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ARAŞTIRMA MAKALESİ **RESEARCH PAPER**

Planning Experience on the Factors Affecting the Physical Land Use Change and Temporal Change in the Eastern Black Sea Coastal Settlements; The Case of Çayeli [*]

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Abstract: Coastal settlements have a dynamic and complex structure, and are constantly changing due to human and partially natural reasons. In this context, it is important to know the reasons that physically change the coastal cities and to create future plans in the light of these data. It was aimed the factors affecting the physical land use change in the Eastern Black Sea coastal settlements are specifiedto determine the change speed and to make correct and effective plan decisions of these changes in 4 different periods (according to maps obtained from institutions) from the past to the present of Çayeli district. The study area is the Çayeli district of Rize province, which has a rugged topographic structure in the Eastern Black Sea Coastal Region. In the study, the factors affecting the physical land use change in the Eastern Black Sea coastal settlements are specified and the temporal and spatial physical land use change (7 land use parameters; settlement, transportation, coastal areas, urban open green areas, forests, agricultural areas, and industrial areas) process (GIS) of Rize province Çayeli district. The land uses, which directly affect the identity of the city, have changed in parallel with the urbanization in Çayeli district. It has been determined that the most change in the district, which experienced a rapid change process from 1959 to 2000, was in the industrial areas, transportation and settlement, respectively. Especially in the 1980s, it was observed that there was a decrease in open green areas, urban agricultural areas and forest areas with the effect of urbanization. In this context, new planning and design scenarios for the development of the city are included in order to create a livable and sustainable coastal city. In order to create a sustainable environment, this study will form a basis for other studies about a city where energy is used effectively, human-oriented, cultural and historical values are protected, urban areas are developed with long-term plans, and in this process, urban agricultural areas and open green areas are protected.

Keywords: Coastal city, coastal planning, eastern black sea, urban land use change.

Doğu Karadeniz Kıyı Yerleşimlerinde Fiziki Alan Değişimini Etkileyen Unsurlar ve Zamansal Değişim Üzerine Planlama Deneyimi; Çayeli Örneği

Öz: Kıyı yerleşimleri dinamik ve karmaşık bir yapıya sahip olup, beşeri ve kısmen doğal nedenlerle sürekli değişime uğramaktadır. Bu kapsamda kıyı kentlerini fiziki olarak değişime uğratan nedenlerin bilinmesi ve bu veriler ışığında geleceğe yönelik planlar oluşturulması önemlidir. Doğu Karadeniz kıyı yerleşimlerinde fiziki alan değişimini etkileyen faktörlerin belirlenmesi, Çayeli ilçesinin geçmişten günümüze 4 farklı dönemde (kurumlardan elde edilen haritalara göre) değişim yönünün ve hızının belirlenmesi, doğru ve etkili plan kararlarının oluşturulması amaçlanmıştır. Çalışma alanı, Doğu Karadeniz Kıyı Bölgesinde engebeli bir topoğrafik yapıya sahip Rize ili Çayeli ilçesidir. Çalışmada, Doğu Karadeniz kıyı yerleşimlerinde

[*] *This study was produced from the master thesis.*

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fiziki alan kullanım değişimini etkileyen faktörler belirtilmiş ve Rize ili Çayeli ilçesinin zamansal ve mekânsal fiziki alan değişiminde (7 arazi kullanım parametresi; yerleşim, ulaşım, kıyı alanları, açık yeşil alanlar, ormanlar, tarım alanları ve endüstri alanları) yaşanan süreç (CBS) belirlenmiştir. Zamansal değişimler, hava fotoğrafları, uydu görüntüleri, topoğrafik haritalar ile CBS kullanılarak tespit edilmiştir. Kentin kimliğini doğrudan etkileyen arazi kullanımları, Çayeli ilçesinde kentleşmeye paralel olarak değişmiştir. 1959'dan 2000 yılına kadar hızlı bir değişim süreci yaşayan ilçede en fazla değişimin sırasıyla sanayi alanları, ulaşım ve yerleşim dokusunda olduğu tespit edilmiştir. Özellikle 1980'li yıllarda kentleşmenin etkisi ile açık yeşil alanlar, kentsel tarım alanları ve orman alanlarında azalma meydana geldiği görülmüştür. Bu kapsamda yaşanabilir ve sürdürülebilir bir kıyı kenti oluşturmak için kentin gelişimine yönelik yeni planlama ve tasarım senaryolarına yer verilmiştir. Bu çalışma sürdürülebilir bir çevre oluşturmak adına, enerjinin etkin kullanıldığı, insan odaklı, kültürel ve tarihi değerlerin korunduğu, kentsel alanların uzun vadeli planlarla geliştirildiği ve bu süreçte kent içi tarım alanları ve açık yeşil alanların korunduğu bir kent için diğer çalışmalara altlık oluşturacak niteliktedir.

Anahtar kelimeler: Doğu karadeniz, kentsel alan kullanım değişimi, kıyı kenti, kıyı planlama.

INTRODUCTION

Coastal settlements are important areas with their being a transition point between water and land, their typology, land values, natural and cultural resource values (Çelik, 2015; Balçık & İnceoğlu, 2020). The potential social, cultural, economic and geographical values of the coasts, which are called dynamic landforms that change with the effect of natural and human factors, have made them an important part of the city (Ansari, 2009; Çoban et al., 2020). In this context, users benefit from the aesthetic and functional uses of coastal areas for touristic, commercial and recreational purposes and change and transform these settlements accordingly. At the same time, these areas form the starting point of urbanization and affect the identity, landscape and architecture of the city (Uzunali & Acar, 2020).

From past to present, these settlements have a dynamic structure and have been re-interpreted by undergoing formal changes due to natural and cultural interactions, mainly due to human, climate and natural disasters (Pardo-Pascual et al., 2012; Aouiche et al., 2016; Sabuncu, 2020). In cities where change has accelerated due to factors such as technological developments and physical needs, the change has not only remained spatial, but also affected societies socio-culturally, physically and psychologically. With the industrial revolution, people turned to urban areas and intervened in these areas in line with their needs. Unplanned urbanization due to the need for settlement resulting from rapid population growth has brought urban sprawl. As a result of this, basic resources such as water and soil, which are necessary for the sustainability of life, have been polluted and the natural environment has been destroyed and nature has been significantly damaged as a result of the misuse of the areas (Üçok, 2019).

With the increasing population in coastal settlements, the development of infrastructure, the inclusion of industry, trade and tourism areas on the coast, the filling of the coast, the destruction and opening of agricultural and forest areas for residences greatly distort the identity of coastal settlements (İdil, 1989; Kiage et al., 2007). These settlements grow rapidly and spread over large areas in the space with the increase in the need for space due to rapid growth. This spreading process affects cities socially, physically, psychologically, environmentally and ecologically, and this process also changes and transforms the urban landscape (Güner & Gültekin, 2020; Bekci, 2021). As a result of unplanned and incorrect use of land by coastal settlements and other cities, natural integrity is deteriorated, and non-ecological practices that do not comply with the natural structure cause great destruction (Şimşek & Korkut, 2009). In this context, it is important to know the reasons that physically change the coastal cities and to create plans for the future in the light of these data.

After the 1960s, this growth and expansion in cities has become an important problem for many cities in the world (Sorensen, 1999; Couch et al., 2008). In our country, rapid and irregular urbanization, and ecologically baseless planning studies reveal many problems and negatively affect the urban identity and the quality of life of individuals (Gül & Küçük, 2001; Kartal et al., 2021). As a result of this situation, green areas disappear, the climate changes and heat islands are formed in cities. Cities are affected not only physically but also socioculturally, and undergoing changes. As a result of these developments, new approaches have emerged in order to make cities a sustainable and livable city by considering the protection-use balance in urban planning (Yılmaz, 2018).

Urban areas contain many types of land use. These uses are residential areas, public areas (hospitals, schools, public institutions and organizations, etc.), industry, commercial areas, military areas, unstructured urban areas (urban void areas, archaeological areas), green areas (parks, natural areas), agricultural areas, transportation, streams, streams, rivers, shores (Deniz et al., 2008). Land use changes are disruption of ecological

balance, fragmentation of biotopes and habitats, deterioration of the quality and integrity of the landscape, reduction of biological diversity, etc. This causes many problems mentioned above, and this situation triggers global warming, which affects the whole world, to a large extent (Kalnay & Cai, 2003; Sönmez, 2012; Doygun, 2017).

The studies of determining the change in the use of space, which are carried out in order to reveal the physical and conceptual change of the cities in time, also enable the determination of new needs and expectations by revealing the current situation. Deciding on the future use of physical and green space uses in cities forms the basis of planning studies. Although landscape planning is a necessary step for taking plan decisions, it aims to protect and develop the natural environment and to ensure sustainability (Bogenç, 2020). Changes in the landscape occur as a result of anthropogenic effects such as industrialization, urbanization and agricultural activities, and parameters such as urbanization, land cover and population are used to monitor these changes (Nurlu et al., 2009). In landscape planning studies, taking into account the existing natural and cultural characteristics and values of the study area, and taking the inventory and analysis of the landscape features have a great importance in the formation of the bases at the planning stage (Erdoğan et al., 2013). In landscape planning studies, the studies of determining the changes by analyzing the functions of the landscape and the processes taking place in the landscape and making the synthesis of natural cultural data show progress in this direction. Land cover indicators, one of the parameters used to observe the changes in the landscape, are generally obtained by processing data sets consisting of satellite data, and thus the change-transformation in the areas is monitored (Haščič & Mackie, 2018). In this process, Geographical Information Systems and Remote Sensing Methods have a great importance because they are used extensively in landscape planning studies (Uzun, 2014).

In cities, landscapes are reshaped by various requirements (settlement area, trade, industry, agriculture, recreation, etc.), and natural landscape areas are transformed into uses such as residential areas, agricultural areas and trade and industrial areas over time. The main cause of environmental problems is the misuse of the areas, along with urbanization, and this intervention to the land cover causes the reduction of green areas and the deterioration of the ecosystem (Meyer & Turner, 1994). The establishment and development of residential areas on unsuitable areas in terms of ground reveals the necessity of determining the temporal and spatial development of the city and its immediate surroundings, as well as the changes in land use. Due to these interventions that directly affect the urban ecosystems, it is necessary to determine and regularly observe the changes in the use of land in the cities (Stow & Chen, 2002). It is very important to determine these changes in terms of showing the future development trends of the landscapes (Oğuztürk et al., 2019). Influencing changes in landscapes positively can be made possible with accurate and effective plan decisions and realistic predictions against the possible consequences of these plan decisions (Barredo et al., 2003).

In the light of these data, in this study, the factors affecting the physical land use change in the Eastern Black Sea coastal settlements are specified and the temporal and spatial physical land use change process and possible planning and design decisions of the Çayeli district of Rize province, which is located in this area, are included. By revealing the physical changes of Çayeli district of Rize province, which has scattered settlements due to its topographic structure and the center of tea agriculture, from past to present, it is intended to reveal the positive and negative effects of these changes in environmental relations, determine the direction and speed of change in the city and reveale new planning and design scenarios for the sustainable development of the city.

MATERIAL AND METHOD

The main material of the study is the central borders of Çayeli district of Rize province, which is located in the Eastern Black Sea region and is a coastal settlement (Figure 1). As auxiliary materials in the study; all aerial photographs produced by the General Directorate of Maps for the district center of Çayeli district of Rize province, 1959 1044,290, 1970 2206/1316, 1975 3088/64-66 (2 pieces), 1982 3626/760, 1989 4012/3790, 2004 4751/8950, 2009 Tubitak Kıyı/2088,2086 (Color) and 2013 jemus 2013 ucx/27496 aerial photographs, produced by the General Directorate of Maps; Produced by the General Directorate of Maps with 1982 (40 cm resolution), 1963 (100 cm resolution), 2004 (70 cm resolution), 2013 (Color) (45 cm resolution) orthophotos; From past to present, 1/25.000 scale raster maps / F45D3 sheet covering Çayeli county, county center were used. In addition, as auxiliary materials in the study; various articles, books, journals, theses and literature obtained through the internet, zoning plans, topographic maps, forest management plans, annual agricultural production reports, reports of the research area, photographs, and computer software were used. In addition, the opinions of experts and institutions related to the subject were also used.

Data Collection and Evaluation: The method of the study is based on the spatial determination of temporal changes in the urban area by geographically digitizing and analyzing the maps (topographic maps and aerial

photographs) of the study area in ARCGIS 10.5 software (Reis, 2003; Wu et al., 2006; Alqurashi & Kumar, 2013). In this context, the study consists of 5 main stages as scanning the domestic and foreign literature on the subject, collecting written and oral data of the area, determining the land use parameters, creating and digitizing the data with GIS, and analyzing the data. In order to determine the physical change of the city, 7 land use parameters were determined. These parameters constituting the physical texture of the city are settlement texture, transportation texture, coastal areas, urban open green areas, forests, agricultural areas, and industrial areas.

Figure 1. Study area, Çayeli.

At the stage of creating the data with GIS, the maps obtained by the General Directorate of Maps were processed with GIS-based ARCGIS 10.5 software to determine the 60-year change between 1959-1989-2009-2019 and for 4 different time periods for settlement texture, transportation, coastal areas, forests, agricultural areas, and streams maps were created. In order to determine the temporal changes in the use of aerial photographs, they were digitized as "area" in line with the data sets. The areal sizes of the land use categories were calculated by questioning the land use separately according to each parameter. In the light of these data, the rate of change and the direction of development in the physical texture of the city were determined.

RESULTS

The findings of the study consist of the factors affecting the physical land use change in the Eastern Black Sea coastal settlement and the numerical determination of the spatial and physical land use changes of the Eastern Black Sea coastal settlement of Rize province Çayeli district. In this study, the findings for determining the spatial sizes and changes of 7 different land use maps obtained by digitizing and processing aerial photographs and satellite images of 1959-1989-2009 and 2019 by GIS ARCGIS are given.

Assessment of the Factors Affecting Physical Land Use Change in the Eastern Black Sea Coastal Settlement: Coastal settlements are areas with natural and culturally important resource values that contain both land and marine ecosystems. These areas are changing and

transforming due to natural (landslide, flood, etc.) and human reasons. Eastern Black Sea coastal settlements start from Ordu in the west and end at the Georgian border in the east (Koday, 2003). Topography is the main factor affecting many planning such as settlement, agriculture and recreation in these regions. Mountainous areas starting right after the coast limit their use of land and urban settlements are dense in coastal areas. In this region, cities fragmented by rivers consist of scattered and small parcels.

When the factors affecting the physical land use changes in the Eastern Black Sea coastal settlements from the past to the present are examined (according to the data and maps obtained at the study scale), it is seen that there are mainly the need for housing and recreational areas due to population growth, the need for limited space due to topography, the need for transportation, epidemic diseases, filling areas, tourism, unplanned practices and other human pressures (Uzun & Özcan, 2016; Yıldırım & Ayna, 2016). In coastal uses, zoning status, spatial use, benefiting from the sea and land, transportation and other environmental factors are effective (Figure 2).

Figure 2. Factors affecting the physical land use change in the Eastern Black Sea coastal settlement.

Due to the lack of flat areas due to the current topography of the Eastern Black Sea, residential, industrial and commercial areas are dense in the coastal region. This situation has caused a scattered unplanned settlement in coastal use. The increasing settlement pattern, the trenches made for the purpose of obtaining agricultural land, the lands divided for transportation purposes have caused great temporal changes in the coastal settlements. Also, due to epidemics (malaria, etc.) that are frequently seen in wetlands, the use of urban areas has changed and residential areas have changed over time.

The most important factor affecting the change in the Eastern Black Sea region is the Black Sea Coastal Road. This road, which increases the means of transportation, has created a border between the sea and the city in coastal settlements and has greatly affected the accessibility of the sea. The main problem in the cities located in the Eastern Black Sea region is that this road disrupts the natural structure of the city and prevents the accession to the coast. Due to the topography, which is effective in both residential areas and agricultural areas, trenches are made for settlement and agriculture in areas close to the coast, and this situation, which is often unplanned, causes the destruction of existing values and environmental problems. Additionally, due to the topography, the sea fills, which are built to gain space for uses such as transportation and recreation, are one of the most important factors affecting the physical land changes.

Determination of Temporal Land Use Change of Çayeli: The temporal land use change of Çayeli district covering the years 1959, 1989, 2009, 2019 was created in GIS environment using aerial photographs, satellite images and topographic maps and evaluated under 7 headings (Settlement, transport, coast, agriculture, ındustry, forest, open green areas). Maps were created by evaluating the determined land uses in 4 different time periods (Figure 3).

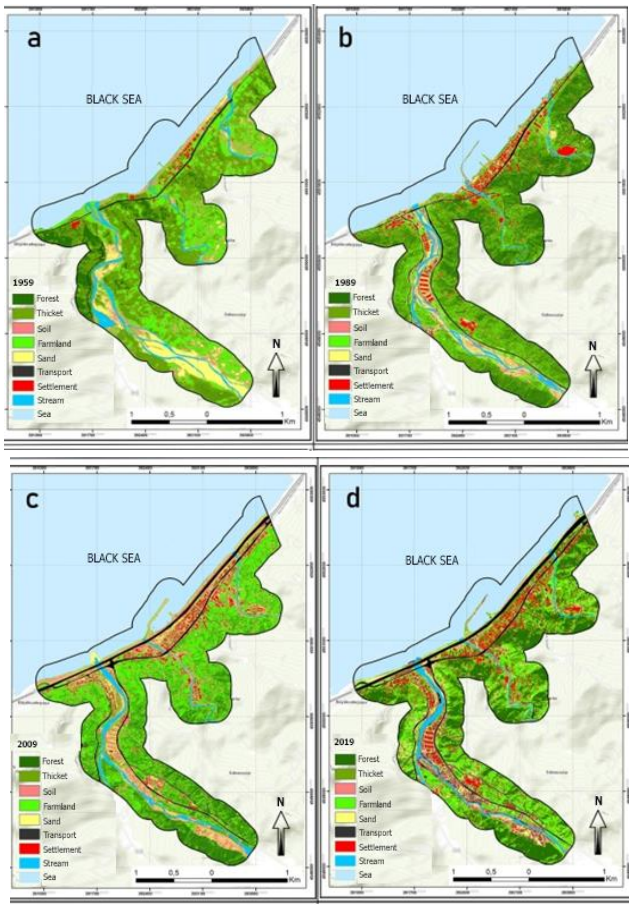

Figure 3. Temporal changes of Çayeli district urban land uses. (a.1959, b. 1989, c.2009, d.2019).

In the 60-year physical land use change of Çayeli district, it was determined that the biggest change is in industrial areas with a rate of 450%, followed by transportation with an increase of 406%. However, it was determined that there was a 250% increase in the settlement pattern and an increase of 69.41 ha in the seashore change. On the other hand, especially in the 1980s, with the effect of urbanization, open green areas (active and passive), urban agricultural areas and forest areas decreased in time, and in the 60-year period between 1959 and 2019, it was observed that there was a 13% decrease in open green areas, 6% in urban agricultural areas, and 37% in forest areas (Table 1).

Table 1. Determination of temporal land use change of Çayeli.

Time intervals		1959	1989	2009	2019	Rate of Change %
Amount of Settlement Texture		11.58 ha	27.04 ha	37.42 ha	40.56 ha	250 increase
Amount of Highway Network		5.98 ha	11.71 ha	27.68 ha	30,29 ha	406 increase
Amount of Coastal Areas	*Stream*	11.58 ha	19.38 ha	37.42 ha	18.10 ha	56 increase
	Sea	1959-1989 years		1989 - 2009 years	2009-2019 years	
		4.05 ha increase		45.69 ha increase	19.67 ha increase	
Amount of Open Green Areas		224.12 ha	195.1 ha	22.79	197.8	13 decreases
Amount of Forest Areas		149.52 ha	130.04 ha	86.96 ha	109.02 ha	37 decreases
Amount of Agricultural Areas		135.29 ha	119.66 ha	137.51 ha	127.25 ha	6 decreases
Amount of Industrial Areas		2 ha	7 ha	9 ha	11 ha	450 increase

As a result of these data, it is observed that the change in the fields of industry, transportation and settlement pattern has increased rapidly. On the other hand, it is seen that there is a decrease in urban agricultural areas, open green areas and forest areas (Figure 4).

The increase in the industry in the 1980s greatly affected the land use in Çayeli district. Industrial areas with

an increase of 450% between 1959 and 2019 consist of tea factories, copper factory and other industrial areas.

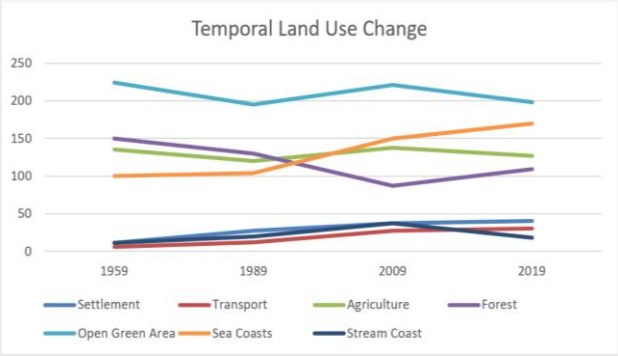

Figure 4. Graph of determination of temporal land use change in Çayeli.

While the settlement texture was 11.58 ha in 1959, it increased by 250% until 2019 and reached 40.56 ha. It is seen that new urbanization areas are developing unevenly while existing textures become idle in the condensed city center.

Transportation, which is one of the most important factors affecting the development of the city, has increased continuously from 1959 to 2019 in Çayeli district, and the biggest change in highway areas was between 1989 and 2009. Compared to the past, due to the increase in settlement, transportation and industrial areas, it was observed that the area of agricultural areas decreased and the spots tended to shrink by dividing, and in this context, it was similar to the study of Bahadır and Özdemir (Özdemir & Bahadır, 2008).

The highest decline in agricultural areas was in the 1980s, which coincided with the period when the industry increased. Agricultural areas, which were 135.29 ha between 1959 and 1989, decreased to 119.66 ha. The main reason for the 17.85 ha increase in the agricultural area from 1989 to 2009 is the increase in the economic return of tea production. For this reason, forested areas in the urban area have been converted into agricultural areas, similar to the work performed by Korgavuş in the central district of Rize (Korgavuş, 2014).

As a result of the data obtained in the study area, there was a 13% decrease in the open green areas, which are included in the urban agricultural areas and squares, in the 60-year period between 1959 and 2019. This situation was caused by the destruction of green areas and their replacement by residential areas and industrial areas for the increasing need for urbanization with the population.

The coasts of Çayeli district, which show the characteristics of a linear city along the Black Sea coast, change in time and the sedimentation caused by the accumulation of the material carried at the Black Sea coastal road, filling areas and the points where the rivers meet the sea constitutes the reasons for this change. This result, which is similar to the study conducted by Uzun and Özcan, (2016) in Trabzon, showed that forest areas decreased due to the increase in settlements in coastal areas. Another area observed as a coastal change is rivers. Stream areas showed a regular increase from 1959 to 2009 and decreased by 106% in 2019. Although the existing water resources limit the city, it creates a flat area for urban settlements and adds ecological, psychological and aesthetic values to the region.

CONCLUSIONS AND SUGGESTIONS

Uncontrolled and unplanned changes in the coastal settlements of the Eastern Black Sea, which come to the fore with agriculture and tourism areas, cause many problems. Misuse of agricultural lands, decrease in open green areas and increase in settlements affect the ecological balance in cities and cause environmental problems. Establishing long-term appropriate plans for land uses will relatively reduce these problems and ensure that the environmental factor is taken into account in new land uses. For this reason, it is very important to determine the temporal change rates and directions of cities with Geographical Information Systems. These data are the main sources for the sustainable development and planning of the city.

The land uses, which directly affect the identity of the city, have changed in parallel with the urbanization in Çayeli district. It has been determined that the most change in the district, which experienced a rapid change process from 1959 to 2000, was in the industrial areas, transportation and settlement, respectively. Especially in the 1980s, it was observed that there was a decrease in open green areas, urban agricultural areas and forest areas with the effect of urbanization. This change will increasingly continue in the coming years, despite the limiting factors of the city (topography, etc.).

The district, which has a scattered and several-storey housing structure, has caused a scattered and irregular rapid urbanization due to the need for settlement and economic developments due to population growth. The construction of the Black Sea Coastal Road by filling the sea was the main reason for the increase in the coastal areas and transport. The existing double lane highway along the Black Sea Coastal road has separated the coastal areas along the Eastern Black Sea line. This situation limited the relationship of the users with the sea and made it difficult to reach the coastline by providing overpasses and underpasses.

The main reason for the decrease of agricultural land between 1959-1989 is the destruction of agricultural lands for housing and other urban structures due to the need for settlement due to population growth. Looking at the data in 2019, it can be said that due to the fact that the topography of the district limits the settlements, the

development of settlement structures and secondary houses in the areas where the tea fields are located is among the main reasons for the decrease in agricultural areas. Considering the change in the forest existence of the district, which stands out with its natural vegetation, it was determined that these areas were destroyed in the 1980s and separated for urban settlement and transportation. The reason for the decrease in forest areas in 2009 can be explained as cutting down forests and converting them to agricultural areas.

In the light of these results; strategic urban proposal plans are needed for the city in order to minimize the damage these changes will cause to the environment and to make correct plans. The use of renewable energy resources should be encouraged in the district, whose natural resources are in a rapid consumption process, and the managers and the public should be made aware of this issue.

Suggestions have been developed for the human-oriented sustainable development of the city in order to minimize the negative situations caused by temporal space usage changes and to improve the current situations in this study. These suggestions are listed as directing urbanization, transforming rivers into recreational areas within the scope of green roads, protecting urban open green areas and agricultural landscape areas, evaluating urban void areas as recreational areas, improving the architectural texture and other issues.

The data obtained in the temporal area use change of Çayeli district, which is examined as an example within the scope of coastal cities with similar topographical, structural and vegetative features within the scope of the Eastern Black Sea coastal settlements, show similarities with other coastal settlements in general. As a result, recommendations for the Eastern Black Sea coastal settlements;

Settlement;

• Constructing needed new settlements in the interior and along the river valleys outside the flood protection zone, in a way that will not disrupt the city silhouette,

• Preserving the urban architectural identity and carrying out street rehabilitation works (Niyazi Çavuşoğlu Street and Sabit İshakoğlu Street for Çayeli district),

Transportation;

• Establishing ecological bridges for existing transit axes and ensuring accessibility by creating different alternatives in transportation as a solution to the problem of access to the coast,

Coastal areas;

• Effective sustainable and accessible coastal planning by protecting water resources,

• Planning the river banks as green roads,

Urban open green areas (recreational areas), Forests, Agricultural Areas;

• Bringing agricultural landscape characters to the forefront and protecting them within the scope of agricultural sites,

• Designing rain gardens within the scope of sustainable management of rainwater,

• Prefering vertical garden applications in existing areas,

• Protecting and increasing urban open green spaces,

• Creating a route for natural resources and tea garden areas that have a unique and cultural landscape value (Çaça Tea Garden, Kuspa Hill, Çeçeva Tea House, Ağaran Waterfall, and Natural Life Museum).

• Planning and designing public and recreational focal points in appropriate areas in the city (Government Office Surroundings, Çayeli Open Market Place, State Hospital Surroundings, Büyükdere, Şairler Stream and Aşıklar Stream for Çayeli district),

• Planning bicycle and walking paths by creating circulation in the city,

• Evaluation of urban void areas as recreational areas,

• Creation of accessible squares,

Industrial areas;

• Industrial areas that have lost their function in the urban area should be re-functionalized with correct uses, open green areas should be included and opened for use with new functions.

Considering the natural and cultural data, by keeping the accessibility in the forefront in the designs and plans made for the disabled, the elderly, children, etc. It is recommended to be designed according to each user's needs and considering their needs.

In order to create a sustainable environment, these studies form a basis for a city where energy is used effectively, human-oriented, cultural and historical values are protected, urban areas are developed with long-term plans, and in this process, urban agricultural areas and open green areas are protected. These studies, which greatly affect the identity and development of the city, should not be ignored and urban design guides should be created in this context. In this direction, the urban planning of the Çayeli district should be made by taking into account the underground riches, hydrological data and natural habitats in a way that is compatible with the natural land structure of the district and the population density is evenly distributed throughout the city. In addition to the planning to be made, urban transformations, silhouette studies and renewals in urban areas should be made according to the city plan.

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