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An Assessment of Pasture Land Management in Turkish Land Consolidation Projects

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Ömer ACAR[1*], Tuba ÇAĞLIKANTAR[2]

[1]*Kahramanmaraş Sütçü İmam University, Göksun Vocational School, Department of Architecture and Urban Planning, 46600, Kahramanmaraş, Türkiye.*

[2]*Gazi University, Faculty of Engineering, Department of Computer Engineering, 06560, Ankara, Türkiye.*

***sorumlu yazar**: oacar@ksu.edu.tr

Ömer ACAR, ORCID No: 0000-0002-2382-8594, Tuba ÇAĞLIKANTAR, ORCID No: 0000-0001-5590-5307

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Özet

Son yıllarda Türkiye'deki hızlı nüfus artışı, barınma ve beslenme gibi temel ihtiyaçların karşılanmasında sorunları beraberinde getirmiştir. Eğitim ve barınma talepleri, yüksek tarımsal potansiyele sahip araziler üzerindeki baskıları artırmıştır. Bu nedenle mevcut tarım arazilerinin planlı ve sürdürülebilir bir yönetim anlayışıyla değerlendirilmesi zorunluluk arz etmektedir. Son yıllarda, çeşitli ülkelerde mevcut tarım arazilerinin korunması ve birim alandan yüksek verim elde edilmesi amacıyla ciddi yatırımlar yapılmaktadır. Özellikle miras yoluyla bölünme, hisseli satışlar ve diğer nedenlerle parçalı ve dağınık hâle gelen; işletme ölçeğinde yeterli genişliğe sahip olmayan araziler, arazi toplulaştırması yoluyla birim alandan yüksek verim sağlayan tarım alanlarına dönüştürülmektedir. Türkiye'de de arazi toplulaştırma çalışmaları son yıllarda artış göstermektedir. Bu bağlamda, halkın geçim kaynakları, mera alanlarına erişim, mera arazilerinin amaç dışı kullanımı, meralarda yapılan uygulamalar ve projelerden geriye kalan miktarlar; Antalya ili Aksu ilçesi Dumanlar Mahallesi, Ardahan ili Göle ilçesi Yavuzlar Köyü, Balıkesir ili Manyas ilçesi Kayaca Mahallesi, Kilis ili Merkez ilçesi Küplüce Köyü ve Niğde ili Bor ilçesi Çukurkuyu Beldesi olmak üzere beş farklı proje alanı kapsamında incelenmiştir. Çalışma sonucunda değerlendirmeler yapılmış ve çeşitli öneriler sunulmuştur.

Keywords

Rural Area Arrangement, Pasture lands, Pasture Planning, Non-Purposeful Use

An Assessment of Pasture Land Management in Turkish Land Consolidation Projects

Abstract

With the rapid population growth in Türkiye in recent years, the problem of shelter and nutrition to meet this sufficient need has emerged. Education and shelter have increased pressures on lands with high agricultural potential. Therefore, it is essential to evaluate existing agricultural lands with a planned and sustainable management approach. In recent years, serious investments have been made in various countries to protect existing agricultural lands and to provide high yields per unit area. Especially these scattered, fragmented areas (inheritance roads and transfers, sales made by feeling and division, etc.) that do not have the width to operate in terms of area are being transformed into agricultural lands collected with high yields per unit area through land consolidation. Land consolidation studies in Turkey have been increasing in recent years. Hence, the livelihood of the people, access to pasture lands, non-purposeful use of pasture lands, what is done in pasture lands, and the remaining project amounts in pasture lands for five project areas, namely Dumanlar neighborhood of Aksu district of Antalya province, Yavuzlar village of Göle district of Ardahan province, Kayaca neighborhood of Manyas district of Balıkesir province, Küplüce village of Merkez district of Kilis province and Çukurkuyu town of Bor district of Niğde province, were examined. Evaluations and suggestions were provided.

1. INTRODUCTION

The determining factors in regional development include the wealth of natural resources and the use of these resources by protecting them (Akdeniz and İnam, 2024). Soil, the leading natural resource, meets the nutritional needs and constitutes a large part of the country's economy (Karakayacı, 2010). In this context, if the soil is used sustainably by protecting it, it will significantly contribute to regional development (RTMD, 2014). Taking soil conservation measures and making the soil sustainable can be done through land consolidation practices. These practices increase agricultural production and support rural development (Sklenicka, 2006; Latruffe and Piet, 2014; Sozen and Karatas, 2015; Bengin and Acar, 2018).

Rural development, which we can define as making the necessary plans to minimize the disadvantages of the population living in rural areas regarding socio-economic, socio-cultural, and working conditions compared to urban areas, is of great importance for Turkey (Backman, 2002; Can and Esengün, 2007, Zhang et al., 2018; Akdeniz et al., 2023). Land disorders in rural areas must first be corrected and protected to benefit from the plans (Sayılan, 2013). Land consolidation, the most significant pillar of rural development, is bringing together the immovable properties scattered and fragmented in rural areas for various reasons by modern agricultural principles and reorganizing the land by taking soil conservation measures. The road transportation network is strengthened, irrigation systems and drainage channels are planned, and infrastructure facilities are established with an appropriate arrangement (Yıldız, 1983; Crecente et al., 2002; Demirel, 2005; Karataş and Sözen, 2017). By converting irregular and tiny real estate that cannot be used for agriculture into agriculture, the average parcel size increases, and labor force and costs decrease (Yağanoğlu et al., 1994; Boztoprak et al., 2015). Therefore, the highest yield is obtained from the unit area with the least cost, and the income level of the farmer and his family increases (Bilgiç, 1961; Manavbaşı, 2012). Along with the economic dimension of the land arrangement process and its results, the protection of historical and cultural areas and their ecological dimensions are also addressed (Vitikainen, 2004; Gün, 2015).

The first land consolidation was in 1343, when a voluntary land exchange was made to change the bed of the Danube River, and the rural land arrangement was made (Demirel, 2005). The first law on consolidation was enacted in Germany in 1781 and became widespread in the early 19th century (Boyacıoğlu, 1975; Yağanoğlu et al., 1994). In the 20th century, land consolidation became a more comprehensive arrangement method with close connections to rural development (Uimonen, 2002). In Turkey, the provision on land consolidation was first included in Article 678 of the Turkish Civil Code No. 743, which entered into force on October 4, 1926 (Article 755 of the Turkish Civil Code No. 4721, which entered into force on January 1, 2002) (Öztrak, 1968). The first land consolidation study was initiated in 1961 in Karkın Village of Çumra District of Konya Province by the General Directorate of Soil and Water based on the provisions of the Turkish Civil Code No. 743 and the Law No. 7457 on the Organization and Duties of the General Directorate of Soil Conservation and Agricultural Irrigation Works of the Ministry of Agriculture (Çevik, 1974; Demirtaş and Sarı, 2003; Çay and İşcan, 2005). The studies were suspended between 1962 and 1964 due to insufficient legal regulations. In 1964, in the development project jointly carried out by the State Planning Organization and the Food and Agriculture Organization of the United Nations, research was conducted to develop the agricultural structure in the region covering the provinces of Antalya, Burdur, and Isparta, and measures were identified, sample plans and projects were prepared and implemented (Ercan, 1966; Yıldız, 1983; Yağanoğlu et al., 1994; Çay, 2001). The Land Consolidation Regulation was issued in 1967, and the studies were carried out in line with this Regulation until 1973. According to the Land and Agricultural Reform Law that came into force in 1973, consolidation works were conducted in areas outside the reform zone until 1978 (Temel, 2013). The General Directorate of Rural Services was established in 1983 and allowed to carry out consolidation works (Küsek, 2014). The Agricultural Reform Law on Land Arrangement in Irrigation Areas that came into force in 1984 enabled the General Directorate of Agricultural Reform to carry out consolidation works in areas which are considered necessary by the Council of Ministers (Sert, 2005). The Soil Protection and Land Use Law that came into force in 2005 gave the Ministry of Agriculture and Rural Affairs the authority to carry out land consolidation (Akdeniz, 2008). According to the amendment added to Article 17 of the Law on Soil Protection and Land Use by Article 4 of the 2007 Law on Amendments, the General Directorate of State Hydraulic Works (DSİ) is authorized to conduct land consolidation within irrigation areas following the enactment of the 2009 Regulation on the Protection, Use, and Land Consolidation of Agricultural Lands, issued by the Ministry of Agriculture and Rural Affairs (DSİ, 2016). Additionally, Article 4 of the same amendment allows legal entities, municipalities, cooperatives, and public institutions to undertake land consolidation projects, subject to a decision by the Council of Ministers (Çay, 2011). According to Article 8 of the Law on Amendments to the Law on the Organization and

Duties of the General Directorate of State Hydraulic Works and Certain Laws and the Decree Law on the Organization and Duties of the Ministry of Food, Agriculture and Livestock, which entered into force in 2018, the land consolidation projects carried out by the Ministry of Food, Agriculture and Livestock were transferred to the General Directorate of State Hydraulic Works, and the General Directorate of State Hydraulic Works continues to carry out land consolidation works by the provisions of Law No. 6200. Besides, land consolidation works are currently being carried out by the provisions of the Land Consolidation and On-Farm Development Services Implementation Regulation, which entered into force in 2019.

2. MATERIAL AND METHODS

This study explores Antalya Aksu Stream Flood Protection Work L.C. and F.D.S. Project Dumanlar Neighborhood, Ardahan Province Lake L.C. and F.D.S. Project Yavuzlar Village, Balıkesir Province Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation L.C. and F.D.S. Project Kayaca Neighborhood, Kilis 1st Section L.C. and F.D.S. Project Küplüce Village, Niğde Bor District L.C. and F.D.S. Project Çukurkuyu Town applications (Figure 1).

Old-new property maps, land consolidation lists, orthophotos, social study, and parceling plan reports related to the mentioned projects were obtained from the General Directorate of Agricultural Reform and the General Directorate of State Hydraulic Works.

Figure 1. Fields of Study.



Licad 2, Litop 7, and ArcGIS Pro software were employed during project evaluation. The study examined general information about the study area, the livelihood of the people, the accessibility to the pasture lands, the misuse of the pasture lands, the changes made in the pasture lands, the amount of deductions made in the pasture lands within the scope of the project in the selected projects.

2.1. General Information About the Study Area and the Livelihood of the People

The economic activities of the local people in the region where land consolidation work is planned are determined through social survey reports conducted in the field prior to the project starts. This is among the basic parameters of land consolidation work. Land consolidation ensures the work to determine the region's needs and carry out the application with the specific needs of the region.

2.2. Transportation Status to Pasture Lands

In rural areas where animal husbandry is carried out, the animals may cause damage to cultivated crops if they pass through the areas where agricultural activities are carried out to reach pasture lands. To prevent such conflicts, pasture lands should have a frontage to the road transportation network, and the transportation networks of rural areas should be strong.

2.3. Misuse of Pasture Lands

Citizens living in rural areas earn income from pasture lands in some regions. These areas allocated for raising animals remain at the disposal of individuals and are used in a way that is far from their

primary purpose. The use of pasture lands other than their intended purpose by constructing fixed facilities (houses, barns, haylofts, warehouses, wells, etc.) without any connection with the situation of encroachment by exceeding the borders of neighboring parcels will be examined.

Pasture lands' unintended use or occupation was identified based on the orthophotos prepared before the project and the pre-project property boundaries. Permanent structures and agricultural plowing activities on pasture lands were detected using these orthophotos, and the relevant areas were digitized. The spatial resolution of the orthophotos used ranged from 0.25 to 1.00 meters.

2.4. Changes Made to Pasture Lands

In land consolidation projects, existing parcel boundaries are eliminated and redefined based on irrigation, drainage, discharge, and road network planning. As a result, the properties' borders are altered. Therefore, formal changes are also made in pasture areas. To assess the impact of these changes, the locational conditions of pasture lands are examined both before and after the implementation of land consolidation projects.

2.5. Deduction Amounts Made in Pasture Lands Within the Scope of the Project

Inland consolidation project plans, deductions are made from all parcels within the scope of the project to provide areas that will be used by the public in common, such as roads, irrigation channels, and drainage. The deduction amount varies across the institution carrying out the project and the law used in implementing the project. The land consolidation lists were examined to determine whether legal deductions had been made from pasture areas within the designated project zones.

3. RESEARCH FINDINGS AND DISCUSSION

3.1. Antalya Aksu Stream Flood Protection Work L.C. and F.D.S. Project Dumanlar Neighborhood

Antalya Aksu Stream Flood Protection Work L.C. and F.D.S. project was carried out by the General Directorate of State Hydraulic Works under the Soil Protection and Land Use Law No. 5403 provisions. Dumanlar Neighborhood is located on the banks of Aksu Stream east of the city center of Antalya Aksu district. Its average altitude above sea level is 19 m. (Figure 2).

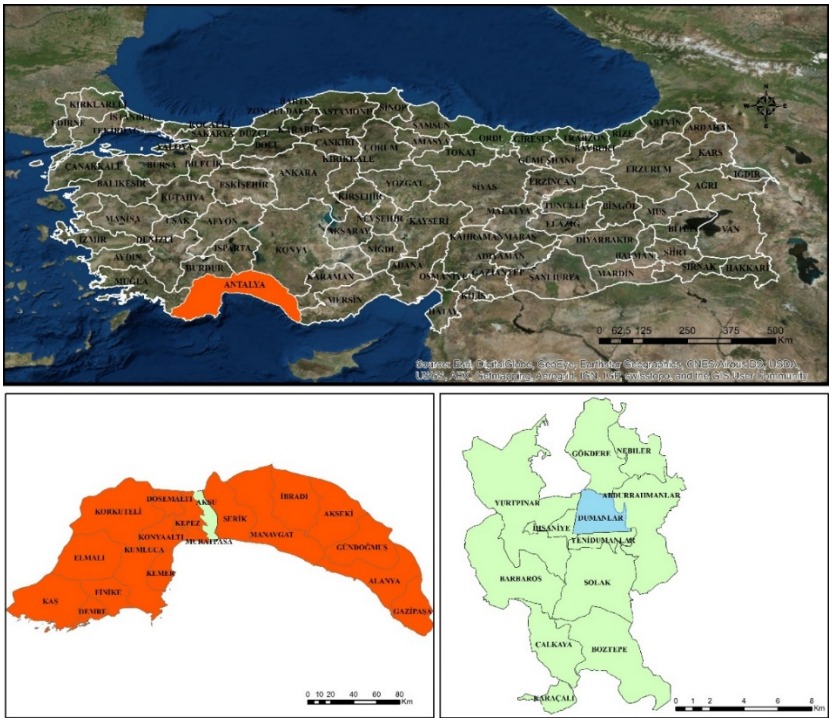

Figure 1. Dumanlar District Location Map

The neighborhood' economy is based on orchard and greenhouse production. Most vegetables are grown in greenhouses. While 84.86% of the residents in the project area earn their living from farming, 15.14% work in the city and lease their agricultural lands to farmers (DSİ, 2015). 1 pasture parcel was incorporated into the Dumanlar project and has a direct road frontage (Figure 3). A road frontage was planned after the project.

In the Dumanlar project, 3‰ of the area subject to regulation consists of pasture land with an area of 9491.78 m2. Examinations revealed no evidence of misuse within the pasture land. However, there is occupation by private parcels adjacent to the pasture parcels (Figure 4). On analyzing the cadastral situation and orthophoto, it was determined that the pasture land was used for agricultural purposes by the neighboring parcel.



Figure 3. Access to pasture lands



Figure 4. Misuse of Pasture Parcels

The pasture land, which was shapeless and long before the arrangement, was arranged in terms of shape and location after the project. As a result of this reorganization, the pasture land was relocated and geometrically reshaped into a trapezoidal parcel in accordance with the block plan (Figure 5). Land consolidation projects aim to ensure the integrity of pasture lands, protect the surrounding area with facilities such as roads and canals, and prevent their misuse and encroachment. However, in the Dumanlar project, it was not feasible to maintain the pasture land as a single, contiguous parcel within one block. The single piece of pasture land in the Dumanlar project is registered as pasture in the name of the treasury. A deduction rate of 6.8% was calculated across the project area, and deductions were made from the pasture land at this rate.

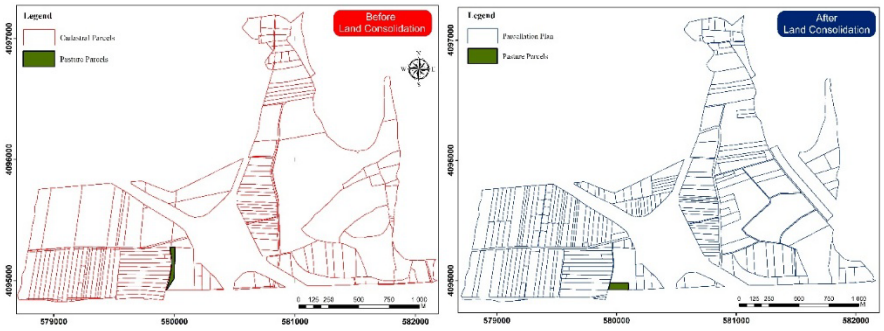

Figure 5. Condition of Pasture Lands Before and After the Project

3.2. Ardahan Lake 1st Section L.C. and F.D.S. Project Yavuzlar Village

Ardahan Lake 1st Section L.C. and F.D.S. Project was carried out by the General Directorate of Agricultural Reform of the Ministry of Food, Agriculture and Livestock by the provisions of the agricultural reform law on land arrangement in irrigation areas numbered 3083. Yavuzlar village is located on the banks of the Kura River in the southeastern part of the Eastern Anatolia Region, affiliated to Göle district of Ardahan province (Figure 6). The average elevation of the village above sea level is 2035 m (TRGM, 2015).

The villagers are engaged in agriculture and animal husbandry. Agricultural product cultivation has been identified to have no commercial dimension and that production is made only to meet their needs. The people earn their living from animal husbandry. After meeting their meat and milk needs, they are sold to cheese and milk factories, and the meat obtained is sold to slaughterhouses (TRGM, 2015). In the Yavuzlar project, six pasture parcels were included in the arrangement, and the pasture parcels had direct road frontage (Figure 7). Following the project, a plan was made to have a road frontage.

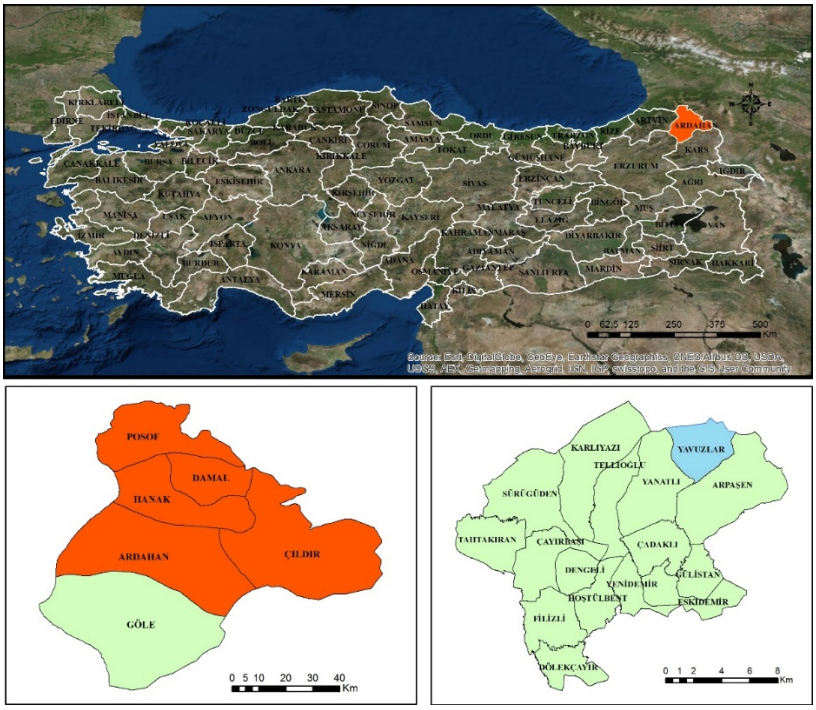

Figure 6. Yavuzlar Village Location Map

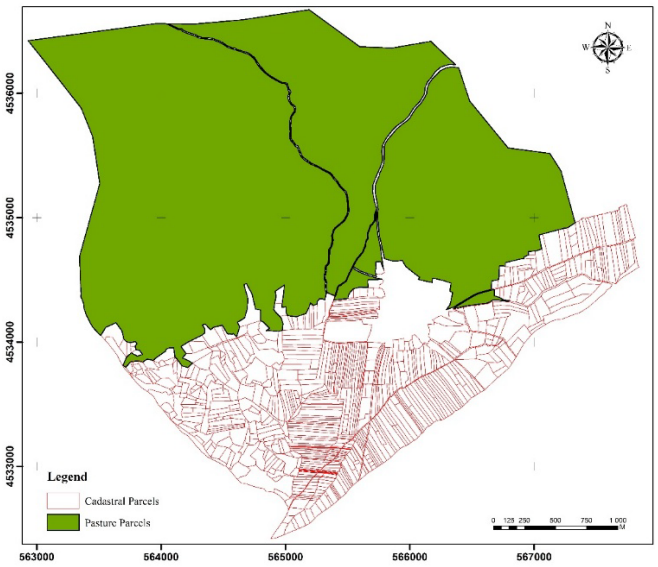

Figure 7. Access to pasture lands

In the Yavuzlar project, 66.68% of the area subject to regulation consists of pasture land and has an area of 7780127.74 m2. Examinations suggested that pasture land has no unintended use. However, there is encroachment by private parcels adjacent to the pasture parcels (Figure 8). According to the calculations, approximately 607800.00 m2 (approximately 8% of the total pasture land) is used by parcels adjacent to the pasture land.

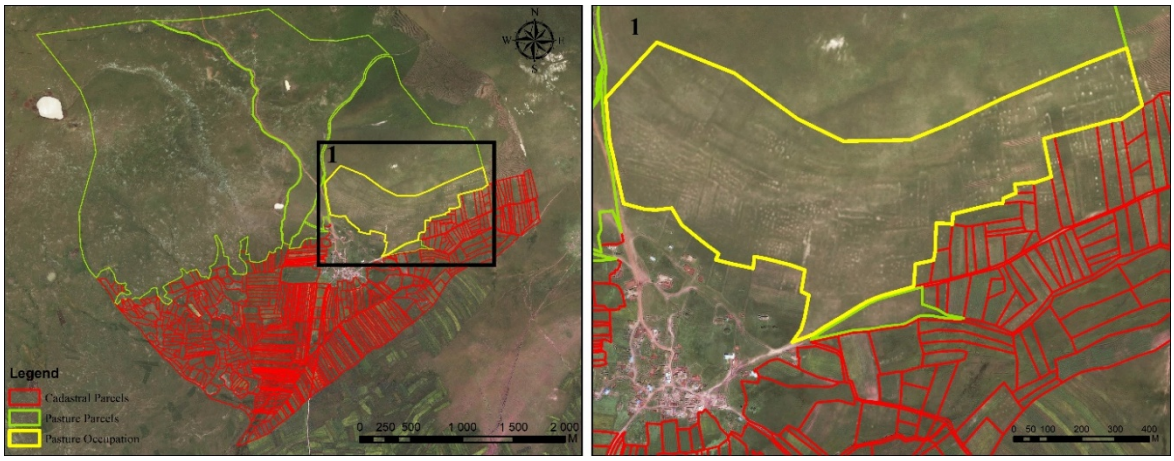

Figure 8. Misuse of Pasture Parcels

In the arrangement made in the Yavuzlar project, pasture lands were given mainly as a whole from their old place. The pasture land, which was six parcels before the project, was arranged as five parcels after the project. Approximately 39000.00 m2 pasture parcel was planned in the southwest of the village settlement area (Figure 9). Within the scope of land consolidation, a transition from dry farming to irrigated farming in all parcels is planned by making irrigation channels. It aims to develop animal husbandry by improving pastures with the irrigation channels that will be built.

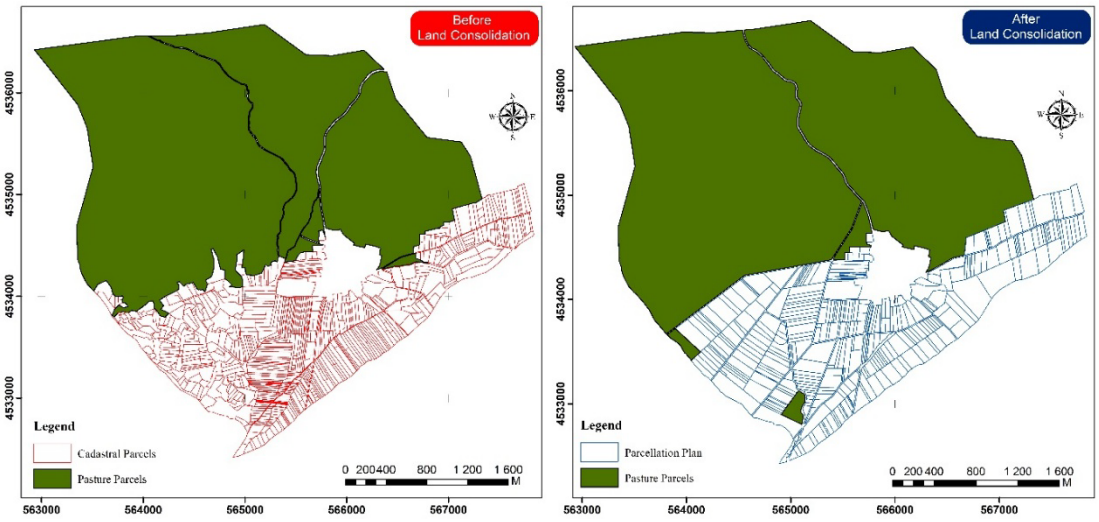

Figure 2. Condition of Pasture Lands Before and After the Project

There are six parcels of pasture land in the Yavuzlar project. A deduction rate of 4.919% was calculated for the overall project area; however, no deduction was applied to the pasture lands in the arrangement area.

3.3. Balıkesir Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation L.C. and F.D.S. Project Kayaca Neighborhood

Balıkesir Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation L.C. and F.D.S. Project was carried out by the General Directorate of State Hydraulic Works by the provisions of the Soil Protection and Land Use Law No. 5403. Kayaca Neighborhood is 2 km from Manya's district center and 92 km from Balıkesir city center. Kayaca Neighborhood is in the southwest of Manyas and is accessible from the Gönen-Manyas asphalt road (Figure 10).

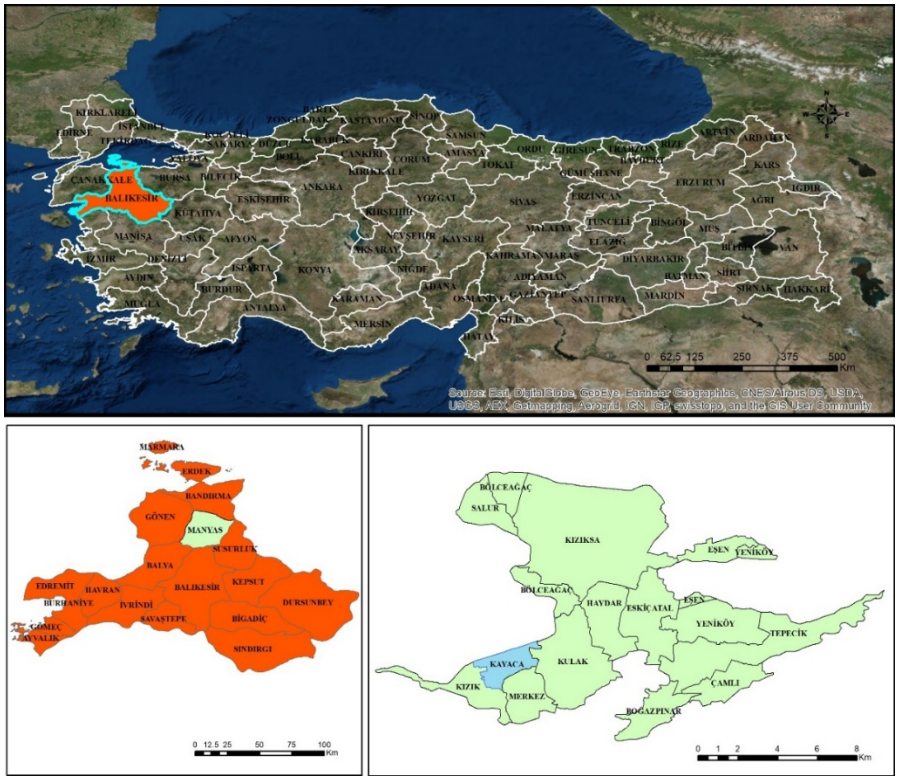

Figure 3. Kayaca District Location Map

The average altitude of the neighborhood above sea level is 30 m and agriculture serves as the primary source of income. The arable agricultural area is 322 ha. Regarding livestock, the area is home to 134 head of cattle and 273 head of sheep (DSİ, 2014). Among the 119 pasture parcels registered in the Kayaca neighborhood, 46 have direct road frontage. Upon considering the pasture integrity of 73 parcels, transportation is provided through the pastures and indirectly has road frontage (Figure 11). Following land consolidation, improvements were made to ensure that all pasture parcels now have direct road access.

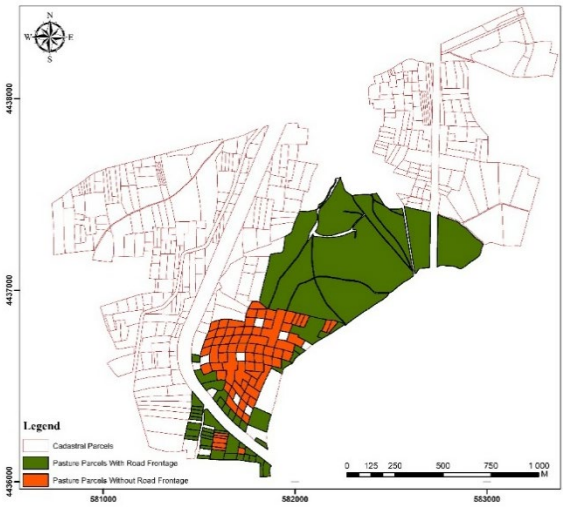

Figure 4. Access to pasture lands

In the Kayaca project, 23.81% of the parcels subject to regulation encompass pasture parcels with an area of 498991.45 m2. Examinations revealed no misuse in the pasture lands. However, individuals in neighboring parcels are encroaching on the pasture lands. The calculations showed that approximately 136700.00 m2 (approximately 27% of the pasture parcels subject to regulation) of pasture lands are used for agricultural purposes (Figure 12).

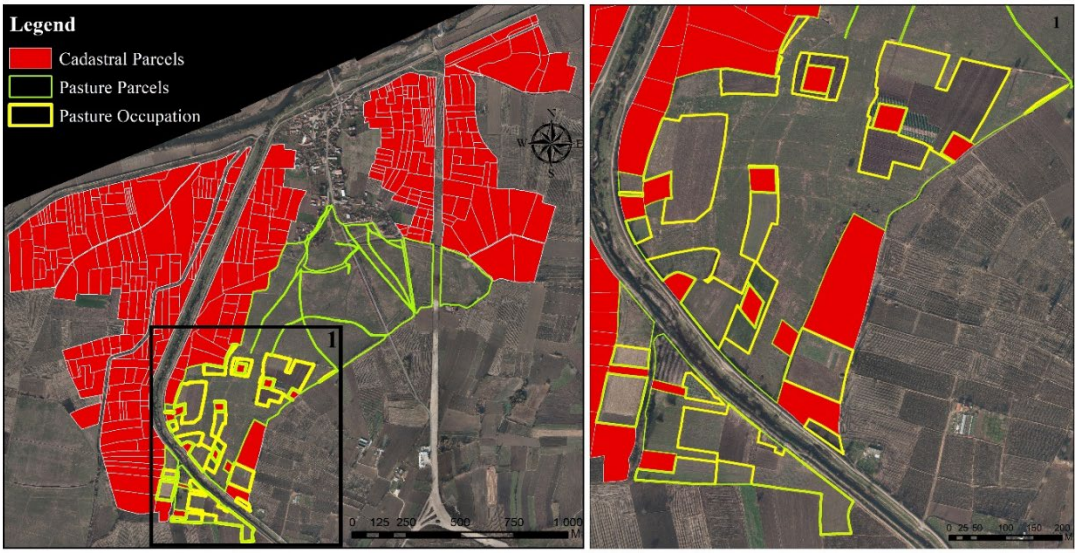

Figure 12. Misuse of Pasture Parcels

In the arrangement made in the Kayaca project, pasture lands were given as a whole from their old place. Cadastral parcels located within pasture lands were relocated to the right holders' alternative parcels upon request during the land reorganization process. One hundred seventeen pasture parcels included in the arrangement before the project (2 pasture parcels were excluded from land consolidation) were planned as nine parcels after the project (Figure 13). Within the scope of land consolidation, a transition from dry farming to irrigated farming across all parcels is planned through the construction of irrigation channels. It aims to support livestock development by constructing pasture reclamation and irrigation channels. There are 119 parcels of pasture land in the Kayaca project. Due to the deduction rate exceeding 10% and the restriction on deducting from pasture lands under the project framework, a total of 215,322.66 m² of land was excluded from the land consolidation process through the adjustment of parcel boundaries. A grass fee was paid for irrigation and drainage channels passing pasture parcels excluded from land consolidation. A deduction rate of 9.4254% was calculated in the project area, with no deductions applied to pasture lands included in the arrangement area.

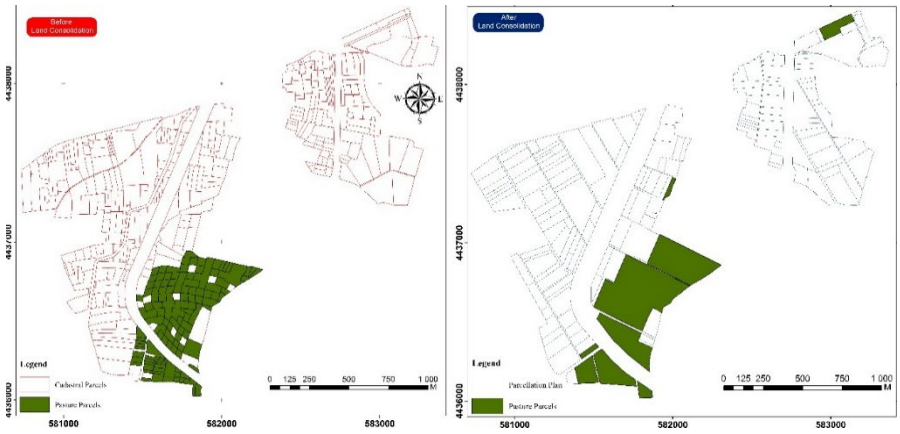

Figure 13. Condition of Pasture Lands Before and After the Project

3.4. Kilis 1st Section L.C. and F.D.S. Project Küplüce Village

Kilis 1st Section L.C. and F.D.S. Project was carried out by the General Directorate of Agricultural Reform of the Ministry of Food, Agriculture and Livestock by the provisions of the agricultural reform law numbered 3083 on land arrangement in irrigation areas. Küplüce village is located 12 km away from Kilis province and east of the city center on the Gaziantep Plateau. The village has an altitude of approximately 603 m above sea level (Figure 14).

In Küplüce Village, people are primarily engaged in farming and animal husbandry. Approximately 70% of the residents make a living from farming, and dry farming is done. Irrigable lands are irrigated with clean water (TRGM, 2011). In the Küplüce project, three pasture parcels were included in the arrangement, and the pasture parcels had direct road frontage (Figure 15). After the project, a new layout was implemented so that all pasture parcels would have road frontage.

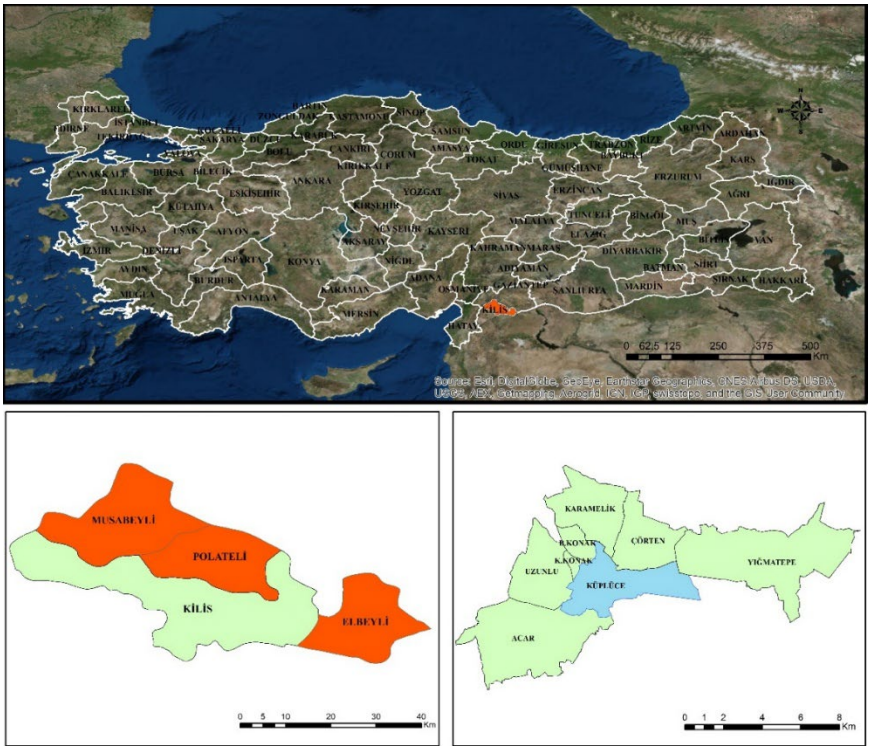

Figure 5. Küplüce Village Location Map

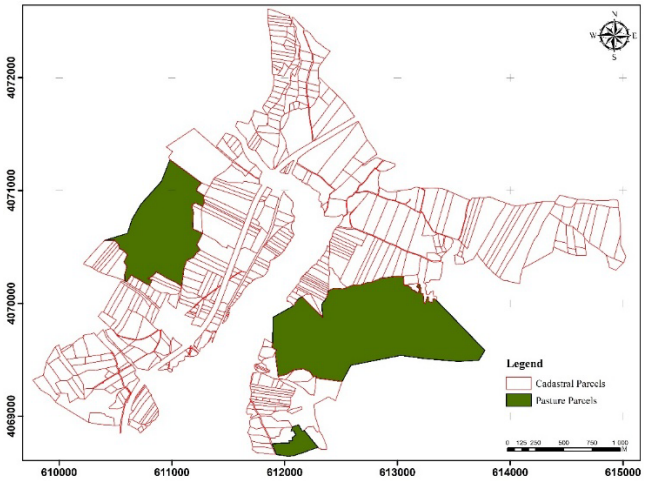

Figure 6. Access to pasture lands

In the Küplüce project, 23.57% (1636724.55 m2) of the parcels subject to regulation involve pastures. Misuse and encroachment exist in the pasture parcels within the project borders (Figure 16). The calculations demonstrated that there is misuse in approximately 64000.00 m2 (approximately 4% of the pasture parcels included in the regulation) and encroachment in approximately 51000.00 m2 (approximately 3% of the pasture parcels included in the regulation).

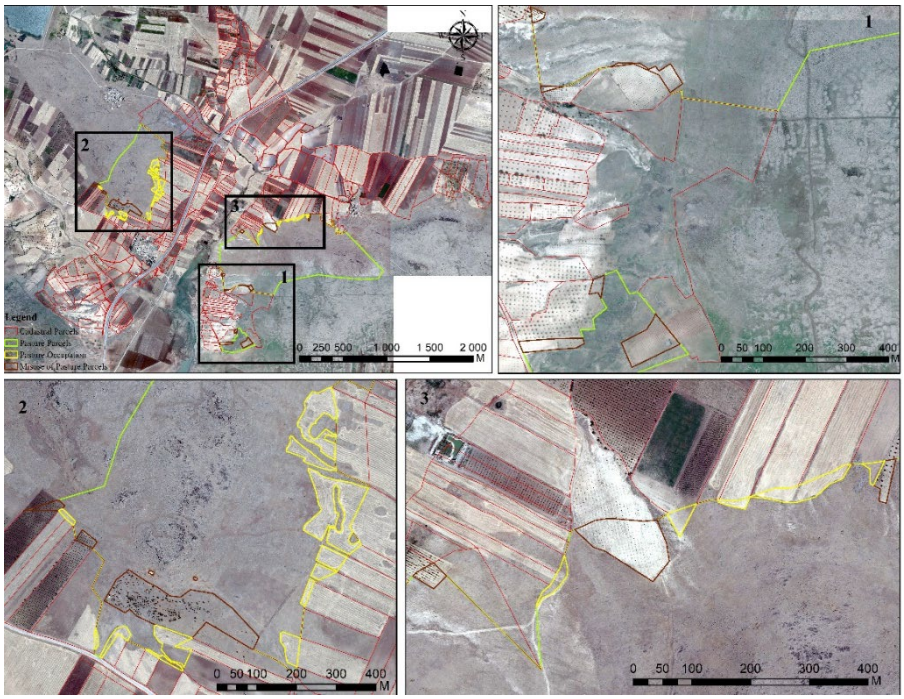

Figure 7. Misuse of Pasture Parcels

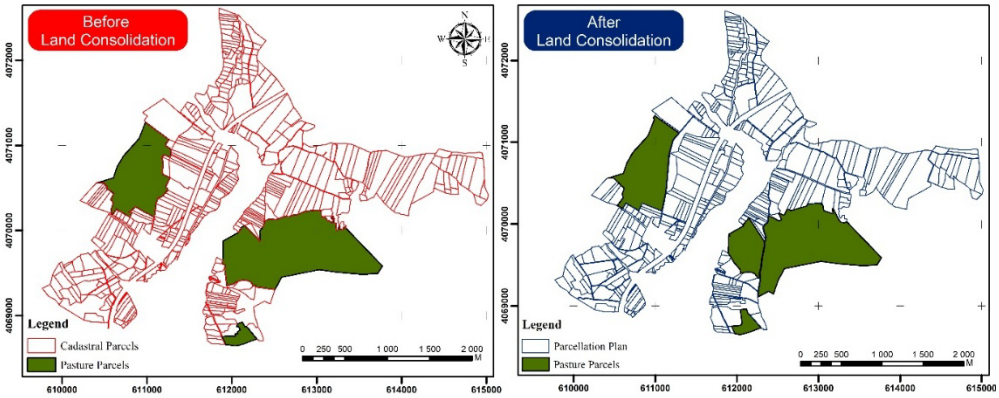

Figure 8. Condition of Pasture Lands Before and After the Project

In the Küplüce project, pasture lands were preserved within their original borders in accordance with the block plan. The three pasture parcels included in the arrangement before the project were reorganized into four parcels following the project (Figure 17). As part of the land consolidation plan, the construction of a new road resulted in the division of pasture parcel number 557 into two separate parcels.

There are three parcels of pasture land in the Küplüce project. Pasture parcels numbered 430 and 557 are registered as public common property, and pasture parcel numbered 919 is registered as pasture. A deduction rate of 4.2396% was calculated for the arrangement made in the project area. No deduction was applied to parcels numbered 430 and 557 based on the calculated rate, but a deduction was made from parcel 910.

3.5. Niğde Bor District L.C. and F.D.S. Project Çukurkuyu Town

Niğde Bor District L.C. and F.D.S. Project was implemented by the General Directorate of Agricultural Reform of the Ministry of Food, Agriculture and Livestock by the provisions of the agricultural reform law numbered 3083 on land arrangement in irrigation areas. Çukurkuyu town is located in the west of Bor district and is adjacent to Kızılca town in the south, Kayı village in the east, Bayat village in the north, Ulukışla town in Altunhisar district and Zengen town in the west (Figure 18). Since the town fields are generally irrigable, there is a wide variety of products. Vegetables, fodder crops, melons, and watermelons are planted. There are also fruit gardens. There is no greenhouse farming in the town. Fruit farming has developed in the town in recent years, and it has been determined that there are organic fruit gardens. The residents earn their living from agriculture and animal husbandry. Most of them involved in animal husbandry, mostly large cattle. Animal waste is utilized as fertilizer in the fields. Those who earn their living from small cattle farming migrate to the plateaus. Poultry farming is practiced mainly for personal consumption rather than as a commercial income source (TRGM, 2012).

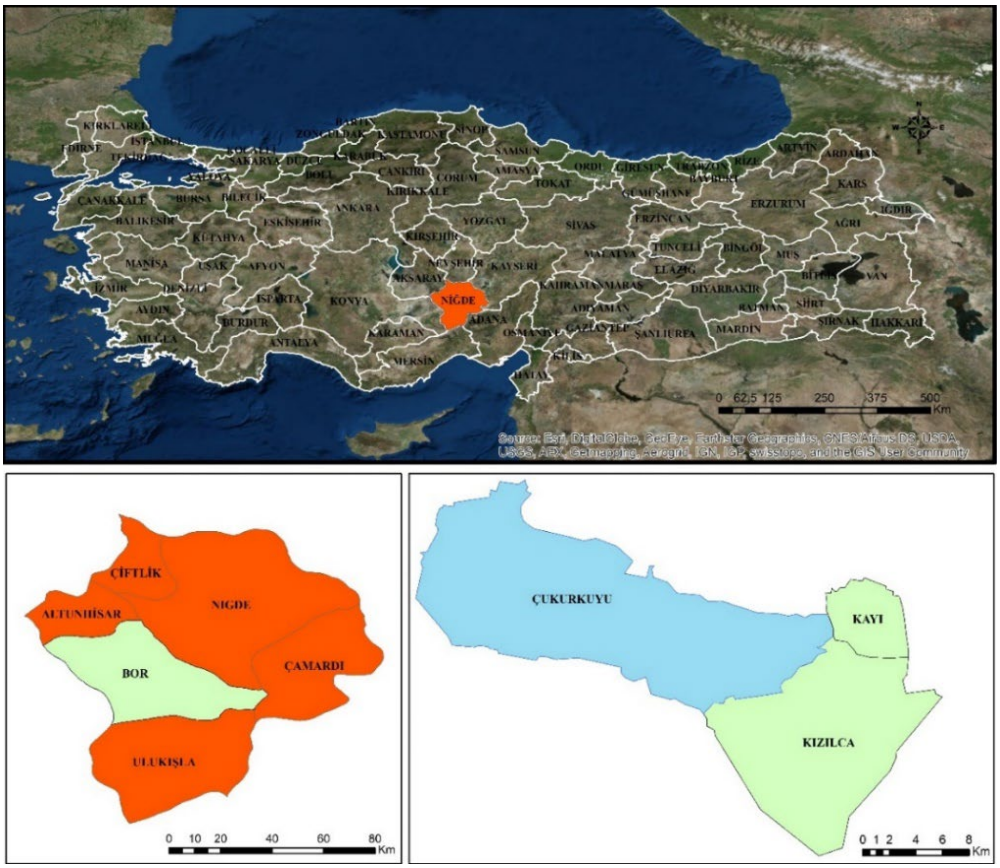

Figure 9. Cukurkuyu Town Location Map

Of the 221 pasture parcels registered in Çukurkuyu town, 156 pasture parcels have direct road frontage, while three have no frontage to the road transportation network. Considering the pasture integrity of 62 pasture parcels, transportation is provided through the pastures, and they indirectly have frontage to the road (Figure 19). After land consolidation, arrangements were made so that all pasture parcels have direct road frontage.

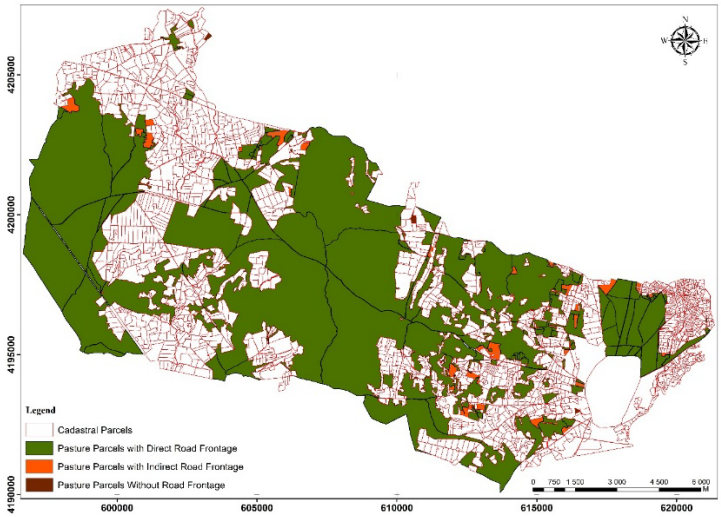

Figure 10. Access to pasture lands

In the Çukurkuyu project, 56.42% (10906 ha) of the parcels subject to regulation include pastures. Misuse and encroachment exist in the pasture parcels within the project borders (Figure 20). The calculations revealed approximately 135000.00 m2 (approximately 1‰ of the pasture parcels included in the regulation) of misuse and approximately 6655700.00 m2 (approximately 6% of the pasture parcels included in the regulation) of encroachment. After land consolidation, the parcels of the people using the parts for misuse and encroachment in the pasture parcels were moved, and these areas were converted mainly into pastures.

In the Çukurkuyu Project, pasture lands were allocated in the arrangement by preserving their original boundaries in accordance with the block plan. Lands that had been encroached upon or used for purposes other than their intended use were reassigned to the rightful users by relocating them to their proper areas. Before the project, 221 pasture parcels included in the arrangement was planned as 126 parcels after the project (Figure 21).

The pasture lands subject to arrangement in the Çukurkuyu project were registered as pastures in the treasury's name. For the arrangement, a deduction rate of 2.3368% was calculated for the project area, and deductions were applied to the pasture lands at this rate.

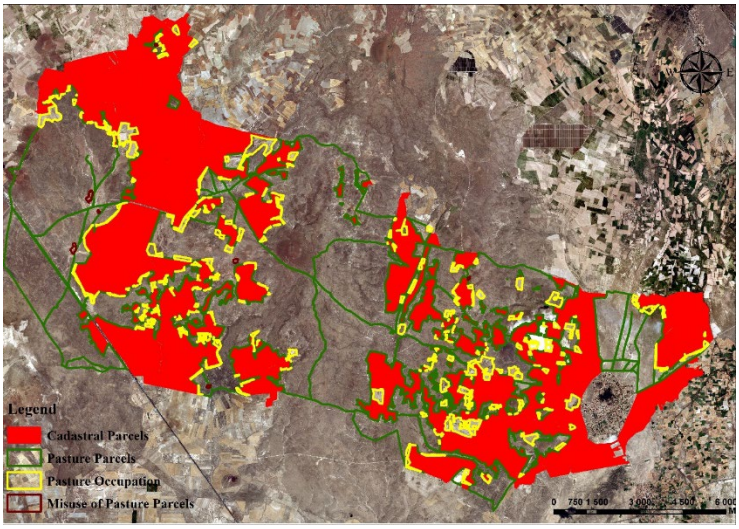

Figure 11. Misuse of Pasture Parcels

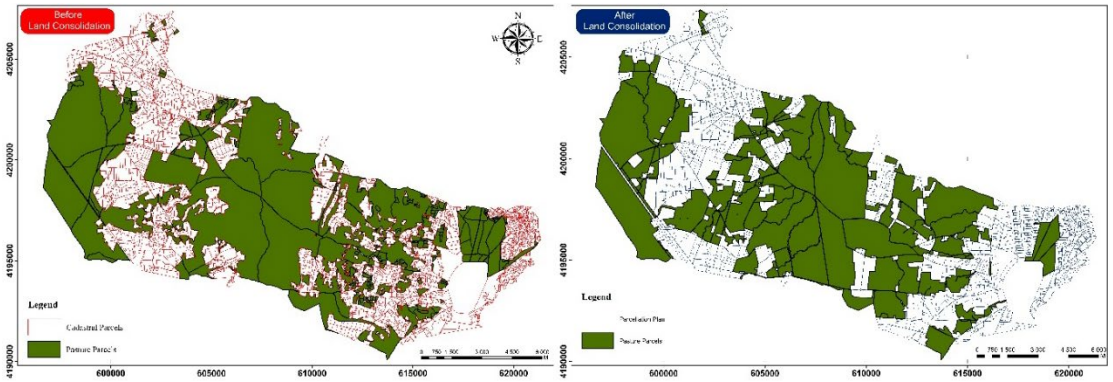

Figure 12. Condition of Pasture Lands Before and After the Project

Table 1. Summary of Project Areas

Project Area	**Dumanlar Nbhd.**	**Kayaca Nbhd.**	**Yavuzlar Vlg.**	**Küplüce Vlg.**	**Çukurkuyu Town**
Institution Carrying Out the Project	General Directorate of State Hydraulic Works		General Directorate of Agricultural Reform of the Ministry of Food		
Total Pasture Areas (m^2)	9491.78	714314.11	7780127.74	1637420.21	109065185.90
Deduction Rate (%)	6.8	9.4254	4.919	4.2396	2.3368
Pasture Cuts	Done	Not Done	Not Done	Done / Not Done *	Done
Deduction Amount (m^2)	645.44	0	0	31648.40	2548635.26
Agriculture Based	84.86	No Social Survey Report Was Made	25.98	70	52.55
Livestock Based	0		82.47	30	61.72

** Deductions were not applied to pasture areas registered as public common property, whereas deductions were implemented for those officially registered as pasture land.*

4. CONCLUSIONS AND RECOMMENDATIONS

Land consolidation studies encompass areas used for agricultural activities, including treasury lands, pastures, summer pastures, winter pastures, and meadows. Including pasture areas in the plans and regulations;

• Land consolidation projects provide the unification of pastures with other parcels, and thus ensuring pasture integrity.

• The rehabilitation of scattered and fragmented pastures is challenging and costly in practice. In contrast, restoring pastures whose integrity is ensured through land consolidation may be more efficient and economical.

• By strengthening the transportation network planned within the scope of on-farm development services, access to pastures becomes easier, and social problems may be prevented.

• Irrigation and drainage studies enhance the variety, quality, and quantity of feed for animals in pastures, and hence increasing pasture capacity.

• Land consolidation facilitates the identification of encroachments on pasture lands, and helps prevent such issues by ensuring pasture integrity. Its surroundings can be protected with irrigation-drainage-discharge channels and in-field roads.

Due to the development of structures such as houses, barns, haylofts, warehouses, and fixed facilities such as planted agricultural lands in pasture

areas, other lands of individuals in the project area can be moved in parts used for purposes other than their intended purpose and these areas can be converted into pastures.

Land consolidation projects not only provide spatial improvements but also have a significant impact on the socio-economic structure of rural areas and the balance of regional ecosystems. Pasture lands' reorganization and rehabilitation contribute substantially to preserving and developing biological diversity. Pasture integrity fragmentation or reduction may lead to habitat disruption, resulting in long-term adverse effects on local flora and fauna. In regions where livestock farming is prevalent, conserving ecologically significant pasture lands is essential for maintaining biodiversity. In this context, land consolidation policies should address not only agricultural productivity but also broader objectives such as ecological protection and the sustainability of rural life. In practice, multi-criteria decision-making models should be employed to evaluate these impacts holistically, and long-term monitoring systems should be established to assess the lasting effects of such projects. In doing so, ecological integrity can be preserved while achieving rural development goals that are more balanced and sustainable.

Although pasture lands are also used like other parcels in land consolidation projects, the approach to whether pastures can be subdivided has varied over time among the institutions responsible for project implementation. This study examines the practices carried out by the General Directorate of Agricultural Reform and the General Directorate of State Hydraulic Works and the subdivision of pasture lands. In this regard, from the land consolidation projects carried out by the General Directorate of State Hydraulic Works;

Antalya Aksu Stream Flood Protection Work L.C. and F.D.S. Project In Dumanlar District, 6.8% of 9491.78 m2 pasture land was cut, and 645.44 m2 area lost its pasture quality. Balıkesir Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation L.C. and F.D.S. Project In Kayaca District, 215322.66 m2 of 714314.11 m2 pasture land was left out of consolidation, and 498991.45 m2 was included in the arrangement and no pasture was cut. Since no cuts were made from pasture lands in the project area, the cut rate was more than 10%, and approximately 30% of the pasture lands were left out of the project to reduce this rate (Table 1).

Among the land consolidation projects carried out by the General Directorate of Agricultural Reform, Ardahan Lake 1st Section L.C. and F.D.S. Project in Yavuzlar Village, 7780127.74 m2 pasture land was included in the arrangement, and no deduction was made from the pasture lands. Kilis 1st Section L.C. and F.D.S. Project in Küplüce Village, 1637420.21 m2 pasture land was included in the arrangement, and a deduction rate of 4.2396% was calculated. Pasture lands numbered 430 and 557 were registered as public common property, and no deduction was made. Pasture land numbered 919 was registered as pasture, and a deduction was made at the calculated rate, thus causing the loss of 21648.40 m2 of pasture status. Niğde Bor District L.C. and F.D.S. Project Çukurkuyu Town, 109065185.90 m2 pasture land was cut by 2.3368%, and 2548635.26 m2 area lost its pasture quality (Table 1).

Social survey reports are prepared before the land consolidation projects start, which include information and data such as population, economy, geography, and socio-cultural information regarding the project area. This section of the land consolidation studies examines the livelihood of the people living in the project area. While the livelihood in some regions is animal husbandry, it can be farming in some regions. Based on the people's livelihoods determined in the Social Survey reports, deductions from pasture areas should be applied in project areas where income is derived from agricultural activities. In contrast, deductions should not be made from pasture areas in project areas where income is obtained from animal husbandry.

Our recommendations regarding making/not making deductions in the projects examined within the scope of the study, based on findings from the social survey reports;

• Antalya Aksu Stream Flood Protection Work L.C. and F.D.S. Project In Dumanlar Neighborhood, since the people's livelihood is agricultural activities, the pastures in the project area will be cut,

• Balıkesir Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation L.C. and F.D.S. Project In Kayaca Neighborhood, no social study report has been prepared. According to the information obtained from the Manyas District Directorate of Agriculture and Forestry, it has been stated that the people's livelihood is agricultural activities, and the pastures in the project area will be cut,

• Ardahan Lake 1st Section L.C. and F.D.S. Project In Yavuzlar Village, since the people's livelihood is animal husbandry, the pastures in the project area will not be cut,

• Kilis 1st Section L.C. and F.D.S. Project In Küplüce Village, since the people's livelihood is agricultural activities, the pastures in the project area will be cut,

• Niğde Bor District L.C. and F.D.S. Since the livelihood of the people in Çukurkuyu Town is animal husbandry, it is thought that not cutting the pasture areas in the project area will contribute to the livelihood of the people living there.

On comparing the situation of making/not making cuts from pasture lands implemented in the project with our suggestions, if cuts were made from pasture lands in Kayaca Neighborhood of Balıkesir Manyas Plain Right Bank Irrigation and Ergili Pumped Irrigation W.I.G.H. Project, pasture lands would not be excluded from consolidation in order to reduce the cut-rate and the cut-rate would be calculated as 6.5% and approximately 3% less cuts would have been made from agricultural areas included in the arrangement. If cuts were made from pasture lands in Küplüce Village of Kilis 1st Section W.I.G.H. Project, the cut rate would be calculated as 3.5%, and approximately 7‰ fewer cuts would have been made from agricultural areas included in the arrangement. If cuts had not been made from pasture lands in Çukurkuyu Town of Niğde Bor District W.I.G.H. Project, the 2548635.26 m2 pasture area would not have been narrowed. In order to eliminate fixed facilities such as buildings, barns, planted agricultural lands, and non-purpose uses in pasture lands, if the person does not have land in the project area, the treasury lands in the project area can be moved to the occupied areas and this area can be sold to the person within the scope of pasture amnesty after the project.

For inland consolidation projects, comprehensice social survey reports should be prepared, and the livelihood of the people living in the project area should be determined precisely based on the report. In addition, the number of animals in the project area should be determined in the social survey reports, and the adequacy of the pasture lands should be analyzed. Suppose it is determined that the pasture land is insufficient according to the analyses made. In that case, it should be stated in the social survey report that the purpose of allocation from the lands under the rule and disposition of the state can be changed, and the pasture need can be met by planning to ensure pasture integrity with land consolidation projects. It should be stated that pasture lands should not be cut in places where animal husbandry is dominant and that pasture lands should be cut in areas where agricultural activities are dominant. The necessary arrangements should be made in the law and regulations on this issue, and this issue should be clearly stated.

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