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# HUMAN-NATURE RELATIONSHIP WITH A FOCUS ON RECREATION - CASE OF ISTANBUL

Zehra Tugba GUZEL[1]
Fatma Aycim TURER BASKAYA[2]

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**Abstract**

Due to altering living standards and technological advances of the 21st century, many people prefer to live in cities. Istanbul has been one of the fastest and most complex developing cities from past to present. Ever-increasing needs of Istanbul have brought about increasing built-up spaces. These dense built-up spaces have damaged the connection between the urbanites and nature and thus their interaction. The human-nature relationship has become an essential necessity with increasing urban pressure today. In the context of the human-nature relationship, although different types of landscapes are considered, the most effective parameter appears to be active green areas and, thus, the recreation activities attached to them. This research aims to scrutinize the relationship between the recreational needs of the public and the transformation of natural areas from 1990 to 2018. In order to detect spatiotemporal alterations, this study mainly benefits from the 1990, 2006, and 2018 dated CORINE land cover data. According to the GIS map-based studies, development and transformation of land covers are identified. These studies forward the sub-types, dispersions, and the alteration trends of major land covers as in the cases of decaying "natural and semi-natural areas", increasing "urban fabrics", and partially increasing "green urban areas" and "sport-leisure facilities". Following to reveal the features of the blue-green network, strategies to upgrade the decaying and fragmented status are discussed through the concepts of “physical and perceptional human-nature contact”, “collective memory”, “connectivity”, “productive landscapes”, “multifunctionality”, and “transformable open spaces”.

**Keywords:** Human-Nature Relationship, Urban Change, Blue-Green Network, Recreation, CORINE, Istanbul

[1] Istanbul Technical University, Graduate School of Science Engineering and Technology, guzel18@itu.edu.tr
[2] PhD, Istanbul Technical University, Faculty of Architecture, turerfat@itu.edu.tr

## 1.INTRODUCTION

The 21st century poses a challenge toward perpetuating the sustainability of the so far established socio-ecological equilibriums. Changed life standards and techniques for benefitting from nature have brought about varying environmental issues as in the cases of global climate change, droughts, and water crisis. These issues highlight the necessity to generate a new way of understanding for the multilayered approaches.

Ranging from the urban, agricultural, rural, countryside, and wilderness scales, land may capture varying components of blue-green network referring to a natural system. At the term of nature, no human impact is existing. According to Forman (2008a), the natural system inevitably relates to nature but represents a concentration on the structure, functioning, and alteration of it. The natural systems contain four primary forms defined as a built area, created green space, semi-natural green space, and natural area. In the built area, the dominance of the buildings and closed spaces is evident. Created green spaces represent plant existences together with the effect of human beings; therefore, these spaces may be created, intensively used, or maintained by the people. Semi-natural areas resemble a natural ecosystem but prominently changed by people. In contrast, natural areas render a type of space, an area unplanted, and with no dense human management and use (Forman, 2008a; Forman, 2014).

"Natural systems are in our place, our nourishment, our home range, and our future" (Forman, 2008b,p251). So, we need to live together in harmony with nature and its resources. In reality, healthy people depend on a healthy environment or nature. (van den Bosch, 2017) Natural resources stand as a healer for human physiology through recreational activities, as a stimulus for cultural memories (Eminagaoglu and Cevik, 2006), as a market through productive landscapes of agricultural facilities. Therefore, we must conserve nature in terms of human-nature relationships.

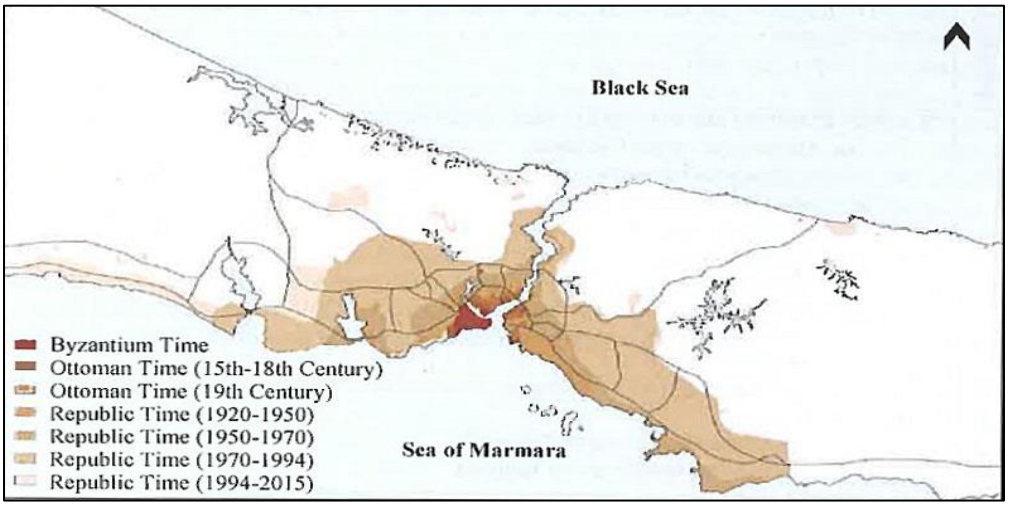


**Figure 1.** Istanbul Urban Macroform (adapted from Istanbul Environmental Plan Report (2009) by Turer Baskaya and Tekeli, 2015)

Istanbul is known as one of the most chaotic cities of the world in point of the human-nature interplay due to its urban growth. Urban sprawl followed by urban expansion reflects that the city has extended toward the rural parts by varying factors and ways (Bhatta, 2010). Istanbul urban macro form handles the growing boundaries of Istanbul throughout history to today due to the impact of several factors (Figure 1). Initial settlements of Istanbul had existed at the European peninsula, and their history dates back to the Byzantine Period. Following the Ottoman Periods, the first urban growth of the Republic Period comprised the east-west axis, which includes basins, groves, pastures, and private gardens. After 1950, second urban growth had happened at the north-south axis as a second dominant impact on the natural resources. Increased workforce demand in Istanbul has enabled the migration from rural (Gokburun, 2017), so the growth has gone toward forests and agricultural areas (Deniz, 2009).

The first group of uncontrolled settlement areas has built-in Bakirkoy and Zeytinburnu districts of the European side, together with the Kadıkoy and Maltepe-Kartal districts of Anatolia side. At the following stage, the built-up area boundary of Istanbul expanded towards the eastern to western axis due to Bosphorus bridge and transportation networks, ascending automobile numbers, moving industrial areas to the periphery (Kubat & Hazar, 2018).

The built-up areas later sprawled to forests and watercourses both along the northeast and northwest axis (Kaya et al., 2009) Bridges passing through the Bosphorus strait are shifting the urban development to northern areas where the protected areas are existing. Besides the urban enlargement, the densification of built-up spaces is another parameter adversely affecting the green areas.

While nature has suppressed and destroyed by the human, human-nature relation has also been lost for Istanbul. Increased quantity of built-up environment with an enormous speed causes a disruptive urban degradation. (Karadag, 2009) Many environmental problems, such as water pollution, decreased biological diversity, deterioration of the ecological chain, have consisted of the causes such as destruction of forests, usage of agriculture area out of purpose, reconstructed watercourses & wetlands.

Considering the history of Turks, throughout the centuries, Turks had been dependent on the earth, because they lived as an unsettled civilization. Thus, they only trusted to the earth and its products. As they have been kept alive by these products, the green and agricultural areas have a specific meaning as a motivation resource for them. However, due to cracking at the communal collective memory, agricultural landscapes ant the attached attributes to them have been altered. According to Yilmaz (2015), the primary purpose of the agricultural areas, which is to produce crops by using the soil, has seriously been transformed due to decreasing rural population while also these areas' quantities have decreased because of division between the legal heirs. Altınkaya Genel (2015) indicates that besides the altering expectations toward the living standards

they face, agricultural areas of Istanbul are obligated to compete with the industrial and built-up areas.

This study cognizes the term of blue-green network as a multifunctional linked system referring to the natural system. Regarding the ambiguity between the forms of the natural system in the case of Istanbul megacity, this study combines the overall features of the blue-green network under the framework definition of nature.

Green areas can be classified into active and passive green areas due to the existence of recreational facilities besides the number and mobility of the people in them. When the main aim of their content involves a demand approach for the benefit of the public's activities, they are defined as active green areas. In the passive green areas, the main aim stands not for the direct usage of the public but the sub-functions like traffic islands and the supply approach regarding the benefit of ecosystems. Therefore as the samples of productive landscapes, agricultural areas are also accepted as passive green areas. Forest areas are one of the components of protected landscapes; thus, they are passive green areas. However, pedestrianized areas inside the forests that are involving picnic and camping facilities regarded as active green areas within this research.

Green areas have been an escape way for the busy urban life of Istanbul. However, as in the case of Istanbul, developing megacities usually examine the insufficiency of green areas. Therefore multifunctional green-blue networks existence is essential for the survival of environmental and socio-cultural sustainability.

With a focus on the recreational needs of the urbanites, this study examines the spatial alterations within the green network and areal transformations that occurred at the types of green areas.

The coastal megacity of Istanbul has got a unique blue network as it is standing on two peninsulas and surrounded with two seas and a straight. Natural and cultural areas of this historical city are capable of serving several recreational activities, although they are gradually losing their capabilities. Beach based recreational facilities are among the diminishing ones as, until the 1990s, southern coastal areas of the city had been famous with their recreational beaches. Nowadays, due to sea pollution and urban development along the coasts, only the northern coastal areas can capture a limited amount of beach tourism.

Today urbanites are gradually losing their recreational habits, thus need to generate new ones to sustain the quality of their lives. This research aims to scrutinize the relationship between the recreational needs of the public and the transformation of natural areas within the urban development from 1990 to 2018. Transformations within the land cover types provide inside to the spatial alteration trends in the city and the locations of fragmented recreational landscapes. Detection of them stands as a cornerstone for developing strategies to accommodate human-nature relations.

## 2.MATERIALS AND METHOD

In order to examine the interplay between the natural systems, blue-green network, multifunctionality, and recreation, this study aims to interrogate the spatiotemporal alterations within the landcover types of Istanbul megacity from 1990 to 2018. Primary data of this research are gained from the GIS-based Corine Land Cover (CLC) maps from 1990 to 2018 (EEA, 2019). These maps are provided by the European Union, and the data pertinent to them have been examined quantitatively within this study by benefiting from ArcGIS 10.4.1 software program. In order to crosscheck the spatiotemporal alterations, edited aerial photograph archives by Istanbul Metropolitan Municipality are accommodated. Through this study, descriptive research modeling has adopted, which describes a problem through its variables and variables' relationship.

This study focuses on the land cover types of Istanbul. Therefore some types are eliminated by reason of not existing in Istanbul, such as 223: Olive groves, 241: Annual crops associated with permanent crops, 244:Agro-forestry areas, 322: Moors and heathland, 323: Sclerophyllous vegetation, 332: Bare rocks, 334: Burnt areas, 335: Glaciers and perpetual snow. While the spatiotemporal detection is essential, this research searches for the answers to some questions;

-What kind of urban spatial development has Istanbul experienced between 1990-2018?

-How has the connectivity of both the people and species to the features of the blue-green network been altered?

- What kind of change has occurred in the areas where the people of Istanbul can meet their recreation needs?

- Where did the human-nature relationship evanish throughout the 28 years?

- What are the recreation-based sustainable landscape strategies that the megacity may benefit from?

## 3.RESULTS AND DISCUSSION

CORINE data own three analyzing levels in terms of being informed with fewer or more details. This study examined the third level of Corine, which is the most detailed level. First of all, Istanbul's built-up areas, forests, agricultural areas, wetlands, water systems assessed with the first Corine data published in 1990.

This study examines the effect of the development of Istanbul city on the interaction of the urbanites with nature in a recreation-oriented way, from 1990 to 2018. In order to conduct a sustainable spatio-temporal analysis, identification of the initial status of the dispersion of the eco-sensitive land covers and built-up spaces is crucial.

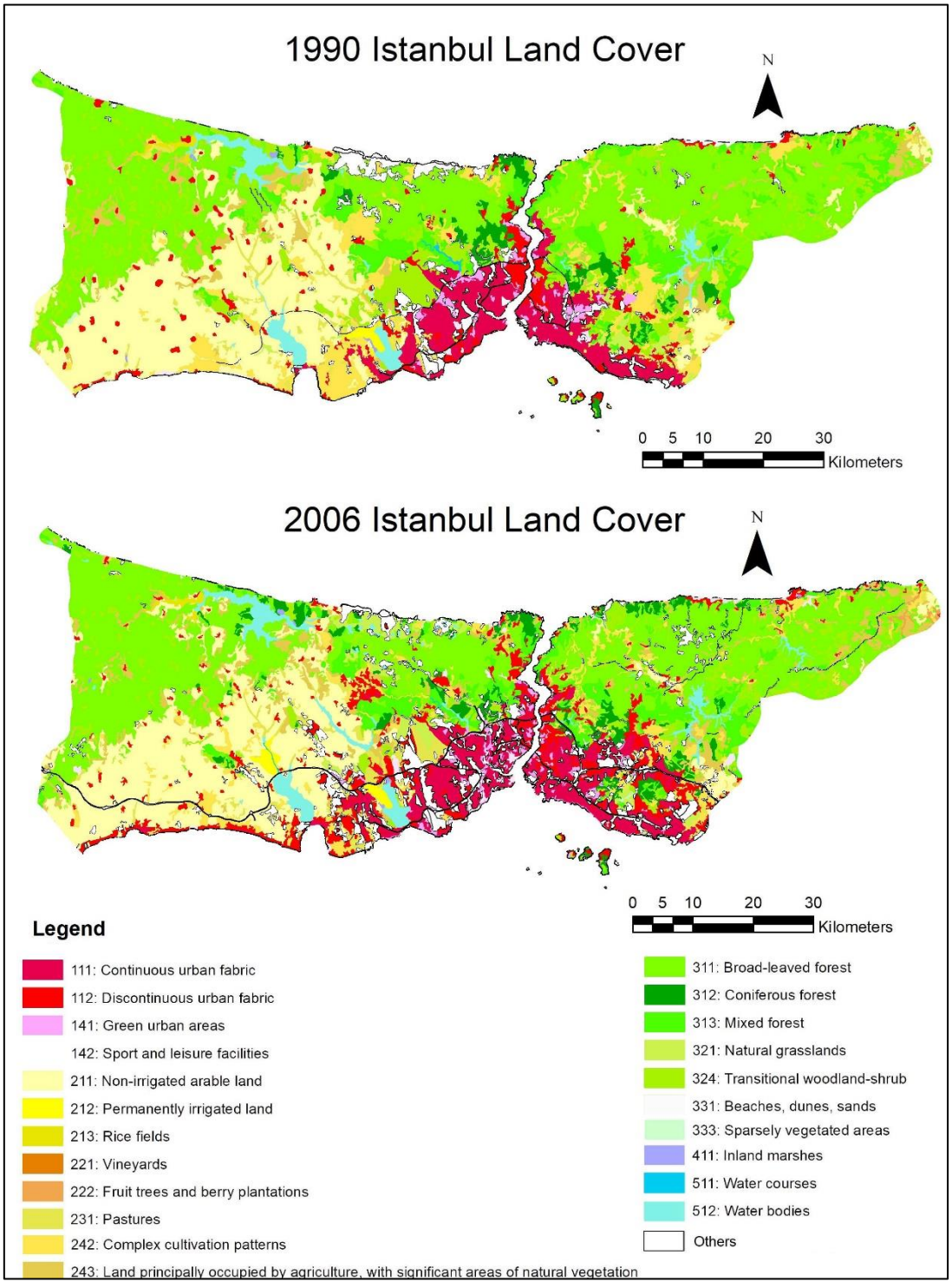


**Figure 2**.1990 and 2006 dated land cover maps based on CORINE

Major components of the green-blue network of Istanbul are drinking water basins, lagoons, and numerous urban streams together with the vast forest and agriculture areas at the north and the dispersed historical groves within the built-up

spaces. Besides these components, the Bosphorus strait and its surrounding natural and cultural protected areas stand as a dominant component of this network.

When the two peninsulas are compared, it is evident that the European peninsula is richer about the drinking water basins, lagoons, and agriculture areas. As Istanbul has been defined as a coastal city from past to present, the urbanites have a dominant demand to interconnect with the sea. As a byproduct of this demand, linear built-up spaces exist along with the southern coastal areas of the Anatolian peninsula.

Linear developed built-up spaces of the Anatolian peninsula prevent the water recreation, secondary houses, and tourism facilities much in which they exist more in southeastern coastal areas of the European peninsula and areas along the Bosphorus. Sand areas and beaches also exist along the north coasts of both of the peninsulas. These areas are separated from the built-up spaces both by the distance and the vast forest areas existing in between them. 1990 dated land cover map also illustrates the urban sprawl, which is existing more at the European peninsula (Figure 2).

When the land cover maps of 1990 and 2006 are compared, increased urban sprawl and expansion of the built-up spaces along the coastline are evident at the European peninsula as a disadvantage to the agriculture areas. These coastal developments become into secondary houses; the farther they go from the city center. At the Anatolian peninsula, city expansion toward the north generates a fragmented landscape and two green hubs surrounded by the new built-up spaces. At both of the peninsulas, major urban green areas are transformed into many small units exist. This alteration brings about decaying of the urban green not at the total area but ecological and social integrity (Figure 2).

Small settlement areas pertinent to urban sprawl standing in the rural areas are identified as discontinuous urban fabric by the land cover maps. The settlers living in these areas have better physical contact with nature through the existence of productive landscapes, and opportunities of passive and active recreation. Besides the occurrence of new settlement areas of high-income groups, the settlers of already existing rural ones have just been provided the human-nature relation with the production way of the areas such agriculture field via rice fields and forestry.

Besides the increased settlements, infrastructure constructions have played an essential role at the blue-green network alterations, as in the case Darlik Dam at the Anatolian peninsula, Sazlidere Dam at the European peninsula, and vast even international transportation roads. These developments occurred on the passive green areas as agriculture fields, complex cultivation areas, pastures, and forests and did have adverse impacts on the human-nature relation, especially pertinent to productive landscapes, passive recreation, and perceptional landscape.

Through their promenade areas and picnic sites, some of the forests of Istanbul, to some extent, answers the recreational needs of citizens. However, existed in green system natural grasslands, transitional woodlands, mixed forests are significant parts of

natural areas owing to the ecological value. These natural and semi-natural areas are standing in between the northern coastal areas and urban fabric.

Northern sites of the city and especially the Black Sea coastal areas have faced several sandpits and stone quarries. These areas are illustrated at the land cover maps within the "others" legend. Although they are still active in function and blocking the people to reach the coastal areas for their recreational needs today, they have the potential to generate recreational services on them in the future.

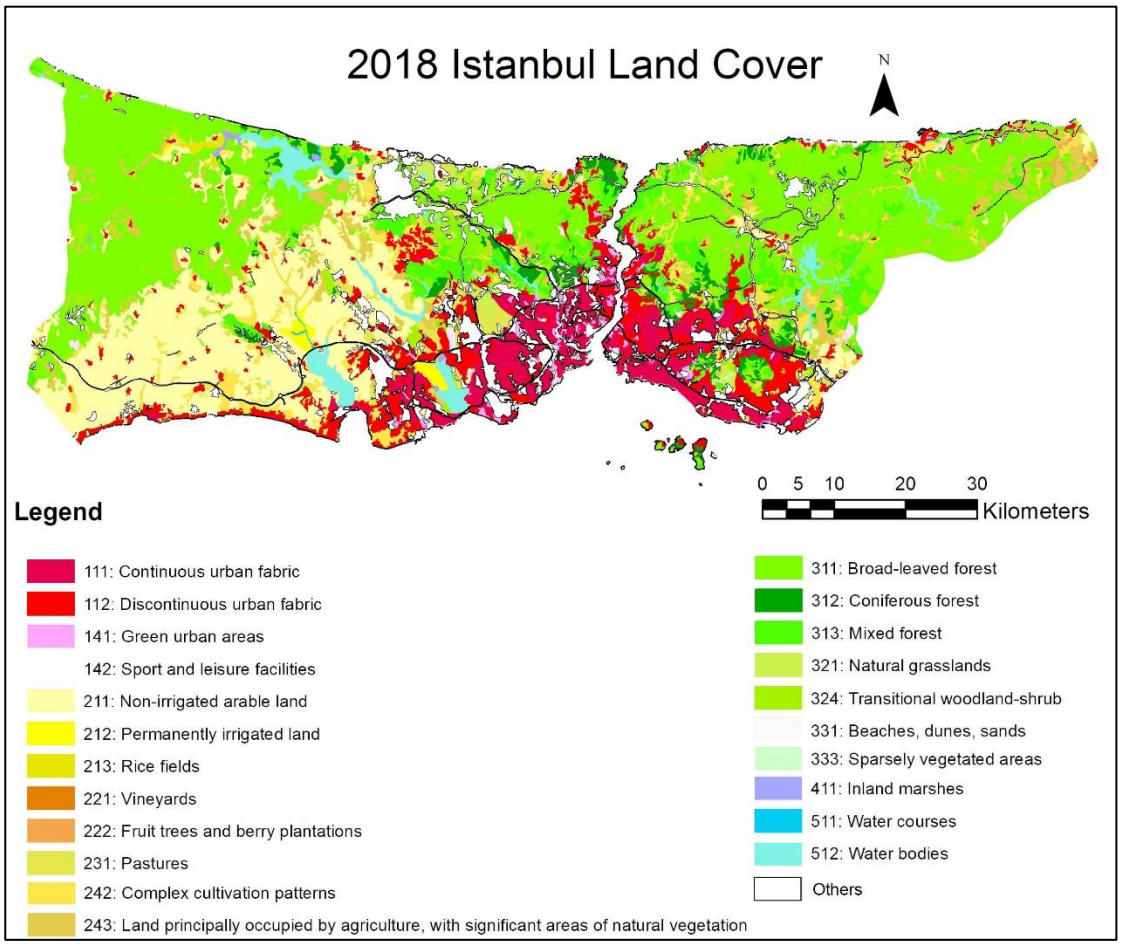


**Figure 3.** 2018 dated land cover map based on CORINE

The alteration of urban green areas and sports areas almost can not be seen from 2006 to 2018 from the land cover maps (Figures 3, 4, 5, and 6). Minor fluctuation occurred at them. The critical alterations occurred at the discontinuous urban fabric as they turned into continuous ones while another drastic loss occurred at the transitional woodland-shrub areas.

Urban streams are described as the watercourses in the land cover maps of this study. In the urban fabric, it is almost impossible to reveal them due to their narrowness and buried form (Figures 2 and 3). When the pollution issues are also regarded, they forward too limited recreational opportunities. If they are next to any coastal parks, a

few of the large streams forward recreational opportunities at the places they reach the sea. Thus, they are not capable of constituting a continuous recreational network along their corridors to bind the other green areas to each other.

Dispersion of the recreation areas is not homogenous within the city, which is a problem due to their accessibility. This dispersion is partly from the planning problems and partly from the topographical-elevational variations. This issue underlines the importance of urban streams and their valleys for constituting an accessible blue-green network. Hubs of the green network are available at the Anatolian peninsula. These hubs represent mixed land covers as they also hold the passive green areas forwarding perceptional human-nature contact.

The potential of water amenities is essential in the case of Istanbul. Direct contact with water, as in the case of swimming, is possible only on the Black Sea coasts and the islands of the Marmara Sea. Luckily they have got sand areas and beaches. Considering the other coastal areas that are holding different coastal and marine landscape characteristics, various watersports types, even at the international scale, are available but need to be developed due to a sustainable strategy.

Istanbul has got the advantage of being the homeland of several national and international sports teams. Their experiences and infrastructures forward a great opportunity to the urbanites, in case it is organized within a city scale. Although its location on the former valuable pastures and grasslands is speculative, internationally known Car Racing Park Istanbul standing at the Anatolian peninsula also may hold a great potential to work for the recreational benefit of the citizens.

Identification of the potentials to increase the recreation capacity of Istanbul is critical to developing strategies to upgrade them. However, separation of the recreational facilities with fees and without fees is critical. Some recreational facilities, as in the case of water sports, require fees; thus, they are not open to all citizens. Free to use recreational areas' distribution requires further strategy studies.

Figure 4 illustrates the total areas of “sport and leisure facilities” and “urban green areas” and how they differed from 1990 to 2018. Although this study argues the deficiency for the recreation areas, figure 4 represents the areal increase pertinent to this issue. This increase is insufficient when it is compared with the spatial development and population increase. Built-up space enlargement toward the semi-natural and natural areas occurred at such a devastating scale that the increase of the recreation-related areas can not heal the human –nature disconnection.

According to the published World Cities Cultural Forum report, in 2015, Istanbul’s public green areas rate was 2.2 percentage (WCCF, 2020). National Statistics defines the population of the European peninsula as 9.772.961 while the Anatolian peninsula as 5.294.763 (TUIK, 2018). The public green area per inhabitant is unbalanced between the peninsulas and inadequate according to the national measures.

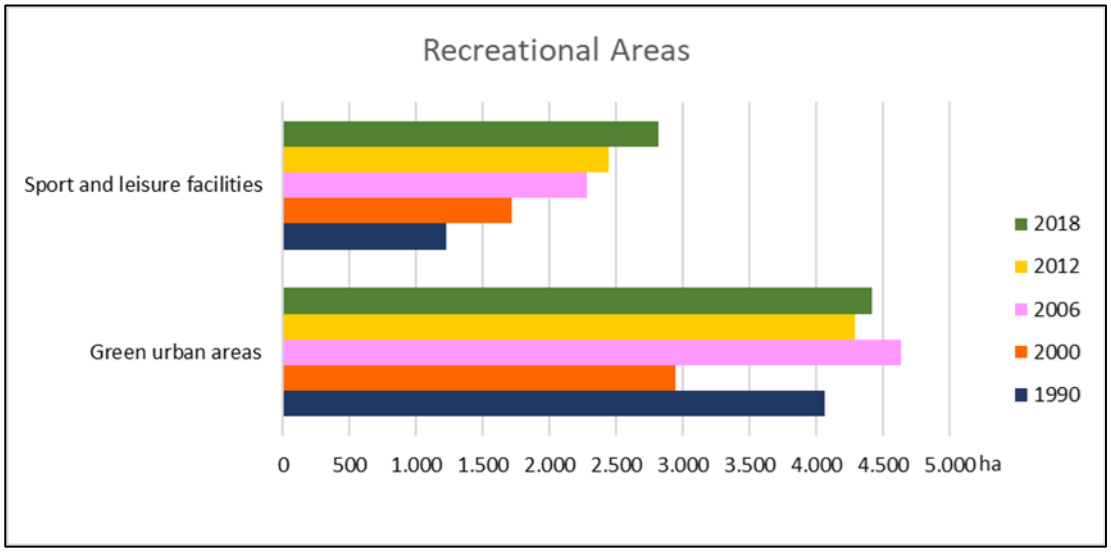


**Figure 4**. Recreation-related CLCs and their alterations through out the years

The green system of Istanbul has faced and will face massive impacts of 2016 dated Yavuz Sultan Selim bridge together with its transportation network and 2019 dated Istanbul Airport. These constructions built in the Arnavutkoy-Sarıyer axis, which is existing in the north of the European peninsula. Especially, the mega airport is located in the Durusu drinking water basin and just by the lagoon on the Black sea coast. 2018 Corine map represents Istanbul Airport as a construction site. Also, the map illustrates that the construction site of the airport is positioned between forests and agricultural areas (Figure 5). This study evaluates the blue-green network status of the city without regarding the unconstructed mega projects, as in the case of Canal Istanbul.

To sum up the whole process, the overlay maps are illustrated in figures 5 and 6. These figures represent the transformations between the land covers throughout the examined 28 years. Figure 7 represents the rates of these revealed transformations. According to the major land covers, the artificial urban fabric is increased by 31,5%, while green areas out of agricultural areas ascend by %27, and forests are increased by %0,77. Among the decreasing groundcovers, agricultural areas are decreased by %43,5, and the semi-natural areas descend by %46. However, the wetlands rate is increased by %53,8 while, watercourses and bodies shrink by %12,5.

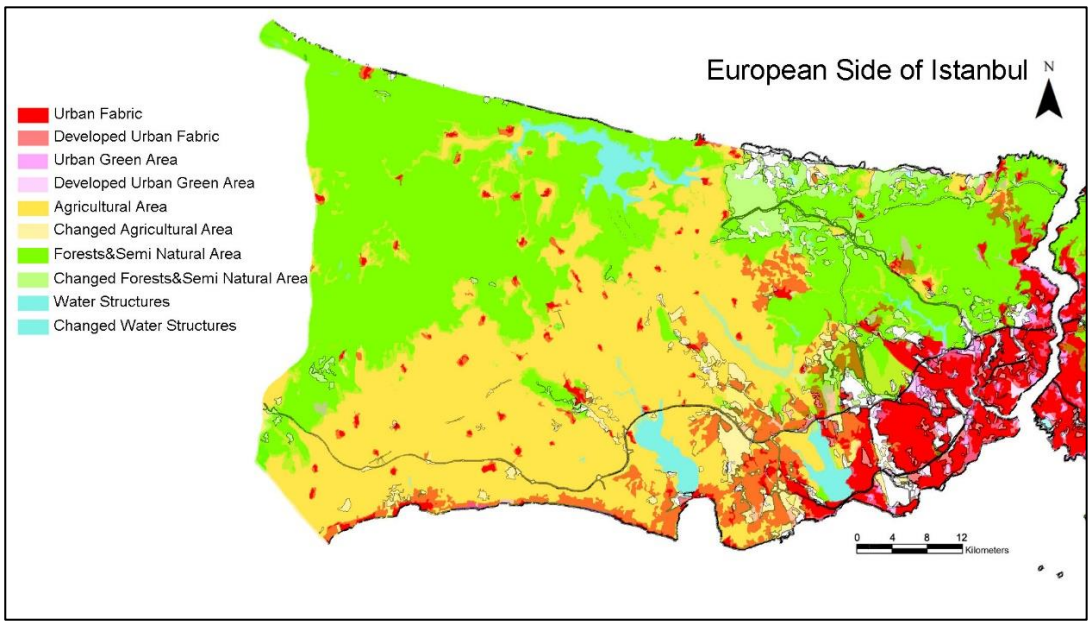


**Figure 5.** 1990-2018 overlay map for the European Peninsula according to CORINE

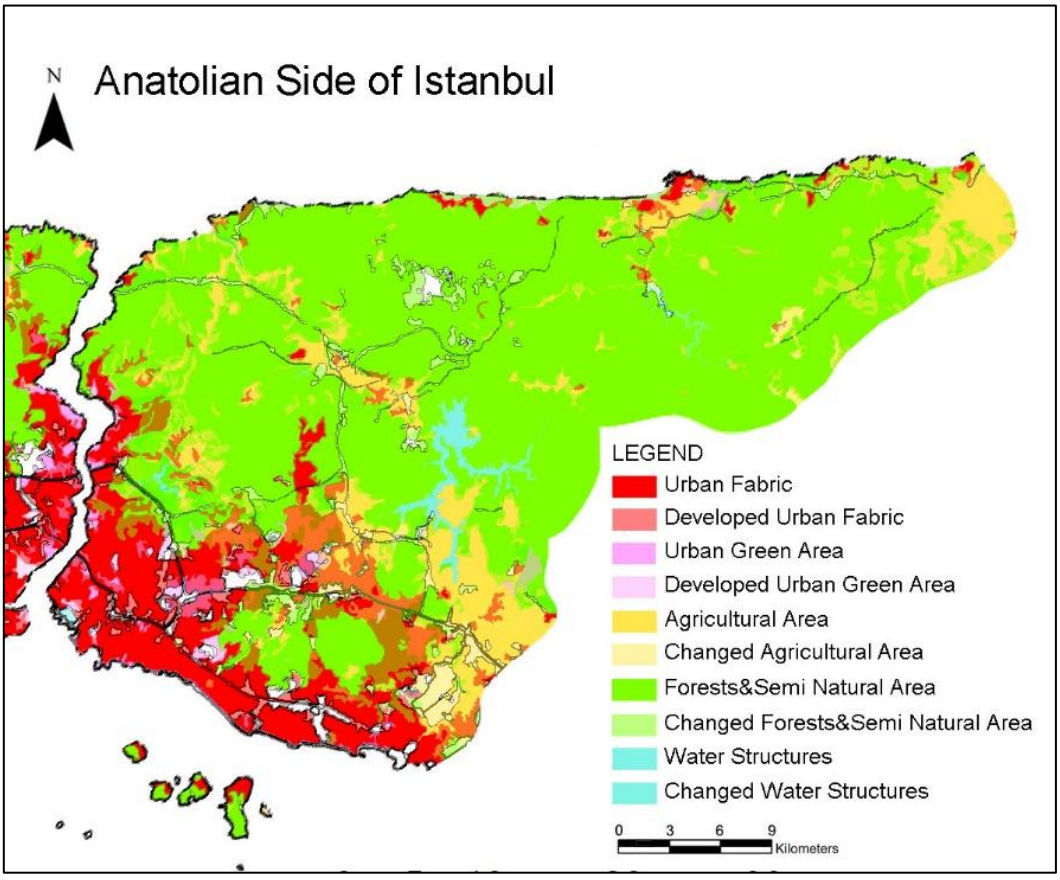


**Figure 6.** 1990-2018 overlay map for the Anatolian Peninsula according to CORINE

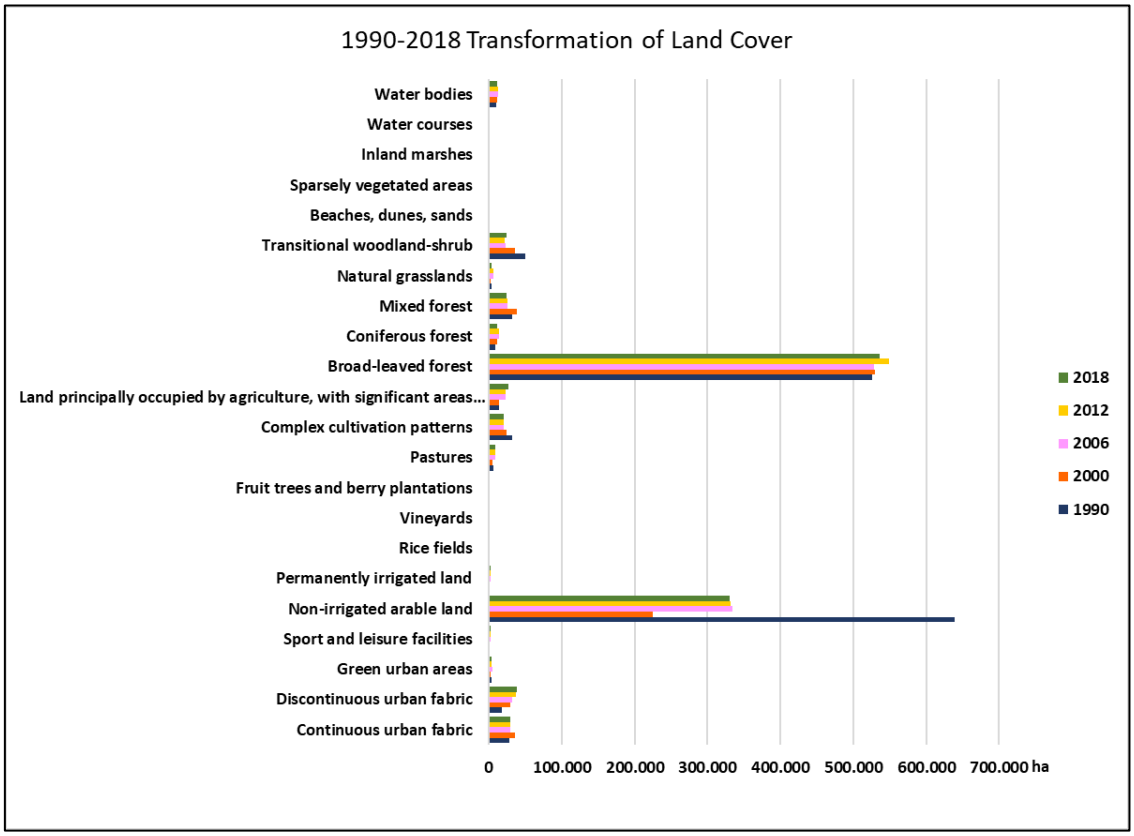


**Figure 7**. CORINE land cover types and their total areas throughout the years

From Figures 5, 6, and 7, it is available to examine that non-irrigated arable lands, complex cultivation patterns, transitional woodlands-shrubs, and mixed forests decreased prominently. Interplay between the discontinuous and continuous urban fabric is essential to understand the small-sized green areas extension and dispersion as such green areas are hidden inside these urban fabrics. Discontinuous urban fabric has a bigger capacity to hold small scale green areas. However, as this type of fabric developed up by eliminating the semi-natural areas, they block the right of urbanites to reach surrounding green areas as well as decreasing the total green area of the city. Regarding the small scale green areas hidden inside the urban fabric legend, multiscale studies are required for the identification, planning, and design of them within a system approach.

Istanbul has got several lakes, lagoons, and wetlands, which the majority of them exist inside the drinking water basins. The ones standing outside of these boundaries have the potential to forward recreational opportunities but only by regarding an ecological sensitiveness and supply approach. These water bodies are under the impact of fast urban development; therefore, attaining such eco-sensitive multifunctions are also for the benefit of their sustainability. These water dominant areas may serve as awareness-raising places for the eco-sensitive subjects. Seaside areas, although due to their locations they have got different capabilities, require an integrated coastal plan to

support many facilities but also the recreational ones. Their capacities can capture a robust recreational network in case they will be studied on.

The sprawled urban fabric on the agricultural areas has destroyed productive landscape practices and, thus, cultural landscape collective memory and the human-nature relation. Currently, large transportation axes are generating physically and perceptually fragmented landscapes, especially at the European peninsula as a byproduct Anatolian peninsula has more recreational areas than the European one. Loss of productive landscape may be healed more or less by the generation of urban agriculture areas. Although they are at small scale, according to their numbers, they can generate efficient stepping stones to survive collective landscapes.

Although large transportation axes are generating physically and perceptually fragmented landscapes at the European peninsula, collective urban memory pertinent to cultural and natural landscapes is still alive as there are some small hubs together with corridors and stepping stones of the cultural green network. They still forward a general layout and opportunities to develop. These areas represent urban green structure rather than the natural areas. The Anatolian peninsula has got several large hubs but a limited amount of corridors and stepping stones to generate a robust network. Besides these issues, small sized but numerous areas bring about more recreational facilities to the Anatolian peninsula. This configuration highlights the importance of multiscale studies ranging from city-scale to even human scale to constitute a sustainable blue-green network.

Due to the existence of a limited amount and size of urban open spaces for recreation within the urban fabric, efficient usage of the existing areas is required by benefitting from multifunctionality and transformability. In the dense built-up spaces, one space may hold several functions, and some of these functions may be permanent while the others are temporary. Thus, a public place or a part of it can be flexible and transformable into another one by benefiting from modular landscape elements. Both of the multifunctional and transformable places are also capable of answering the recreational demands of different types of users. Regarding the necessity of organizing such a sub-network that holds temporal and transformable spaces, management gets more vital for the benefit of both the urbanites and recreational capacity of the city.

## 4.CONCLUSION

Challenges of the 21st century bring about increasing urban population and expansion and thus decaying human-nature relationship within the cities. Cities examining dense built-up structures require innovative strategies to forward robust human-nature relationship. Examining the human –nature relationship with a focus on recreation, this study handles coastal megacity of Istanbul due to its ever-expanding and complex urban fabric. Beginning with the GIS-based spatio-temporal analysis to identify the problems and potentials of the city, this study underlines the importance of multiscale and multilayered strategies to upgrade the blue-green network and constitute

a sustainable socio-ecological system. This study is an attempt to forward a city-wide sub-network of transformable, hybrid, and temporal spaces for ameliorating the deficiency of recreational areas. Developing such a sub-network system requires further detailed studies, even involving managemental tools. Thus, this study stands as an initial step for further studies on defining the new layers of blue-green network holding a flexible recreational spatial system, not only for the benefit of Istanbul megacity but other developing cities examining the absence of open spaces.

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