

## TECHNICAL EXAMINATION OF PASTURE AREAS IN LAND CONSOLIDATION PROJECTS AND LEGAL FRAMEWORK: THE CASE OF BALIKESİR PROVINCE, TÜRKİYE

Tayfun ÇAY<sup>1</sup>, Ömer ACAR<sup>2\*</sup>

<sup>1</sup>Konya Technical University, Faculty of Engineering and Natural Sciences, Department of Geomatics Engineering, 42250, Konya, Türkiye


<sup>2</sup>Kahramanmaraş Sütçü İmam University, Göksun Vocational School, Department of Architecture and Urban Planning, 46600, Kahramanmaraş, Türkiye


**Abstract:** Among the natural resources, pasture areas are of great importance for animal husbandry and animal production. In addition, they have many benefits, from preventing soil and water erosion to protecting genetic resources. Many studies are being carried out to protect, improve, and make these areas sustainable. In rural areas, land consolidation studies are carried out to obtain the highest yield from the unit area with the least cost. Inland consolidation studies, the geometric shapes of the parcels are corrected, their planning is done so that they will have direct access to roads, irrigation, and drainage networks, and land reclamation is carried out. Pasture lands within the regulation border are also evaluated within this scope. In Türkiye, until April 28, 2018, consolidation studies were carried out by the Ministry of Food, Agriculture and Livestock and the General Directorate of State Hydraulic Works, while after this date, they were carried out by the General Directorate of State Hydraulic Works. In addition to the changes in the implementing institution in the consolidation projects, changes were made to the legislation. The changes made within this scope also include the evaluation of pasture areas. In this study, the Manyas Left Bank Irrigation and Fertile Pumped Irrigation L.C. and F.D.S. Project, the works carried out in Bereketli and Simavlı villages will be evaluated. The General Directorate of State Hydraulic Works carries out the project. Different applications regarding pasture areas within the project's scope were made in two villages. The main difference in the application is the cutting from pasture areas. No cutting was done in Simavlı Village pastures, but Bereketli pastures were cut. Within the scope of our study, these differences were revealed, and their status before and after the project was evaluated. Of the two villages in the same project area, no deduction was made from pasture parcels in Simavlı Village, while deductions were made in Bereketli Village. In Simavlı Village, most of the pasture parcels were left out of the regulation in order to reduce the rate of participation in standard facilities and to avoid expropriation costs.

**Keywords:** Land consolidation, Pasture, Rural area arrangement, Technical analysis

\*Corresponding author: Kahramanmaraş Sütçü İmam University, Göksun Vocational School, Department of Architecture and Urban Planning, 46600, Kahramanmaraş, Türkiye

E mail: oacar@ksu.edu.tr (Ö. ACAR)

Tayfun ÇAY  <https://orcid.org/0000-0002-4661-5583>

Ömer ACAR  <https://orcid.org/0000-0002-2382-8594>

Received: October 03, 2024

Accepted: November 17, 2024

Published: January 15, 2025

**Cite as:** Çay T, Acar Ö. 2025. Technical examination of pasture areas in land consolidation projects and legal framework: the case of Balıkesir province, Türkiye. *BSJ Eng Sci*, 8(1): 11-18.

### 1. Introduction

Rapid industrialization and urbanization have put pressure on rural areas, causing their shrinkage/deterioration (Kucukmehmetoglu and Geymen, 2009; Aydoğdu et al., 2012; Gürbüz et al., 2012; İnkincarakaya et al., 2013; Denizdurduran et al., 2017; Sumiahadi et al., 2020; Yin et al., 2022). Rural areas where food needs are met for living things must be protected and their sustainability ensured (Diesendorf, 2000; Marten, 2001; Capone et al., 2014; Baciör and Prus, 2018; Akın, 2021). One of the essential criteria for sustainable rural development is the efficient and effective use of agricultural lands for their planned purpose (Steiner et al., 2000; Reidsma et al., 2011; Akdeniz et al., 2023).

Land consolidation studies are among the methods applied to ensure this (Paşakarnis and Maliene, 2010;

Kaya and Şişman, 2020; Ertunç and Janus, 2021; Zang et al., 2021; Akdeniz and Acar, 2023). Land consolidation refers to the arrangement made in rural areas in line with the objectives of combining small and fragmented agricultural lands with irregular geometric shapes and making them suitable for modern agriculture, increasing agricultural production, using water resources more effectively, protecting and improving soil, ensuring food security, and increasing the living standards of farmers and their families (Çay, 2001; Crecente et al., 2002; Vitikainen, 2004; Demirel, 2005; Lerman and Cimpoieş, 2006; Paşakarnis and Maliene, 2010; Munnangi et al., 2020; Çay and Acar, 2022; Acar and Akdeniz, 2023).

The first land consolidation study in Türkiye was carried out by the General Directorate of Soil and Water in 1961, based on the provisions of the Turkish Civil Code No. 743 and 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 İscan, 2005; Acar and Bengin, 2018). From 1961 to 2023, consolidation works were carried out by different institutions at different times and according to different legislations, including the Land Consolidation Regulation, the Soil and Agricultural Reform Law, the Agricultural Reform Law on Land Arrangement in Irrigation Areas, the Soil Protection and Land Use Law, the Law on the Organization and Duties of the General Directorate of State Hydraulic Works, and the Land Consolidation Regulation (Küsek, 2014; Duru et al., 2017; Güzel, 2021; Akkul, 2022). Between 1961 and 2022, consolidation works were completed on 6.78 million hectares, and 82% of the completed works were carried out by the General Directorate of Agricultural Reform (TRGM), 11% by the General Directorate of State Hydraulic Works (DSI), and 7% by other institutions (GTHB, 2016; DSI, 2017; GTHB; 2017; DSI, 2022a). On April 28, 2018, land consolidation works carried out by different institutions under different laws were transferred to DSI to ensure that a single institution managed them. Before April 28, 2018, TRGM was carrying out land consolidation works according to the provisions of Law No. 3083, while DSI was carrying out them according to the provisions of Law No. 5403.

There were differences in the arrangement of pasture areas in the projects carried out by both institutions. While deductions were made from pasture areas in TRGM projects, no deductions were made from pasture areas in DSI projects. The legislative change made with the transfer process started to allow deductions from pasture areas in projects carried out by DSI. The 3<sup>rd</sup> paragraph of Article 15 of the Land Consolidation and In-Farm Development Services Implementation Regulation published in the Official Gazette dated February 2, 2019 (Official Gazette, 2019) states: *“Meadows and pastures and other immovable properties registered in the public common property register shall be included in the consolidation by making a deduction for the common participation share and shall benefit from the irrigation, drainage, and road system as much as possible.”* Land consolidation projects were examined according to the changes made in the land consolidation legislation. Some consolidation projects carried out by DSI in Bandırma District of Balıkesir were completed before the transfer process, and some were completed after the transfer process. Of the two arrangement areas evaluated, Simavlı Village was registered before the transfer process, and Bereketli Village was registered after the transfer process according to the legislation applied.

Within the scope of our study, these differences were revealed, and their status before and after the project was evaluated. Of the two villages in the same project area, no deduction was made from pasture parcels in Simavlı Village, while deductions were made in Bereketli Village. In Simavlı Village, most of the pasture parcels

were left out of the regulation in order to reduce the rate of participation in standard facilities and to avoid expropriation costs.

## 2. Materials and Methods

Manyas Left Bank Irrigation and Bereketli Pumped Irrigation L.C., and the 25th Regional Directorate of the General Directorate of State Hydraulic Works of the Ministry of Agriculture and Forestry carry out F.D.S. Project in Balıkesir province. Project data in the study area were obtained from the 25th Regional Directorate. It is carried out in 23 villages, 7 in Bandırma district, 5 in Gönen district, and 11 in Manyas district, in an area of approximately 200 km<sup>2</sup>. Simavlı Village, where suspension work started before 28.04.2018, and Bereketli Village, where suspension work started after 28.04.2018, were evaluated in the project area (Figure 1). The consolidation work carried out in Simavlı Village started within the scope of the provisions of Law No. 5403 and was evaluated within this scope. The arrangement works were completed without making any deductions from the pasture areas. The consolidation works carried out in Bereketli Village were carried out by the provisions of Law No. 6200, and the arrangement works were completed by making deductions from the pasture areas. In both consolidation projects, the cadastral status (before consolidation) and parcellation plan (after consolidation) were analyzed using LiTop software. Netcad 8.5, LiCad, and ArcGIS software were used to create thematic maps. The inclusion rates of pasture areas in the regulation, cadastral status and parcellation plan, utilization status of irrigation and drainage system, interruption rate, and location change criteria were evaluated in the study area.

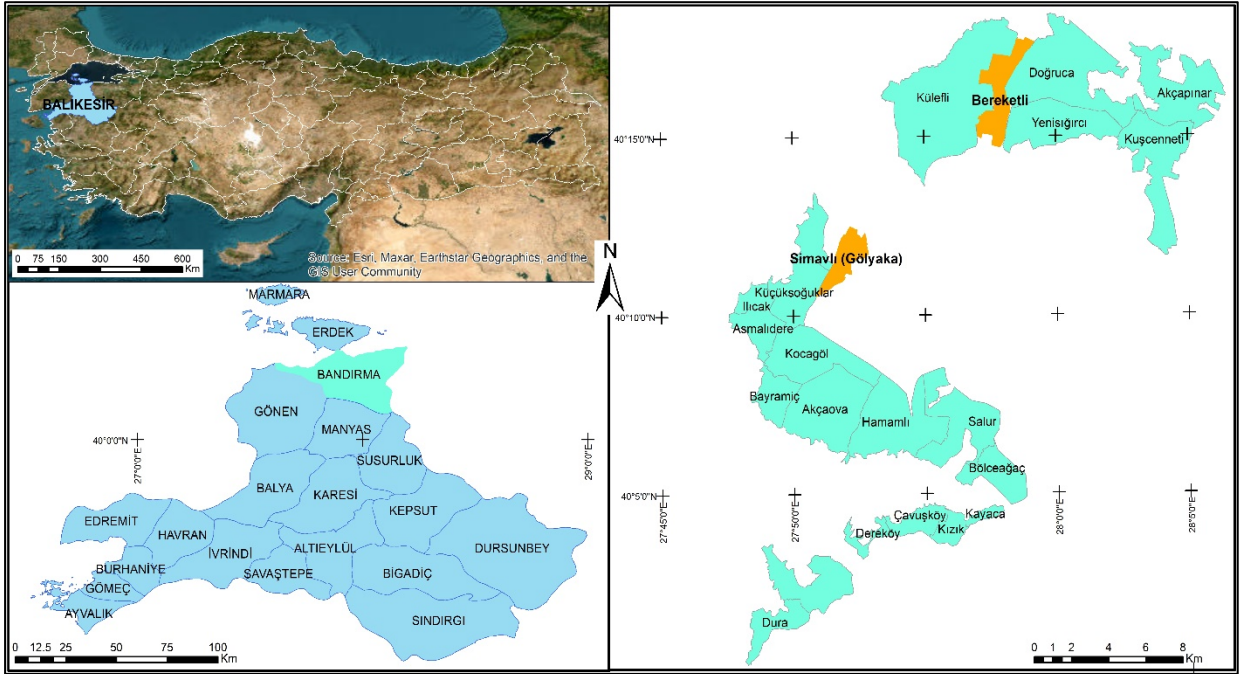


Figure 1. Study area.

### 3. Results and Discussion

In the arrangement study in Simavlı (Gölyaka) Village, 468 parcels are located within the arrangement border (Figure 2). Although there are 54 pasture parcels in Simavlı village, the number of pasture parcels subject to arrangement is 2 (Figure 2).

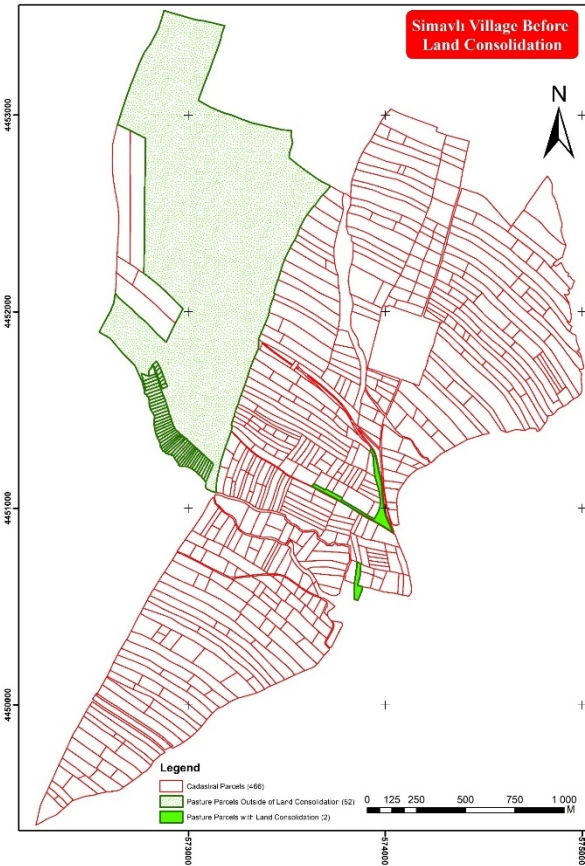


Figure 2. Simavlı village cadastral status map

The separation diameter was arranged in the pasture parcel numbered 201, and 2319.15 m<sup>2</sup> of it was included in the project, and 2330.85 m<sup>2</sup> of it was left out of consolidation. The total title deed area of 54 pasture parcels is 142.54 hectares, and the total area of pasture parcels included in the project is 1.72 hectares. 98.79% of the pasture parcels in the project area were left out of the project. Pasture parcel numbered 311 was primarily preserved in its current location, and the part of pasture parcel numbered 201 included in the arrangement was planned to be close to the large pasture parcel in Figure 2. In the project, a subdivision plan was prepared for pasture areas as three parcels (Figure 3). The participation share rate for common facilities in the regulation area was calculated as 9.80%, and no deduction was made from pasture parcels (Table 1). Before and after consolidation, the pasture area remained at 17219.14 m<sup>2</sup>, and the pasture parcels did not undergo any changes in area. Within the project's scope, all pasture parcels included/not included in the regulation benefit from irrigation and drainage systems. The first suspension of Simavlı Village was made on 02.06.2017. The project was completed, and registration procedures were carried out on 21.12.2022. In the regulation area, where the first suspension was made before the transfer process, the implementation was completed with the initiative of the authorized administration without making any arrangements according to the new legislation. There is no provision in Law No. 7139 regarding the status of the projects that have been started to be arranged.

In the study conducted in Simavlı Village, land consolidation studies were carried out by the provisions of Law No. 5403. In the projects conducted by D.S.İ, no deductions were made from pasture areas. Especially if

the deduction rate was 10% or more, it caused pasture areas to be excluded from the regulation. If the pasture parcels outside the regulation border were included in the project, the deduction rate would be 11.79%. In this case, D.S.İ. should expropriate the part exceeding 10%, i.e., 1.79%. The expropriation process is not preferred because it will both burden the institution financially and cause time losses due to possible problems during the expropriation process. If deductions were made from pasture areas as is the practice today in Simavlı Village, the deduction rate to be calculated in the project area would be 8.51%, and all pasture parcels would be subject to regulation, allowing for regulation in their geometric shapes.

In the regulation study carried out in Bereketli Village, 509 parcels are located within the regulation border (Figure 4). 6 of these parcels consist of pasture parcels registered as Public Common Property, and all of the pasture parcels are subject to regulation.

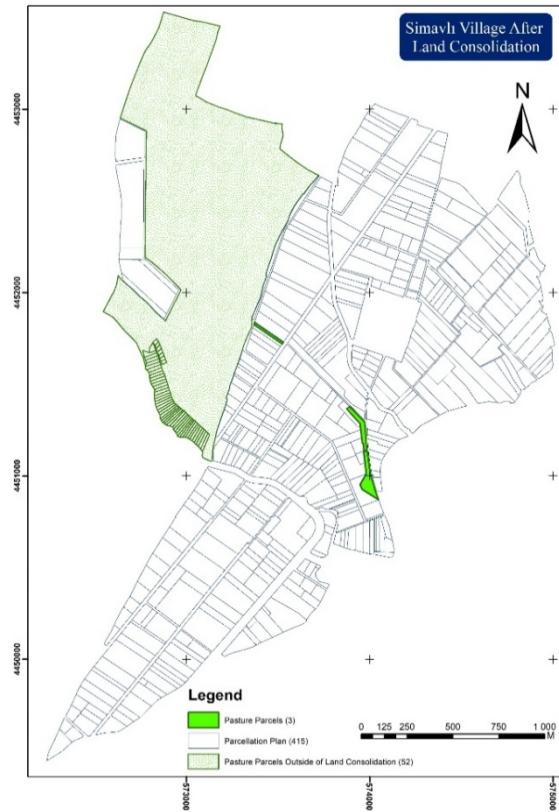


Figure 3. Simavlı village subdivision plan

Table 1. Simavlı village LC-8 list (DSİ, 2022b)

Province:	Balıkesir	Republic of Türkiye, Ministry of Agriculture and Forestry, General Directorate of State Hydraulic Works, State Hydraulic Works 25 <sup>th</sup> Regional Directorate, Manyas Left Bank Irrigation and Bereketli Pumped Irrigations Lc, New Block Parcel Sequential List														Land Deduction: 0.098028		
District:	Bandırma																	
Neighborhood:	Simavlı																	
Landowner		Before land consolidation							Project Values			After Land Consolidation						
		Parcel		Consolidation										AS				
EN	LN	FN	BN	PN	RA (m <sup>2</sup> )	AA (m <sup>2</sup> )	EA (m <sup>2</sup> )	IA (m <sup>2</sup> )	PVN	DA	E/PC	EBN	BN	PN	PA (m <sup>2</sup> )	A (m <sup>2</sup> )	E/PC	PI
1.		TF	-	311	14900	14900	0	14900	8195	0	8195	118	118.	3.	5739.59	5736.59	3155.13	0.550001
					14900		0	14900	8195	0	8195					5736.59	3155.13	
1.		TF	-	311	14900	14900	0	14900	8195	0	8195	118	118.	8.	9163.4	9163.4	5039.87	0.550000
					14900		0	14900	8195	0	8195					9163.4	5039.87	
1.		TF	-	201	4650	4650	2330.85	2319.15	1275.53	0	1275.53	119	135.	4.	2319.15	2319.15	1275.53	0.550000
					4620	2330.85	2319.15	1275.53	0	1275.53						2319.15	1275.53	
Total New Entitlement																		9470.53
Total New Parcel Area																		17219.14
Total Entitlement																		9470.53
Total Deduction Amount (Entitlement)																		0
Total Deduction Amount (m <sup>2</sup> )																		0
Total Parcel Value Number																		9470.53
Total Included Area																		17219.15
Total Excluded Area																		2330.85
Total Allocated Area																		17219.14

EN= enterprise number, LN= last name, FN= first name, BN= block number, PN= parcel number, RA= registered area, AA= allocated area, EA= excluded area, IA= included area, PVN= parcel value number, DA= deduction amount, E/PC= entitlement/payment claim, TF= treasury of finance, AS= allocated share, EBN= existing block number. BN= block number, PN= parcel number, PA= parcel area, PI= parcel index

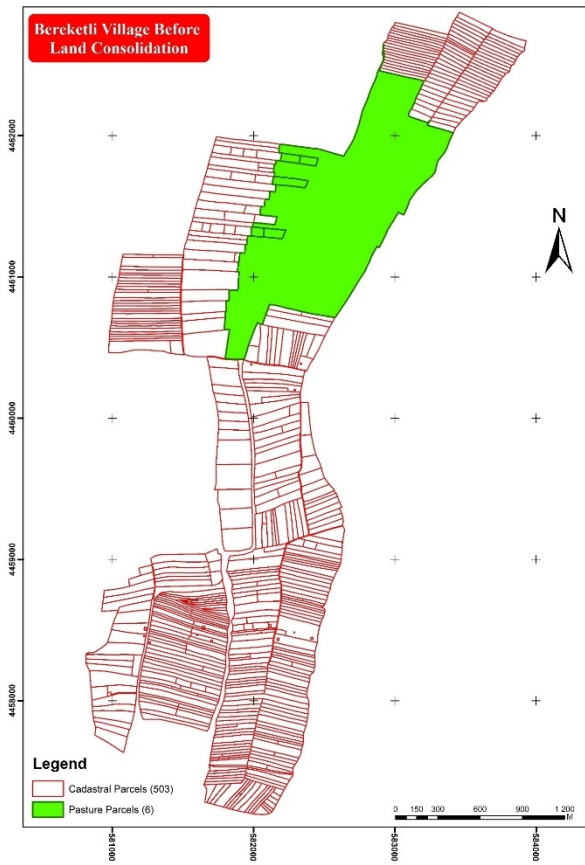


Figure 4. Bereketli village cadastral status map.

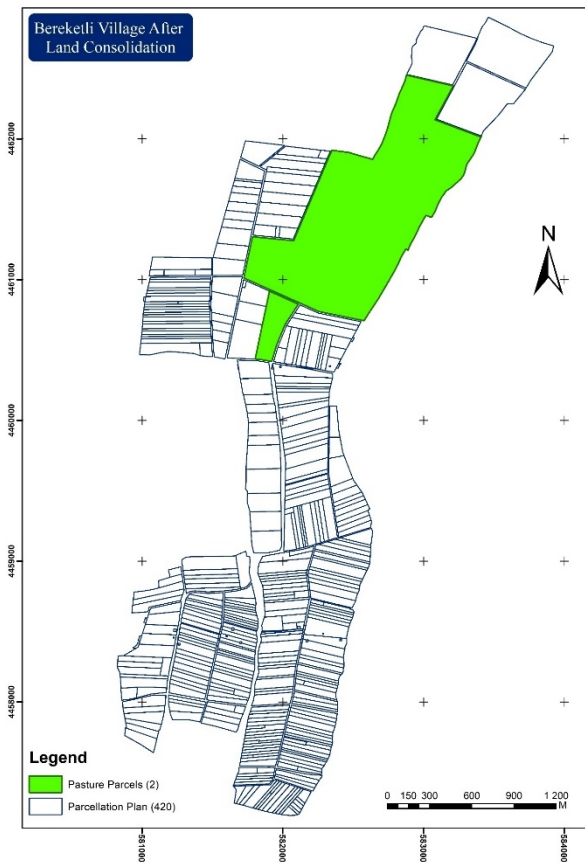


Figure 5. Bereketli village subdivision plan.

The total area of pasture parcels in the regulation area is 141.62 hectares. The deduction amount within the project's scope was calculated as 3.96%, and deductions were made from all parcels included in the regulation at this rate (Table 2). The total deduction amount made in pasture parcels is 5.61 hectares. After the project, pasture parcels were distributed as 136.01 hectares. Pasture areas, six parcels before consolidation, were combined after the project, and a subdivision plan was prepared as two parcels (Figure 5).

The subdivision plan was prepared in the project by preserving the pasture areas primarily in their location before consolidation. It is seen that their geometric shape is more regular than before consolidation. All pasture parcels benefit from irrigation and drainage systems within the project's scope. The first suspension of the arrangement work in Bereketli village was made on 10.11.2018. The project was completed, and registration procedures were completed on 04.01.2023. In the study conducted in Bereketli Village, land consolidation studies were carried out by the provisions of law no. 6200. With the transfer of authority to DSI in land consolidation studies, deductions were made from pasture areas. Pasture areas were included in the consolidation studies, and in-field development services were provided. If the project were intended to be carried out without deductions from pasture areas, the deduction rate to be calculated would be 4.90% when pasture areas were included, and 1% more deductions would be made from private lands, which would prevent the shrinkage of 5.61 hectares of pasture area.

**Table 2.** Bereketli village LC-8 list (DSİ, 2023)

Province:		Balıkesir													Land Deduction: 0.039606			
District:		Bandırma													Republic of Türkiye, Ministry of Agriculture and Forestry, General Directorate of State Hydraulic Works, State Hydraulic Works 25 <sup>th</sup> Regional Directorate, Manyas Left Bank Irrigation and Bereketli Pumped Irrigations Lc, New Block Parcel Sequential List			
Neighborhood:		Bereketli													LC-8			
Landowner		Before land consolidation							Project Values			After Land Consolidation						
		Parcel			Consolidation							AS						
EN	LN	FN	B N	PN	RA (m <sup>2</sup> )	AA (m <sup>2</sup> )	EA (m <sup>2</sup> )	IA (m <sup>2</sup> )	PVN	DA	E/PC	EBN	BN	P N	PA (m <sup>2</sup> )	A (m <sup>2</sup> )	E/PC	PI
305.		PCP	-	50	5700	5700	0	5700	3135	124.16	3010.84	106	104.	1.	1287077.1 3	5474.25	3010.84	0.550000
305.		PCP	-	51	9047.38	9047.38	0	9047.38	4976.06	197.08	4778.98	106				8689.05	4778.98	
305.		PCP	-	61	13238.72	13238.72	0	13238.72	7281.3	288.38	6992.91	106				12714.39	6992.91	
305.		PCP	-	70	6900	6900	0	6900	3795	150.3	3644.7	106				6626.72	3644.7	
305.		PCP	-	71	7486.35	7486.35	0	7486.35	4117.49	163.08	3954.42	106				7189.85	3954.42	
305.		PCP	-	151	1373855.54	1373855.54	0	1373855.54	755620.55	29927.11	725693.44	104				1246382.9	685510.59	
					1416227.99		0	1416227.99	778925.39	30850.12	748075.28					1287077.1	707892.43	
305.		PCP	-	151	1373855.54	1373855.54	0	1373855.54	755620.55	29927.11	725693.44	104	128.	4.	73059.72	73059.72	40182.85	0.550000
Total New Entitlement																	748075.28	
Total New Parcel Area																	1360136.85	
Total Entitlement																	748075.28	
Total Deduction Amount (Entitlement)																	30850.12	
Total Deduction Amount (m <sup>2</sup> )																	56091.14	
Total Parcel Value Number																	778925.39	
Total Included Area																	1416227.99	
Total Excluded Area																	0	
Total Allocated Area																	1360136.85	

EN= enterprise number, LN= last name, FN= first name, BN= block number, PN= parcel number, RA= registered area, AA= allocated area, EA= excluded area, IA= included area, PVN= parcel value number, DA= deduction amount, E/PC= entitlement/payment claim, PCP= public common property, AS= allocated share, EBN= existing block number. BN= block number, PN= parcel number, PA= parcel area, PI= parcel index

#### 4. Conclusion

Land consolidation studies have been carried out in our country since 1961. These studies carried out with many different laws and regulations, were last transferred to DSI with the statute made in 2019 and are currently implemented according to the regulation issued in 2021. This research examined the approaches applied during the transition to the latest regulation. In this context, the applications made in Simavlı and Bereketli Villages of Bandırma District of Balıkesir Province, whose projects continue during the transition period, were evaluated. No deduction was made from pasture parcels in the land consolidation study carried out in Simavlı village. There are 54 pasture parcels in the arrangement area in Simavlı village. When pasture areas are included in the arrangement, the participation share rate for common facilities is 11.79%, necessitating expropriation. 52 pasture parcels are excluded from the regulation to reduce the participation rate from common facilities. By excluding 52 pasture parcels from the regulation, the rate of participation share from common facilities was reduced by 2%. This situation caused 52 pasture parcels not to benefit from land consolidation and in-field development services. Because pasture parcels were not included in the arrangement, the block plan where 52 pasture parcels are located was terrible, and the private lands located there were also affected by this situation. As a result, it is seen that not subjecting pasture parcels to deduction does not mean protecting pastures; on the

contrary, it means that pastures in project areas such as Simavlı do not benefit from land consolidation and in-field development services.

In the land consolidation work carried out in Bereketli Village, deductions were made from pasture areas. A deduction of 3.96% was made from the pasture areas included in the arrangement in Bereketli Village as a participation share in common facilities. If the project had been completed without deductions from pastures, the deduction rate would have increased to 4.9%. Since the project was completed by deductions from pasture parcels in this area, the pasture area decreased from 141.62 ha to 136.01 ha, and 5.61 ha of pasture area was allocated to shared facilities.

While no deductions were made in Simavlı Village, which is included in the same project, deductions were made in Bereketli Village. In the regulation made with Law No. 7139, it was stated that all projects should be evaluated within the scope of this law on the date of the law announcement within the scope of the transfer process. Instead, an article could have been added stating that projects to be made after the law announcement date should be subject to this law and projects whose tenders were made before the law announcement date should be completed according to the provisions of the legislation, they were subject to.

According to the current legislation, pasture areas are cut. Pasture areas are essential areas for animal husbandry. These areas need to be protected, and grass quality needs to be improved. However, pasture quality

varies in each region, and pasture quality may even be lost. Therefore, each region should be evaluated on its own. Social surveys conducted before land consolidation should be more critical, and livelihood determination should be more comprehensive. Decisions should be made considering the people's livelihood in the project area. Pasture commissions in provincial directorates of agriculture should give opinions on whether to make cuts, and project-specific decisions should be made based on these opinions. It may be more beneficial to make a legislative change in order not to make deductions from pasture areas where animal husbandry is intensive. Pasture quality is good, and to make deductions in areas where agricultural production is intensive.

#### Author Contributions

The percentages of the authors' contributions are presented below. The author reviewed and approved the final version of the manuscript.

	T.Ç.	Ö.A.
C	50	50
D	50	50
S	50	50
DCP	50	50
DAI	50	50
L	50	50
W	50	50
CR	50	50
SR	50	50
PM	50	50
FA	50	50

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

#### Conflict of Interest

The authors declared that there is no conflict of interest.

#### Ethical Consideration

Ethics committee approval was not required for this study because of there was no study on animals or humans.

#### References

Acar Ö, Akdeniz HB. 2023. Arazi toplulaştırma projelerinin parsel şekil değişimine etkisinin analizi: Manyas/Salur mahallesi örneği, Türkiye. In: Ayaz T, Öztürk F, editors. Tarımsal Eski Sorunlara Yeni Yaklaşımlar. Iksad Publishing House, Ankara, Türkiye pp: 81-101. <https://doi.org/10.5281/zenodo.8373721>

Acar Ö, Bengin E. 2018. Evaluation of Yozgat (Baştürk Village) land consolidation project in terms of regional development. In: 3rd International Bozok Symposium Regional Development and Socio-Cultural Structure, 3-5 May, Bozok University,

Yozgat, Türkiye, pp:1105-1113.

Akdeniz HB, Acar Ö. 2023. Arazi toplulaştırma projelerinin arazi parçalanması değişimine etkisi bakımından değerlendirilmesi: Manyas / Yeniköy mahallesi örneği, Türkiye. In: Ayaz T, Öztürk F, editors. Tarımsal Eski Sorunlara Yeni Yaklaşımlar. Iksad Publishing House, Ankara, Türkiye, pp:103-121. <https://doi.org/10.5281/zenodo.8373751>

Akdeniz HB, İnam Ş, Çay T. 2023. Evaluation of land consolidation projects implemented in terms of their effects on rural development in Türkiye. COMU J Agric Fac, 11 (1): 18-30. ISSN: 2147-8384 / e-ISSN: 2564-6826. doi: 10.33202/comuagri.1232016.

Akın İ. 2021. The effects of water, soil and climate change on the sustainability of safe food and some determinations. Rahva J Tech Soc Stud, 1(1): 13-23.

Akkul M. 2022. Examination of property-related problems in rural land arrangement practices in terms of sustainable land management: the example of Kop region. PhD thesis, Necmettin Erbakan University, The Graduate School of Natural and Applied Science, Konya, Türkiye, pp: 114.

Aydoğdu M, Özdemir Ş, Dedeoğlu F, Mermer A. 2012. Determining misuse of agricultural lands in yemimahalle district of Ankara using gis and remote sensing techniques. J Field Crops Central Res Instit, 21(2): 57-64.

Bacior S, Prus B. 2018. Infrastructure development and its influence on agricultural land and regional sustainable development. Ecol Inf, 44: 82-93. <http://dx.doi.org/10.1016/j.ecoinf.2018.02.001>.

Capone R, Bilali H, Debs P, Gianluigi C, Nouredin D. 2014. Food system sustainability and food security: connecting the dots. J Food Sec, 2 (1): 13-22. <https://doi.org/10.12691/jfs-2-1-2>.

Crecente R, Alvarez C, Fra U. 2002. Economic, social and environmental impact of land consolidation in Galicia. Land Use Pol, 19(2): 135-147.

Çay T. 2001. Arazi düzenlemesi ve mevzuatı. Petek Ofset, Konya, Türkiye, 2<sup>nd</sup> ed., pp: 350. ISBN: 975-97743-0-5

Çay T, Acar Ö. 2022. Balıkesir ilinde yapılan arazi toplulaştırma projelerinin teknik analizi. In: Babayigit M, Özkan M, Çanakçı AA, Abdelghany AHA, Polat M, Cengiz L, editors. Geçmişten Günümüze Balıkesir'in Kültürel Mirası, Palet Yayınları, 4<sup>th</sup> ed., Ankara, Türkiye, pp: 67-98. E- ISBN:978-625-6401-09-9.

Çay T, Işcan F. 2005. Karkın kasabası ve şatır köyünde yapılan arazi toplulaştırma çalışmalarının değerlendirilmesi. In: Türkiye'de Arazi Toplulaştırması Sempozyumu Bildiriler Kitabı, 15-16 September, Konya, Türkiye, pp: 12-26.

Çevik B. 1974. Konya İli Çumra-Karkın Köyünün kültürteknik sorunları ve bu sorunların çözümünde arazi toplulaştırmasının yeri ve önemi üzerinde bir araştırma. Ankara Üniversitesi Basımevi, Ankara, Türkiye, pp: 77.

Demirel Z. 2005. Kırsal toprak düzenlemesi (arazi toplulaştırması). Yıldız Teknik Üniversitesi Basım-Yayın Merkezi, İstanbul, Türkiye, 4<sup>th</sup> ed., pp: 223.

Demirtaş El, Sarı M. 2003. Land consolidation. Derim, 20(1): 48-58.

Denizdurduran M, Kızılelma Y, Acar Ö, Bengin E. 2017. The analysis of the temporal changes with remote sensing in the city, Afşin (Kahramanmaraş) and its surrounding. In: TUFUAB IX. Teknik Sempozyumu, 27-29 April, Afyonkarahisar, Türkiye, pp: 126-130. ISBN978-605-67429-1-0.

Diesendorf, M. 2000. Sustainability and sustainable development. In: Dunphy D, Benveniste J, Griffiths A, Sutton P, editors. Sustainability: The Corporate Challenge of the 21<sup>st</sup> Century, Allen & Unwi, Australia, 1<sup>st</sup> ed., pp: 19-37.

Duru S, Gül A, Hayran S. 2017. Land consolidation in Turkey: Legislation and practices. Turkish J Agri Econ, 23(2):263-269

- Ertunç E, Janus J. 2021. Impact of Land Consolidation Projects on Land Fragmentation Change: The Case of Turkey and Poland. *Turkish J Agri Nat Sci*, 8(1): 226-234.
- Gürbüz M, Denizdurduran M, Karabulut M, Kızılelma Y. 2012. Uzaktan algılama ve CBS kullanarak Elbistan ovasında arazi kullanımı/arazi örtüsünde meydana gelen değişimlerin incelenmesi. *KSÜ Müh Bilim Derg*, 2012: 30-37.
- Güzel A. 2021. Problems encountered in the land consolidation works performed by GDSHW and suggestions for solutions. MSc thesis, Artvin Çoruh University, Graduate Education Institute, Artvin, Türkiye, pp: 87.
- İkincikarakaya SÜ, Beyaz KB, Rezaei F. 2013. Doğal kaynaklar ve tarım. *Türk Bilim Der Derg*, 6(1): 104-109.
- Kaya MS, Şişman A. 2020. Investigation of objections in parceling phase in land consolidation projects Turkey. *Land Manage J*, 2(1): 25-32.
- Kucukmehmetoglu M, Geymen A. 2009. Urban sprawl factors in the surface water resource basins of Istanbul. *Land Use Policy*, 26(3): 569-579.
- Küsek G. 2014. Legal status and historical developments of land consolidation in Turkey. *J Agric Fac ÇÜ*, 29 (1): 1-6
- Lerman Z, Cimpoieş D. 2006. Land consolidation as a factor for rural development in Moldova. *Europe-Asia Stud*, 58(3): 439-455.
- Marten GG. 2001. Human ecology: Basic concepts for sustainable development. Routledge, London, UK, 1st ed., pp:256. ISBN: 978-1-85383-714-2
- Munnangi AK, Lohani B, Misra SC. 2020. A review of land consolidation in the state of Uttar Pradesh, India: qualitative approach. *Land Use Policy*, 90, 104309.
- Paşakarnis G, Maliene V. 2010. Towards sustainable rural development in central and eastern europe: applying land consolidation. *Land Use Policy*, 27(2): 545-549.
- Reidsma P, Konig H, Feng S, Bezlepkina I, Nesheim I, Bonin M, Sghaier M, Purushothaman S, Sieber S, Van Ittersum, MK, Brouwer F. 2011. Methods and tools for integrated assessment of land use policies on sustainable development in developing countries. *Land Use Policy*, 28(3): 604-617. <https://doi.org/10.1016/j.landusepol.2010.11.009>
- Official Gazette. 2019. Arazi toplulaştırması ve tarla içi geliştirme hizmetleri uygulama yönetmeliği. URL: <https://www.resmigazete.gov.tr/eskiler/2019/02/20190207-5.htm> (accessed date: August 10, 2024).
- Steiner K, Herweg K, Dumanski J. 2000. Practical and cost-effective indicators and procedures for monitoring the impacts of rural development projects on land quality and sustainable land management. *Agri Ecosyst Environ*, 81: 147-154.
- Sumiahadi A, Acar R, Özel A. 2020. Green manure for soil properties improvement. In: 2nd International Eurasian Conference on Science, Engineering and Technology (EurasianSciEnTech 2020), 7-9 October, Gaziantep, Türkiye, pp: 1267-1274.
- T.C. GTHB (Gıda Tarım ve Hayvancılık Bakanlığı). 2016. 2016 yılı faaliyet raporu. URL: [https://www.tarimorman.gov.tr/SGB/Belgeler/Bakanlik\\_Faaliyet\\_Raporlari/2016%20YILI%20BAKANLIK%20FAALİYET%20RAPORU.pdf](https://www.tarimorman.gov.tr/SGB/Belgeler/Bakanlik_Faaliyet_Raporlari/2016%20YILI%20BAKANLIK%20FAALİYET%20RAPORU.pdf) (accessed date: July 20, 2024).
- T.C. GTHB (Gıda Tarım ve Hayvancılık Bakanlığı). 2017. 2017 yılı faaliyet raporu. URL: [https://www.tarimorman.gov.tr/SGB/Belgeler/Bakanlik\\_Faaliyet\\_Raporlari/2017.pdf](https://www.tarimorman.gov.tr/SGB/Belgeler/Bakanlik_Faaliyet_Raporlari/2017.pdf) (accessed date: July 20, 2024).
- T.C. Orman ve Su İşleri Bakanlığı, Devlet Su İşleri Genel Müdürlüğü. 2017. 2017 yılı faaliyet raporu. URL: <https://cdniys.tarimorman.gov.tr/api/File/GetFile/425/KonuIcerik/759/1107/DosyaGaleri/dsi-2017-faaliyet-raporu.pdf> (accessed date: July 20, 2024).
- T.C. Tarım ve Orman Bakanlığı, Devlet Su İşleri Genel Müdürlüğü. 2022a. 2022 yılı faaliyet raporu. URL: <https://cdniys.tarimorman.gov.tr/api/File/GetFile/425/Sayfa/759/1107/DosyaGaleri/dsi2022faaliyetraporu.pdf> (Access Date: 20/07/2024)
- T.C. Tarım ve Orman Bakanlığı, Devlet Su İşleri Genel Müdürlüğü. 2022b. DSİ 25. Bölge Müdürlüğü, Manyas Sol Sahil Sulaması ve Bereketli Pompaj Sulamaları A.T. ve T.İ.G.H. projesi Simavlı köyü parselasyon planı raporu, Ankara, Türkiye, ss: 58.
- T.C. Tarım ve Orman Bakanlığı. 2023. Devlet Su İşleri Genel Müdürlüğü, DSİ 25. Bölge Müdürlüğü, Manyas Sol Sahil Sulaması ve Bereketli Pompaj Sulamaları A.T. ve T.İ.G.H. projesi bereketli köyü parselasyon planı raporu, Ankara, Türkiye, ss: 63.
- Vitikainen, A. 2004. An overview of land consolidation in europe. *Nordic J Surv Real Estate Res* 1(1): 25-44.
- Yin Q, Sui X, Ye B, Zhou Y, Li C, Zou M, Zhou S. 2022. What role does land consolidation play in the multi-dimensional rural revitalization in china? a research synthesis. *Land Use Policy*, 120: 106261.
- Zang Y, Yang Y, Liu Y. 2021. Toward serving land consolidation on the table of sustainability: an overview of the research landscape and future directions. *Land Use Policy*, 109: 105696.