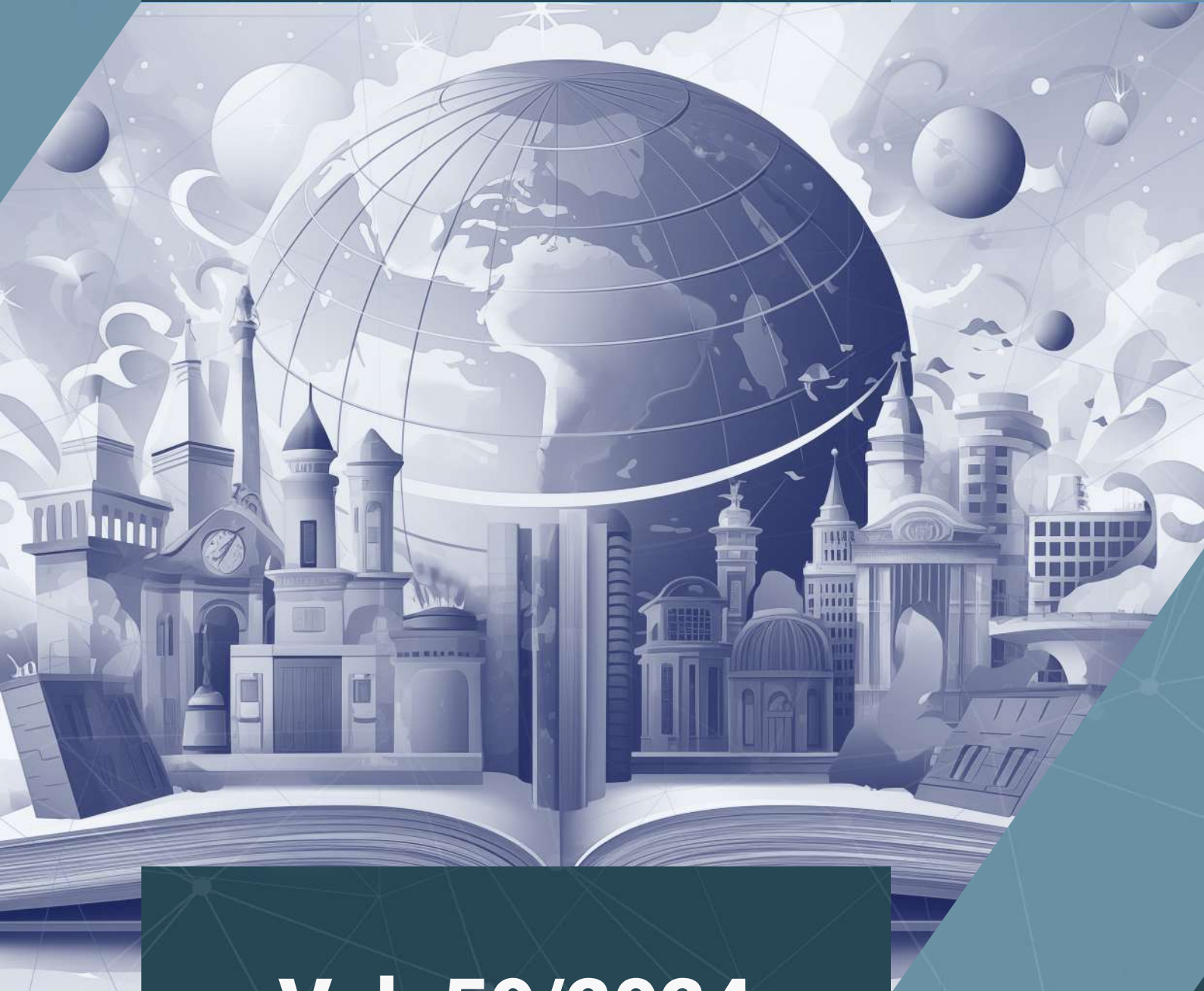




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## Interaction between old settlement areas and natural vegetation

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**Abstract.** Areas that have been considered as cultural environments since ancient times have been under the influence of anthropogenic activities. That's why vegetation; It has been destroyed as a result of field clearing, grazing, fire, cutting and recently increasing mining activities. Studies carried out to reduce the impact of destruction may cause the vegetation to diversify or the presence of alien species in the field. Studies conducted in these areas, especially pollen analyses, reveal the vegetation transformation that the areas have undergone. In order to reveal the causes, results and interaction of these transformations, the results of the study were shared as a result of the research in the sample of the Gökyurt (Kilistra) ancient settlement area and its surroundings, located within the borders of Meram district of Konya province. In order to achieve the aim of the study, studies on the vegetation characteristics of the field were evaluated and the vegetation map of the field was prepared and the evaluations in the conclusion were reached.

**Keywords.** Kilistra Ancient City, Anthropogenic Activity, Vegetation, Degraded Forest

### 1.Introduction

Since ancient settlements have been considered as cultural environments for a long time, they have been under the influence of anthropogenic activities. That's why vegetation; It has been destroyed as a result of field clearing, grazing, fire, cutting and recently increasing mining activities. In addition, there are changes in land use in areas with changes in climate data over long periods. As a result of the work carried out to prevent the change in land use and loss of vegetation in these areas in order to reduce the impact of destruction, special afforestation areas have been created, causing the vegetation to diversify and different species to be seen in the areas.

The vegetation change occurring in historical settlement areas can be achieved by pollen analysis, and the transformation in land use can be achieved by revealing and interpreting the data.

## **2. Material and Method**

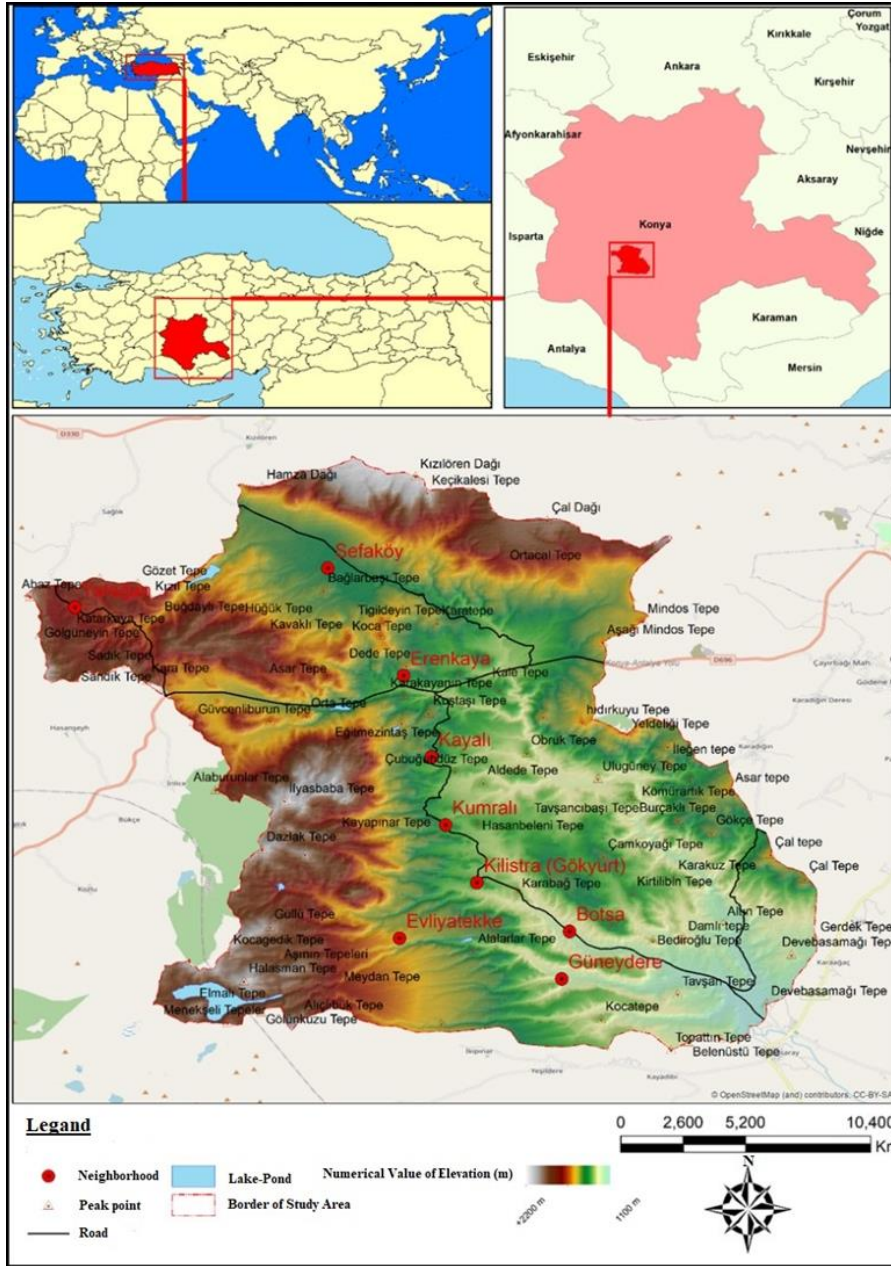
It is important to evaluate and interpret historical documents and previous studies in revealing the cause-effect and interactions of transformations and changes seen in cultural settlement areas. In this study, previous studies on the research area were evaluated, a vegetation map was prepared and the interpretation was made using Corine data in order to interpret the change in the land.

## **3. Findings**

Gökyurt (Kilistra) and its immediate surroundings, located within the borders of Meram district of Konya province and used as a settlement since ancient times, were chosen as the research area (Figure 1). The area determined as the study area consists of approximately 549.8 km<sup>2</sup>. Gökyurt, Kayalı, Erenkaya, Kumralı, Yatağan, Sefaköy, Güneydere (Botsa) and Evliyatekke neighborhoods constitute the residential areas in the field.

The study area is located within the borders of Meram district of Konya province. The field is from the north; Kızılören Mountain, Çal Mountain, Keçikalesi Hill, from the east; Çal Tepe and Midos Tepe, from the west; Sadık Hill, Güvenburun Hill, Alaburunlar Hill, Dazlak Hill and Kovagedik Hill, from the south; Menekşeliler Hill, Gölnkuzu Hill, Alıçlıbük Hill, Topattın Hill etc. It is surrounded by elevations and Hatunsaray Plain (Figure 1).

The study area was classified as Urban Archaeological Site, Urban Site, I. and III. by the decision of Konya Provincial Cultural Heritage Preservation Regional Board dated 29.04.2016 and numbered 3605. They have been accepted as 1st Degree Archaeological Protected Areas and the protection principles and usage conditions of the areas have been determined.



**Figure 1.** Research Area Location Map (Taken from Baylak, 2023).

The population in the research area is generally engaged in agriculture and animal husbandry as an economic activity. Additionally, charcoal production is another notable economic activity in Yatağan District. The population size tends to decrease, adapting to the wave of migration from villages to cities seen in the Turkish population, especially in the 1950s (Baylak et al., 2024). When the population data of 2022 is examined, the female population in Evliyatekke, Kayalı and Güneydere neighborhoods is high due to the male population migrating to cities to work. The residential area with the highest population is Sefaköy with 2509 people, followed by Güneydere with 633 people and Kilistra

(Gökyurt) with 510 people. The neighborhood with the lowest population is Kumralı with 68 people (NVİ Statistics, 2022)

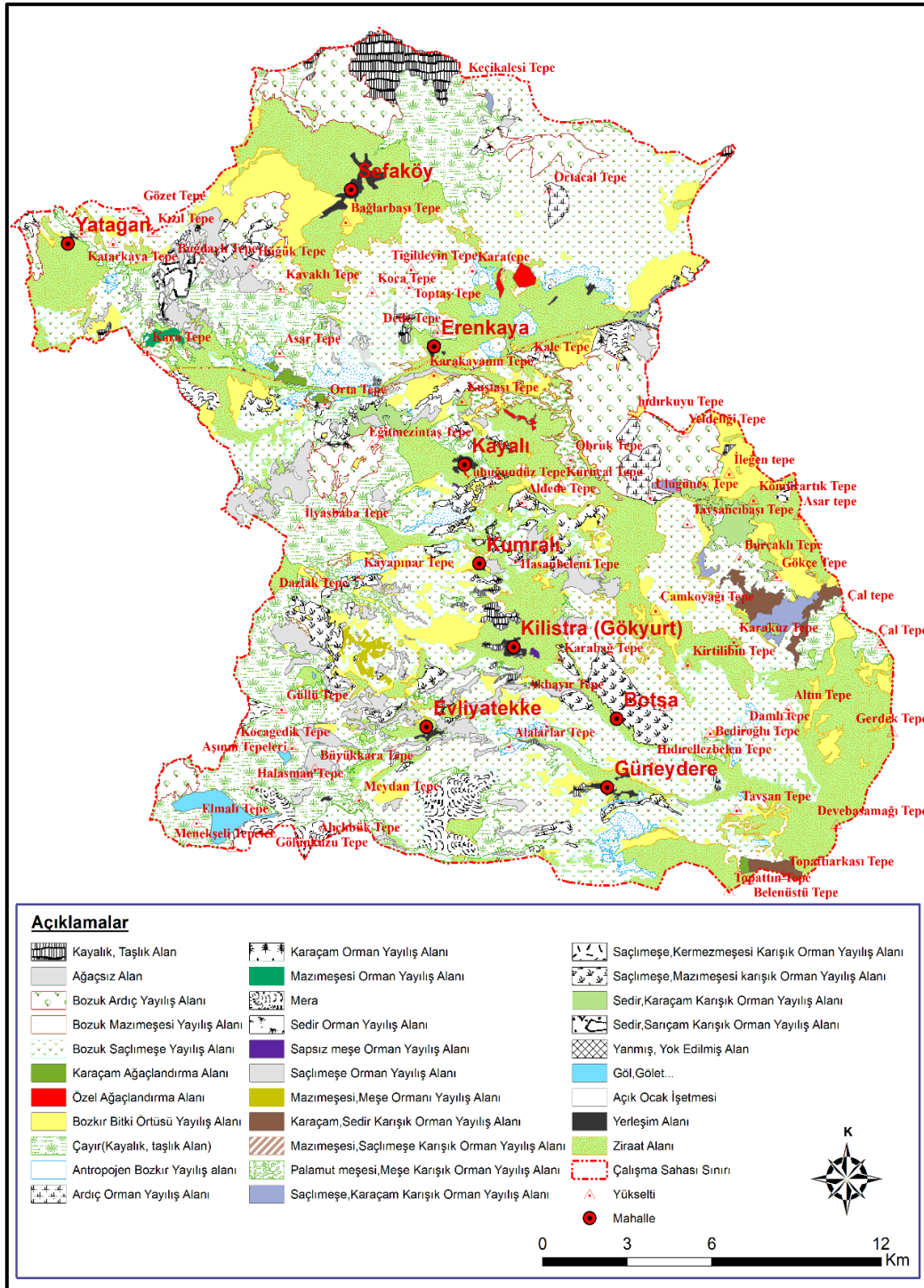
### **3.2. Vegetation Characteristics of the Research Area**

Since the research area has been considered a cultural environment for a long time, it has been under the influence of anthropogenic activities. That's why vegetation; It has been destroyed as a result of field clearing, grazing, fire, cutting and recently increasing mining activities. In order to reduce the impact of destruction, partial works have been initiated by the Konya Regional Directorate of Forestry and special afforestation areas have been created and the vegetation has diversified.

Pollen analyzes carried out in the field and its immediate surroundings reveal evidence that there was a more lush vegetation in the past. Especially in the early Holocene, there was a lush vegetation consisting of juniper and oak species (Yiğitbaşıoğlu, 2014, p.156). Today's anthropogenic steppe area has emerged in the Kilistra (Gökyurt) region as a result of the increasing intensive use of trees and the decrease in the amount of precipitation due to climate change and human impact that occurred in later times.

Forest, degraded forest and steppe vegetation types have emerged in the Kilistra (Gökyurt) Region. Anthropogenic steppes were formed in the low plateau areas where the forest was destroyed and in the plain area in the southwest (Figure 2). The steppe vegetation, which has the appearance of a forest steppe, consists of herbaceous plants such as astragalus, oats, martin, mountain tea, field ivy, honey herb, euphorbia, thistle, dandelion, poppy, dog's tongue, oak ball, marshmallow, couch grass; There are shrub species such as goat almond, wild rose, medlar, hawthorn, blackberry, wild pear and cherry plum. Herbaceous plants consist of annual plants.

The forest vegetation in the area looks like a degraded forest. There are large open areas within the forest in the area and it is observed that they are covered with dried grass species, especially in July and August. In these months when rainfall is low, high temperatures and rapid drying of herbaceous plants cause surfaces to become susceptible to erosion.



**Figure 2.** Natural Vegetation Distribution Map of the Study Area.

The forest vegetation has the characteristics of steppe forest at altitudes between 1200-2000 meters. It is located in the east and west of the field. Oak-juniper mixed forests are observed on the slopes of the elevations in the region between Kayalı and Erenkaya

(Figure 2). Black pine is occasionally found among oak-juniper species. Larch does not show any characteristic features in the area.

In the study area, degraded forest vegetation is found on the valley slopes of streams, mountain slopes and high plateau surfaces. While hairy oak is dominant in these areas, forests dominated by hairy oak species are seen in the low plateau areas. Pulley oak communities appear on the hills where the altitude increases, starting from 1500 meters. Oak and juniper species form a scattered structure. In areas where forests have been destroyed for many years, steppe plants such as astragalus, gray astragalus, sheep's wort and bull thistle constitute the dominant natural vegetation in the ground flora.

In the valleys and along the river banks, there are plants such as willow, blackberry, oleaster and plane tree, which have hygrophilous characteristics.

The cultivation of the soil by local people due to clearing fields in forested areas for agricultural purposes significantly increases the erosion values in these areas. In some parts, bedrock is observed on the surface due to erosion.

### 3.3.Land Use

When the usage data of the land with a surface area of 549.8 km<sup>2</sup> in the study area is examined, it is observed that it varies according to the conditions imposed by the topography (Table 1).

Considering the study area as a cultural environment, although 54% anthropogenic destruction is felt, the land is forest, degraded forest, shrubland, etc. It is considered to reflect the characteristics of the natural environment. Agricultural activities are carried out in 19% of the area (Figure 3).

When an evaluation is made within the scope of human activities in the study area, changes due to land use are evident even in short periods of time. The data in Figures 4 and 5 reveal important results in evaluating the proportional amount and consequences of this change.

Namely; When the Corine data for the years 1990-2018 (Figure 4 and Figure 5) are examined, the values in Table 2 emerge. The change is especially experienced in the transformation of sparse vegetation areas into xeric vegetation and the proportional change in pasture areas. The most important factor on this result is the recent increase in the effect of anthropogenic destruction. The economic activities of the field population and site evaluation activities accelerate the geomorphological process and enable the area to be evaluated in terms of cultural geomorphology.

Land Use Type	Area (km <sup>2</sup> )	Ratio (%)
<b>Agricultural Area</b>	104.0	18.91
<b>Forest (Degraded Forest, Heath etc.)</b>	297.0	54.02
<b>Archaeological Site (Old Settlements)</b>	25.0	4.55
<b>Rangeland Activity Area</b>	61.7	11.22
<b>Road / Asphalt, Stabilized, soil etc.)</b>	0.8	0.15

<b>Mining Area</b>	0.1	0.02
<b>Lake-Pond</b>	2.8	0.51
<b>Residential area</b>	1.6	0.29
<b>Stream</b>	1.2	0.22
<b>Bare Rock Field</b>	55.6	10.11
<b>Total</b>	<b>549.8</b>	<b>100.00</b>

**Table 1.**  
Proportional distribution of land use type in the Study Area.

Source: (Obtained using Corine maps)

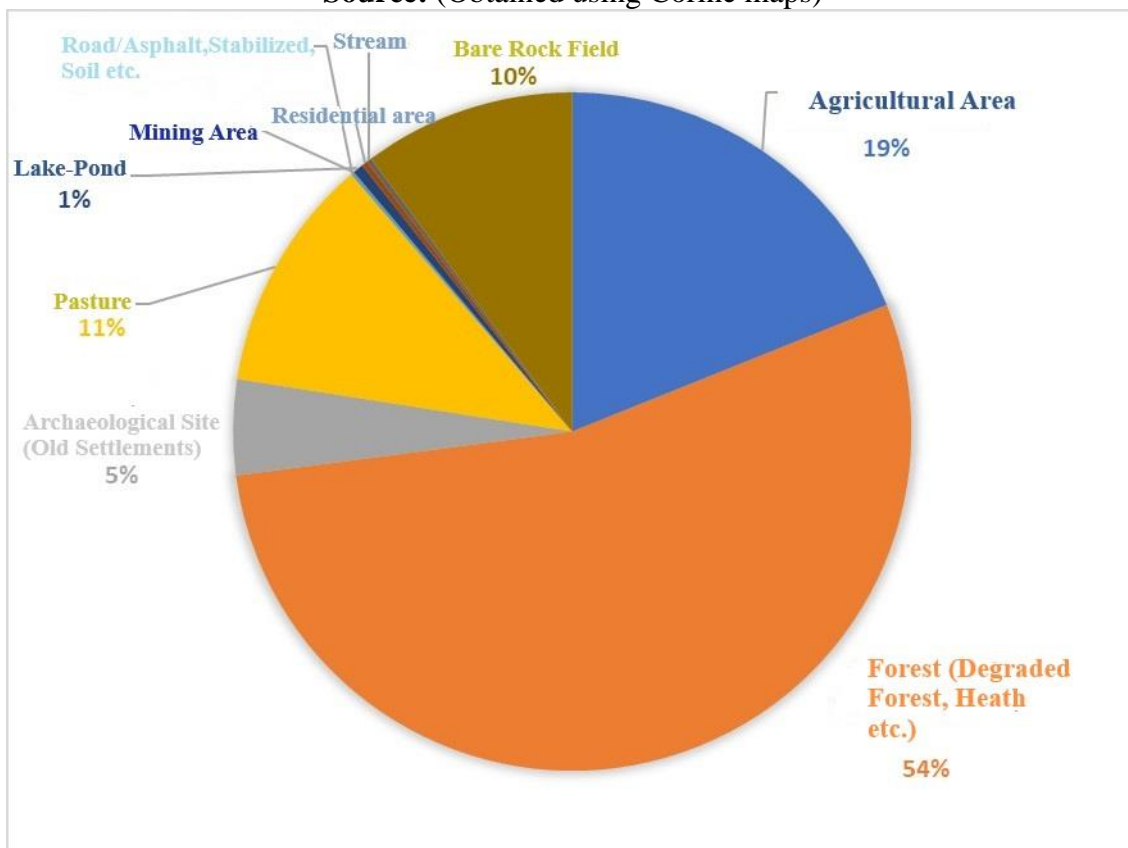
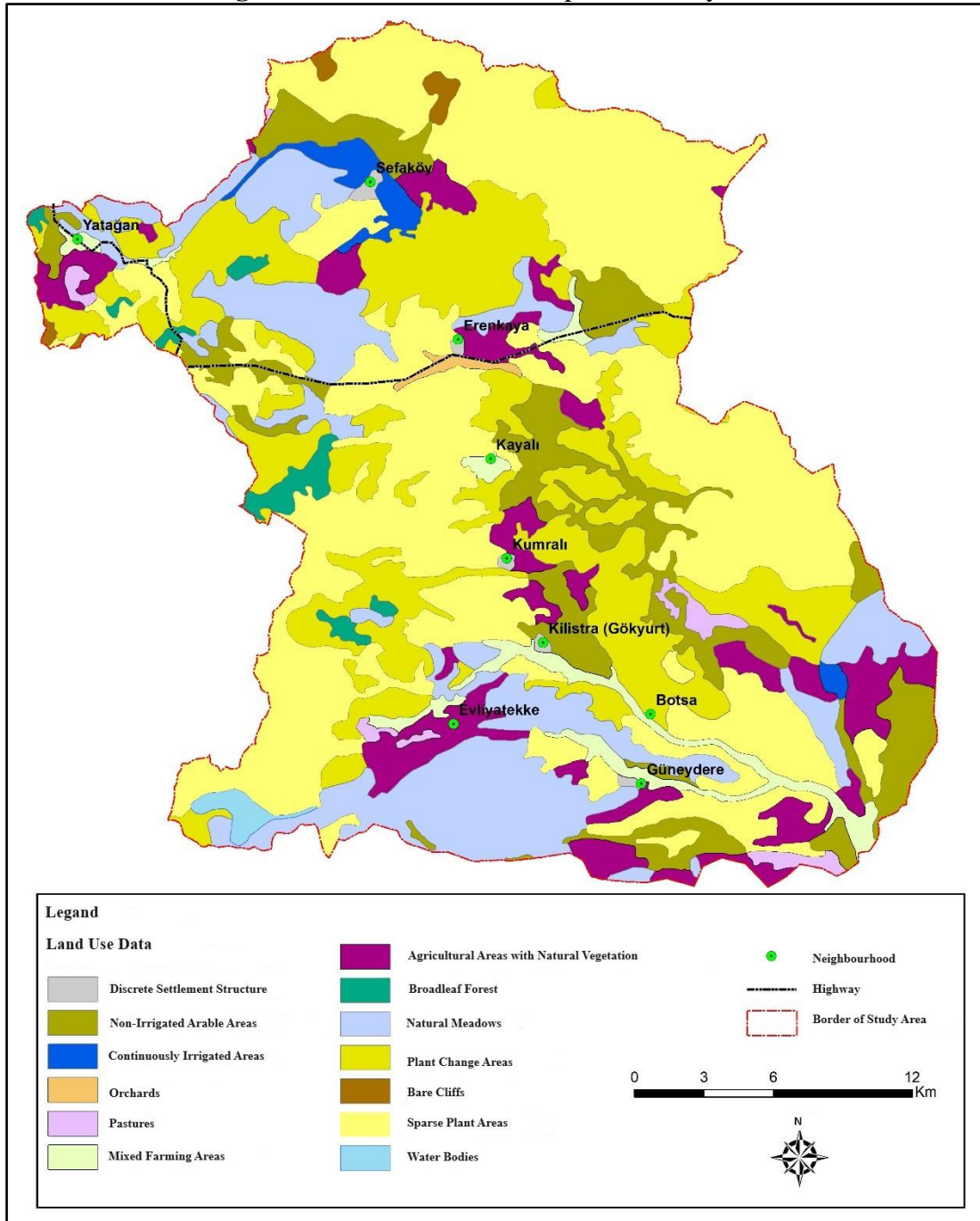


Figure 3. Study Area Land Use Proportional Distribution.

#### **4. Discussion and Conclusion**

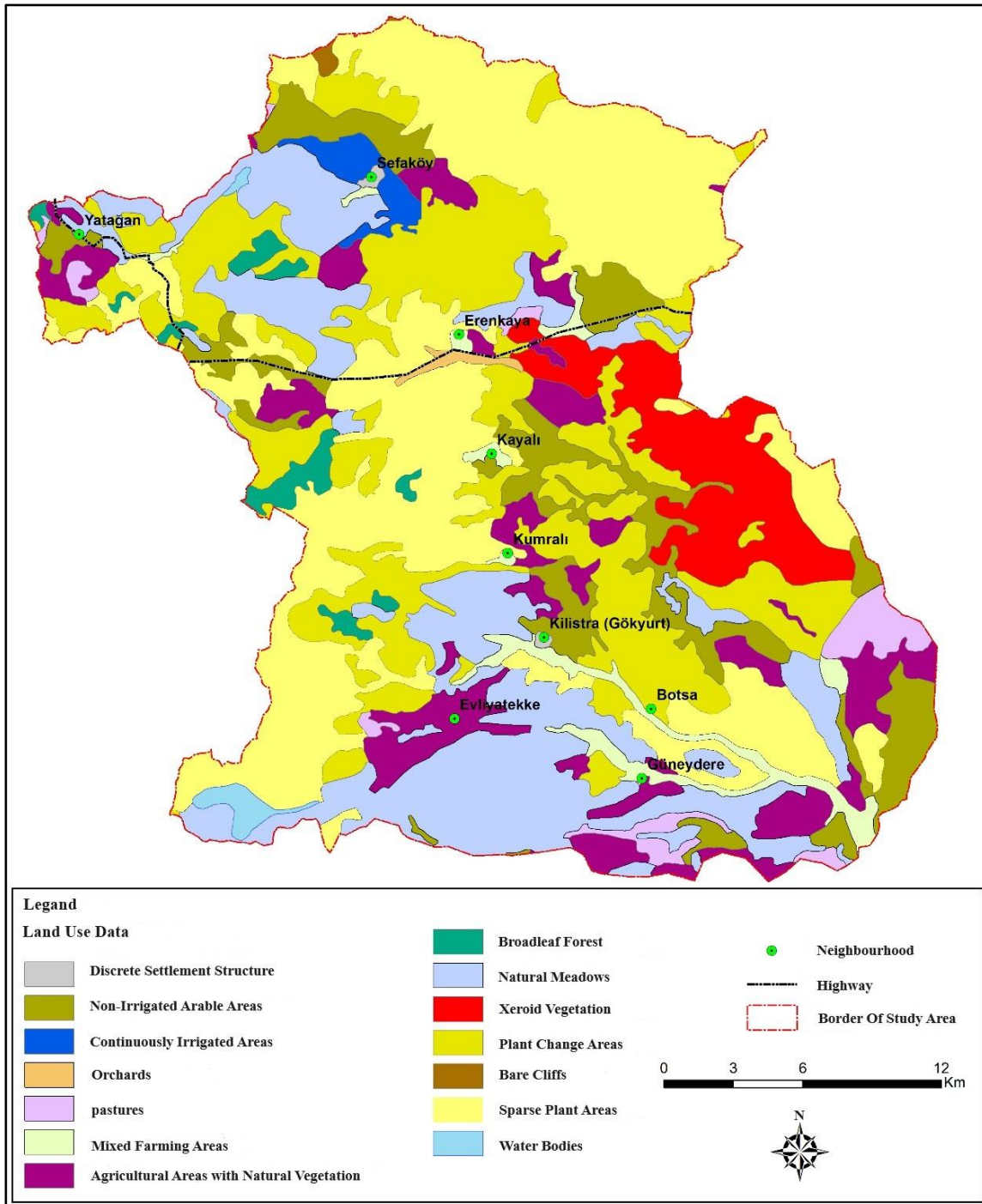
The study area has been evaluated as a cultural environment since historical times, has interacted with its environment, and this effect has had a direct or indirect effect on the geomorphology in the field. For example, the presence of large armies on the transit route or the establishment of camps caused human loss and weakening of the flora. In addition to the fact that the region suffered from water scarcity in ancient times (as understood by the construction of water collection areas), natural and anthropogenic erosion caused the landscape to develop on lithological features. Such impact in the work area; Gavur Lake, which is considered to be formed by artificial damming and the development of fairy chimneys on tuffaceous slopes in areas where vegetation is weakened, can be exemplified.

**Figure 4.** 1990 Corine data map of the study area.



Source: (compiled from <https://land.copernicus.eu>).

**Figure 5.** 2018 Corine data map of the study area



Source: (compiled from <https://land.copernicus.eu>).

**Table 2.** Table of change rates of land use in the research area between 1990 and 2018.

Change Value Name	Year 1990	Year 2018	Change

	Area (km <sup>2</sup> )	Ratio (%)	Area (km <sup>2</sup> )	Ratio (%)	Area(km <sup>2</sup> )
<b>Sparse Plant Areas</b>	216.27	39,3	156.81	28,5	59.45
<b>Plant Change Areas</b>	111.77	20,3	116.58	21,2	-4.81
<b>Natural Meadows</b>	79.58	14,5	96.52	17,6	-16.94
<b>Non-Irrigated Arable Area</b>	57.37	10,4	50.90	9,3	6.47
<b>Agricultural Areas with Natural Vegetation</b>	43.50	7,9	48.45	8,8	-4.95
<b>Mixed Farming Areas</b>	14.31	2,6	13.97	2,5	0.34
<b>Continuously Irrigated Areas</b>	6.72	1,2	5.70	1,0	1.01
<b>Broadleaf Forest</b>	6.55	1,2	8.40	1,5	-1.85
<b>pastures</b>	5.38	1,0	11.15	2,0	-5.77
<b>Water Bodies</b>	2.65	0,5	3.02	0,5	-0.37
<b>Bare Cliffs</b>	2.46	0,4	0.70	0,1	1.77
<b>Residential area</b>	1.72	0,3	0.68	0,1	1.04
<b>Orchards</b>	1.52	0,3	1.52	0,3	0.00
<b>Xeroid Vegetation</b>	0.00	0,0	35.39	6,4	-35.39
<b>Total</b>	549.8	100,0	549.8	100,0	-0.01

**Source:** (Created using Corine maps)

There is intense human intervention in the work area. These include, in particular, the concentration of commercial mining activities on the site, interventions that take place before the value research of the land and its elements is completed, or the failure to fully analyze the environmental impact assessment in works such as road construction.

## 5.Resources

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