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EVALUATION OF THE MOST APPROPRIATE PLANNING ALTERNATIVES FOR ATATURK FOREST FARM: ANALYTIC HIERARCHY PROCESS (AHP) AND FUZZY SET APPROACH

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Abstract

Due to urbanization pressure and unplanned uses, Atatürk Forest Farm (AFF) is currently facing various problems. The planning of AFF is of great importance in terms of solving these problems and preserving the original identity of the area and transferring it to future generations. This study aims to provide a basis for determining the most appropriate planning strategies for AFF. In the study, land characteristics were analyzed in detail within the framework of conservation, conservation-use and utilization strategies. Evaluations using Fuzzy and Analytic Hierarchy Process (AHP) techniques revealed the strengths and weaknesses of each strategy. Factors affecting the land were evaluated through criteria such as altitude, geological formations, soil structure, land uses, historical and cultural values, transportation facilities, ownership status, business opportunities, protection of biodiversity, development of recreational areas and support for agriculture and livestock. Each criterion was selected to understand the land use potential and to determine the most appropriate use of the area. In conclusion, when all factors were evaluated together, Alternative A was determined to be the most appropriate alternative. In this context, the proposed planning alternatives for the sustainable conservation and development of AFF have been comprehensively evaluated, considering social, environmental and economic dimensions.

Keywords: *AHP, Fuzzy Set, Atatürk Forest Farm, Urban Planning Strategies*

ATATÜRK ORMAN ÇİFTLİĞİ İÇİN EN UYGUN PLANLAMA ALTERNATİFLERİNİN DEĞERLENDİRİLMESİ: ANALİTİK HİYERARŞİ SÜRECİ (AHS) VE FUZZY SET YAKLAŞIMI

Özet

Atatürk Orman Çiftliği (AOÇ), kentleşme baskısı ve plansız kullanımlar sonucu günümüzde çeşitli sorunlarla karşı karşıyadır. AOÇ'nin planlanması bu sorunların çözümü ve alanın özgün kimliğinin korunarak gelecek nesillere aktarılması açısından büyük önem taşımaktadır. Bu çalışma, AOÇ için en uygun planlama stratejilerinin belirlenmesi adına bir altlık oluşturmayı amaçlamaktadır. Çalışmada, arazi özellikleri koruma, koruma-kullanma ve kullanma stratejileri çerçevesinde detaylı olarak analiz edilmiştir. Fuzzy Set ve Analitik Hiyerarşi Süreci (AHS) teknikleri kullanılarak yapılan değerlendirmeler, her bir stratejinin güçlü ve zayıf yönlerini ortaya koymuştur. Araziyi etkileyen faktörler; yükseklik, jeolojik oluşumlar, toprak yapısı, arazi kullanımları, tarihi ve kültürel değerler, ulaşım olanakları, mülkiyet durumu, iş olanakları, biyoçeşitliliğin korunması, rekreasyon alanlarının geliştirilmesi, tarım ve hayvancılığın desteklenmesi gibi kriterler üzerinden değerlendirilmiştir. Her bir kriter, arazi kullanım potansiyelini anlamak ve alanın en uygun kullanımını belirlemek için seçilmiştir. Çalışma sonucunda tüm faktörler bir arada değerlendirildiğinde, Alternatif A en uygun alternatif olarak belirlenmiştir. Bu bağlamda, AOÇ'nin sürdürülebilir korunması ve geliştirilmesi için önerilen planlama alternatifleri sosyal, çevresel ve ekonomik boyutlar dikkate alınarak kapsamlı bir şekilde ele alınmıştır.

Anahtar Kelimeler: *AHS, Fuzzy Set, Atatürk Orman Çiftliği, Kentsel Planlama Stratejileri*

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1. INTRODUCTION

The rapid increase in the world population promotes the pressure on natural resources day by day. Therefore, it becomes important to plan and implement sustainable activities for land use. Every step taken for development also brings along various environmental problems. In our country, the misuse or uncontrolled and unplanned use of productive agricultural areas causes irreversible loss of land. The amount of land (I, II, III class) lost in this way has reached 573,239 ha (Cangir et al., 1998). For this reason, it has become imperative to implement decisions on land use according to the results of land assessment and utilization planning studies. One of the most important lands of our country is Atatürk Forest Farm (AFF). Atatürk Forest Farm is a settlement that has defined and designed the scope and nature of the "modernity project" on a small scale with all its details, from the choice of the location where it was established to the organization of agriculture, industry, production and entertainment (Keleş, 1990; Dengiz et al., 2006).

The Atatürk Forest Farm (AFF) has been established as a comprehensive agricultural production complex serving the city of Ankara. Initially, Atatürk has acquired a 20,000-decare tract of land, after which neighboring farm owners have sold their properties to be incorporated into the facility (Keskinok, 2007). To increase land productivity, river regulation projects have been carried out, and swamp areas have been drained. Prior to the start of production, detailed soil analyses have been conducted (Kılınç, 2019). Various tree species have been planted to form forested areas, alongside the creation of orchards and vegetable gardens (Kılınç, 2019). Livestock farming has been initiated, and activities such as apiculture and poultry farming have been added as complementary components. To support production, factories for milk processing, malt, mineral water, brewing, and winemaking have been constructed. The farm has produced a wide range of products, including yogurt, butter, meat, vegetables, soda, cheese, honey, and eggs. The reforms introduced have significantly increased both the diversity and volume of production. In addition, seedlings, seeds, and breeding animals from the farm have been distributed to rural farmers to promote agricultural development (Dinçer, 2008). The products have been marketed locally in both Ankara and Istanbul. The farm's production and management model became a significant symbol of the city's social life, economic development, and urban structuring—uniting producers organized through cooperatives with a consuming community—serving as an exemplary model for the rest of the world (Dinçer, 2008).

This urban space has been subjected to managerial and spatial transformations due to changing administrations over time and has been subjected to land loss since Atatürk's death by being converted to different functions than Atatürk's will, which stipulated that it should be preserved and operated within the framework of its founding purposes (Armangil, 1975).

After 1938, various governmental institutions, as well as public and private corporations, have begun to occupy lands originally designated as part of the Atatürk Forest Farm (AFF) (Öztoprak, 2008). As the city of Ankara has expanded westward, AFF is no longer situated outside the city limits; instead, it has become surrounded by newly developed urban areas. Given the farm's strategic location in line with the city's growth direction, the lands have become increasingly attractive. Consequently, many companies have shown interest in renting or purchasing portions of the property. In the early 1990s, AFF lands have been given a new protection status to prevent the process of fragmentation with the decision of the Ankara Metropolitan Municipality. Especially, in 1992 and 1998, the Atatürk Forest Farm (AFF) has been declared a first-degree protected cultural heritage site. This designation has temporarily halted the fragmentation and degradation of its lands (Öztoprak, 2008). One of the reasons AFF has gradually been sold off without much public resistance has been the lack of awareness among citizens regarding the significance and value of the land. The careful and systematic production practices that have characterized the early years of the farm have not been maintained in subsequent decades (Kimyon & Serter, 2015). As urban expansion has become a priority, infrastructure projects such as new roads constructed through AFF lands have been largely accepted by the public, as they have been perceived as solutions to the city's growing traffic problems. During the 1990s, shopping malls have begun to proliferate and attract increasing numbers of people (Dengiz et al., 2006). Consequently, public life has shifted indoors, and people's connection to land, nature, and agricultural production has weakened. This shift has disrupted the once-sustained balance between production and consumption in Ankara. In the 2000s, this change and transformation have gained momentum, and AFF has begun to be seen and used as a reserve area for urban development by administrations and various other actors with the influence of neoliberal policies. The reason for this transformation of AFF, which can be characterized as negative, has been that participation mechanisms

within the framework of governance in spatial planning processes have not been effectively implemented (Cangir et al., 1998; Keleş, 1990). Since 2006, one of the major points of contention has been the changes made to the protection status of Atatürk Forest Farm (AFF) lands (Gürkan, 2019). The protection level of certain areas has been downgraded from first-degree to third-degree, while some zones have lost their protected status entirely. Although these decisions have been legally challenged, such efforts have not been sufficient to prevent large-scale constructions and irreversible damage. Over time, green spaces have been lost due to the increasing pressure of urban development. Trees have been cut down, agricultural activities have been discouraged, and the societal value of production has gradually diminished. As a result, AFF has become surrounded by highways and has ultimately lost its unique identity (Kaçar, 2010).

Since AFF is a 1st degree natural and historical protected area (DDK Report, 2003), it is an integral part of the farm. First of all, a vision of AFF regarding natural and historical conservation must be established, and therefore a balance of use, conservation-use and utilization must be observed. At this point, a special law numbered 5659 was enacted for AFF on 24.3.1950 (Tekeli, 1987). According to this law, "the transfer and assignment of the real estates within the boundaries of Atatürk Forest Farm on the date of the publication of the law to real or legal persons and their expropriation are subject to obtaining permission by a special law" (DDK Report, 2003). On the other hand, despite this special law, Atatürk Forest Farm continued to be fragmented during this period, which meant that the land was no longer functionally integrated due to the deterioration of its geological and topographical structure, slope and soil characteristics, surrounding land use pattern and historical-cultural values (Açıksöz & Memlük, 2004). Aycı (2017) categorizes the events that determined the fate of AFF, which can also be defined as breaking points, into three different periods according to changes in the form of administration. The first period covers the period between 1925 and 1937, when Atatürk ruled as the sole will of the state; the second period covers the period between 1938 and 2006, when it was managed by the state under the pressure of military coups, free market economy and neoliberal policies; and the third period covers the period from 2006 onwards, when it was managed by transferring unlimited powers to local and central governments through laws. These ruptures started to change the planning system of the region (Aycı, 2017; Açıksöz & Memlük, 2004). This situation has greatly affected both the bio-physical and socio-cultural structure of the place.

1.1. Bio-physical Environment and Problems

1.1.1. Soil Properties

Soil capability classes in AFF land assets are classified from Class I to Class VIII. Since Class I, II and III agricultural lands are generally concentrated in the regions where the Ankara Stream flows, agricultural production is emphasized in these regions (Akıner & Akıner, 2020). Classes IV, V and VI generally include meadow, pasture and afforestation areas (Ankara Metropolitan Municipality, 2011). Afforestation and public use areas to be built in line with the soil structure are in this region (Akalan, 1981). When the general soil structure of AFF is examined; "salinity, alkalinity and lack of drainage", which are important limiting factors that reduce the productivity of agricultural areas and even lead to extreme levels of inefficiency, stand out (Ateş, 1989). Inadequate drainage, salinity and alkalinity prevent the oxygen uptake and development of plant roots. The fact that these factors limiting production are mostly seen in flat and nearly flat alluvial areas and that they can be improved ensures that expensive reclamation works in areas with salinity, alkalinity and drainage problems remain at an economic level (Ateş, 1989; Ankara Metropolitan Municipality, 2011; Akalan, 1981).

Alluvial formations are suitable regions for plantation and agriculture. Since certain portion of the AFF Land is located on two sides of Ankara Stream, those areas show alluvial character and highest degree soil capacity (Erol, 1973). The north-east section of the alluvial formation, which is now used as an amusement/theme park, is physically limited by two highways namely Istanbul and Ankara Boulevards. Although the surface soil was cleared away for the construction of the theme park, the layers of alluvial sediments and hydrological assets still exist (Erol, 1973). They can be used for repairing and claiming agricultural coverage. The north-west section, on the other hand, remains more secluded owing to hills and railway lines which are physically defining the area (Figure 1).

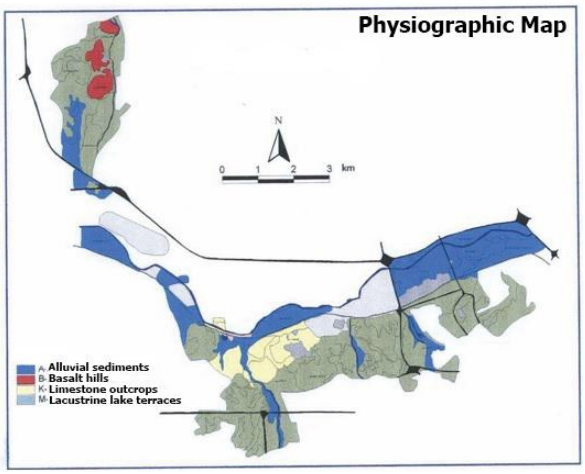

Figure 1. Physiographic map of AFF (Ankara Metropolitan Municipality, 2006)

The main objective in agricultural production is to obtain as much and good quality products as possible from cultivated lands (Class I, II, 111) (Akalan, 1981). To achieve this goal, first of all, it is important to take cultural measures to increase the fertility of soils (Figure 2).

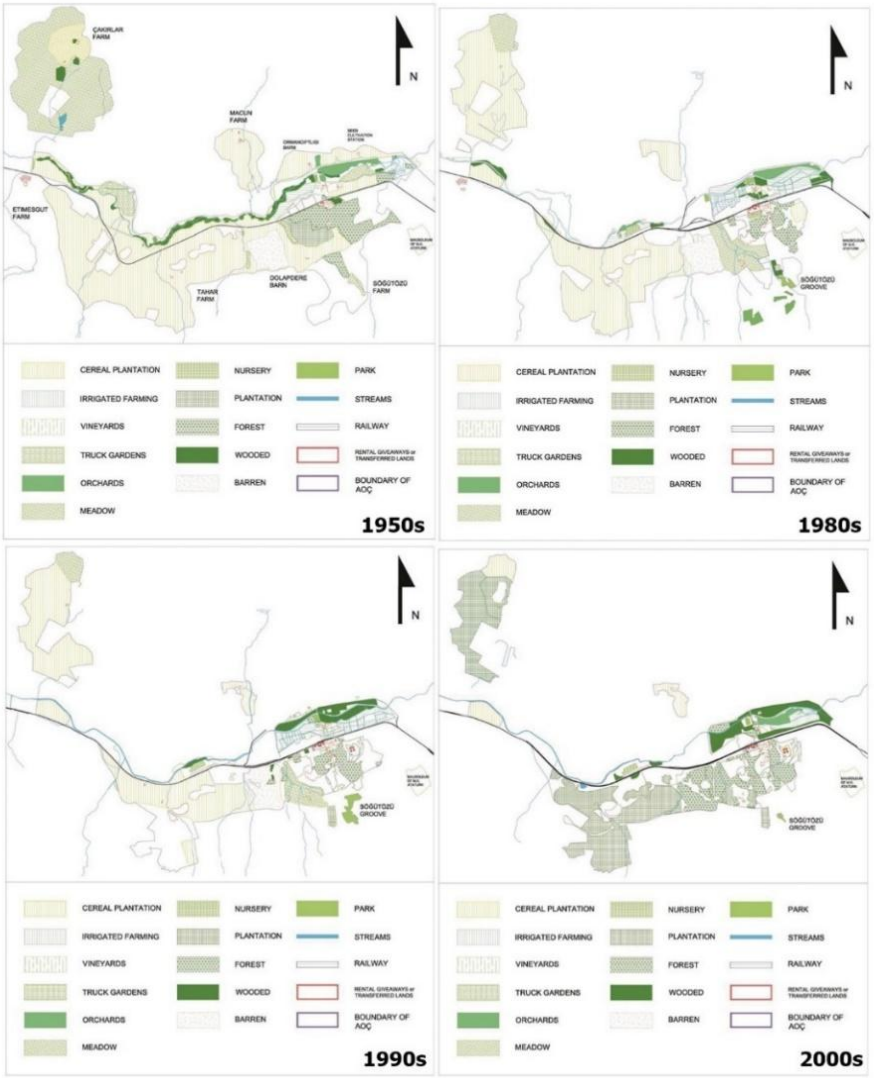

Figure 2. Agricultural cover of the Atatürk Forest Farm (Reproduced by the author from Çavdar Sert, 2017)

Figure 2 presents the land cover changes observed at AFF between the 1950s and the 2000s. The results of this mapping study indicate a significant decline in agricultural land, which has been progressively replaced by plantation areas over the examined period.

1.1.2. Geological Structure

The geological character, climate and water resources are the main factors in determining the location of settlements and urban form. According to Akçura (1971), Ankara is located in the habitable zone between Central Anatolia and the mountains separating the region from coastal regions. This mountain zone offers certain opportunities which are water supply, moderated climate, accessibility of agricultural land and military defense (Akçura, 1971).

In the planning area, there are geomorphologic units such as Valley Floor Plains (VT), Low and High Tablelands (SA, SY) and Hill Land. Valley Floor Plains are not suitable for use as settlement and industrial areas since the ground water is close to the surface (Ankara Metropolitan Municipality, 2011). It is used as a transportation area. Low benches are part of the old alluvial land. They are continuously sought-after surfaces in terms of settlement. The high benches, on the other hand, are inadequate in terms of settlement opportunities, but there are hilly lands to the west and northwest of the cement factory (Ankara Metropolitan Municipality, 2011). Due to the high number of alluvial, filling and clayey surfaces in the area and the fact that the old filling areas are very scattered and uncertain, the utilization strategy in these areas should be evaluated in a healthier way. In these areas, large volumetric changes should be expected in the clayey parts due to regional precipitation and temperature changes (Keskinok, 2000) (Figure 3).

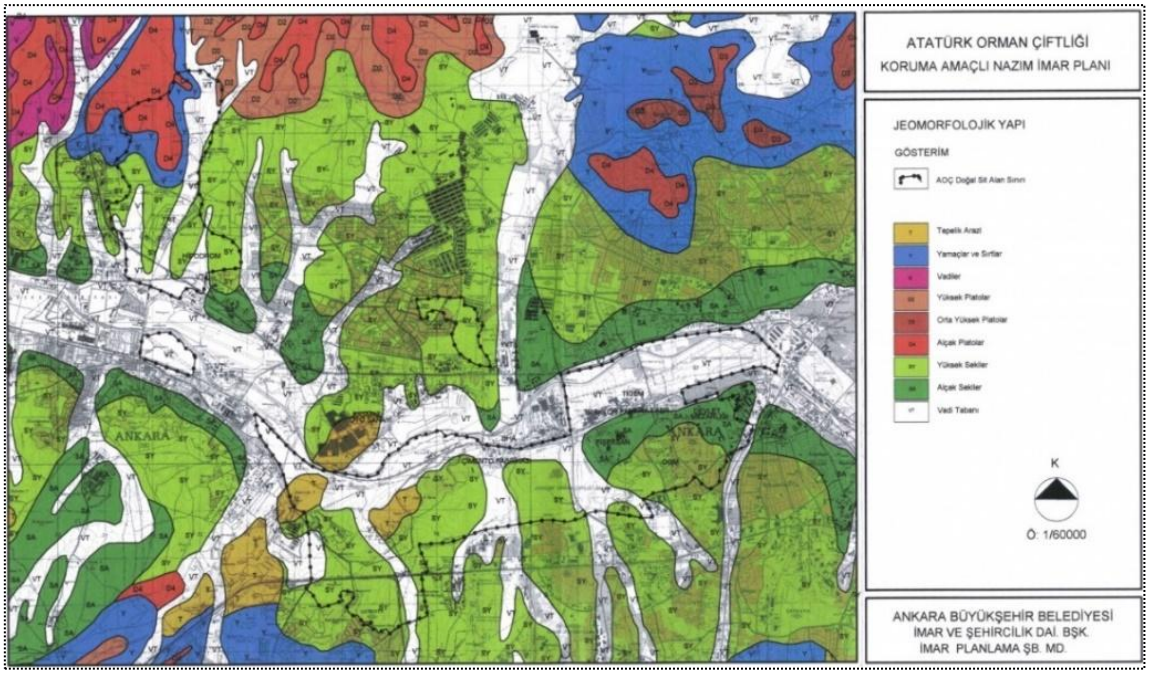

Figure 3. Geological structure of AFF (Ankara Metropolitian Municipality, 2018)

According to geological map of AFF, a substantial portion of the AFF area is characterized by valley floor topography. These valley floors are primarily composed of fluvial deposits, including pebbles, sand, and clay, and are classified as undissected alluvial flats (Ankara Metropolitan Municipality, 2006). Due to the shallow depth of the groundwater table, the area is prone to subsidence, which poses a persistent geotechnical risk. Valley floors are also environmentally sensitive zones, particularly vulnerable to water and air pollution. In light of these characteristics, such areas are more suitable for agricultural activities—such as orchards, vineyards, and vegetable farming—as well as for open-space uses like parks and sports facilities, rather than for residential or industrial development. Notably, these valley floors exhibit high potential for irrigated agriculture. Beyond the valley floors, the remaining land consists of lower and higher terraces, along with a series of hills. These terraces are remnants of former alluvial plains, now incised by stream valleys. Compared to valley floors, lower terraces have a reduced groundwater supply; however, the quality of groundwater is relatively higher (Erol, 1973). Moreover, these areas are not exposed to the risk of flooding. As such, lower

terraces are well-suited for vegetable gardens, pasturelands, and reforestation efforts. Higher terraces, by contrast, are appropriate for dry farming practices. Although the availability of groundwater may be abundant in some parts, the steeper slopes of these terraces are more appropriate for livestock grazing due to limitations for crop cultivation (Erol, 1973).

1.2. Socio-cultural-economic Situation and Problems

1.2.1. Near Surrounding Land Use-Historical Values and Ownership Status

The AFF land can be considered as a continuous system of public open spaces along the east-west axis, forming a large part of the city. This large system of open spaces is owned by military areas, public institutions and organizations, universities, the Sugar Factory and AFF (Alpagut, 2010) (Figure 4).

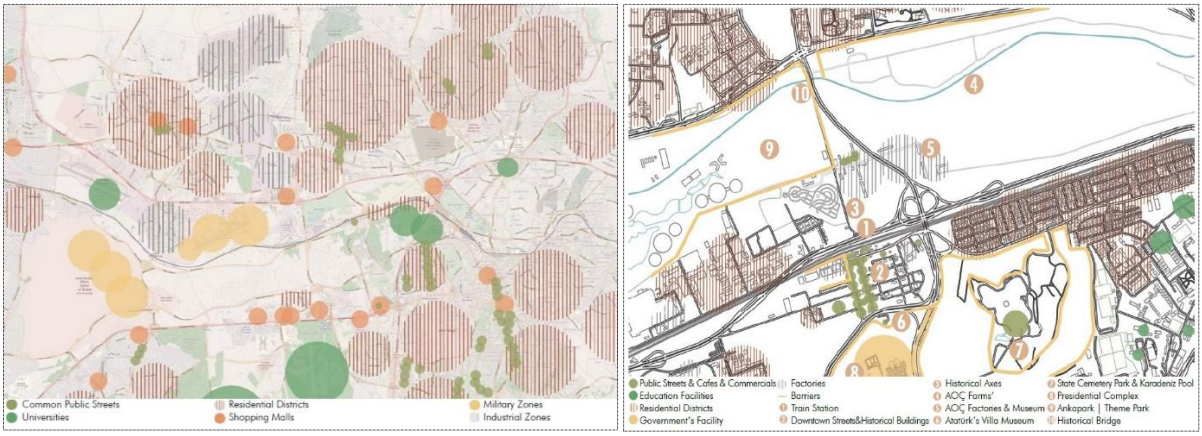

Figure 4. Land use and function analysis of AFF (Gürkan, 2019)

On the other hand, the functions in the AFF area are disjointed and complex. The lands transferred to various public institutions and organizations and private individuals have destroyed the integrity of function and the farm has turned into a fragmented structure due to the losses that have occurred over the past period, which has made the land difficult to operate (Özdemir & Varol, 2023; Alpagut, 2017) (Figure 5). In addition, it is clear that in order for the recreational areas in AFF to fulfill their functions, it is necessary to re-examine the characteristics of the protected area.

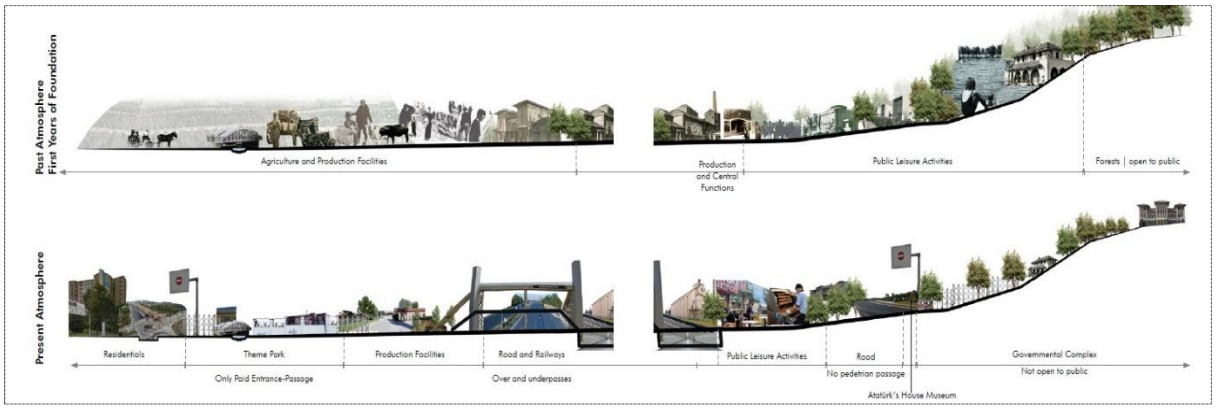

Figure 5. Conceptual section in AFF downtown (Gürkan, 2019)

1.2.2. Socio-economic Situation

Most of the land is used for agriculture and animal husbandry. However, due to the transfer of the agricultural production function to other institutions and its allocation to other uses, it is observed that wrong and unplanned decisions have been made for both the city and Atatürk Forest Farm. In addition, the parks and forest areas within the land have been one of the recreational areas of interest for the people of Ankara (Figure 6).

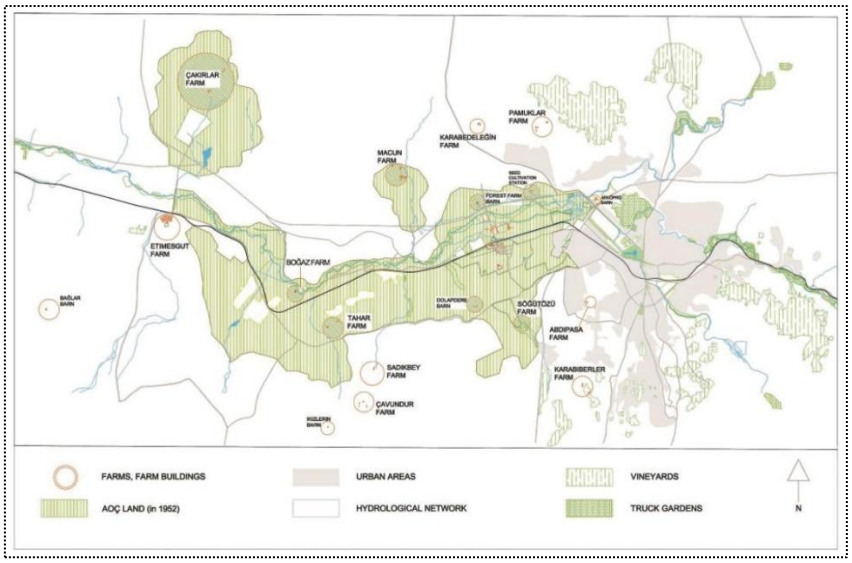

Figure 6. The farm structures in the AFF land and other private farms (Çavdar Sert, 2017)

However, in recent years, due to the increase in crowds, they have lost their characteristic of being recreational areas (Kimyon & Serter, 2015). In addition to recreation services, healthy and cheap food is also offered within the land. Industries producing milk and dairy products and fruit juice are located within the farm (Kimyon & Serter, 2015; Alpagut, 2010). On the other hand, the land in the middle of the city has become increasingly unsuitable for crop production and animal husbandry activities.

1.2.3. Transportation

Since Atatürk Forest Farm is located in the middle of urban transportation arteries, it is impossible to talk about land continuity and integrity. Due to its location in the western development corridor and the opening of the Istanbul-Eskişehir transportation artery, the farm has lost both its functional and physical integrity (Figure 7). In this sense, it is important to determine the transportation strategy of the land.

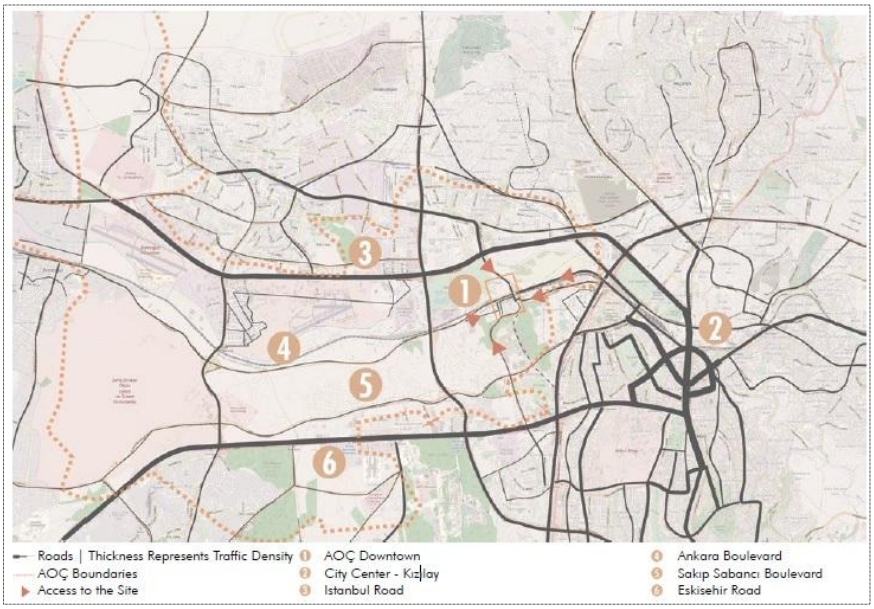

Figure 7. Accessibility analysis of AFF (Gürkan, 2019)

The primary aim of this study is to develop a scientifically grounded planning approach for the Atatürk Forest Farm (AFF), an area that holds significant ecological, historical, and cultural value. As a result of increasing urbanization and shifting land use demands, AFF faces conflicting functional pressures, highlighting the urgent need for a comprehensive strategy that balances conservation and sustainable development. In response to

these challenges, the study evaluates AFF through three strategic planning approaches: **conservation, conservation–use**, and **utilization**. These strategies aim to preserve the area's landscape character, support ecological integrity, and ensure its continuity for future generations.

To determine the most suitable land use alternatives, the study takes into account a range of biophysical and socio-economic factors—including altitude, geological formations, soil, surrounding land uses, historical values, transportation, ownership status, job opportunities, protection of biodiversity, creation of recreational areas, and agricultural and livestock support. Recognizing that the relevance of these factors varies depending on the specific planning objective, **suitability maps** were generated for each strategy. In this context, **Fuzzy Set Theory** and the **Analytic Hierarchy Process (AHP)** were employed as multi-criteria decision-making tools to systematically assess and compare planning scenarios. The central research question guiding this process is as follows: **How can the most appropriate planning strategies for the Atatürk Forest Farm be identified using integrated multi-criteria analysis methods such as Fuzzy Set Theory and AHP?**

2. MATERIALS AND METHOD

2.1. Materials

The study area is Atatürk Forest Farm (AFF), which was established with a sustainable urbanization project dating back nearly 100 years (Figure 8).

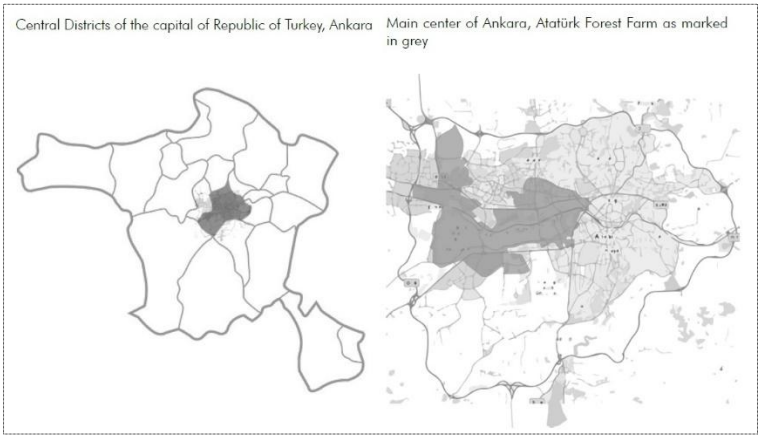

Figure 8. Location of AFF in Ankara (Ankara Metropolitian Municipality, 2018)

Although AFF was designed as part of the green belt in Ankara's initial plans, over time it has lost its agricultural and green areas within the city. However, AFF has significant potential for Ankara on a larger scale. The green belt is negatively affected by the development of the old hippodrome and Atatürk Forest Farm lands, which are part of the land complex comprising Gençlik Park, the old Hippodrome, Atatürk Forest Farm, Middle East Technical University, Hacettepe University, and Bilkent University, which serve as Ankara's ventilation corridor (Aycı, 2017). This interruption in the green belt has not only weakened its ecological features, such as the air corridor, but also the public relationship between AFF and the city (Aycı, 2017).

Looking at the historical process, actions for a planned development of Atatürk Forest Farm in order to give it a contemporary appearance started in the 1930s. This period coincides with the period of 1927-1940, when the modernity project gained momentum in Ankara's architectural environment with the contributions of architects from German-speaking countries and the search for modern architectural styles (Alpagut, 2010). At the beginning of 1925, Atatürk Forest Farm was established as a 20,000-acre land consisting of steppe and swamp, located five kilometers away from Ankara, through which the Ankara-Eskişehir train route passed (Aydoğan, 2012) (Figure 9). From the correspondence between the Directorate of Atatürk Forest Farm and the Presidency, it is understood that Egli was very influential in the initial planning in the 1930s, determining the locations of the new buildings and preparing their projects (Alpagut, 2010) (Figure 10 and Figure 11).

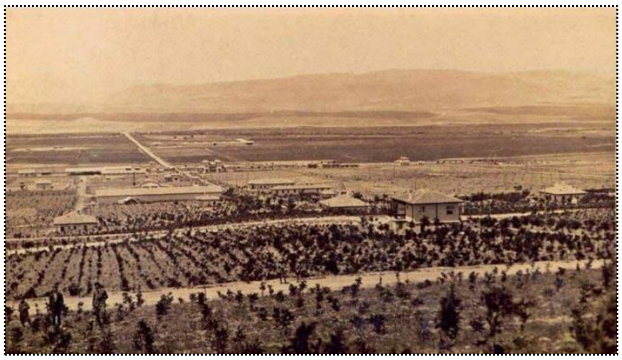

Figure 9. Atatürk Forest Farm, general view, 1920s (Tunalı, 2007)

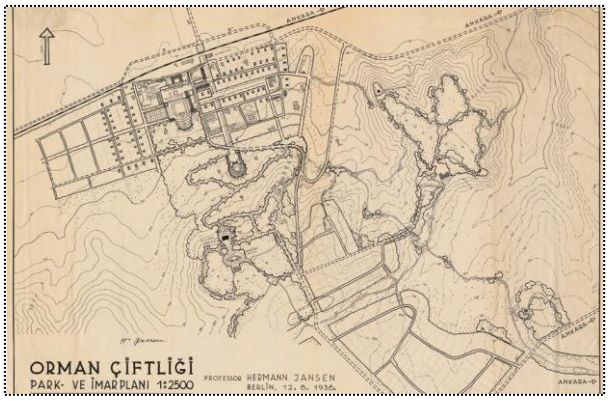

Figure 10. AFF Park and zoning plan (1:2500) (Jansen, 1936)

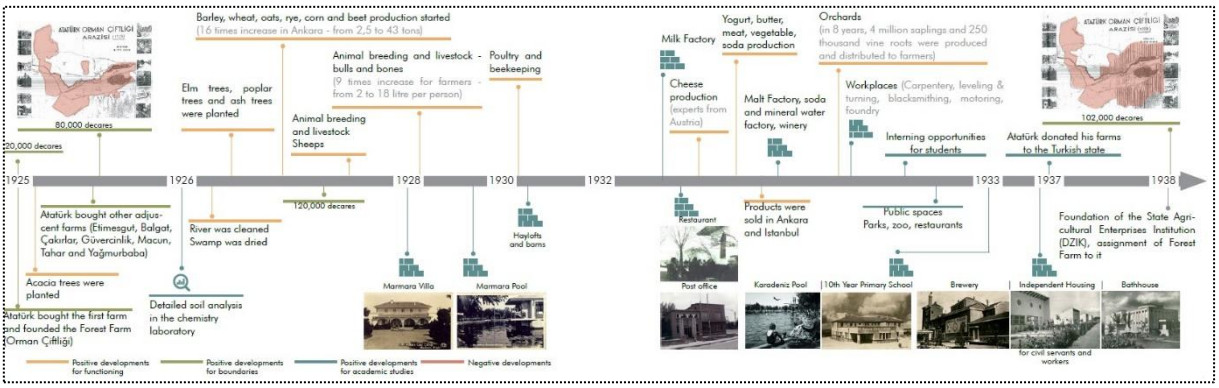

Figure 11. Timeline of AFF between 1925-1937 (Gürkan, 2019)

Between 1940-48, most of the land allocated from AFF was given to public uses and institutions for agriculture, industry and communication. In the 1960s, the land allocation of AFF accelerated, 1253 hectares of land continued to be transferred to other institutions, and this fragmentation continued in the 1970s – 80s. In relation to the concept of "urban agriculture", AFF also has functions such as providing food, labor force, education and recreation opportunities (Özdemir & Varol, 2023). In terms of the purpose of its establishment, it was designed to provide food products, education and employment opportunities in the urbanization process. On the other hand, although the "Atatürk Forest Farm Law", which is the founding law of the farm, aims to manage the lands in accordance with the founding purposes and to prevent land losses, the Farm could not withstand the pressure of urbanization due to factors such as the management strategy and administrative structure of the Farm and the fact that it was located in the city center due to the growth of Ankara city due to population growth, and it started to shrink rapidly by turning into different uses (Özdemir & Varol, 2023) (Figure 12).

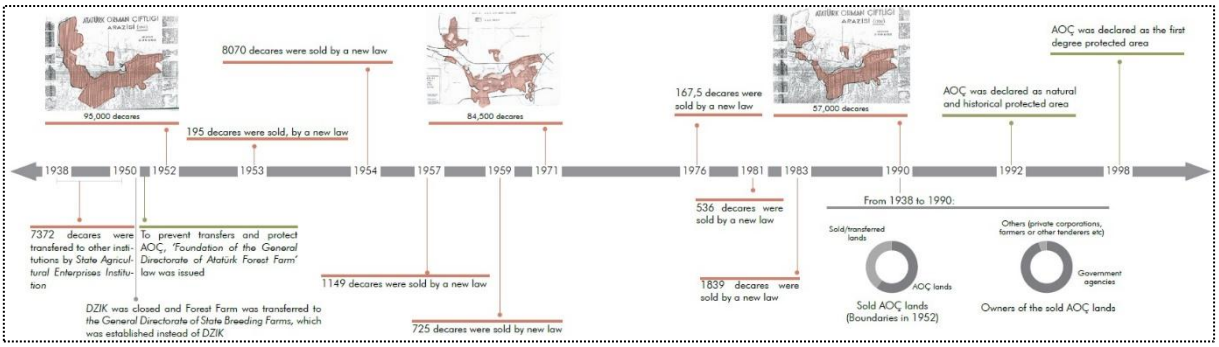

Figure 12. Timeline of AFF between 1938-1998 (Gürkan, 2019)

Today, the AFF land, which belongs entirely to the treasury and the public, is being lost due to ongoing interventions that are contrary to the conditions of private use and exceptional ownership. These interventions are facilitated by legal and administrative changes, planning practices, and conservation decisions. Where these tools and hegemonic discourses reach an impasse, change is sustained through the use of coercive and institutional power. The process of seizing and transferring public lands and public assets, carried out in collaboration between the government and capital, is proceeding in a neglected manner in AFF and its surroundings. Additionally, AFF is facing the issue of the commodification of public spaces. These interventions, which are leading to physical destruction, are also causing identity and functionality issues at AFF. Essentially, this is a process that has been ongoing since 1937, resulting from the severing of the production-consumption unity that was part of the original design of AFF and the erosion of the rural-urban unity. As a result of all these developments, AFF has become an area where production is not carried out, unlike in the old days when it was associated with production, but rather consumption is encouraged (Figure 13).

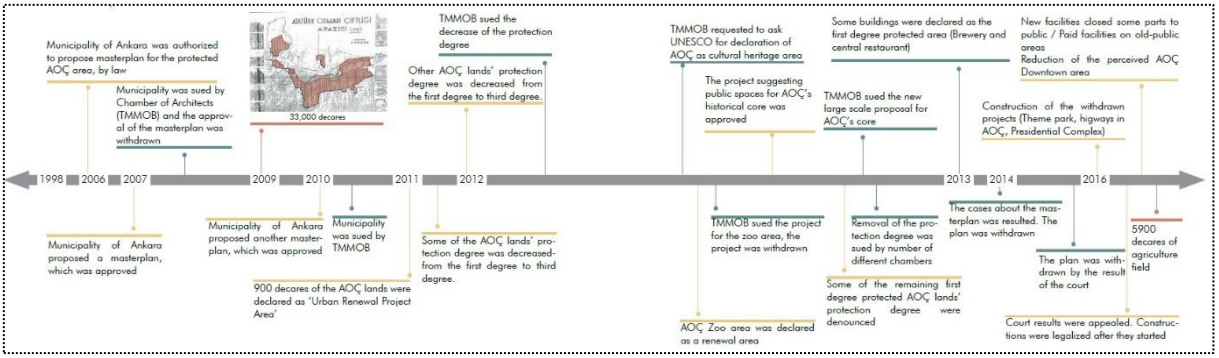

Figure 13. Timeline of AFF between 1998-present (Gürkan, 2019)

In summary, AFF is an area that is being strategically destroyed by the state. By eroding, altering, and transforming both the ownership status/characteristics of the area and the protection decisions, the use and ownership of AFF lands are being changed, ultimately leading to the loss of AFF as a whole (Figure 14).

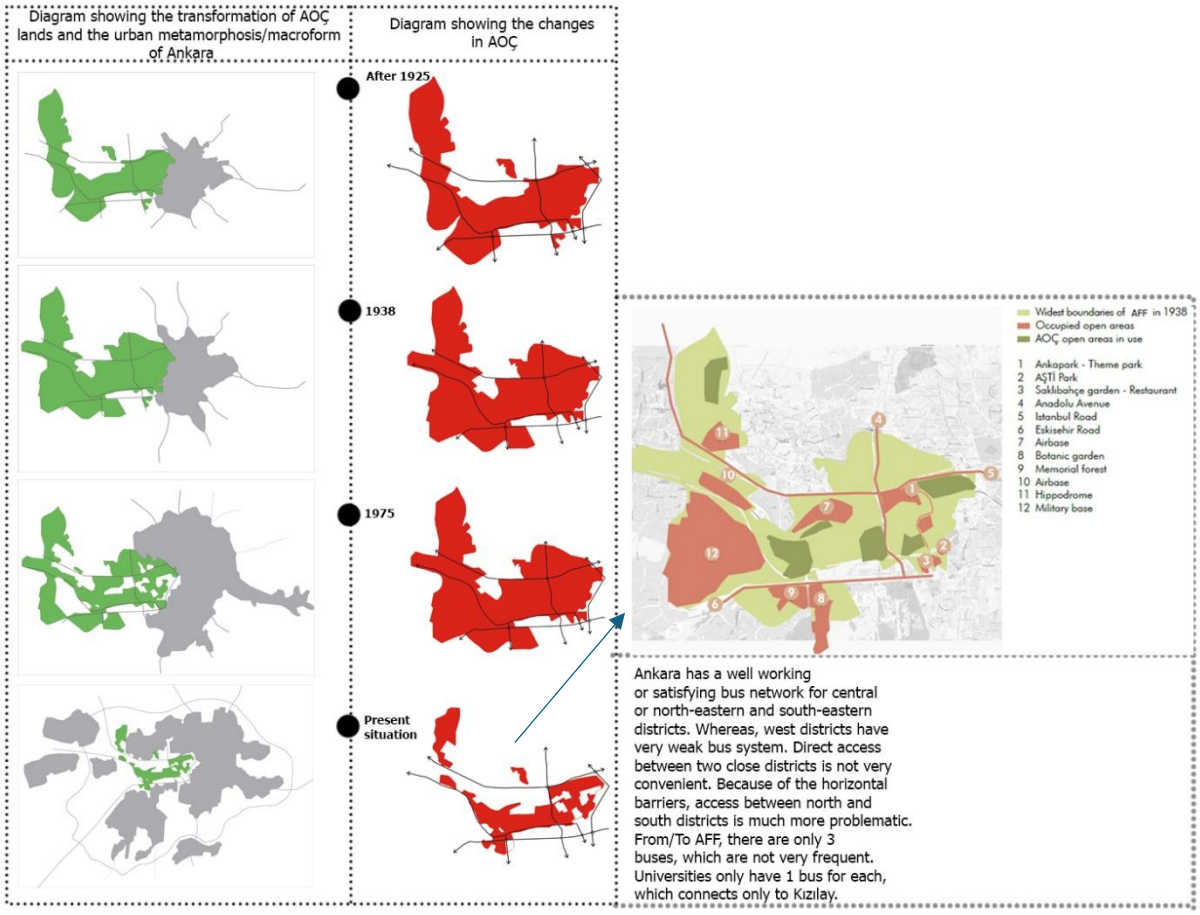

Figure 14. Diagram showing the macroform of AFF (Reproduced by the author from Kimyon & Serter, 2015; Gürkan, 2019)

2.2. Method

2.2.1. Research Design

Within the scope of the study, land use strategies were evaluated by associating Fuzzy Set and Analytic Hierarchy Process (AHS) techniques through a survey. The results of the expert group survey consisting of academicians (15 people) working in Landscape Architecture Departments in Turkey and having knowledge about the study area constitute the main material. In this context, the participants were first asked to compare the factors related to natural, historical-cultural and land use objectives and policies with each other in terms of importance and then to compare each factor with the alternative types (A, B, C).

2.2.2. Development of Space Utilization Strategies

Considering the factors and problems related to natural, historical-cultural and land use objectives and policies in the development of land use strategies, evaluating Atatürk Forest Farm in terms of three basic strategies consisting of conservation, conservation-use and utilization will allow the landscape composition of the land to change and the intensity of land use to increase. Due to changes in the intensity of use and recreational areas, it was investigated what type of decisions would be effective for Atatürk Forest Farm,

1. Preservation of heritage, collective memory, biodiversity and historical values, and the restoration of institutional functions,

2.Meeting the recreation needs of the people of Ankara,

3. Preservation and utilization of job opportunities in agriculture and animal husbandry in Atatürk Forest Farm,

To support the economic structure of the land, 3 alternatives have been developed with the aim of giving importance to agriculture and animal husbandry.

- Alternative A: Conservation

Since its establishment, Atatürk Forest Farm has been declared as a first degree historical and natural protected area and its boundaries have been determined. In this sense, it is one of the areas that need to be protected and encompasses economic, social and sustainable development alternatives. In this case, the evaluation of the conservation strategy in terms of natural, historical, cultural and land use factors will be important for the transfer of the land to the future. In particular, in recent years, increasing crowding and changes in the landscape have had a negative impact on both biodiversity and soil, slope or geological formations. A strategy for nature-biodiversity conservation and historical-cultural conservation areas will help to prevent further degradation.

- Alternative B: Conservation-Use

It is important to evaluate the areas of the AFF land where agricultural production is carried out (milk factory, wine-honey factory, etc.) and which are within the protected area, in terms of both conservation and utilization strategies, both for the continuity of the socio-economic situation and for the protection of the protected areas. According to the decision of the High Supervisory Board, in order to prevent further loss of land and to prevent further occupation, the existing land should be forested and reforested with ecologically suitable native species, thus becoming an open-air and agricultural museum and under protection. In this case, this strategy is valuable in terms of both conservation and utilization.

- Alternative C: Utilization

Especially when factors related to land use objectives and policies are taken into consideration, it is clearly seen that job opportunities are decreasing and the use of recreational areas continues to be destroyed day by day due to the transfer of land uses to other institutions and organizations. The open-green areas along the east-west axis in which Atatürk Forest Farm is located are adversely affecting the farm due to the prevailing winds. Considering the transportation factor, it has been determined that since the land is located in the middle of the transportation arteries, it causes some difficulties for urbanites to reach this land and does not create a functional integrity in the land. In this case, determining the utilization strategy will be important to solve these problems. To analyze and evaluate these three alternatives, the data obtained from the study area were grouped in accordance with the Fuzzy Set technique to be used in determining the most appropriate planning strategy.

Determination of the most appropriate planning strategy was analyzed according to three basic factors. These are

- Natural Factors
- Historical-Cultural Factors
- Factors Related to Land Use Objectives and Policies.

These factors were divided into sub-factors, and a ranking was created for the three alternatives from the top to the bottom (Figure 15).

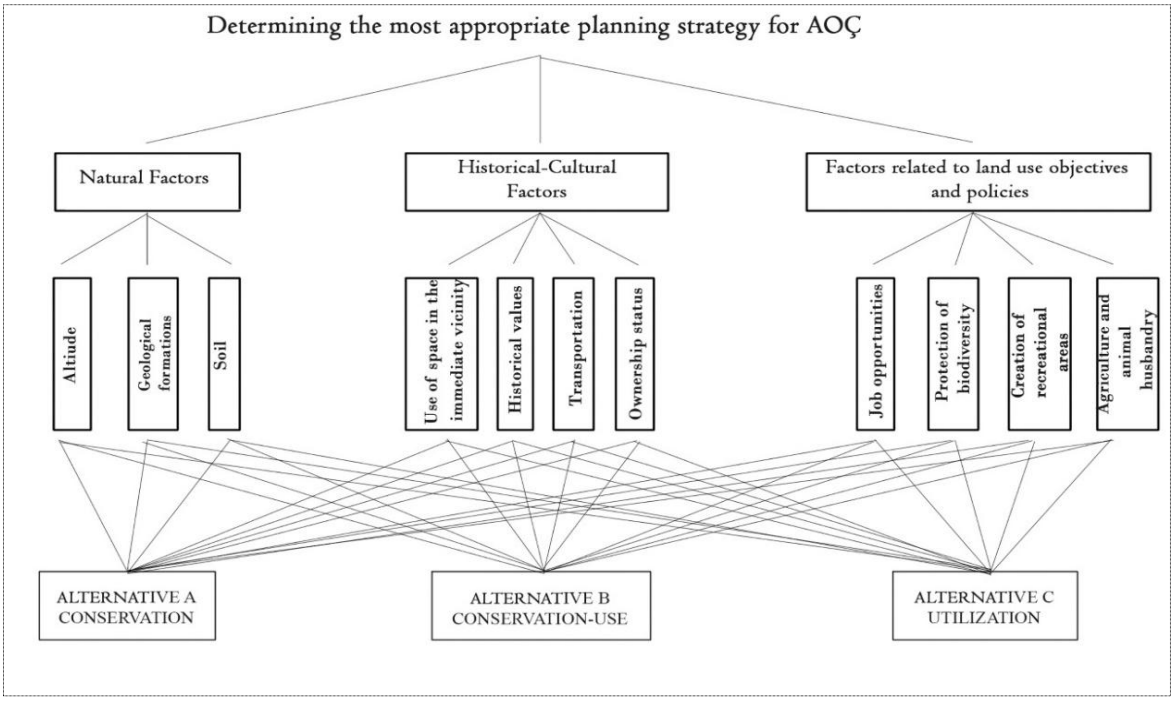

Figure 15. Fuzzy set for the selection of the most appropriate planning alternative based on qualitative factors

AHS (Analytic Hierarchy Process) was developed by Saaty in the late 1970s (Saaty, 1990). The reason why AHS is preferred by decision makers is that it can take subjective criteria into account in making multi-criteria decisions. In AHS, one of the multi-criteria decision-making approaches, qualitative factors are of primary importance (Akpınar, 1995; Saaty, 1990). It is a technique that can combine qualitative and quantitative factors in the detailed evaluation of alternatives. AHS is used to evaluate factors that are independent of each other at various levels in the hierarchical structure they are in (Anık, 2007). Fuzzy set technique, which is shaped within the framework of the basic principles of AHS developed by Saaty (1990), is a technique that can be used in the evaluation and selection of land use alternatives. The idea of fuzzy set is based on the effect of the relative value of each factor on the alternatives with AHS (Akpınar, 1995).

The technique, developed according to analytical ranking procedures, allows for the analysis and examination of objects that are close enough to be examined as a group in terms of their characteristics, but not equal. The fuzzy set technique is known as the multiple criteria technique, and it facilitates the calculation of the total impact of each alternative and the analysis of the relative value of each factor affecting the selection of alternatives (Akpınar, 1995). The result of the fuzzy set analysis assigns importance weights to the alternatives with a sum of 1, making the alternative with the highest weight superior to those with lower importance weights (Akpınar, 1995). During the application of the technique, an expert or a group of experts is needed to evaluate the importance of one element over the other in the comparison of two elements according to the basic evaluation scale of AHS. After the creation of the matrices, the relative weight of each fuzzy set element is determined by calculating the basic eigenvector for the reciprocal matrix (Akpınar, 1995). The method does not limit the number of experts, but the high level of knowledge and experience of the decision makers increases the consistency of the solution. For this reason, the people selected should be relevant to the subject matter even if they are not experts (Kurtilla et al., 2000; Masozera & Alavalapati, 2006). In this study, as mentioned before, 15 experts working in the discipline of landscape architecture were consulted. The prioritization questionnaire prepared according to the hierarchical model in Figure 4 was applied to the identified group of experts. Within the scope of the questionnaire, the experts responded to comparative questions including natural factors, historical and cultural factors, and factors related to land use objectives and policies.

Since the AHS application reflects the subjective opinions of people, if there is only one expert on the subject, the pairwise comparisons matrix can also be created by including his/her opinions. The 1-9 scale developed by Saaty to assign values in pairwise comparisons and the meanings of the scale values are given in Table 1.

Table 1. AHS basic evaluation scale (Saaty, 1990)

Importance level	Definition	Explanation
1	Equally important	1st and 2nd factor equally important
3	Weakly more important	1st factor is slightly more important than 2nd factor
5	Significantly more important	1st factor is more important than 2nd factor
7	Demonstrably more important	1st factor is much more important than 2nd factor
9	Definitely more important	1st factor is extremely important compared to 2nd factor
2, 4, 6, 8	Intermediate values	1 and 2 have values close to each other, or there is a compromise between the two values

The application steps of the AHS technique developed by Saaty (1990) are given below;

1. Defining the problem and determining the objective in this problem.

2. Starting from the objectives, placing the criteria at the middle level and the alternatives (options) at the lowest level in a hierarchical structure.

3. Making pairwise comparisons between both alternatives (lowest level) and criteria (middle level) using the scale given in Table 1 to determine which alternative or criterion is dominant over which, and preparing pairwise comparison matrices of size (nxn).

4. For each column in the pairwise comparison matrix, take the column sums and normalize the matrix by dividing the elements in the matrix by the corresponding column sum.

5. Taking the row sums for each alternative or criterion in the normalized matrix. (The values calculated at this stage are the priority values for the criteria or options and the matrix formed by these values is the priority vector matrix).

6. Multiplying the priority values obtained for each criterion or option in the priority matrix created with the priority vector by all the elements in the column in the pairwise comparison matrix for that criterion or option. (The matrix created with the values calculated at this stage is the weighted total matrix.)

7. Dividing the row total values in the weighted total matrix by the row total values of the priority matrix obtained in step 5 and calculating the value by taking the arithmetic mean of the values in the final matrix of size (nx1).

8. Calculation of the consistency index.

In this study, the criteria for the decision were determined according to the ratios obtained from the experts and pairwise comparisons were made. Weights for the evaluation criteria were defined and the order of importance of the decision options was established. It was determined which criteria came to the forefront against the three alternatives.

3. RESEARCH FINDINGS

3.1. Comparison of Evaluation Factors Against Each Other and Against Alternatives

3.1.1. Comparison of qualitative factors

Firstly, qualitative factors were compared and the weight score of natural factors was the highest with 0.550. Historical-cultural factors had a value of 0.240 and factors related to land use objectives and policies had a value of 0.210. Umax (maximum eigenvalue) was determined as 3.23200, CI (compatibility of the matrix) as 0.11600 and CR (compatibility ratio) as 0.02000 (Table 2).

Table 2. Comparison of qualitative factors

Comparison of qualitative factors	N.F	H.C.F.	LUO.P.	Weight Points
Natural factors	1	2	3	0.550
Historical-cultural factors	1/2	1	1	0.240
Land use objectives and policies	1/3	1/2	1	0.210
				Umax: 3.23200
				CI : 0.11600
				CR : 0.02000

3.1.1.1. Comparison of natural factors

After the evaluation of the qualitative factors, the weight scores of the sub-factors were calculated separately. Under the heading of natural factors, altitude, geological formations and soil sub-factors were defined. The weight score of the soil sub-factor was the highest with 0.582. Geological formations has a value of 0.309 and altitude has a value of 0.109. Umax (maximum eigenvalue) was determined as 3.00408, CI (compatibility of the matrix) as 0.00204 and CR (compatibility ratio) as 0.00352 (Table 3).

Table 3. Weight scores of natural factors

Comparison of natural factors	A.	G.F.	S.	Weight Points
Altitude	1	3	5	0.109
Geological formations	1/3	1	2	0.309
Soil	1/5	1/2	1	0.582
				Umax: 3.00408
				CI : 0.00204
				CR : 0.00352

After the weight scores were calculated, which alternative was suitable for the altitude was analyzed and weight scores were calculated for Alternative A, Alternative B and Alternative C. Alternative B (conservation-use) has the highest weight score with a value of 0.482. Alternative C (utilization) has a value of 0.405 and alternative A (conservation) has a value of 0.114. Umax (maximum eigenvalue) was determined as 3.03480, CI (compatibility of the matrix) as 0.01740 and CR (compatibility ratio) as 0.03000 (Table 4).

1. For Altitude:

Considering the altitude, which alternative is appropriate?

Table 4. Determination of the appropriate alternative for the altitude factor

Altitude	A	B	C	Weight Points
Alternative A (Conservation)	1	5	3	0.114
Alternative B (Conservation-Use)	1/5	1	1	0.481
Alternative C (Utilization)	1/3	1/2	1	0.405
				Umax: 3.03480
				CI : 0.01740
				CR : 0.03000

Considering the geological formations, Alternative A was found to be the most appropriate with a weight score of 0.637, Alternative C had a weight score of 0.405 and Alternative A had a weight score of 0.114. Umax (maximum eigenvalue) was determined as 3.04640, CI (compatibility of the matrix) as 0.02320 and CR (compatibility ratio) as 0.04000 (Table 5).

2. For Geological Formations:

Considering Geological Formations, which alternative is appropriate?

Table 5. Determination of the appropriate alternative for the geological formations factor

Geological Formations	A	B	C	Weight Points
Alternative A (Conservation)	1	3	5	0.637
Alternative B (Conservation-Use)	1/3	1	3	0.258
Alternative C (Utilization)	1/5	1/3	1	0.105
				Umax: 3.04640
				CI : 0.02320
				CR : 0.04000

Alternative A was determined as the most suitable alternative in terms of soil characteristics and had a weight score of 0.648. Alternative B had a weight score of 0.230 and alternative C had a weight score of 0.122. Umax (maximum eigenvalue) was determined as 3.00408, CI (compatibility of the matrix) as 0.00204 and CR (compatibility ratio) as 0.00352 (Table 6).

3. For soil:

Considering the soil characteristics, which alternative is appropriate?

Table 6. Determination of the appropriate alternative for soil characteristics

Soil	A	B	C	Weight Points
Alternative A (Conservation)	1	3	5	0.648
Alternative B (Conservation-Use)	1/3	1	2	0.230
Alternative C (Utilization)	1/5	1/2	1	0.122
				Umax: 3.00408
				CI : 0.00204
				CR : 0.00352

When all natural factors (elevation, geological formations, soil) were considered, the most appropriate alternative was A (conservation) with a weight score of 0.5863 (Table 7).

4. For Natural Factors:

Considering all natural factors, which alternative is appropriate?

Table 7. Determination the appropriate alternative for all natural factors

For all natural factors						
Altitude	**Geological F.**	**Soil**		**Eigenvector**		**Alternatives**
0.114	0.637	0.648		0.109		0.5863 A
0.481	0.258	0.230	*	0.309		0.2660 B
0.405	0.105	0.122		0.582		0.1475

3.1.1.2. Comparison of historical-cultural factors

Historical-cultural factors are divided into sub-factors such as use of the immediate environment, historical values, transportation and ownership status. The weight scores of these sub-factors were calculated separately and it was determined which factor came to the fore. In this context, the weight score of ownership status has the highest value with 0.338. Historical values has a weight score of 0.270, transportation has a weight score of 0.237, and the use of the immediate environment has a weight score of 0.154. Umax (maximum eigenvalue) was determined as 4.21600, CI (compatibility of the matrix) as 0.07200 and CR (compatibility ratio) as 0.08000 (Table 8).

Table 8. Weight scores of historical-cultural factors

Comparison of historical-cultural factors	U.S.I.V.	H.V.	TRANS.	O.S	Weight Points
Use of space in the immediate vicinity	1	3	1	2	0.154
Historical values	1/3	1	1	2	0.270
Transportation	1/2	1/2	1	1	0.237
Ownership status	1/2	1/2	1/2	1	0.338
					Umax: 4.21600
					CI : 0.07200
					CR : 0.08000

After the weight scores of the sub-factors were calculated, it was determined which alternative was more appropriate for each sub-factor. First of all, when the use of the immediate environment was analyzed, it was determined that the most appropriate alternative was B (conservation-use) with a weight score of 0.582. Umax (maximum eigenvalue) was determined as 3.00408, CI (compatibility of the matrix) as 0.00204 and CR (compatibility ratio) as 0.00352 (Table 9).

1. For the use of space in the immediate vicinity:

Which alternative is appropriate when considering the use of space in the immediate vicinity?

Table 9. Determination of the appropriate alternative for the use of space in the immediate vicinity

The use of space in the immediate vicinity	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	2	3	0.309
Alternative B (Conservation-Use)	1/2	1	5	0.582
Alternative C (Utilization)	1/3	1/5	1	0.109
				Umax: 3.00408
				CI : 0.00204
				CR : 0.00352

Considering the historical values, Alternative A (conservation) was found to be more appropriate. The weight score of Alternative A is 0.659. Umax (maximum eigenvalue) is 3.00408, CI (compatibility of the matrix) is 0.0174 and CR (compatibility ratio) is 0.0300 (Table 10).

2. For historical values:

Considering the historical values, which alternative is appropriate?

Table 10. Determination the appropriate alternative for historical values

Historical values	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	5	3	0.659
Alternative B (Conservation-Use)	1/5	1	1	0.156
Alternative C (Utilization)	1/3	1/2	1	0.185
				Umax: 3.0348
				CI : 0.0174
				CR : 0.0300

When the transportation factor is taken into consideration, Alternative C (utilization) came to the forefront with a weight score of 0.637. Alternative B (conservation-use) was determined as the second most important alternative with a weight score of 0.258. Umax (maximum eigenvalue) was determined as 3.0464, CI (compatibility of the matrix) as 0.0232 and CR (compatibility ratio) as 0.0400 (Table 11).

3. For transportation:

Considering transportation, which alternative is appropriate?

Table 11. Determination the appropriate alternative for transportation

Transportation	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	3	5	0.105
Alternative B (Conservation-Use)	1/3	1	3	0.258
Alternative C (Utilization)	1/5	1/3	1	0.637
				Umax: 3.0464
				CI : 0.0232
				CR : 0.0400

For the ownership factor, the appropriate alternative was calculated and it was determined that alternative C (utilization) was more appropriate with a weight score of 0.594. Umax (maximum eigenvalue) was determined as 3.0580, CI (compatibility of the matrix) as 0.0290 and CR (compatibility ratio) as 0.0500 (Table 12).

4. For ownership:

Considering the ownership status, which alternative is appropriate?

Table 12. Determination the appropriate alternative for the ownership status

Ownership status	A	B	C	Weight Points
Alternative A (Conservation)	1	2	3	0.157
Alternative B (Conservation-Use)	1/2	1	3	0.249
Alternative C (Utilization)	1/3	1/3	1	0.594
				Umax: 3.0580
				CI : 0.0290
				CR : 0.0500

When all historical-cultural factors (use of space in the immediate vicinity, historical values, transportation, ownership status) are taken into consideration, the most appropriate alternative is C (utilization) with a weight score of 0.4184 (Table 13).

5. For Historical-Cultural Factors:

When all historical-cultural factors are taken into consideration, which alternative is appropriate?

Table 13. Determination of the appropriate alternative for all historical-cultural factors

For all historical-cultural factors							
Immediate vicinity	Historical v.	Transp.	Ownership s.		Eigenvector		Alternatives
0.309	0.659	0.105	0.157		0.154		0.3034 A
0.582	0.156	0.258	0.249	*	0.270		0.2770 B
0.109	0.185	0.637	0.594		0.237		0.4184 C
					0.338		

3.1.1.3. Comparison of factors related to land use objectives and policies

Factors related to land use objectives and policies were divided into sub-factors such as job opportunities, protection of biodiversity, creation of recreational areas, and support for agriculture and animal husbandry. The weight scores of these sub-factors were calculated separately and it was determined which factor came to the forefront. In this context, the weight score of protecting biodiversity has the highest value with 0.505. Creating recreational areas has a weight score of 0.264, supporting agriculture and animal husbandry has a weight score of 0.165, and job opportunities has a weight score of 0.066. Umax (maximum eigenvalue) was determined as 4.1350, CI (compatibility of the matrix) as 0.0450 and CR (compatibility ratio) as 0.0500 (Table 14).

Table 14. Weight scores of factors related to land use objectives and policies

Factors related to land use objectives and policies	J.O.	P.B	C.R.A	S.A.A.H	Weight Points
Job opportunities	1	7	5	2	0.066
Protection of biodiversity	1/7	1	3	2	0.505
Creation of recreational areas	1/5	1/3	1	2	0.264
Support for agriculture and animal husbandry	1/2	1/2	1/2	1	0.165
					Umax: 4.1350
					CI : 0.0450
					CR : 0.0500

When the job opportunities factor was analyzed, the most appropriate alternative was identified as C (utilization) and its weight score was calculated as 0.582. Alternative B (conservation-use) was identified as the second most important alternative with a weight score of 0.309. Umax (maximum eigenvalue) was determined as 3.00408, CI (compatibility of the matrix) as 0.00204 and CR (compatibility ratio) as 0.00352 (Table 15).

1. For Business Opportunities:

Considering the job opportunities, which alternative is appropriate?

Table 15. Determination the appropriate alternative for job opportunities

Job opportunities	A	B	C	Weight Points
Alternative A (Conservation)	1	3	5	0.109
Alternative B (Conservation-Use)	1/3	1	2	0.309
Alternative C (Utilization)	1/5	1/2	1	0.582

				Umax: 3.00408
				CI : 0.00204
				CR : 0.00352

Considering the factor of biodiversity conservation, Alternative A (conservation) came to the fore with a weight score of 0.682. Alternative C (utilization) was identified as the second most important alternative with a weight score of 0.216. Umax (maximum eigenvalue) was determined as 3.00292, CI (compatibility of the matrix) as 0.00146, and CR (compatibility ratio) as 0.00252 (Table 16).

2. For biodiversity conservation:

Considering biodiversity, which alternative is appropriate?

Table 16. Determination the appropriate alternative for biodiversity conservation

Protection of biodiversity	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	7	3	0.682
Alternative B (Conservation-Use)	1/7	1	2	0.103
Alternative C (Utilization)	1/3	1/2	1	0.216
				Umax: 3.00292
				CI : 0.00146
				CR : 0.00252

When the factor of creation of recreational areas was analyzed, the most appropriate alternative was determined as B (conservation-use) and its weight score was calculated as 0.649. Alternative C (utilization) was determined as the second most important alternative with a weight score of 0.279. Umax (maximum eigenvalue) was determined as 3.06960, CI (compatibility of the matrix) as 0.03480 and CR (compatibility ratio) as 0.06000 (Table 17).

3. For the creation of recreational areas:

Considering the creation of recreational areas, which alternative is appropriate?

Table 17. Determination of the appropriate alternative for the creation of recreational areas

Creation of recreational areas	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	7	5	0.072
Alternative B (Conservation-Use)	1/7	1	3	0.649
Alternative C (Utilization)	1/5	1/3	1	0.279
				Umax: 3.06960
				CI : 0.03480
				CR : 0.06000

Considering the factor of supporting agriculture and animal husbandry, the most appropriate alternative was determined as C (utilization) with a weight score of 0.637. Umax (maximum eigenvalue) was determined as 3.04640, CI (compatibility of the matrix) as 0.02320 and CR (compatibility ratio) as 0.04000 (Table 18).

4. For supporting agriculture and animal husbandry:

Considering the support for agriculture and animal husbandry, which alternative is appropriate?

Table 18. Determination the appropriate alternative for supporting agriculture and animal husbandry

Supporting agriculture and animal husbandry	**A**	**B**	**C**	**Weight Points**
Alternative A (Conservation)	1	3	5	0.105
Alternative B (Conservation-Use)	1/3	1	3	0.258
Alternative C (Utilization)	1/5	1/3	1	0.637
				Umax: 3.04640
				CI : 0.02320
				CR : 0.04000

5. For factors related to land use objectives and policies:

Considering factors related to all land use objectives and policies, which alternative is appropriate?

When the factors including all land use objectives and policies (job opportunities, protection of biodiversity, creation of recreational areas, support for agriculture and animal husbandry) were taken into consideration, it was determined that the most appropriate alternative was A (conservation) with a weight score of 0.3879 (Table 19).

Table 19. Determination of the appropriate alternative for factors related to all land use objectives and policies

For factors related to all land use objectives and policies								
	J.O	**P.B.**	**R.A**	**A.A.H**		**Eigenvector**		**Alternatives**
	0.109	0.682	0.072	0.105		0.066		0.3879 A
	0.309	0.103	0.649	0.258	*	0.505		0.2863 B
	0.582	0.216	0.279	0.637		0.264		0.3262 C
						0.165		

3.1.2 Comparison of alternatives according to all qualitative factors

After the comparison of qualitative factors with sub-factors, alternatives (A, B, C) were compared according to all qualitative factors (natural factors, historical-cultural factors, land use objectives and policies). Each alternative was analyzed based on the factors and the most appropriate alternative was found to be A (conservation) with a weight score of 0.47674 (Table 20).

Table 20. Determination of the most suitable alternative according to all qualitative factors

According to All Qualitative Factors:							
	N.F.	**H.C.F**	**LUO.P.**		**Total Eigenvector**		**Alternatives**
Alternative A (Conservation)	0.5863	0.3034	0.3879		0.550		0.47674 A
Alternative B (Conservation-Use)	0.2660	0.2770	0.2863	*	0.240		0.27290 B
Alternative C (Utilization)	0.1475	0.4184	0.3262		0.210		0.25004 C

4. EVALUATION AND CONCLUSION

Atatürk Forest Farm is one of the first and most important examples of the reflection of science and technology on Turkish agriculture. Undoubtedly, AFF has had very important functions such as being a teaching system and a modern laboratory where agriculture is integrated with technique, but it has also had inadequacies and problems. In this study, recommendations have been developed by following the management planning process for the prevention of land loss, the solution of existing problems, and the future structuring of AFF within the scope of urban agriculture and agricultural recreation. Within the scope of management planning, ideal goals for AFF, constraints and supports affecting planning, and implementation goals were determined. In this context, a basis for determining the most appropriate planning strategies for Atatürk Forest Farm has been established. In order to preserve the landscape structure of the land, which has a special ecosystem and habitat, and to transfer it to the future, conservation, conservation-use and utilization strategies were examined. In this study, an evaluation was made by recognizing that the types of factors selected within the framework of the identified problems are differently important for each use. In comparing the qualitative factors with each other, a judgment and evaluation was made that natural factors are weakly more important than historical-cultural factors and historical-cultural factors are equally important than factors related to land use objectives and policies. According to the membership degrees resulting from the calculation of the basic eigenvector, “natural factors” with the largest value (0.550) was the most influential factor.

In the comparison of natural factors, soil has emerged as the most determining factor with a value of 0.582. It has been followed by geological formations. Accordingly, when the alternatives have been compared based on altitude, the most appropriate alternative has been conservation-use with a value of 0.481; based on geological formations, conservation has stood out with a value of 0.637; and based on soil, conservation has again been the most suitable option with a value of 0.648. However, when all natural factors have been evaluated together, conservation has emerged as the most appropriate alternative with a value of 0.5863, while conservation-use has ranked second with a value of 0.2660. This finding is strongly supported by the work of Dengiz et al. (2006), who demonstrated that 54.4% of the AFF land is highly suitable for agricultural use, based on detailed soil quality assessments. Similarly, Duman et al. (2023) highlighted the dominant role of soil in shaping land

use suitability across varying elevations in the Eastern Black Sea region, emphasizing its influence over other physiographic variables such as slope and aspect. Furthermore, the study of Dindaroğlu and Canbolat (2017) has shown that although elevation and geological structure impact soil characteristics, the intrinsic physical and chemical properties of the soil itself are more decisive in determining productivity and conservation priorities. Collectively, these studies affirm that soil must be prioritized in multi-criteria decision-making frameworks, particularly in regions like AOÇ, where ecological sustainability and land conservation are essential. The consistency of these findings across diverse geographical contexts underscores the fundamental role of soil in ensuring long-term environmental resilience and sustainable land use planning.

One of the strongest indicators of this has been Lörcher's inclusion of significant details on human and public health—especially in the "Free Squares" section of his planning report—and how these concerns have reflected the urbanism understanding of the early 20th century (Alpagut, 2017). The idea of designing squares and open, natural spaces, which had been theorized at the congress held in Mannheim in 1905, has become a pioneering application with the implementation of the Lörcher Plan in Ankara in 1924–25. Public squares, green spaces, gaps formed by cemeteries, parks for the elderly, and sports areas for youth have been proposed as open spaces in a modern and contemporary city. The Lörcher plan and its approach, which later formed the basis of Hermann Jansen's planning for Ankara, has prioritized the idea of parks, gardens, and green areas in the division of the city and has shown that Atatürk Forest Farm and similar initiatives have constituted an essential part of urban planning, with protection at the forefront (Alpagut, 2017). Also, it is possible to say that despite the decreasing land availability and the loss of institutional activities, the AFF land holds significant potential for urban agriculture in the city of Ankara. With urban agricultural activities, production can be revitalized, and the city's transformation process can be initiated in many aspects. When the farm regains its function as a production area, it will enhance the quality of life, create a healthy environment, and establish a connection between rural and urban life. The adoption of production as a way of life begins with raising public awareness. In this context, it is necessary to create spaces where people can directly participate in production and adapt to a lifestyle based on production. Hobby gardens are among the most effective ways to achieve this goal. Choosing the right starting point is also of great importance. The people of Ankara are more familiar especially with the central part of the farm. Therefore, production activities should initially be encouraged in this area and gradually expanded to a wider region.

In the comparison of historical-cultural factors, ownership status (0.338) has emerged as the most important factor. Historical values (0.270) have been identified as the second most significant factor. When land use in the immediate vicinity has been considered, Alternative B (0.582) has appeared as the most appropriate option, while Alternative A (0.309) has ranked second. When historical values have been taken into account, Alternative A (0.659) has ranked first, while Alternatives B and C have followed with a slight difference. According to transportation, Alternative C has come out on top with a value of 0.637, and in terms of ownership status, "use" has ranked first with a value of 0.594. When all historical-cultural factors have been evaluated together, Alternative C (0.4184) has emerged as the most appropriate strategy. These findings are consistent with various academic and legal studies conducted within the context of Turkey. In a study by Uçar and Demir (2024), it is emphasized that property rights and the cadastral system shape land use decisions not only from a legal perspective but also through administrative and social dimensions (Uçar & Demir, 2024). Moreover, Law No. 2863 on the Conservation of Cultural and Natural Heritage identifies ownership status as a fundamental parameter in decision-making processes related to the protection of historical sites. This legal framework highlights that ownership directly influences permissible forms of land use, particularly in areas designated as cultural heritage (Republic of Turkey, 1983). In this regard, the prominence of ownership and historical values as high-weighted factors in your findings aligns with existing legal and scholarly sources, thereby reinforcing the reliability and validity of your model results.

The concept of cultural heritage has started to be included in current debates regarding the Atatürk Forest Farm (AFF) land, and even initiatives have been made by democratic mass organizations to nominate the area for the World Cultural Heritage List. Rather than aiming at the universalization of the AFF, these efforts have

sought to promptly halt local and central government interventions that have disregarded its social and historical significance (Çavdar Sert, 2017). Unfortunately, these valuable efforts have not received support at either the central or local government levels. On the other hand, various academic approaches have criticized defining the AFF land solely as cultural heritage. Keskinok (2000) and Kaçar (2010) have argued that describing the AFF land through the lens of heritage alone has been insufficient. They have claimed that the area is a model space reflecting the foundations of national identity and where the Republican Revolutions had been tested, and that the significance attached to the place can only be preserved if the farm's original function is maintained. In this regard, maintaining a balance between conservation and utilization has been considered vital for the continuity of historical-cultural factors.

According to the factors related to land use objectives and policies, the protection of biodiversity (0.505) has been identified as the most important and effective factor. According to the National Biodiversity Strategy and Action Plan (2018–2028), the protection of biological diversity and the provision of sustainable ecosystem services are prioritized, aligning with the high weighting (0.505) assigned to biodiversity in the current findings. This has been followed by the creation of recreational areas, support for agriculture and animal husbandry, and job opportunities. In terms of alternative choices, the most appropriate alternative for job opportunities has been Alternative C (0.582); for biodiversity protection, Alternative A (0.682) has emerged as the best option; for creating recreational areas, Alternative B (0.649) has been found to be the most suitable; and for supporting agriculture and animal husbandry, Alternative C (0.637) has stood out as the leading choice. When the factors related to land use objectives and policies have been evaluated together, Alternative A has been determined as the most appropriate strategy. Similarly, when all qualitative factors have been assessed collectively, Alternative A (conservation, 0.47674) has been recognized as the most suitable alternative. Concurrently, Food and Agriculture Organization of the United Nations (FAO)'s Integrated Land Use Planning Initiative, conducted in collaboration with the Turkish Ministry of Agriculture, emphasizes the necessity of harmonizing competing land uses—including agriculture, urban development, conservation, recreation, and livelihoods—to ensure both food security and ecological resilience (Food and Agriculture Organization of the United Nations, 2023). Socio-economic modeling of land cover changes across Turkey demonstrates that regions with greater availability of recreational and agricultural lands exhibit distinct expansion dynamics, underscoring the significance of objective-driven land use decisions (Yılmaz & Demir, 2024). In addition, the flora of the Atatürk Forest Farm constitutes the largest component of the urban center that represents the nature of Central Anatolia. In Ankara, a city where the threat of drought has consistently been a concern, the AFF area has provided a unique opportunity for the creation of new-generation recreational spaces through climate-sensitive planting, for conducting biological reserve research, and for enabling urban residents of all ages to engage with and learn about nature (Çavdar Sert, 2017). The afforested and naturalized parts, which have made up a significant portion of the AFF land, have also served as a habitat for wildlife. The AFF land has fallen within the migration routes of numerous bird species, including one sensitive species and another that has been classified as nationally endangered. When flora and fauna values have been considered on a broader ecological scale, it has become evident that the AFF area is part of a larger system of biodiversity, ecosystem balance, and international wildlife corridors. Therefore, updating the existing ecologically based scientific reports to include the entire area and to address current observation gaps has been seen as necessary. In this context, the prominence of the conservation alternative has confirmed this perspective. Moreover, the findings of the search highlight the necessity of developing a site-specific management and conservation policy framework tailored to the unique characteristics of the AFF. As one of Turkey's most significant heritage assets, AFF holds exceptional value due to its central role in embodying and realizing the ideals of the Republican revolutions and promoting a self-sufficient national economy. In addition, its protection is reinforced by a dedicated legislative instrument, the AFF Establishment Law (Aydınoğlu, 2018). Beyond its legal and historical significance, AFF contributed substantially to the cultural modernization of Turkish society—particularly in the realms of education, urban planning, landscape architecture and architecture—and serves as a symbol of land ethics and appreciation for nature. The formulation of a comprehensive site management and conservation program would support efforts to nominate AFF as a cultural landscape to the World Heritage Committee (WHC) and the International Union for Conservation of Nature (IUCN). Recognition by these international

bodies would not only provide scientific and technical guidance for conservation but also enhance AFF's prestige and potential access to financial and institutional resources necessary for its long-term preservation.

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