the continuity of the construction tradition called "*huğ*" and coming from the past, is seen in the Mediterranean Basin and Çukurova.

Of the masonry walls, those built with adobe are rendered, while stone walls are generally not rendered. To ensure stability and enhance earthquake resistance, lacing courses are used at specific intervals on the walls built with masonry materials in the masonry system. In general, the timber material is selected as the lacing course. The stone wall technique is in either mortar-free (drystone wall) or mortared order, and the wall technique is in different forms such as with rubble, coarse freestone, and fine freestone depending on the quality of the building and of the wall.

3.1.1. Stone walls with lacing courses

The timber lacing courses built in the context of enhancing the resistance of the wall and creating a flat horizontal line are performed with original techniques at some localities of Anatolia and leave their mark on the architectural identity of the relevant locality. In this regard, "*düğmeli evler*", which are the striking settlement examples of the Mediterranean locality and which constitute the group of houses unique to the Akseki-İbradı locality in the Taurus Mountains, can be given as examples. Constituting the most important characteristic of the traditional buildings at the locality, the construction technique is the technique which is called "*a wall with pıştuvans* (pışduvans) *or a wall with lacing courses*" – a functional technique based on the experience and accumulation of knowledge for years. In this technique, the examples of which are seen at the Ormana locality in Antalya, the yellowish stone unique to the locality is used as the material, along with juniper for the pışduvans and pine and cedar trees for the lacing courses. The area is poor in terms of lime resources, which entailed the construction of walls as mortar-free. In this case, reinforcement was provided by means of timber lacing courses in order to enhance resistance. In other words, the formation of the technique concerned results from the local conditions. In this system, timber elements called lacing courses are placed on the exterior and interior surfaces of the wall as one in every half meter and the lacing courses are bound with "pışduvans" by notching them to each other as being perpendicular to the wall. The wall width is about 50 to 70 cm (Davulcu, 2015).

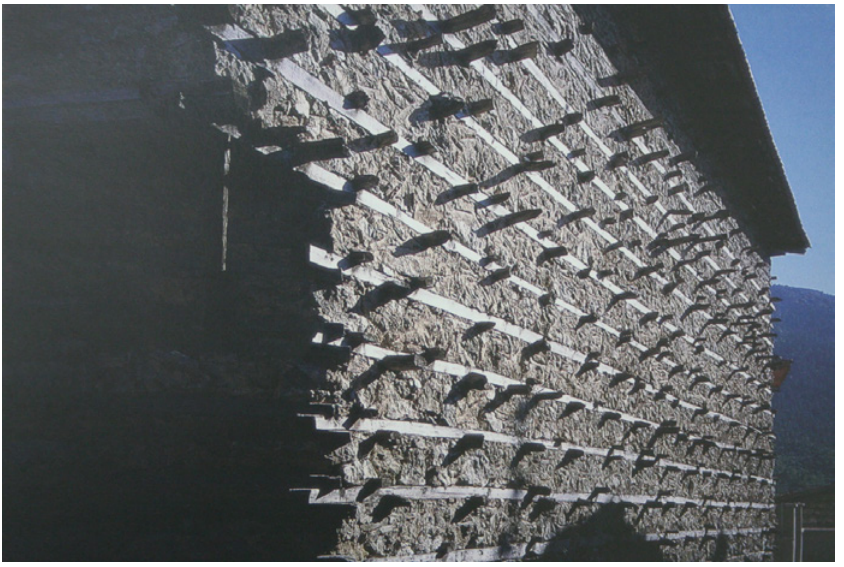

Figure 4. A wall with pıştuvans (pışduvans)- düğmeli ev

Reference: Sözen, 2001, p. 209.

The houses of Erzurum from the Eastern Anatolia Region can be given as another example in the context of stone walls with timber lacing courses. Now that Erzurum frequently experiences earthquakes the stone walls were constructed with timber lacing courses in order to enhance flexibility and durability. It was intended to ensure that the wall remained in balance and that the masonry load was reduced by using the timbers (15x15, 10x10cm) which were passed through the walls, which were called "lacing courses", and whose ends were clamped to each other at the corners of the walls (Gök, Kayserili, 2013; Gündoğdu, 1996).

Along with earthquakes, the lacing courses are also aimed at providing the walls with a binding task and integrity as the foundations rest on a sandy ground (Karpuz, 1984, p. 21). Moreover, when building the exterior walls, the interiors of large ashlars called "cornerstones" were carved and lead was poured into them, thereby making an effort to minimize the risk of collapse during an earthquake (the interview with Ahmet Severoğlu – a Building Master from Gök).

3.1.2. Stone and brick walls

They are examples in which different building materials are used altogether in the wall. Examples in which a material other than the main building material is predominantly used for decorative purposes are also available. For instance, in the houses of Muğla, the walls in which a pattern is created by horizontally placing Turkish-style tile fragments in the joints in the stone wall are called "*tiled walls*" (Aladağ, 1991: 61).

Figure 5. Sample of "tiled walls" – Alanya

Figure 6. Sample of stone and brick walls- Muğla

3.2. Floors

In traditional houses, the floors are generally stone and earthen on the ground floor, at the courtyards, and in the gardens but in the form of timber cladding over the laid beams on the upper floors. Whilst the ceilings of rooms are generally clad with timber in the Turkish houses, it is common to perceive beam laying as the roof in the sofa (hall) space. The timber flooring system which constitutes the ceiling of the downstairs but the floor of the upstairs in two-story houses can be analyzed differently. Especially in buildings with protrusions, the laid beams of the space overflow and carry the load of the projecting lateral surface and its roof. It is seen that the timber beams in question were supported with elements called raking shores (flat) or eli böğründe (curvilinear) from the bottom but that the spaces between the raking shores were closed with lags and rendered in some examples. A striking example in the context of protrusion construction is the technique called "pendentive", which is seen in the houses of Ankara. In this system, the beams rest one on top of the other and a plastic effect is created.

3.3. The Roof

In traditional houses, the roof may be in the form of a flat roof, a sloping roof or a curvilinear roof. In some examples, different sections of the mass of the house contain roof solutions in different styles. For instance, the roof of the higher summer unit with abundant windows is a sloping roof, but the winter unit has a lower ceiling, a solid mass, a masonry system, and a flat roof in the houses of Alanya, where the dominant factor in the formation of a house is the climate.

a) The flat roof

It is a prevalent roof order in the rural section. In some houses, the top of the barn space qualifies as an earthen roof and is at the same time in the form of a space for use which is accessed via the other sections of the house. This space is called a *dambaş* (e.g. the villages of Kula); in addition, it is also seen that the houses with an earthen roof are called *dambaş*s (e.g. Elmalı).

In the houses with a flat roof, thin branches, shrubs and a thick layer of soil are spread over the timber beams. The clayey soil at the top is aimed at preventing the entry of rainwater into the interior space. Additionally, the cylindrical stone, the stone roller, on the roof is used to go to the roof and compact the soil during the rain. Their examples can be seen in Konya, Ankara, Eskişehir, and the rural areas of Konya in Central Anatolia.

The flat earthen roof technique in and around Konya dates back to the Seljuk period (Karpuz, 2001: 123).

In the example in the Ağırnas Village, Kayseri, large *"flagstones"* were paved over the timber beams and they were covered with soil and çorak (salty soil).

b) The sloping roof

In traditional houses, the sloping roof is analyzed as a single-slope roof and generally as a two-or four-slope hipped roof which is also called a span roof. Examples in which the roofs of the houses with a flat roof were converted in time into sloping roofs owing to flowing during the rain or due to the difficulty in compacting the soil by means of a stone roller are also available in this style, apart from the roofs built to be sloping at the construction stage. In traditional houses, the roofs have a timber frame and are generally covered with tiles. Although Turkish-style tiling is particularly common in earlier examples, there are also houses whose roofs were converted into Spanish tiling during the maintenance and renewals in the process.

c) The curvilinear roof

The houses with a domed roof which are seen in Eastern and South-eastern Anatolia can be indicated in the context of such examples. The houses in Harran district of Urfa in South-eastern Anatolia reflect a plan order which includes square units repeated in the honeycomb order. In the houses, the roof of each square unit comprises corbelled domes in a circular order which is gradually reduced in size.

The number of modules ranges from 2 to 12 in every house. The corbelled dome is located on the square units whose edges measure 3 to 4 m on the interior. The houses are formed with the coexistence of almost same-sized spatial units in different ways. An opening or a window qualifying as a vent is available on the domes.

The houses with a corbelled dome are densely available in Syria, while they are seen in Harran and Suruç in South-eastern Anatolia in Turkey. The system concerned is a very appropriate solution for the areas where no timber in adequate size or with adequate resistance to build the roof of the building is available (Akın, 1996: 248-256).

Figure 7. Houses with a corbelled dome

Reference: www.wowturkey.com

The other type of the curvilinear roof is the order which is called a *tüteklikli kubbe* (a dome with a tüteklik) or a *kırlangıç örtü* and whose examples are seen in the houses of Erzurum. In this order, applied in the tandırevi space and in those spaces where no windows will be opened on the lateral sides in the houses concerned, the main timber bearing posts (20x20) are placed to adjoin the main wall after the main walls of the space have been completed and the bearing elements are converted into T-bearing elements by placing a cap called "koçbaşı" at the top of the bearing elements. A square infrastructure is built by putting timber beams which measure 20 by 20 over the T-bearing elements. Later on, the square infrastructure is converted into an octagon and into a square in the next row. There is a window which is opened and closed by means of a rope tied to a pulley in the middle of the kırlangıç örtü, which is gradually reduced in size in nine grades as a square and an octagon, in this order. A different style of the roof in question is the order in which each time the square roof is rotated by 45° and the ceiling ascends by gradually being reduced in size (Karpuz, 1984: 28; Gök & Kayserili, 2013).

Figure 8. A House with a tüteklik

Reference: Karpuz, 1984, p.121.

Although the total timber use is not scarce in this system, which is called "fenerli örtü, tüteklikli örtü or kırlangıç kubbe", the space can be covered with shorter timbers. The requirement of a family for a large-sized space for the harsh and long winter months is solved in this way. The houses with a tüteklik are seen from the Caucasus to the Caspian Sea outside the Anatolian borders. In Eastern Anatolia, the houses with a tüteklik are concentrated in the north-east of the Erzurum-Muş line. Furthermore, they are seen from the south of the mountain range in the north to the north and the west of Lake Van, to the north of the Eastern Taurus Mountains, and in Central Eastern Anatolia and the east of Central Anatolia (Akın, 1996: 248-256).

In the context of the use of a curvilinear roof, except the houses with a corbelled dome and the houses with a tüteklik, houses with vault and dome elements in the downstairs spaces, can be stated.

4. EVALUATION

It might be stated that the construction system of the types of houses which developed in Anatolia in the historical process affected the successive examples in the context of cultural continuity. Besides, the events which influenced the life of settlements affected the construction tradition too. For instance, it is known that such disasters as fires and earthquakes often affect the urban life and lead to substantial destruction of buildings besides serious losses of lives in such big cities as İzmir and İstanbul. While entirely timber houses or masonry houses used to be constructed in İzmir in the past as they were more economical, a different solution was introduced since timber cannot resist fire and masonry cannot resist earthquakes. Because the former led to serious losses during fires and not a single house but the whole street and even the whole neighborhood burnt and were destroyed during the smallest fire and since the latter caused great damage during the earthquakes, houses which were stone (masonry) up to a specific height and which were timber frame houses above it were subsequently applied as the optimum solution. It was also intended to eliminate the great damage during the disasters concerned through

the Ebniye Nizamnameleri (Building Regulations), and the requirement of abiding by some building conditions was set forth.

When the examples of houses constructed with the same material in the Anatolian geography are scrutinized, it is seen that the examples of cubic stone architecture in some coastal Aegean settlements and its examples in Mardin in South-eastern Anatolia reflect a difference. The houses concerned were built with the horizontal and vertical coexistence of cubic masses. Located on the plain area in such settlements as Datça, Bodrum, Dikili, and Çandarlı in the Aegean Region and called "tower houses", its examples took shape for protection against the pirate attacks to come from the sea. On the other hand, the houses of Mardin were constructed to be multi-story without closing the façades of each other and in a style to embrace the land also by using self-existing cave-like spaces located on a sloping land. They reflect an effective appearance in the north-south direction. The houses are perceived as single-story at the uppermost elevation of the street that the building faces.

Construction system			**Examples of the settlements where it is seen**
Masonry	Masonry	stone	Siirt, Kayseri, Mardin
		brick	
		adobe	Konya, Adıyaman
		stone and brick	Muğla, Bergama (İzmir)
	Timber	log	Bartın, Şavşat (Artvin)
Timber Frame	Timber	Infill wall- *hımış*	Safranbolu
		Unfilled wall- *bağdadi*	Mudurnu
Composite	Masonry + timber frame	The construction system which differs in the context of floors	Kula (Manisa), Taraklı (Sakarya),İzmir, Milas
		The construction system which is different in the context of building elements	Aydınlar (Denizli)
		The use of different construction systems in the building mass.	Alanya
	Masonry + carved		Cappadocia
Carved			Güzelyurt

Table 1. Traditional construction system in Anatolia

When the examples in Western Anatolia and the houses of Mardin are compared in the context of cubic stone architecture, it is seen that there is sparser building in the former, while a concentration draws attention in the latter. The standardization of the dimensions of closed and semi-open units and the module order seen in the houses of Mardin are analogous to those in the examples in Western Anatolia.

The borders in the context of the construction technique do not overlap geographical borders or national borders. The analogues of houses with a corbelled dome seen in Urfa (Harran and Suruç), are seen in Syria and Italy, the analogues of houses with a tüteklik in the Caucasus, and the analogues of tower houses, on the Aegean Islands and in Greece. While the examples of houses constructed in composite construction system where downstairs is masonry and upstairs is timber frame, are seen in the Mediterranean, Aegean, Marmara

Regions in Anatolia, very similar examples are located in Balkan countries. The traditional stone houses in Kars, show similarity with the examples in Russia. In this, the fact that in the past the Ottoman Empire borders encompassed these areas, are effective.

Figure 9 – 10. Composite construction system (downstairs is masonry and upstairs is timber frame), first Aegean Region in Anatolia, Manisa – Kula; second Berat – Albania.

Reference: N. Akın, 2001, p. 196 (Figure 10).

However, in the context of examples of the same form produced with different materials in different geographies, the warehouse constructions (serander) that integrate the traditional timber houses in the Black Sea Region and the warehouses in Spain can be stated. In this design aiming to protect the harvest against adverse weather conditions (humidity, etc.), the construction has been raised from the ground with bearing posts.

While in the Black Sea Region in Anatolia the examples are of timber, in Spain they are of stone.

Figure 11. The warehouse construction (serander) - Sürmene

Reference: Batur, Öymen Gür, 2005, p. 25.

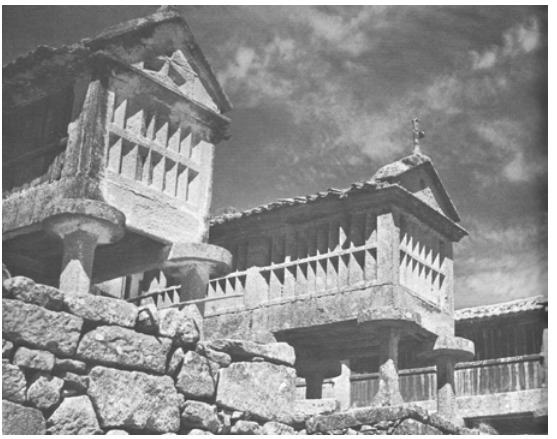

Figure 12. The warehouse construction in Spain

Reference: Rudofsky, 1987, figure 90.

5. CONCLUSION

In conclusion, when the construction system in Anatolian houses is scrutinized, the main factors determining the occurrence of the formation concerned can be stated as follows:

a. The construction tradition which developed in the historical process and which reflects the accumulation of knowledge and experience for years,

b. The use of those materials which are most easily procured from the environment,

c. Whether the settlement is a seismic zone, and

d. Climatic conditions.

It is possible to perceive the outcomes of this reflection in various types of houses. The houses with a corbelled dome are a form of the dome which was constructed in the order of horizontal layers but not with molds in the traditional system due to the unavailability of timber. On the other hand, the houses with a tüteklik (kırlangıç örtü), a type of corbelling technique, are a solution which was found to cover the space with large openings since no sufficiently long timber material was available in spite of the availability of timber materials in the environment. The walls with pişduvans used in the construction technique of düğmeli evler can also be described as a solution forced by the possibilities of the material that could again be procured from the environment. The use of a mortar-free drystone wall owing to the unavailability of lime at the locality entailed the use of lacing courses to make it durable as well as of pişduvans to bind the lacing courses.

To sum up, the real determinant in the resulting construction techniques is the effort to realize the space intended to be created in a durable way by means of the material likely to be procured from the environment. *"The construction methods forced by the material possibilities and unique to the locality"* were developed instead of common construction methods.

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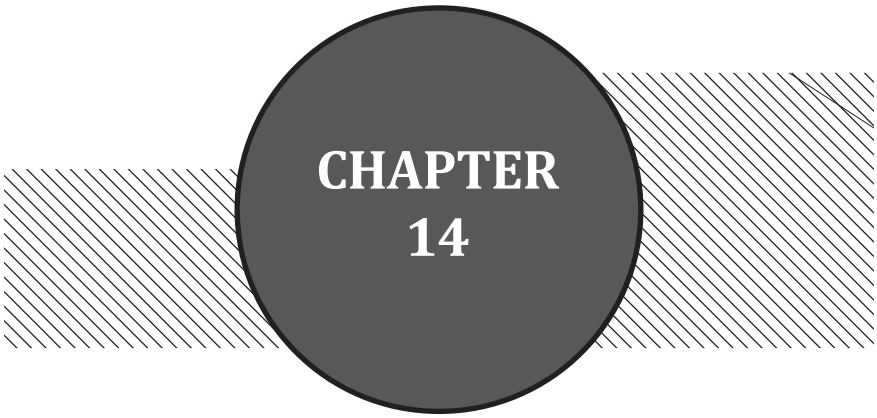
Revision Of Port Areas In Urban Transformation

Özgür ÖZKAN[1]



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INTRODUCTION

Water has been one of the most important elements for the establishment and development of cities from the past to the present. Water, as it also means life itself, also allows the establishment of many equations such as "Water= life, Water= agriculture Water= trade Water= transportation" within the region. The watersides, especially the seasides or the cities near the sea, have become the center of transportation and trade thanks to their ports within the development of history. These port areas have always been the city centers and ever-evolving changing regions. With the development / change of technology and transportation conditions, port areas have always needed to be in a change, and there have been changes in their locations with the purpose of developing capacity conditions after a certain level in many places, and compliance with the conditions of the day. As a result, enormous ports, which are very close or directly related to the water, have turned up unused.

Coastal areas and ports are the areas where urban transformation applications are most frequently observed due to function changes unproductive useage of cities. Coastal area transformations in different developed and developing countries in the world leads to useage of functions and areas of activities such as tourism, culture, trade and service areas.

Since the ports/coastal areas to be reorganized are too large and public resources will not provide sufficient support for these arrangements, reorganization of the ports/coastal areas is also considered as an urban transformation project. As a result of considering these arrangements as urban transformation, the coasts should not only be organized as parks and gardens for usage of public, but as in many different types of buildings, such as touristic and commercial ones. In these urban regeneration projects, it should be a prerequisite that public interests should be taken into consideration, considering the constitution clause indicating that the coasts should be public.

Görgülü (2009) states that the samples produced as an urban transformation project are produced without reference to the architectural and urban identities and that these new spaces should be critical for the alienation of the spirit and space of the city, especially for the compatibility with the human / user requirements and the identity of the cities. The projects that will accommodate many different types of buildings to meet all these needs, and which will open the shores to the public's use, also need to be considered as the main places that construct the identity of the city. When the re-planning of the ports/ coastal regions is considered as an urban transformation site project, the concepts and definitions about urban transformation should also be taken into account; in this case, we can see that the criteria for planning the coast are very similar. Urban transformation has emerged to serve five fundamental purposes. These five main objectives are;

1. Establishing a direct relationship between the physical and social problems of the city,
2. Responding to the need for physical change of many elements of urban texture,
3. Demonstrating a successful economic development approach to increase urban welfare and life quality,
4. Introducing strategies for the most effective useage of urban areas and avoiding unnecessary urban expansion,
5. As a product of social conditions and political forces, meeting the need of to be shaped of the urban areas. (Roberts, 2000)

In the wide and complex panorama of urban transformation, waterfront revitalisation is one of the most interesting phenomena of urban renewal of the last decades, bringing

'cities on water' around the world to a new leadership. In particular, the visual contact with water together with pedestrian paths along the waterfronts and the implementation of waterborne transports, where possible, are giving an added value to these areas, becoming even more interesting in terms of Real Estate. Now spread out and developed at a global dimensions, involving both, big cities but also medium and smallscale cities at all latitudes and in all continents, waterfront regeneration is in many cases the starting point for the regeneration of the city itself and of its relocation in the international context. Under this point of view, marine, port and fluvial cities can be considered laboratories for the process of urban renewal in terms of residential, transports, public spaces and quality of the environment, in view of both, the broad range of cases and the quality of the results. (Giovanazzi; Moratti, 2010)

This study aims to represent how the concept of conservation, renewal, revitalization and development of the area is handled in practice and in all application processes within the framework of spatial planning and structural understanding of urban coastal areas in Turkey comparatively through examples such as London, Barcelona, Marseille, Genova, Hafen-Hamburg, Rotterdam in Europe and Golden Horn coasts and Haliçport, Galataport, Haydarpaşa and İzmir ports.

All coastal areas examined in the study have similar qualifications. Many common points and their unique differences can be summarized in terms of being a coastal city, having a city center port, allowing cruise port projects, having a historical texture, their location in the region, functions as a logistic center and the use of coastal areas.

Change / Transformation / Interaction of the Coasts and Harbors

The coasts on the point of intersection of the water play a very active role in the development and formation of cities, from the first ages until the beginning of the urbanization. Defense, transportation and economic activities provided by water, which are very effective factors in the establishment of the city; have been effective in urban-coastal relations and formation, development and useage of the city and coast.

Throughout history, coasts have always been a priority in the areas for being selected as a settlement, the development of urbanization, the settlement of industry, and the useage as a social life area. In line with the importance of water, the coasts provided social, economic, aesthetic and rescional opportunities. These opportunities have always had a positive impact on coastal cities. (Erkmen, 2015)

The relations between the city and its coast, which have been in constant interaction since its establishment, have been intermittently interrupted in the process due to various dynamics and have been discharged by the process of industrialization. With the developing technology and new economic policies, the decentralization of the industry from the coastal zones has created an opportunity for the restoration of the urban-coastal relations that have been broken along with new problems. Therefore, the urban-coastal relationship is considered as a starting point in the redevelopment of urban coastal areas. (Kılıç,1999).

In the early stages of the Industrial Revolution, the coasts were almost exclusively used for the transport, stocking and trade of various goods. Later on, with the technology is developed, passenger cars and airplanes became widespread, the cities have strayed from the coast. In the same period, the importance of the coasts and the opportunities that can be provided are begun to be understood; Europe and America have been pioneers in the revitalization of coastal areas. These two continents began to revive the Industrial Era's weathered and degraded shores in the 1970s. The revitalization, evaluation and development of urban shores reflected many positive results to the cities. The coasts, which are important areas for the city, are the sensitive areas which should be studied

diligently due to its sensivity and in terms of seeing the value they deserve.

In general terms the reasons for preparing the coastal transformation can be summarized in six articles:

1. Problems due to the capacity needs of port regions,
2. The port has completed its economic development:
3. Transportation and accessibility problems in the port area:
4. Inadequacy of the port area in the technological infrastructure and development processes in maritime and shipping activities:
5. Reduction of labor force and employment in the port area:
6. Inadequacy of public open spaces, recreation and parking areas in the city and increasing needs: (Koca, 2011)

The port cities, which are the center of modernization and change, have served as the economic channel for the cities in other regions with their post-areas and commercial networks, and become the doors of the inner regions to the world.

View of the port city as a site of cultural exchange where people from different parts of the world met, mixed and influenced one another. The shore-inland opposition has played a dominant role in the social organization of space, power and culture around the World (Braudel, 1976). The port town as a settlement form has received only scant attention in the humanities and social sciences. (Driessen, 2005)

The common features of the port cities are their relations with water, and this geographical feature causes them to develop and characterize differently from other cities. When the development of big cities in history is examined, it is seen that the cities which have coastal transportation and sea transportation are enriched with trade and became ecenomically powerful. With its strategic, geoeconomic and geopolitical features, the port cities have become the most important trade and production centers of the countries in every period.(Nemlioğlu Koca, 2017)

The rupture of the cities' relations with water has damaged the important features of urban design. This situation has led to significant changes in the location of ports in the sea trade since the 1950s, especially with the use of containers. Containers required increased trade speed, increased load carrying and fast lowering, as well as expanding ports and transporting them to water edges outside the city (Hall, 1993). Another reason for the relocation of ports in this period is the development of highways and the choice of industrial and commercial organizations located in the city centers in the city walls and start of the decentralization process. The abandonment of the traditional ports and water edges in the city centers to the outer walls of the city has given rise to new opportunities in the life of the cities. Hoyle stated that the withdrawal of the industrial function from the coastal zone has created a spatial and functional space, revealing an offshore threshold phenomenon that is the original land-water interface zone and a race for the redevelopment of the most advantageous positions of the coastal areas had started and that this situation represented the feature called "return to shore".(Hoyle, 1988)

Port cities such as Istanbul, London, Barcelona, Genoa, Hafen, Rotterdam and Marseilles are agglomerations where land use is very intense and dense regional, national and international communication networks are coming together.(Driessen, 2005)

It is no coincidence that almost all major cities are located on the shore when considered on a world scale. (Erdoğan, 2006)

The waterfront revitalization which emerged firstly the main industrial cities and then has became Waterfront revitalization can be defined as the transformation of urban lands, confronted decay and decline due to the retreat period of the industry from

downtown waterfronts, in terms of economical, ecological, social, spatial, cultural aspects by bringing new functions to be able to become a part of the city again. That is, waterfront revitalization is basically the process of re-producing the social and physical relationship between the water and the city, which had been traditionally existed but then interrupted by industrial uses for a long time, as a way of being renewed by the necessities of the era. (Erkmen, 2015)

The waterfront should not be simply considered as a line, but should be more correctly envisaged as a network of places, functions, additions and hinges between the coast and the city, between the port and urban activities. The waterfront has to be imagined as a concentration of functions that can be productive, cultural, relational, recreational, residential and public. It is not a closed and protective area, but an osmotic interface, with a permeable perimeter. A waterfront can not be considered as a local hub, but more correctly as a crossroad of infrastructural strips on sea and land that run across, that nourish it: the core of an increasingly planetary network of relational energies. (Carta 2006).

Urban waterfronts are, therefore, dense and hybrid places where resources, opportunities, aspirations and ambitions held by the city could become vision, strategy and project, capable of generating a new urban form and producing a new landscape to make cities more vital, communicative and competitive. The planning, development and revitalisation of waterfront areas represent a multidisciplinary and multitask issue, that have to account for the economic, social and cultural development of the community all-together and have to respect, on the other hand, the historical, social and urban conditions of the waterfront. Waterfront areas should therefore considered part of the cultural and natural heritage of the communities. Several regions in Europe and all over the world have undergone interesting urban-port conversion processes and urban waterfront transformation projects in recent years. (Giovinazzi, 2008)

The transformation of port cities and urban waterfronts has aimed to recreate a relationship between spaces, uses and visions, between urban image and economic development. The transformation has been achieved developing and implementing specific territorial approaches, tools, and funding strategies and by promoting the dialogue between all the parties involved. In Europe several important cities have focused on the waterfront development as a strategy to pull ahead their urban and territorial development. All over Europe, the importance of the relationship between city and port is emerging, as well, in small and medium urban realities. These realities, are choosing to delocalise industrial and commercial activities into areas outside the city centre, reclaiming the port and waterfront spaces and structures for the city and for the creation of public spaces, recreational areas, hospitality. (Giovinazzi, 2008)

In the context of the initiatives for the Global Conference on the Urban Future (URBAN 21) held in Berlin in July 2000 and in the course of the EXPO 2000 World Exhibition, 10 Principles for a Sustainable Development of Urban Waterfront Areas were approved. These topics have been previously developed by Wasserstadt GmbH (URL 1) a trustee development agency of the federal state of Berlin in collaboration with the International Centre Cities on Water, Venice, in the course of international seminars attended by local administrators, public and private entrepreneurs, university professors and scholars of the processes to re-qualify urban waterfronts.

1. Secure the quality of water and the environment
2. Waterfronts are part of the existing urban fabric
3. The historic identity gives character
4. Mixed use is a priority

5. Public access is a prerequisite
6. Planning in public private partnerships speeds the process
7. Public participation is an element of sustainability
8. Waterfronts are long term projects
9. Re-vitalization is an ongoing process
10. Waterfronts profit from international networking(Giovinazzi, 2008)

Coastal areas are one of the most common areas of application for renovation and transformation projects. The reconstruction and restoration of the port and industrial zones, which have been destroyed, disinfected or abandoned in large areas, are among the studies of the reorganization of the coastal area. As it is observed in the current examples, these areas, which are mostly located in the city center, are historical and environmentally valuable areas. As a result of the changing geographic and socio-economic conditions as well as the developing technology, the port areas located in the center of the coastal cities have started to move out of the city mainly due to the need for space. As a result, empty areas have emerged on the coasts which are the most valuable areas of urban centers. Even though these areas, which are often idle, appear to be a threat to the city, they are turned into opportunities thanks to their potential. (Erdoğan, 2006)

Until today, with the numerous projects produced worldwide, many cities have used this great chance to reclaim access to the waterfront, taking into account the rethinking of the role and arrangement of the entire urban area surrounded by the "waterfront" and have developed strategies, plans and projects to determine how best to reintegrate the coast into the city.

The phenomenon of re-development of coastal areas, which Millspaugh (2001) expressed as "the back door of society", with diversified uses (housing, recreation, office, tourism, etc.) is considered as "the cornerstones of local economic development in western cities" by Feldman.

The phenomenon of coastal resuscitation, which can be defined as the transformation of the port, shipyard and industrial functions on the shore in urban centers by introducing new functions in order to make the coastal regions that are emptied again as a part of the city, has become a significant global trend in all coastal cities with the influence of successful leading examples.

Restored Port Areas in the World

The old ports, which are the most central coastal points of the cities to be reorganized, have been dealt with in the world for a long time with serious studies and successful results are obtained. It aims to transform the old industrial coastal zone into the city's technology and innovation zone in the new coastal / port planning and increase the residential and entertainment areas. The process of "deindustrialization" following the process of industrialization worldwide also brought the need to use large area uses that serve directly to industry and trade functions for different functions.

Within the context of the great transformations that have taken place in recent decades, special attention must be reserved for the great temporary events underlying some of the most interesting cases of waterfront redevelopment. In the international context, these great events and their long-term effects have turned several cities on water into the unquestionable protagonists of the most recent urban affairs. Access to considerable and exceptional funding and resources, clear-cut construction schedules and extraordinary opportunities made it possible to transform temporary events into long-lasting and usable acquisitions.(Giovanazzi; Moretti, 2010)

In the process of reforming the old port areas around the world, three main objectives have been identified as; connection of the port area to the city, providing various activities, especially recreational activities in the port area and reuse of the area without losing the character of the port area.

The examples selected for the review of the transformation of coastal areas are the coastal cities which are generally important in the city and are transformed from the change of function and aiming to increase urban quality.

London

The former port area of London, known as "Docklands", is the largest urban renewal area in the world. The changes on the banks of the Thames are the result of the economic, political and social changes that Britain has experienced since the 1970's (Basatemür, 2001). When the harbor ponds (royal docks) were abandoned after the establishment of more modern facilities in Tilbury in the late 1970's, a strategic plan was developed by the government of the time to give priority to local municipalities in order to renew the economic and social life together with the physical environment. In the region where 80% of the total area belongs to public institutions, when the targeted level of improvement could not be achieved, private institutions - urban development institutions - have been started to be created in order to attract private sector and investments. The London Docklands Development Corporation (LDDC) has attracted investment in these areas as the owner of public areas in Docklands between 1981 and 1998.(Ulushan, 2004)

LDDC provided the necessary infrastructure works to attract the private sector, expropriation of the land and making it ready for development with cleaning it. The strategic plan produced ideas that considered the relationship between the old and the new; In the areas where historical buildings are located, buildings have been redeveloped by giving their functions back. The advantages of the redeveloped areas, along with the ten-year tax exemption, detailed planning and free planning approach, are as following;

- Responding quickly to developments based on economic revitalization,
- Approaches that allow for clearly defined management objectives such as project formation and costs.,
- Avoiding long and non-productive researchs,
- -Out of policy- compounds and long design requirements,
- Focusing on practical short-term interventions. (Shaw, 1993)

Docklands, which runs from Tower Bridge along the River Thames, is divided into four development zones: Wapping, Isle of Dogs, Royal Docks and Surrey Docks. On the banks of the River Thames, there are many different functions such as residential houses, international high-tech buildings, high-rise office buildings, hotels, shopping areas and theaters. Different functions of development areas divided into four as; Wapping: Office, hotel; tourist areas, residential, shopping mall, Isle of Dogs: commercial area, office, shopping mall, entertainment areas, Royal Docks: Stadium and art center, and Surrey Docks itself. The urban transformation in London includes the city center, the shipyards, the re-functioning of existing warehouses, the creation of cultural functions at the center and the introduction of the marina function. This transformation was carried out in the city center and in the surrounding regions. (Koca, 2011)

Figure 1-2. London Dosklands before – after (URL 2)

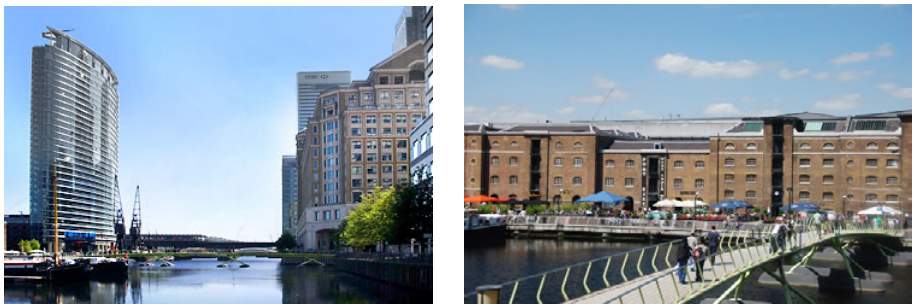


Figure 3-4. London Docklands (URL 3)

The main objective for the redevelopment of the Docklands Project, which has an urban scale; physical, social and economic problems as well as transportation and infrastructure problems at docklands. In this way, it is aimed to make the area -that is disconnected with the city- into a living area.

The Docklands Project has received a lot of criticism on a number of issues, such as limiting social goals, prioritizing economic targets and intense construction. Nevertheless, the urban appearance created by the rebuilt historic buildings and new buildings has succeeded in bringing it back to this region.

The transformation project of London's ports region is one of the most important examples of the last fifty years. A good management scheme and a clear definition of the task behind the success of the project have been effective.

Barcelona

As a result of the changes in transportation and cargo loading technologies, the hinterland of the Port of Barcelona has seen improvements in the growth of industry and trade. As in many port cities, need for space has occured to meet new needs. The port has played a key role in the development of the city of Barcelona and the port has expanded to the south and has developed towards the old region close to the historic city center (Rodrigez ve Sastre, 1993).

The fact that the Olympic Games in 1992 will be held in Barcelona has supported the work to create a new and dynamic European city in the coastal area by using the relationship with water and the water itself. It was the focal point of the coastal area is turning back its development in the opposite direction before the 1980s and returning it to the port direction after the 1980s. Meeting of the city with the shore was aimed

not only during the games but also afterwards. (Rodrigez ve Sastre, 1993). As a result, in the redevelopment of the coastal area in Barcelona, the development in the field of transportation and tourism and the organization of the Olympic games in the city played a role together.

Port Vell is located between Barcelona Quay and Catuluna Quay. Within the scope of the Olympic Games, it was aimed to provide activities such as sailing and other water sports, as well as functions to support all sports activities. (Erdoğan, 2006)

Figure 5-6 Barcelona Port Velle (URL 4 – URL 5)

The Urban Development Corporation, Port 2000, was first established by the Autonomous Port of Barcelona (Barcelona Port Authority) to meet the planned needs in the project and to successfully complete the redevelopment of the port area. Secondly, a city development plan has been prepared for the implementation which requires individual work in the success of the project.

The new plans aim to transform the old industrial coastal zone into a city of technology and innovation and to increase the residential and entertainment areas. In this process, the port area lost its importance in the case of Barcelona, the port area was abandoned and an important opportunity for re-evaluation of the coastal area emerged spontaneously.

Another refurbishment project in the Poblenou region, which is located in the northeast of Barcelona and was decided to be renovated before the Olympics, consists of the Diagonal Mar, the Besòs area and the Poblenou area, which are on the agenda due to the organization of the Universal Forum of Cultures 2004. The project played an important role in the transformation of urban texture. 1888 and 1929 International Exhibitions, 1952 Eucharistic Congress, 1992 Olympic Games and 2004 Universal Forum have important roles in the realization of the project. Barcelona, a coastal city, turned its back to the sea after the 1980s and re-directed towards the sea with the 1992 Olympics. (Gören, 2011)

Although Poblenou has broken off from the sea with its railways and industrial buildings, the marina was built along with the design of the Olympic Village and the coasts were organized. With this change, as an ex-industrial zone, Poblenou's potential, is recognized for the first time in the business and residential areas. Within the scope of Diagonal Mar project, important infrastructure systems such as wastewater treatment plant, solid waste classification / recycling plant and thermal power station have been renovated. (URL6).

After the industrial structures shifted out of the city, the General Metropolitan Plan was prepared for the re-functioning of Poblenou and a new sub-region named 22 @ in the region, previously referred to as mixed-use, has been defined in the region previously called industrial zone 22a. Structuring on information and communication technologies has taken place in the project @ 22. More than one million square meters of industrial space; it has become a central area with residential buildings, parks and public facilities. (Gören, 2011)

In the proposal of 22 urban projects designed by the Barcelona City Council, a mixed-function zone consisting of residences, modern industrial buildings, offices, shops and hotels is considered. The urban and economic transformation of Poblenou was carried out by a newly established company. In this context, the company; has been responsible for the planning, development, design, construction and management of infrastructure, urban services and public spaces as well as the national and international development of these industrial production areas (URL7).

Marseilles

In Marseilles consultation and dialogue, on both the political and technical level, were accompanied by moments of reflection and constructive debate; the urban regeneration of the port area took place with the involvement of the community in diversified actions and a process that questioned and carefully assessed possible scenarios of strategic development, to define and implement a common project to bridge the gap between the city and the sea. (Giovanazzi; Moretti, 2010)


Figure 7-8. Marseille Port Global (URL 8 – URL 9)

The port of Marseilles is characterized by the fragmentation of its spaces across a metropolitan reality in which the city and the port appear clearly divided because of a process of specialization of the productive and commercial spaces that excluded the city centre with its constant and disorderly growth. In the 1980's the idea emerged for a new urban centrality recomposed around the ancient port basins between the Joliette and the Estache, but the relationship between the city and the port, between urban architecture and port development, appeared rather complex. With the objective of justifying and supporting a strategy to reconvert the port waterfront and to build a technological hub complete with university, research laboratories and advanced tertiary activities, the city sustains the presence of abandoned port spaces and rundown warehouses to be renovated, in total contrast with the opinion of the Autonomous Port; in the debate between city and port the community of Marseilles remains attached to the idea of a port city where the port blends with the city center and the suburban area with indefinite limits. An anticipation of the Euromediterranée project was the Schéma de Cohérence Marseille 2015, published in 1997, the Plan Directeur and the Marseille Port Global project, which the Autonomous Port began to work on the following year, at a time when the port and city seemed to have reached an agreement, established common strategies, shared issues and solutions. The Euroméditerranée project represents a great opportunity for regenerating and 'stitching together' a strategic bond between port space and public space along the waterfront, and for the ambition to create a "coexistence" between an active port and an inhabited city preserving its historic and cultural resources and its identity as a port. The planning process, divided into a series of public or privatebased initiatives, concerned several different regional areas, each of which acquired a specific role within the overall vision: the new advanced tertiary hub at the Joliette, the office district and multimodal hub at Saint-Charles Porte d'Aix, the cultural complex of Belle-de-Mai, the Cité de la Mediterranée

with the museum and the training center, the hub dedicated to the sea, the new maritime station, the tourist and cultural structures, the businesses and offices, the green spaces and the public spaces. (Giovanazzi; Moretti, 2010)

Cenova

In the center of the multi-centered city of Genoa, there is a historical center with a direct connection to the port in the middle of the urban area. The center of the nineteenth-century industrial city, with its long history, strong public sector and the busiest port of the Mediterranean in terms of passenger-cargo traffic, is located outside the old (historical) core. (Koca, 2011)

Genoa, a port city overlooking 33 km of coastline has long pursued the ambition of becoming a great international port, but has had to contend with several problems concerning the morphology of the land, the infrastructure system and a complex relationship with the inner urban fabric. This is the context surrounding the process of urban regeneration regarding the Dock and the Ancient Port in particular, whose purpose is to recreate the bond between the historic city centre of Genoa and the port. The concession of the port spaces in question has belonged since 1995 to the Società Porto Antico, whose shares are owned by the City, by the Chamber of Commerce and by the Port Authority. Its objective is to return the areas to the city with the organization of cultural initiatives, the development of a convention industry, the construction of general-interest structures to create a center of tourist attraction. (Giovanazzi; Moratti, 2010)

In 1992 the Ancient Port was the venue for the celebrations in honor of Christopher Columbus and for an exhibition in the port area where many activities still take place: on that occasion the City Administration and the Port Authority collaborated to build several projects in the area between the Old Wharf and Ponte Spinala; a series of projects by architect Renzo Piano served to create the Piazza delle Feste, to restore the Cotton Warehouses which were transformed into a convention center, to build the largest aquarium in Europe and the Bigo that supports the panoramic elevator. Other projects followed in the years after the event: the construction of a multipurpose complex, of a new venue for the Faculty of Economics and Trade in the Scio district, underground parking and public spaces that complete the seaside promenade in 2000. (Giovanazzi; Moretti, 2010)

With the concept of physically and functionally relating the historic city center to the water, during the G8 in 2001, more projects are brought to term: the tourist port, a movie theatre complex, the Museum of the Antarctic, the City of Children and the Biosphere. In 2004 Genoa became the European Capital of Culture, an event that brought new opportunities for the revitalization of the historic city centre near the port area (Via San Lorenzo, Via Garibaldi, etc.) and the construction of the Museum of the Sea and Navigation designed by architect Guillermo Vasquez Consuegra in the spaces of the Galata port warehouse. The renovation of the Ancient Port in coming years will include the construction on the Ponte Parodi – a port wharf located between the Darsena and the Aquarium where a grain silo had stood through 2002 – of an international center with high-impact architecture, cultural and recreational activities at the service of the city and a new cruise ship terminal. The structure, which will become a new "city square on the water" was designed by the firm Van Berkel & Bos for an international competition launched in 2001. (Giovanazzi; Moratti, 2010)


Figure 9-10. Genoa Port (URL 10 – URL 11)

A possible long-term scenario for the future of the port and the city was recently hypothesized by Renzo Piano's Affresco, divided into three different phases of transformation over a period of 18 years for the 200-hectare area which the Port Masterplan attributes to the city. Uninterrupted development along 8 km of coastline, the construction of two artificial islands connected to the mainland by underground tunnels to host the new airport and shipyards, the renovation of the promenade along the urban waterfront from the Darsena to Boccadasse, the creation of three new urban parks. (Giovanazzi; Moretti, 2010)

The Genoa Port Area is not only used as a passenger and cargo port, it has been developed as a public space with a multifunctional - mixed use and integrated into the historic city as a national - international center of attraction. The harmonious and successful blending of the Genoa Cruise Port terminal with the old port and the city center will be an important starting point for the transformation of the port areas and the rethinking of the concept of public space in the coastal areas.

Regulated / Planned Port Areas From Turkey

Innovation based urban transformation is a category of urban transformation that is used in the renewal of existing areas such as abandoned ports and industrial areas with economic and functional potential. Reconstruction, redevelopment and restructuring are the methods used in this urban transformation. (Zeren Gülersoy and Gürler, 2011).

The port, shipyard, coastal lands that are idle due to the withdrawal of industrial functions from urban centers; economic, social, environmental, spatial, urban re-open in order to become a part of the imaginary, this phenomenon can be defined as the process of converting imparting new functions compared to the world experience a new urban agenda for Turkey. (Erkmen, 2015) Turkey, has lost the function of the new initiatives in the revitalization of urban coastal areas has been realized for the first time in 1980; However, despite the fact that it was in the 2010s, Istanbul coasts, which is the most developed city of our country, is still not being revitalized enough.

The Golden Horn Environmental Protection Project is the oldest of all the transformation projects. The first steps were taken in 1984 by IBB and ISKI for the purpose of cleaning the Golden Horn (Baycan, 2003). Today, the Galata Quay section of the Istanbul Port serves cruise ships, and the Pazarpazarı Quay section will also serve as the same if the contract is completed. In addition, in the Haydarpasa port, which is still in use, but is suffering from the fact that it is now in the city, renewal and re-evaluation projects are frequently on the agenda and await the order for implementation.

Haliç Coasts and Haliçport Project

Haliç coastal areas have many functions and social structure within the historical process. The functions of the Golden Horn's relationship with the city continued until the 19th century. From the 19th century on, the relationship of the city with water showed a different development. Industrialization and modern urban plans have led to changes in coastal functions (Gören, 2011).

The fact that historical factories are not operated efficiently, they are technically inadequate, they are closed for various reasons like polluting the city or they lose their function is a worldwide situation. (Föhl, 1995; Köksal&Ahunbay, 2006) Industrial facilities that contribute to the economic development of countries can be reconsidered as traces of industrial history, for use in the city and in the public interest. (Köksal&Ahunbay, 2006)

In the period up to the second half of the 20th century, some suggestions and plans were developed by the world's important planning experts in the development of the estuary There are basically two plans that determine the future of the Golden Horn. The first one is the Prost Plan. With this plan, the Golden Horn has lost its historical identity and has been completely transformed into an industrial area. The second is the Haliç Expropriation Plan, which was built in 1985. With this plan, the Golden Horn is intended to be restored to its former identity. (Gören, 2011) In the 2000s, point transformation projects came to the forefront. With these projects, cultural and educational oriented transformations of the functions of the industrial heritage have been realised.

Transformation for the Golden Horn is evolving with the idea of decontamination and the valley of the Golden HornBy changing the functions of industrial structures, congress center, cultural activity areas and bianel areas are formed.

The project, which transformed the former Cibali Tobacco and Cigarette Factory to Kadir Has University Central Campus, was awarded in the category of lay Architectural Heritage in 2003 and it was stated by European Union European Nostra Award Program in Munich on June 4, 2004 that this project was important in reviving the historical environment where the building was located. (URL 12).

Lengerhane which was established between 1703-1730 is used as an industrial museum today. It was restored between 1991 and 1994 by the initiative of Rahmi Koç Museum and Culture Foundation and turned into a cultural facility on the shore of the Golden Horn. This transformation of industrial heritage has been one of the first steps towards the development of an important cultural axis of the Golden Horn coast. (Gören, 2011) Due to the inadequacy of the Lengerhane building to exhibit museum collections; Hasköy Shipyard, located opposite the Lengerhane building, has also been converted into a museum. The shipyard and its buildings have been restored to the original, and the historic skids and cataracts have been restored.

The large workshop building is important because it is one of the first industrial buildings built as prefabricated. In 1998, the restoration of the factory started with the intervention of Istanbul Metropolitan Municipality. The restored building was used as a cultural center for the first time as an exhibition and exhibition center during the 3rd International Istanbul Biennial. Today, Feshane International Exhibition Congress and Cultural Center building, includes exhibition and concert hall, restaurants, meeting rooms, shopping centers, entertainment areas, such as many sections, and is one of the largest active culture around the Golden Horn.

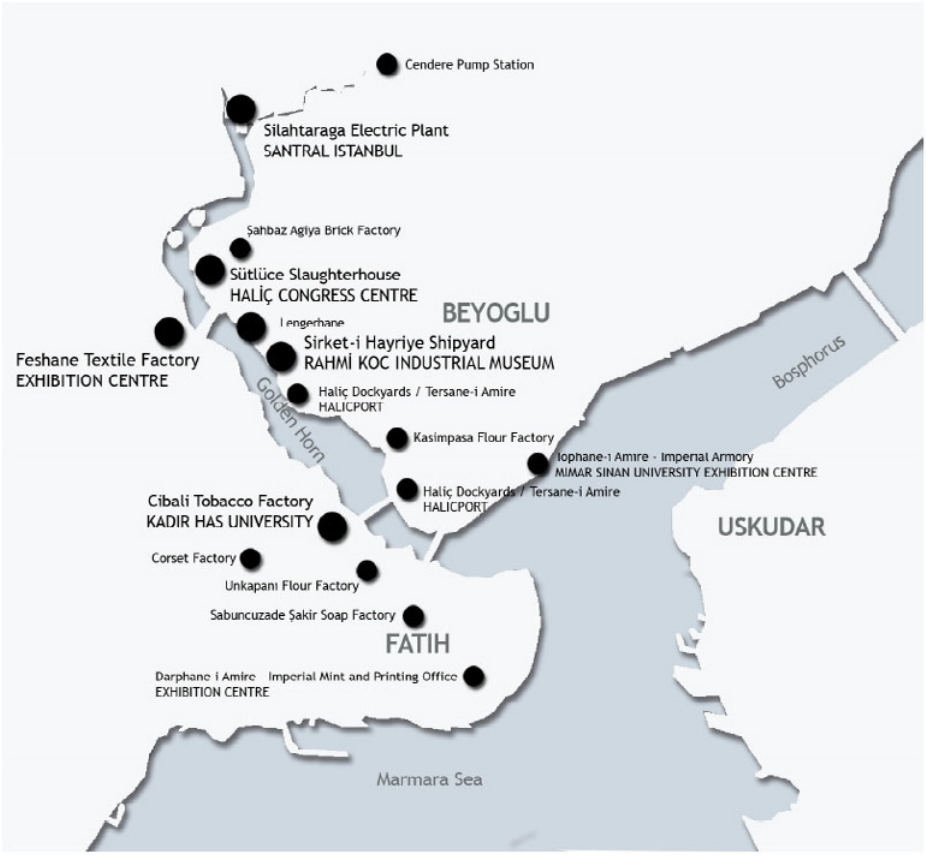


Figure 11. Industrial Heritage of Goldenhorn (Günay, 2014)

Miniatürk, which was built by IBB between Sütlüce and Sunnet Bridge on the north side of the Golden Horn, is one of the important projects that will contribute to tourism and education in the region. (Gören, 2011). In the park, the works carried from various cultures and civilizations to the present day are reduced by 1/25. The models of the historical and cultural structures exhibited in the exhibition allow us to know the places where real structures are located and to have information about their history.

Figüre 12 – 13. Bilgi Univesity – Halic Congress Center (URL 13 – URL 14)

In May 2004, the plant was given to Istanbul Bilgi University to be converted into a museum by the Ministry of Energy and Natural Resources. With the name "Santral İstanbul", modern art works are exhibited in the building. Including Contemporary Art Museum, Energy Museum, International Residence Program, Library and Information

Center, European Art Street, International Cultural Network and NGO Center, Training Programs and Urban Transformation units, concert halls, open air amphitheater, café-restaurant and recreation areas. (URL 15).

Figure 14. Feshane International Fair, Congress and Cultural Center (URL 16)

The Sütlüce Culture and Arts Center, which is planned to be the largest cultural center of Europe, is now operating under the name of Haliç Congress CenterThere are multi-purpose cultural places in the building constructed with the restoration of the old buildings. (Gören, 2011) In the cultural center; there are concert and congress hall, theater hall and auditorium, cinema hall, entrance and exhibition halls, museums, outdoor theater, exhibition and meeting room, berth, sightseeing and rest areas, cafes and sales units.

In the Golden Horn coastal area, with the preservation of the industrial heritage, the cultural significance of the city and the quality of life are improved.

Galataport

Today, the Port of Istanbul, which consists of Galata Quay and Salıpazarı Quay, has been an important port area until the 16th century. This port area has been continuously renovated for ever-changing needs throughout historyThe process of coming to the present state of the port area is based on the quay facilities built between 1892-1895 to provide better facilities for the port.

As a result of the socio-economic and geographic changes experienced with the development of technology, cities started to be affected by the process started with the relocation of the port areas, which is a part of transportation. Since the 1950's, a solution has been sought after the coastal areas, which are considered to be the most valuable areas in the city, have become increasingly collapsed areas. Projects have been developed to address the problems of the areas that are valuable for the city. The majority of projects can be defined as mixed-use redevelopment works. (Erdoğan, 2006)

The disputed process from the early 2000s on the transformation of the idle cargo and passenger port area on the shores of Tophane, Salipazari and Fındıklı; has been started by development for the coastal section from Karaköy until Armory Square, the planned operational transformation projects, the ownership field Turkey Maritime Organization (TDI) with open tender procedure granting a private company. Tabanlıoğlu, who is the author of the project known as Galataport in the public opinion, prepared the Master Plan in line with the requirements; five of which are two important historical monuments in the project area that hosts ten important structures, cruise port and tourism complex and

around the shopping, entertainment centers, hotels and housing areas have stated that they foresee to be built. Tabanlıoğlu, stated that they bring functions as hotels, restaurants, bars, shopping and touristic shops, office floors, exhibition and fairgrounds, museums, car parks, etc. can be enjoyed by the residents and tourists of the city every day of the year. to provide commercial income. (Tabanlıoğlu, 2004)

Figure 15-16. Galataport Project (URL 17 – URL 18)

As the demand for residential areas in the old city center, which began in the 2000's, increased, the regions in question were rediscovered. The buildings which have historical value by the investors are restored and turned into quality houses and especially address the upper income group. It can be said that the difference between the day and night population, which is one of the biggest problems in providing security in the areas where work areas are located, is gradually decreasing. Thanks to the support of local administrations, the region has begun to gain its former reputation and vitality again thanks to non-governmental organizations and private entrepreneurs.

Due to the fact that the Galataport region is located in one of the most important areas of the city, the hinterland of the project does not take any share of the developments. (Erdoğan, 2006)

In the project, the project was supported with the support of accommodation services such as exhibition-exhibition areas, shopping centers, culture and art centers, as well as areas where local people could use it daily.

Outline of the project are;

- With the complete lifting of the existing cargo port functions, the passenger ships from cruiser ships will be transported to Istanbul to provide a contemporary port of cruisers, Tourism and Trade Complex,
- Giving positive image of Turkey in this region in the nature of the main entrance of tourists coming from abroad,
- The historical Tophane Square is revitalized, with the emergence of strong cultural and artistic activities as well as the establishment of strong connections with the environment and the sea,
- Strengthening links with social, commercial and cultural centers within Istanbul,
- It should be considered as a pilot region within the scope of Beyoğlu Kent Tourism Project, establishing the integrity of Beyoğlu and its pedestrian axis as well as its integrity with Beyoğlu and its surroundings,
- Due to its location, it is necessary to prepare the architectural works especially from the Historic Peninsula without disturbing the Istanbul skyline,
- It should be restored in the scope of the project by making a change of function in the buildings which were registered in Karaköy region and in 2001 as a 2nd degree historical building,
- New functions brought to the region as a result of new culture, art, business and

shopping center in Istanbul,

- It can serve not only to the tourists who are not in a region to be used by local people, but also to increase tourism revenues,
- Within the scope of the project, employment in the region should be increased,
- Ensuring that the region is living at night within the scope of the project is determined as an attempt to eliminate the day-night population difference (Tabanlıoğlu, 2003).

Much discussion about the Galataport Project stems from the concerns that the region will lose its historical value and importance, and that the boundaries of the project cover only the port area, so that the Kemeraltı and Galata regions cannot be integrated into the design and that the tenderer will not be opened to the public in the event of a monopoly. In addition, the coast of Karaköy, due to the large ships anchored in the harbor can not be opened to the perspective of the sea, the city and the city will not be re-created without a concern. (Erbaş, 2007)

When the general structure of the project is examined, TDİ Head Office Building, Çinili Han, Passenger Terminal and the number 20 and 1 warehouse building are re-functionalized as hotels. It is recommended that the Package Post Office and the number 2 warehouse serve as shops and restaurants, warehouses numbered 3 and 7 as commercial and office and antique warehouses as cruise terminals. According to the EIA report, it is stated that half of the project area is open to the public. This public open space is a consists of a square, acoastal promenade, walkways and green areas. (Demirkan, 2014).

Haydarpaşa Harbour

With the law dated July 24, 2008, the World Trade Center and Cruise Port functions were introduced in all areas including Haydarpaşa Port and Haydarpaşa Station, and the Privatization Administration was authorized for the construction of facilities such as ahotel, a mega marina, a marina, etc.. (Özden, 2010)

Today, the area known as Haydarpasa is composed of public institutions and it is not possible to define the borders due to the fact that there is very little use of housing here and it is a quite late settled area according to the history of Istanbul. (Koca, 2011). Outside of the garage and customs area, Haydarpaşa port and its transformation projects covering a large area of approximately 100 hectares, including important historical buildings such as the Selimiye Barracks.

Istanbul Metropolitan Municipality, "Kadıköy Square Haydarpaşa-Harem Urban Design Project Competition", which was orginized by the Istanbul Metropolitan Municipality, was held in 2000.

The main aim of the project is the regeneration of the container port in Haydarpaşa to be a centre of recreation, tourism, business and culture, which will serve 3 million people in its hinterland. In this regeneration project, special attention has been given that the coast remains accessible to public, the buildings designed do not form a wall between the city and the sea and that the overall project protects the historical, cultural and natural site values of the project area and city"s authentic silhouette. The other aim of the project, one of the dorms east side of the city into a single center in Istanbul against in this area, business centers, tourism and office use, with commercial, recreational, cultural and social facilities (theaters, concert halls, convention center, marina, harbor cruise) by developing alternative aims to create a new center.(Koca, 2011)

Jury members evaluated the competition projects and concluded the competition and determined the winning projects under the terms of compatibility between upper scale and sub-scale decisions, integrity between land-use decisions, sensitivity in cultural and heritage relations, integrity, spatial patterns and principles, scale, identity, realization,

applicability, flexibility, implementation strategies, rail transport and maritime transport.

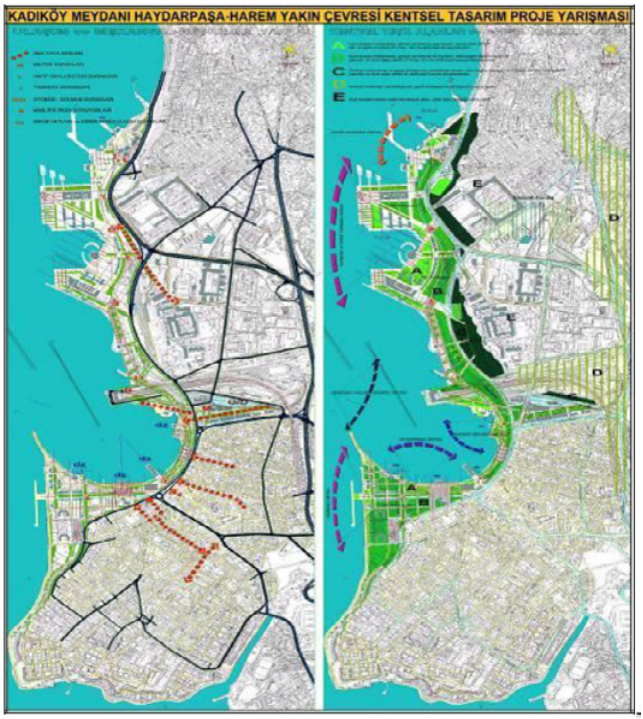
In relation to the project, the project report and jury evaluation report is excerpted as follows;

"The distribution of passenger (and outgoing) passengers from the European side to the area and other transportation generators is provided by tram and pedestrian routes. Interventions in the area of Kadıköy-Moda Urban Conservation and Development, where the registered structures are intense, will be mainly focused on urban conservation and development. In order to strengthen the relations between pedestrian zones and housing islands, in - house arrangements will be encouraged and a hierarchy of courtyard - pedestrian - road relations will be establishedThe Planning Area has been allocated to the Public Project Areas (PA) in order to utilize the advantages of location and functionality of the public areas in terms of building order and relationship with existing metropolitan habitatsIn the Asian side of the Anatolian side, metropolitan working and living corridors and centers supported by active and passive recreation corridors are envisaged. The planning area is a whole with the transportation infrastructure. In the field of planning, it is necessary to carry out sub-scale and ownership studies in the areas of metropolitan interactions for the environmental transformation that falls within the first degree domain of implementation studiesCore structures and investments that will provide acceleration in the transformation of PA are determined. These areas, which are defined as private and / or public project packages, should be prioritized in property transformation and design.

The integration of the whole area with the planning area, the allocation of space and the consistency between them, the continuous continuity of the green area between the Harem-Mühürdar, the integrity of the public, semi-public spaces, the importance of the rail system from the transportation systems, the choice of transfer centers, the specificity and sensitivity of identification and the consistency, the simplicity of the language of expression and the flexibility to allow re-evaluation in the application phase were found to be positive.

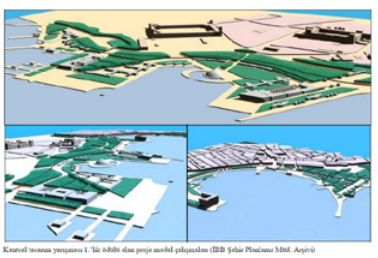
In the Kadıköy-Harem green system, a supportive green bridge over the Haydarpaşa rail system is positive in terms of providing the integrity of the area, but the jury, which believes that the application can create problems, shares the idea of doing alternative works to eliminate this negativity. It is also recommended to reconsider the connection between the urban lines pier and its surroundings and the rail system.

During the planning phase; It is possible to see the stages of analysis, synthesis and principle approach. With the vison of "Haydarpasa shores where public use and pedestrian spaces are located, which meet the requirements of the central function in an optimum way and where the modes of transportation are arranged and developed as required by the functions";t here is an approach where public and pedestrian-oriented, air-popping spaces are reproduced, all parts of the society are accessible equally, where rent is spread to the broader public as much as possible, and silhouette and historical values are preserved. (İBB Haydarpaşa Search Conference Report, 2008)"



Şekil 5.24 : Kentsel tasarım yarışması 1.'lik ödülü alan proje (İBB Arşivi)

Figure 17. Kadıkoy Square Haydarpaşa – Harem Urban Design Competition (Koca, 2011)



kil 5.27 : Haydarpaşa projesi çalışma örnekleri vaziyet planı (İBB Arşivi)

Figure 17 -18. Kadıkoy Square Haydarpaşa – Harem Urban Design Competition (Koca, 2011)

It is a fact that such an important area cannot be planned without the full support and consensus of the local and metropolitan people. On the other hand, there are many cultural, historical and architectural structures in the area; while this process of transformation increases the need for gaining a scientific qualification, it also makes the issue of us protection bu one of the key points of the transformation process. In addition, the potential for silhouette and silhouette tracking of the site in relation to these assets brings another element with it that needs to be protected.

Conclusion

Waterfronts, where the land meets the ocean, see, lake, river or canal, are unique, finite resources representing, often, the best opportunity for community enhancement and enrichment. (Giovinazzi, 2008)

The city's borders and axes are perfectly laid out in a coastal city. The aim for a coastal city is to develop a line where the sea and the land meet. And it explains why the characteristic structure of a seaside town is more observed. The aim of the designer is to ensure the charm of the seaside without disturbing architectural continuity. (Cullen, 1961)

The main objective of the studies determined is that the cities that break the relationship with the coastal areas and water are returned to the water, and also work has been done for the functionalization of urban areas.

In Spain, Italy and England, it is seen that the projects provided many benefits to the city population with their economic and social benefits. Efforts have been made not only to improve spatial and physical characteristics, but also to improve the local economic structure and to ensure equality of opportunity between people.

When we evaluate the approaches and application examples in different countries, it can be said that more urban transformation projects are on the agenda due to socio-economic, political and technological changes. The realization of long-term and large-scale urban transformation projects depends primarily on the establishment and implementation of the relevant legal framework in these countries. However, projects are carried out not only by the municipalities but also by private organizations which can be supported by a mediating unit or state which also provides communication between public and private sectors. (LDDC, LDA, DATAR, BRA for example) In this way, financial problems are easier to overcome and these units focus on a single issue can work more effectively. These organizations are under the control of the state or local government, but also cooperate with many existing organizations on the issue.

Compared coastal areas have similar characteristics. Many common points and differences are summarized in terms of being a coastal city, having a city center port, allowing cruise port projects, having a historical texture, their location in the region, functions as a logistic center and the use of coastal areas.

When the projects carried out around the world are examined, it is seen that the general approach in the animation strategies that bring mixed use to the coastal areas is to make the public part of the urban texture alive again through the creation of public open spaces that can provide physical access to the shoreline as a catalyst for redevelopment.

The revitalization is defined as the work of revitalizing the urban areas, which have lost its old vitality, and the social measures to be taken to the urban areas and urban centers (Şahin, 2003). When considered for the port area, revitalization involves the addition of new urban functions as well as port functions to the area. In the framework of redevelopment, when looking at the new functions brought to the port area, the warehouse and office buildings remaining from the old port function are re-evaluated as office buildings which hotel and service sector need. The typology of the old building, in most cases, is replaced by glorious high-rise buildings such as skyscrapers and the like. Projects that include national and international meeting rooms, conference centers, hotels, art centers, concert halls, higher education areas, and cultural and sports activities are also carried out (Akkar, 2006). The benefits of redevelopment can be summarized as stopping the phsical aging, controlling economic losses, increasing property values, creating new attractive areas of development, creating new opportunities for urban land uses, deteriorating or deteriorating areas and finding remedies for real estate (City of Gardena, 2005).

The construction period of the projects exceeds ten, twenty or thirty years. Completion of conversion or renewal works after a long period of time is at risk of losing the value of current trends on the start date of the project over time. For this reason, it is beneficial to observe the long-term needs and to have a certain flexibility.

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