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Identifying Factors Influencing Benefit Perception in Land Consolidation Projects: A Case Study of Tekirdağ Province

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ABSTRACT

Fragmented agricultural land structure in Turkiye is a significant structural problem that negatively affects productivity, and land consolidation (LC) aims to offer a solution. This study aims to determine the factors affecting farmers' perceived benefits from an LC project implemented in Tekirdağ province. Data were collected through surveys with 101 farmers in villages where LC was implemented in the Hayrabolu, Malkara, and Süleymanpaşa districts of Tekirdağ. Farmers' judgments regarding LC were analyzed using factor analysis, followed by a binary logistic regression (logit) model to identify the factors influencing perceived benefits. Factor analysis identified five main perception dimensions: satisfaction, knowledge level, yield effect, mechanization advantage, and pre-process information. According to the logit model results, the 'Satisfaction' factor (Exp(B) = 227.23) was identified as the most statistically powerful factor influencing the likelihood of farmers finding the project beneficial. Similarly, the 'Yield Effect' (Exp(B) = 61.39), 'Pre-Process Information' (Exp(B) = 16.88), and 'Mechanization Advantage' (Exp(B) = 9.95) factors, along with education level, were found to have a significant and positive impact on the perception of benefits. Conversely, land size was found to have a negative effect on benefit perception. In contrast, the 'Knowledge Level' factor was not found to have a significant effect. This study makes a significant contribution to the literature by evaluating the success of LC projects beyond technical outcomes, placing farmer perception and satisfaction at the center of the analysis. The findings reveal that social and perceptual factors may be more decisive than technical implementation in the success of the project, offering concrete, data-driven insights for policymakers.

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Arazi Toplulaştırma Projelerinde Fayda Algısını Etkileyen Faktörlerin Belirlenmesi: Tekirdağ İli Örneği

ÖZET

Türkiye'de tarımsal arazilerin parçalı yapısı, verimliliği olumsuz etkileyen önemli bir yapısal sorundur ve arazi toplulaştırma (AT) bu soruna çözüm sunmayı amaçlamaktadır. Bu çalışma, Tekirdağ ilinde uygulanan bir AT projesi özelinde, çiftçilerin toplulaştırma projelerinden algıladıkları faydayı etkileyen faktörleri belirlemeyi amaçlamıştır. Veriler, Tekirdağ'ın Hayrabolu, Malkara ve Süleymanpaşa ilçelerinde AT uygulanan köylerdeki 101 çiftçiyle yapılan anketler yoluyla toplanmıştır. Çiftçilerin AT'ye yönelik yargıları faktör analizi ile incelenmiş, ardından algılanan faydayı etkileyen faktörleri saptamak amacıyla ikili lojistik regresyon (logit) modeli kullanılmıştır. Faktör analizi sonucunda; memnuniyet, bilgi düzeyi, verim etkisi, mekanizasyon avantajı ve süreç öncesi bilgilendirme olmak üzere beş temel algı boyutu belirlenmiştir. Logit model sonuçlarına göre, çiftçilerin projeyi faydalı bulma olasılığını istatistiksel olarak en güçlü etkileyen faktörün 'Memnuniyet' (Exp(B) = 227.23) olduğu belirilenmiştir. Benzer şekilde, 'Verim Etkisi' (Exp(B) = 61.39), 'Süreç Öncesi Bilgilendirme' (Exp(B) = 16.88) ve 'Mekanizasyon

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Avantajı' (Exp(B) = 9.95) faktörleri ile eğitim düzeyinin de fayda algısını pozitif yönde anlamlı olarak etkilediği görülmüştür. Arazi büyüklüğünün ise fayda algısı üzerinde negatif bir etkiye sahip olduğu belirlenmiştir. Buna karşın, 'Bilgi Düzeyi' faktörünün fayda algısı üzerinde anlamlı bir etkisi saptanmamıştır. Bu çalışma, AT projelerinin başarısını değerlendirirken teknik sonuçların ötesine geçerek çiftçi algı ve memnuniyetini analizin merkezine almasıyla literatüre önemli bir katkı sağlamaktadır. Bulgular, projenin başarısında sosyal ve algısal faktörlerin, teknik uygulamalardan daha belirleyici olabileceğini ortaya koyarak politika yapıcılara somut veriye dayalı çıkarımlar sunmaktadır.

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INTRODUCTION

In Turkiye, agricultural holdings are generally characterized by small, highly fragmented, and scattered land parcels. Land fragmentation is a significant structural problem, both in Turkiye and globally, that adversely affects agricultural productivity and rural development (Vitikainen, 2004; İkikat Tümer et al., 2010; Küsek, 2014a). This structural issue diminishes the efficiency of agricultural activities, increases production costs, and impedes the application of modern farming techniques (Ekinci & Sayılı, 2010; Küsek, 2014a). Land fragmentation leads not only to physical infrastructure challenges but also to significant inefficiencies in the use of labor and capital during the production process (Takka, 1993; Yoğunlu, 2013).

Land consolidation (LC) is a fundamental rural development policy and structural intervention aimed at combining fragmented and scattered agricultural lands to create larger, more integrated, and economically viable farm holdings. These projects extend beyond mere physical land rearrangement to encompass a wide range of infrastructure services, such as the establishment or improvement of rural infrastructure like roads, irrigation, and drainage systems, the reshaping of parcels, and the efficient provision of on-farm services (Sayılan, 2013; Sağlam, 2022). Through this comprehensive approach, the primary objectives of LC initiatives include enhancing agricultural productivity, reducing operational costs, and improving the quality of rural life. Indeed, the expected positive outcomes of LC projects can be listed as technical benefits, such as increased parcel size and reduced parcel count, alongside savings in time and labor, lower input costs, and ultimately, an increase in farm income (Eser & Uçan, 2012; Dağdelen et al., 2017; Bayram & Değirmenci, 2018; Eskici, 2020; İyisöz Bulut & Unakıtan, 2023).

While the literature often highlights the technical and economic benefits of land consolidation (LC), the sustainable success of these projects is critically dependent on the willingness of farmers to participate, their satisfaction with the outcomes, and their overall perception of the benefits. Projects that are technically successful can fail to achieve their ultimate goals if they lack social acceptance. In this context, the primary objective of this study is to identify the determinants of farmers' perceived benefits from an LC project in the Tekirdağ province of Türkiye, using an analytical approach. By focusing on perceptual and social factors rather than conventional technical outputs, this study aims to fill a significant gap in the literature, prioritizing the farmer's perspective to understand the true drivers of project success.

The positive impacts of LC are well-established in the literature, demonstrating a clear causal chain from operational improvements to economic and environmental benefits. Numerous studies have confirmed that the creation of larger, more accessible parcels directly facilitates agricultural mechanization and enhances irrigation efficiency. These operational gains, in turn, are shown to reduce per-unit operating costs and increase overall farm profitability (Oğuz & Bayramoğlu, 2004; Hristov, 2009; Eser & Uçan, 2012; Küsek, 2014b; Şişman & Bilgin, 2016; Mesci & Karlı, 2018; Nguyen & Warr, 2020; Gürgenç Irmaklı & Aydın, 2022). Moreover, LC applications also contribute significantly to environmental sustainability, for instance, by reducing fuel consumption and carbon emissions through more efficient fieldwork (Polat & Manavbaşı, 2012; Bilgin, 2014; Kuzu et al., 2018).

However, the success of LC projects is not limited to the quality of technical implementation and the achievement of planned physical outputs; it is largely dependent on the willingness of farmers to participate, their adoption of the process, and their satisfaction with the final outcomes (Akkaya Aslan et al., 2007; Eser & Uçan, 2012; Bilgin, 2014; Şişman & Bilgin, 2016; Luo & Timothy, 2017; Demirarslan et al., 2019; Karkacıer & Karabaş, 2019; Karaönder & Gürel, 2021; Gorgan & Bavorova, 2022; İyisöz Bulut & Unakıtan, 2023). In this complex and sensitive process involving the rearrangement of land ownership, farmers' socio-economic characteristics, expectations,

current concerns, and general attitudes toward the project directly influence their participation decisions and the project's acceptance level (Kızılaslan & Almus, 2002; Eser & Uçan, 2012; Bilgin, 2014; Mesci & Karlı, 2018; Demirarslan et al., 2019; Tunalı, 2019; Gorgan & Bavorova, 2022; İyisöz Bulut & Unakıtan, 2023). Indeed, Bilgin (2014) found that LC projects in some regions could lead to dissatisfaction and objections among farmers and emphasized that these negative outcomes often stemmed from inadequate information and poor communication during the project process. Therefore, to enhance the effectiveness of LC policies, ensure their sustainability, and minimize potential social resistance, a thorough and comprehensive understanding of the factors shaping farmer behavior and participation decisions is of critical importance.

The literature contains several studies examining farmers' satisfaction levels and their perspectives on LC projects (İkikat Tümer & Akbay, 2016; Şişman & Bilgin, 2016; Kahramanoğlu & Dağdelen, 2018; Karaönder & Gürel, 2021; İyisöz Bulut & Unakıtan, 2023). However, studies that use analytical methods to investigate the factors affecting satisfaction with consolidation services, benefit perception, and adoption are relatively scarce in the literature. In a study conducted in the Tokat-Zile-Güzelbeyli town, Kızılaslan & Almus (2002) used chi-square and variance analysis (t-test) to determine that the level of social participation and awareness of LC were effective in farmers' adoption of the projects. The study also revealed significant differences between adopting and non-adopting farmers based on economic factors such as farm size, parcel count, pre- and post-consolidation irrigated land area, post-consolidation road access, annual sales of agricultural products, and gross production value, suggesting that farmers with higher economic welfare were more inclined toward LC projects. Similarly, Gözener et al. (2016) examined farmers' behaviors regarding LC in the Samsun-Bafra case using chi-square analysis and found significant relationships between whether participation was voluntary or compulsory and farmers' social security, education level, LC knowledge, and perceptions about the potential for re-fragmentation through inheritance.

In studies aiming for a more in-depth analysis of the variables affecting farmer decisions and perceptions, the use of probabilistic choice models such as Logit and Probit has become prominent. Akkaya Aslan et al. (2007) analyzed the factors affecting farmers' adoption of LC projects in the Bursa-Karacabey plain using a logit model. Their study revealed that factors such as benefiting from the irrigation system, a reduction in disputes among farmers (over water, roads, and boundaries), the suitability of parcels for mechanized farming, the enlargement of parcels through consolidation, and consideration of farmer demands during the project had a significant positive effect on adoption. They also noted that the probability of adoption decreased as the education level increased. Luo and Timothy (2017) evaluated farmer satisfaction in the Hangzhou, Changsha, and Guiyang regions of China using a Probit model. They found that 11 socio-economic and structural variables—including education level, employment characteristics, family size, agricultural input costs, transportation methods for agricultural products, level of mechanization, land transfer features in the village and within their own families, perceptions of LC's importance, social security support, and participation in rural production cooperatives—were statistically significant and decisive determinants of satisfaction. In another study conducted with 1349 farmers across 10 provinces in Turkiye, Karkacıer and Karabaş (2019) examined farmers' satisfaction with LC projects using logistic regression analysis. Their work showed that factors such as cost reduction, increased efficiency in irrigation and drainage, ease in agricultural work, effective parceling, and trust in technical personnel positively influenced farmer satisfaction, with trust in technical personnel having the highest impact. Gorgan and Bavorova (2022) analyzed the willingness of farmers in North Macedonia to participate in LC projects using a logit model. They found that the farmer's age, plans to transfer land to their children, perceived possession of sufficient information about the project, and the number of parcels owned had statistically significant effects on their willingness to participate. A comprehensive literature review reveals that evaluating LC projects solely on their technical and economic outputs is insufficient; farmers' perceptions of the process, their satisfaction levels, and social acceptance are decisive factors in project success.

When these studies are considered, it becomes evident that farmers' decisions to accept, be satisfied with, or participate in LC projects depend on a multitude of factors, including: (a) perceived and realized economic benefits (cost reduction, yield increase, income growth), (b) technical and structural outputs of the project (parcel size, shape, number, irrigation, road access), (c) socio-demographic and farm characteristics (age, education, family size, parcel count, off-farm income), and (d) the level of knowledge and perceived uncertainty. Logit and Probit models, by revealing the relative importance of these factors, can provide valuable insights for policymakers and project implementers to enhance the effectiveness of consolidation services and secure farmer acceptance.

MATERIAL and METHOD

The primary data for this study consist of survey data collected from farmers in villages designated for land consolidation. The surveys were administered between July and October 2023.

In this study, the demographic characteristics of the farmers and the structural characteristics of their farms were

determined. Farmers' judgments regarding land consolidation were then analyzed using factor analysis. A logit model was employed to identify the factors influencing farmers' perception of the land consolidation project as beneficial. All statistical procedures, including factor analysis and the logit model, were performed using the SPSS software.

Sampling Method

The study focused on farms producing sunflowers and wheat in the province of Tekirdağ. These two crops were selected because they are an integral part of the region's dominant crop rotation system, and farms cultivating other crops also largely include these two products in their production patterns. According to the Farmer Registration System, there are a total of 3,592 farms producing sunflower and wheat in the selected districts: 1,515 farms in 17 villages in Hayrabolu, 596 farms in 7 villages in Malkara, and 1,481 farms in 12 villages in Süleymanpaşa. The sample size was determined using Neyman's stratified random sampling formula (Equation 1) (Yamane, 2001).

$$n = \frac{(\sum N_h * S_h)^2}{N^2 * (\frac{d^2}{Z^2}) \ + \ \sum(N_h * {S_h}^2)} \quad (1)$$

$$n_i = \frac{N_h * S_h}{\sum N_h * S_h} * n \quad (2)$$

N_h : *Number of farms in stratum h*
S_h : *Standard deviation of stratum h*
N : *Total population size*
d : *Margin of error (0,10)*
Z : *Z-score based on the confidence level (1,96)*
S_h^2 : *Variance of stratum h*
n_i : *Sample size in stratum i*
n : *Total sample size*

The farms were stratified into three groups based on land size: 0–140 decares (da), 141–400 da, and over 401 da. The total sample size was set at 101, based on a 95% confidence level and a 10% margin of error. This total sample size was allocated to the strata using the optimum allocation criterion (Equation 2). The number of farms to be surveyed was calculated as 32 in the 0–140 da stratum, 21 in the 141–400 da stratum, and 48 in the over 401 da stratum. The distribution of the sample across the districts was determined proportionally to the number of farms in each district (Table 1).

Table 1. Distribution of the surveyed farms by district and strata
Çizelge 1. Anket uygulanan işletmelerin ilçelere ve tabakalara göre dağılımı

	Stratum 1 (0-140 da)	Stratum 2 (141 – 400 da)	Stratum 3 (over 401 da)	Total
Hayrabolu	13	9	27	49
Malkara	6	3	3	12
Süleymanpaşa	13	9	18	40
Total	32	21	48	101

Factor Analysis

To determine farmers' views on land consolidation, 17 statements prepared on a 5-point Likert scale were presented to them. The reliability of the farmers' responses was measured using reliability analysis and Cronbach's Alpha coefficient. After confirming the high reliability of the scale, factor analysis was performed.

Before proceeding with the factor analysis, the suitability of the data was assessed using Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) test. High correlation and adequate sample size provided a suitable basis for the analysis. To enhance the interpretability of the identified dimensions, Varimax orthogonal rotation was performed. Following the rotation, factor scores were computed for each farmer to enable the use of these extracted factors as independent variables in the subsequent logit model. The Regression Method, a widely adopted approach for generating standardized scores, was utilized for this purpose. The number of factors was determined by considering factors with an eigenvalue greater than 1. A rotation procedure was performed to enhance the interpretability of these factors. Finally, meaningful names were assigned to each factor based on the variables it contained. In this study, farmers' judgments regarding land consolidation were grouped and summarized into factors.

Logit Model

A binary logit model was chosen to analyze the factors affecting whether farmers found the land consolidation (LC) projects beneficial. The model's dependent variable, benefit perception (F), was coded as '1' for farmers who found the LC activities beneficial and '0' for those who did not. The selection of independent variables was based on previous literature.

Accordingly, the factor scores for satisfaction (F1), knowledge level (F2), yield effect (F3), mechanization advantage (F4), and pre-process information (F5)—obtained from the factor analysis and representing various perceptions and experiences with LC—were included in the model. The use of these factor scores parallels the approach in studies like Karkacıer and Karabaş (2019) and Luo and Timothy (2017), which evaluated the multifaceted elements influencing satisfaction. Furthermore, to reflect the potential effects of farmers' socio-demographic and farm characteristics on LC perceptions, the variables of total farmland size (landsize), the farmer's total years of education (education), and age group (agegroup) were also added to the model. The role of land size in LC adoption was highlighted by Kızılaslan & Almus (2002) and Akkaya Aslan et al. (2007), while the effects of demographic factors like education and age have been examined in various studies, including Akkaya Aslan et al. (2007), Luo and Timothy (2017), and Gorgan and Bavorova (2022). In this study, the age group variable was divided into three categories: younger than 51 (agegroup1), 51–60 years (agegroup2), and over 60 years. The 'over 60' group was used as the reference category in the model. The model for farmers' perception of the LC project as beneficial is presented in Equation 3, and the descriptions of the variables are provided in Table 2.

$$\ln\left(\frac{P(Y=1)}{1-P(Y=1)}\right) = \beta_0 + \beta_1 F1 + \beta_2 F2 + \beta_3 F3 + \beta_4 F4 + \beta_5 F5 + \beta_6 landsize + \beta_7 education + \beta_8 agegroup(1) + \beta_9 agegroup(2) + u_i \quad (3)$$

Table 2. Definitions of Variables
Çizelge 2. Değişkenlerin Tanımları

Dependent Variable	Description	Definition
F	Farmer's perception of the land consolidation project as beneficial	0: Not beneficial 1: Beneficial
Independent Variables		
F1	Satisfaction factor	Factor 1 score
F2	Knowledge level factor	Factor 2 score
F3	Yield effect factor	Factor 3 score
F4	Mechanization advantage factor	Factor 4 score
F5	Pre-process information factor	Factor 5 score
landsize	Total farmland size	Decares
education	Total years of education of the farmer	Years
agegroup1	Farmer's age group (age < 51)	1: Yes, 0: No
agegroup2	Farmer's age group (51 < age < 60)	1: Yes, 0: No

To test for multicollinearity among the independent variables, the Variance Inflation Factor (VIF) and tolerance statistics were calculated. The results indicated that all VIF values were substantially lower than the common cutoff threshold of 10 (Max VIF=1.83), and all tolerance values were well above the minimum required value of 0.1 (Min Tolerance = 0.55). These findings strongly suggest that multicollinearity is not an issue, ensuring the stability and reliability of the model's coefficient estimates. Furthermore, the assumption of a linear relationship between the continuous independent variables and the logit of the outcome was examined using the Box-Tidwell test. The non-significance of all created interaction terms (all p >.050) confirmed that the linearity assumption was satisfied.

RESULTS and DISCUSSION

This section examines the demographic characteristics of the farmers and the structural features of their farms. Information regarding the surveyed farmers is presented in Table 3. All respondents were male, with an average age of 59.7 years. Among the farmers, 1.98% were under 35 years old, 17.82% were in the 35–50 age range, and 80.20% were over 50. All respondents in this research were male, which reflects the prevailing socio-cultural and structural context of agriculture in the study region. Farm holdings are predominantly registered under the male head of the household in the Farmer Registration System (FRS), and men typically act as the primary representatives and de facto decision-makers in formal interactions concerning agricultural projects. Regarding education, 63.37% had completed primary school, 14.85% had completed middle school, 14.85% had completed high school, 4.95% had a vocational school degree, and 1.98% held a master's degree. The farmers' agricultural experience ranged from 2 to 63 years, with an average of 43.44 years. A significant portion of the farmers (54.46%)

reported having off-farm income. The average family size was 3.52.

Table 3. Demographic Profile of Farmers
Çizelge 3. Çiftçilerin Demografik Özellikleri

Category	Subcategory	Frequency	Percentage (%)
Age	<35	2	1.98
	35-50	18	17.82
	51 and over	81	80.20
Education	Primary School	64	63.37
	Middle School	15	14.85
	High School	15	14.85
	Vocational School	5	4.95
	Graduate	2	1.98
Off-farm Income	Pension	50	49.50
	None	46	45.54
	Artisan/Tradesman	3	2.98
	Village Headman	2	1.98
Family Size	1 - 3 persons	60	59.41
	4 - 6 persons	34	33.66
	7 and over	7	6.93

Before land consolidation, the average farm size was 360.98 decares (da), which decreased to 345.26 da after consolidation, representing an average reduction of 4.35% (Table 4). This reduction was 8.96% for irrigated land and 3.98% for dry land. The average number of parcels per farm decreased by 42.37%, from 16.12 to 9.29. This reduction was 44.79% for wholly-owned parcels and 43.62% for jointly-owned (shared) parcels. While the total area of wholly-owned parcels increased by 4.97%, the total area of shared parcels decreased by 63.54%.

Table 4. Structural Characteristics of Farms
Çizelge 4. İşletmelerin Yapısal Özellikleri

	Before Consolidation		After Consolidation	
	Value	Std. Dev.	Value	Std. Dev.
Farm Size (da)	360.98	462,46	345.26	446,57
Irrigated Land (da)	27.22	75,11	24.78	67,12
Dry Land (da)	333.76	432,76	320.48	419,88
Number of Parcels	16.12	12,55	9.29	6,38
Wholly-owned Parcels	13.53	12,10	7.47	5,76
Shared Parcels	2.82	3,09	1.59	1,68
Size of Wholly-owned Parcels (da)	312.38	452,30	327.89	443,52
Size of Shared Parcels (da)	47.70	64,01	17.39	19,98
Average Parcel Size (da)	26.65	39,14	34.79	40,72

Studies conducted across Türkiye indicate that the average reduction in the number of parcels is 39.56% (Eser & Uçan, 2012; Kır, 2012; Küsek, 2014b; Boztoprak et al., 2015; Gözener et al., 2016; Şişman & Bilgin, 2016; Durduran et al., 2018; Kahramanoğlu & Dağdelen, 2018; Mesci & Karlı, 2018; Tunalı & Dağdelen, 2018; Kuzu & Değirmenci, 2020; Gürgenç Irmaklı & Aydın, 2022; Yeniay, 2020). The 42.37% reduction observed in Tekirdağ province is consistent with the national average. While the literature reports varying increases in farm size after consolidation (Boztoprak, 2010; Boztoprak et al., 2015; Dağdelen et al., 2017; Kahramanoğlu & Dağdelen, 2018; Mesci & Karlı, 2018), some studies also show a decrease (Döner & Kaya, 2021; Türk, 2021). This can be interpreted as a reflection of the project's impact, varying with the different socio-economic and geographical conditions of each region. Previous studies have reported that the change in average parcel size after consolidation ranges from 27.33% to 75.23% (Boztoprak, 2010; Eser & Uçan, 2012; Kır, 2012; Küsek, 2014b; Boztoprak et al., 2015; Dağdelen et al., 2017; Kahramanoğlu & Dağdelen, 2018; Mesci & Karlı, 2018; Tunalı & Dağdelen, 2018; Eskici, 2020; Yeniay, 2020; Döner & Kaya, 2021).

A majority of the farmers (95.05%) stated that they had attended an informational meeting before the land consolidation activities (Table 5). Of those who attended, 94.79% felt they received sufficient information about the planned consolidation. However, farmers who felt the information was insufficient noted discrepancies between what was explained in the meeting and the actual implementation (e.g., methods of soil analysis).

Table 5. Farmers' Participation in Land Consolidation Meetings
Çizelge 5. Çiftçilerin Arazi Toplulaştırma Toplantılarına Katılım Durumu

	Was a meeting held?		Did you attend?	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Yes	96	95,05	96	95,05
No	5	4,95	5	4,95
Total	101	100,00	101	100,00

Farmers' opinions on the land consolidation project, comparing the pre- and post-implementation periods, are presented in Table 6. Before consolidation, a large majority of farmers (93.07%; 94 individuals) had a positive outlook on the project, with only a small minority (6.93%; 7 individuals) expressing negative views. This indicates a general sense of expectation and hope at the project's outset. However, a significant shift is observed in post-consolidation assessments. After implementation, the proportion of farmers with a positive view dropped to 41.58% (42 individuals), while the proportion with a negative view rose to 58.42% (59 individuals). These data reveal a distinct negative shift in farmer perception following the land consolidation experience.

Table 6. Farmers' Opinions on the Land Consolidation Project
Çizelge 6. Çiftçilerin Arazi Toplulaştırma Projesi Hakkındaki Görüşleri

	Before Consolidation		After Consolidation	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Positive	94	93,07	42	41,58
Negative	7	6,93	59	58,42

The reasons for the negative change in opinion among the 52 farmers are detailed in Table 7. The primary reasons cited were that "the promises made before consolidation did not materialize" (48.08%) and that "the implementation was flawed" (32.69%).

Table 7. Reasons for Negative Opinions After Land Consolidation
Çizelge 7. Arazi Toplulaştırması Sonrası Olumsuz Görüşlerin Nedenleri

Reason for Negative Change	Frequency	Percentage of Farmers (%)*
The promises made before consolidation did not materialize	25	48.08
The implementation was flawed	17	32.69
There was biased treatment	16	30.77
The consolidation staff were incompetent	9	17.31
My new lands are less fertile	7	13.46
Soil classification was not done	4	7.69
I had to leave my ancestral land	3	5.77
My lands became more scattered	3	5.77
Total Responses	84	-

** Farmers provided more than one response.*

Factor Analysis

The internal consistency of the 17 variables subjected to factor analysis was confirmed by a Cronbach's alpha coefficient of 0.823, indicating that the scale is highly reliable. The KMO measure, which assesses the suitability of the sample for factor analysis, yielded a value of 0.749, suggesting that the dataset is well-suited for factorization. Furthermore, Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 473.436$, $p < 0.001$), confirming the presence of a sufficient correlation pattern among the variables to justify the application of factor analysis.

In this study, the number of factors was determined based on eigenvalues. Variables with eigenvalues greater than 1 were retained to define the factors. To facilitate interpretation, a rotation was applied to the matrix, resulting in a rotated factor matrix. According to the results of the rotated factor matrix, the scale consists of 17 items and 5 factors (Table 8). Factor loadings, which represent the correlation between each variable and its corresponding factor, were calculated for each factor. In the social sciences, a factor loading of 0.3 is considered the minimum threshold for a variable to be assigned to a factor (Peterson, 2000). According to Hair et al. (1998), while factor loadings greater than 0.3 meet the minimum level, loadings greater than 0.4 are considered more practically significant. In this study, the lowest accepted factor loading was 0.50. Based on the meaning conveyed by the items

within each factor, the dimensions were named as follows: 'Satisfaction', 'Knowledge Level', 'Yield Effect', 'Mechanization Advantage', and 'Pre-Process Information'.

The first factor, identified as 'Satisfaction', accounts for 26.615% of the total variance in farmers' judgments about land consolidation. The second factor, 'Knowledge Level', explains 13.314% of the variance. The third factor, 'Yield Effect', accounts for 11.934% of the variance. The fourth factor, 'Mechanization Advantage', explains 9.476% of the variance, and the fifth factor, 'Pre-Process Information', accounts for 9.160% of the variance.

Table 8. Results of the Exploratory Factor Analysis of the Farmers' Judgments on Land Consolidation Scale
Çizelge 8. Çiftçilerin Toplulaştırma Konusundaki Yargıları Ölçeğinin Açıklayıcı Faktör Analizi Sonuçları

	Factor Loadings					Eigenvalue	Variance Explained (%)
	Factor 1 Satisfaction	Factor 2 Knowledge Level	Factor 3 Yield Effect	Factor 4 Mechanization Advantage	Factor 5 Pre-Process Information		
The promises made before consolidation were fulfilled.	0.727					5.375	26.615
The new parcels created after consolidation were distributed fairly.	0.801						
The consolidation was economically beneficial.	0.845						
The consolidation was socially beneficial.	0.670						
The consolidation brought peace and prosperity.	0.707						
I would recommend land consolidation to other farmers.	0.879						
I am satisfied with the location of my land after consolidation.	0.715						
Information was provided about land types (e.g.. flat. sloped).		0.837				2.361	13.314
Information was provided about soil classes.		0.891					
I have knowledge about land grading.		0.726					
My yield increased after the consolidation.			0.853			1.851	11.934
My annual agricultural income increased after the consolidation.			0.843				
My land quality decreased / I was given infertile land after consolidation.			0.591				
Access to my land became easier after the consolidation.				0.713		1.219	9.476
The use of machinery became easier after the consolidation.				0.844			
The information provided before the consolidation was sufficient.					0.797	1.179	9.160
I knew about the changes to be made to my land before the consolidation.					0.838		

Logit Model

The overall goodness-of-fit statistics indicate that the model fits the data well. The -2 Log Likelihood value was 22.047, and the Nagelkerke R^2 value was calculated as 0.853. A Nagelkerke R^2 of 0.853 signifies that the independent variables have a very high explanatory power for the variation in the dependent variable.

The findings show that the 'Satisfaction', 'Yield Effect', 'Mechanization Advantage', and 'Pre-Process Information' factors have a statistically significant and positive effect on the likelihood of farmers finding the consolidation beneficial. These results are largely parallel to many studies in the literature, while also exhibiting notable differences on certain points.

The 'Satisfaction' factor (F1), which reflects farmers' overall contentment with the consolidation, was found to have the strongest positive impact on the probability of perceiving the project as beneficial, increasing the odds by a factor of over 227 (Exp(B) = 227.229, 95% CI [6.880, 7504.923]). This finding strongly aligns with the study by Karkacıer & Karabaş (2019), where 87% of farmers reported positive views on consolidation, and factors such as cost reduction, irrigation-drainage efficiency, and trust in technical personnel increased satisfaction. Similarly,

Akkaya Aslan et al. (2007) emphasized that meeting farmer demands and general project approval are critical for the perception of consolidation. Therefore, the project's ability to meet farmers' expectations and deliver tangible benefits plays a central role in its adoption, mediated through overall satisfaction.

The 'Yield Effect' (F3) and 'Mechanization Advantage' (F4) factors were also found to increase the likelihood of finding the consolidation beneficial by approximately 61 times (Exp(B) = 61.389, 95% CI [1.284, 2934.631]) and 10 times (Exp(B) = 9.951, 95% CI [1.415, 69.991]) respectively. These results are consistent with the findings of Akkaya Aslan et al. (2007), who identified parcel reshaping for mechanized farming and the creation of larger parcels as highly valued criteria by farmers, and with Karkacıer & Karabaş (2019), who found that the facilitation of agricultural activities was a key satisfaction factor. Post-consolidation on-farm improvements that enhance production efficiency and the use of agricultural mechanization contribute to farmers evaluating the project positively by improving their operational processes.

The 'Pre-Process Information' (F5) factor, which increased the odds of perceiving benefit by approximately 17 times (Exp(B) = 16.881, 95% CI [1.679, 169.784]), highlights the importance of transparent and open communication at the project's outset. Gorgan & Bavorova (2022), in their study in North Macedonia, found that having sufficient information increased the willingness to participate in consolidation. Similarly, Kızılaslan & Almus (2002) identified the "level of awareness" of consolidation as an effective factor in its adoption. These findings demonstrate that effective communication strategies and the active involvement of farmers in the process are critical for building their confidence in the process and enhancing their perception of its benefits.

The 'Knowledge Level' (F2) factor was found to be statistically insignificant (Exp(B) = 0.806, 95% CI [0.271, 2.403], p = 0.699), suggesting that farmers' general level of knowledge does not have a direct and significant impact on their decision to find the project beneficial. However, the significance of the 'Pre-Process Information' factor indicates that timely and transparent information specific to the project is more effective than general or abstract knowledge. Indeed, Kızılaslan & Almus (2002) and Gorgan & Bavorova (2022) emphasized the importance of awareness and having sufficient information. This suggests that the content and presentation of information, and how well it can be related to the farmer's direct experience, may be more important than the mere level of knowledge.

Among the demographic and structural variables, land size (B=-0.009, p=0.098) and years of education (B=0.878, p=0.087) approached statistical significance. Given the exploratory nature of this study and the sample size (N=101), a significance level of α = 0.10 was also considered for these variables to avoid potential Type II errors and to identify factors that may warrant further investigation for policy-making. The findings indicate that each unit increase in land size slightly decreases the odds of a farmer perceiving the project as beneficial (Exp(B) = 0.991, 95% CI [0.981, 1.002]). This counterintuitive finding may suggest that farmers with larger holdings have higher expectations that are not fully met, or that they perceive a greater relative loss if specific, high-value parcels are exchanged during the consolidation process. In contrast, each additional year of education increases these odds by approximately 2.4 times (Exp(B) = 2.406, 95% CI [0.879, 6.585]). The age group variable did not create a statistically significant difference in the model (p=0,335 > 0.050, p=0,223 > 0.050, p=0,206 > 0.050), indicating that benefit perception does not vary significantly with age.

Table 9. Logit Model Results Factors Affecting Benefit Perception
Çizelge 9. Fayda Algısını Etkileyen Faktörler: Logit Model Sonuçları

						95% C.I.for EXP(B)	
	ß	S.E.	Wald	p.	Exp(B)	Lower	Upper
Satisfaction (F1)	5.426	1.784	9.246	0.002***	227.231	6.880	7504.923
Knowledge Level (F2)	-0.215	0.557	0.149	0.699	0.806	0.271	2.403
Yield Effect (F3)	4.117	1.973	4.354	0.037**	61.389	1.284	2934.631
Mechanization Advantage (F4)	2.298	0.995	5.329	0.021**	9.951	1.415	69.991
Pre-Process Information (F5)	2.826	1.178	5.759	0.016**	16.881	1.679	169.784
landsize	-0.009	0.005	2.740	0.098*	0.991	0.981	1.002
education	0.878	0.514	2.922	0.087*	2.406	0.879	6.585
agegroup			2.189	0.335	Ref. Group		
agegroup(1)	-4.37	3.583	1.488	0.223	0.013	0.000	14.186
agegroup(2)	-1.952	1.543	1.6	0.206	0.142	0.007	2.923
Constant	-4.549	2.597	3.068	0.080	0.011		
-2 Log likelihood					22.047		
Nagelkerke R Square					0.853		

p < 0.100, **p <0 .050,*p <0 .010*

The model correctly predicted 94.4% of farmers who did not find the consolidation beneficial and 96.2% of those who did. Overall, the model has a correct classification rate of 95.2%. The estimated model is given below:

$$Benefit_i^* = -4{,}549 + 5{,}426F1_i - 0{,}215F2_i + 4{,}117F3_i + 2{,}298F4_i + 2{,}826F5_i - 0{,}009landsize_i + 0{,}878education_i - 4{,}370agegroup(1)_i - 1{,}952agegroup(2)_i + u_i$$

One of the most striking findings of this study is the significant paradox between farmers' high pre-consolidation optimism and their widespread post-consolidation dissatisfaction. While 93.07% of farmers initially held a positive view of the project, this figure plummeted to 41.58% after implementation (Table 6). The initial optimism was likely fueled by the promised benefits of LC, such as increased efficiency and productivity, communicated during informational meetings. However, the post-implementation dissatisfaction suggests a significant implementation gap, where the project's execution failed to meet these high expectations. The reasons cited by farmers for their negative opinions (Table 7) provide direct evidence for this gap: the most common complaints were that "the promises made before consolidation did not materialize" (48.08%) and that "the implementation was flawed" (32.69%). These findings underscore that the dissatisfaction stems not from the concept of LC itself, but from failures in its practical application. This highlights that for LC projects to be successful, managing farmer expectations through transparent communication and ensuring a fair, technically sound implementation process are as crucial as the planned technical outcomes.

This study reveals that the success of land consolidation initiatives hinges more critically on how farmers perceive their potential benefits rather than on their demographic or structural characteristics. While structural variables like farm size exert a marginally significant but secondary influence, perceptual factors emerge as the decisive drivers of benefit perception. Therefore, for consolidation policies to be effective, their design and communication must move beyond technical criteria to actively address the subjective viewpoints and concerns of the farming community.

CONCLUSION

This study was conducted in 17 villages in the Hayrabolu district, 7 villages in the Malkara district, and 12 villages in the Süleymanpaşa district of Tekirdağ province, all designated as land consolidation areas, to determine the factors affecting the perception of the land consolidation project as beneficial by farmers. The research findings indicate that although land consolidation achieved some of its technical objectives, social and administrative elements that shape farmers' perceptions of the process directly affect the success of the implementation.

First, it was determined that as a result of the consolidation projects, the number of parcels per farm decreased by 42.37%. This rate is close to the average for Turkiye (39.56%) and shows that the project was successful in its objective of reducing the parcel count. Additionally, the average parcel size increased by 30.54%, from 26.65 to 34.79 decares. This situation can facilitate a more effective use of agricultural mechanization, thereby contributing to the reduction of production costs and an increase in operational efficiency.

Although 95.05% of the farmers stated they attended informational meetings before the consolidation, there was significant dissatisfaction regarding the content of these meetings and their alignment with the implementation. After consolidation, only 41.58% of the farmers found the project beneficial. A key finding of this research is the profound gap between high initial optimism and subsequent dissatisfaction, primarily because "what was promised did not materialize" and "the implementation was flawed." This paradox reveals that the success of LC projects is critically dependent not just on achieving technical targets, but on managing farmer expectations and ensuring procedural justice throughout the implementation phase.

The results of the logit model are highly significant in explaining farmers' perceptions regarding the benefits of consolidation (Nagelkerke $R^2 = 0.853$). The model predicted the farmers' benefit perception with a 95.2% correct classification rate.

The analysis conclusively demonstrates that farmers' perceptions are the primary determinants of how they view the benefits of consolidation. This is most strikingly illustrated by the 'Satisfaction' factor, which proved to be the single most powerful predictor, increasing the odds of a positive perception 227-fold and underscoring that subjective experience outweighs technical outcomes. Furthermore, the significance of the 'Yield Effect', 'Mechanization Advantage', and 'Pre-Process Information' factors highlights that tangible production improvements and early-stage project transparency are critical in shaping these positive perceptions. While these perceptual elements are dominant, the model also reveals a more nuanced reality where demographic and structural characteristics play a subtle but significant role. Specifically, higher educational attainment was associated with a more favorable view, whereas larger land ownership had a marginal negative effect. This complex

interplay reveals that project success is ultimately filtered through the subjective lens of the farmer, which is itself shaped by their socio-economic context.

This study concludes that the success of land consolidation hinges on a socially attuned implementation model that moves beyond mere technical arrangements. Therefore, implementing agencies must embed social acceptance and perception management into their core strategic planning. This requires a fundamental shift from a one-size-fits-all communication strategy to a segmented and empathetic approach tailored to different farmer groups. Specifically, proactive engagement with large landowners is crucial to address their unique concerns, while informational materials for farmers with lower formal education must be designed for maximum accessibility and clarity. By focusing on transparent communication, genuine participation, and emphasizing tangible benefits like mechanization, agencies can foster the farmer satisfaction that is ultimately critical for policy success.

Based on the research findings, various recommendations have been developed to increase the effectiveness of future land consolidation projects. In this context, the implementation of effective communication and education strategies is of great importance. Clear, accurate, understandable, and timely information should be provided to farmers at every stage of the consolidation process; farmers' level of preparedness for the process should be increased through education and extension activities. Informational meetings should be considered a strategic tool that shapes perception, rather than a mere formality.

Adopting a participatory approach in project management is also a critical element. Greater and more active participation of farmers in decision-making processes should be ensured and encouraged in this regard. It is anticipated that satisfaction rates will also increase with the level of participation. This will contribute to greater ownership of the project by farmers and its long-term success.

For the continuity and improvement of the process, the monitoring of social acceptance and the establishment of effective feedback mechanisms are necessary. Farmers' satisfaction levels should be regularly monitored post-project, and channels through which complaints and suggestions can be easily conveyed should be created so that the process is continuously developed with feedback. In this way, potential problems can be identified and resolved at an early stage.

The competence of the personnel involved in the implementation phase is also an important factor in the success of the project. The technical personnel involved in the consolidation process should be supported with social communication skills and technical equipment to enable them to communicate effectively with farmers. It is essential for personnel to possess not only technical knowledge but also the ability to empathize and communicate effectively, in order to establish a healthy dialogue with farmers.

Finally, a planning approach sensitive to regional differences should be adopted in the design of consolidation projects. Before projects are implemented, detailed analyses should be conducted on the demographic structure, socio-cultural characteristics, and existing agricultural production patterns of the region where the project will be applied, and projects should be shaped in light of these analyses according to the specific needs and expectations of the region.

In conclusion, land consolidation should be addressed with an approach that extends beyond being a mere engineering project involving physical arrangements. It should be evaluated as a multidimensional rural development tool that also incorporates processes of social acceptance, effective perception management, and trust-building among stakeholders. A successful consolidation project must not only reduce parcel numbers and increase parcel sizes but also concretely improve the production conditions of farmers and ensure they develop a strong sense of ownership towards the project.

Another key element in project success is the adoption of effective information and communication strategies. Transparent, open, and continuous communication with farmers should be established from the beginning of the project; providing detailed and understandable information about the changes to be made to their lands and the potential impacts of the project should be prioritized, as this is of more critical importance than the general level of knowledge. The informational materials and meetings being in a language and format that farmers can understand will ensure that the information provided is perceived as sufficient and reliable. Educational and demographic factors must also be taken into account. Given that education level positively affects benefit perception, special information and extension activities should be designed for farmers with lower education levels to help them better understand the benefits and processes of the project. Similarly, considering the slight negative effect of land size on benefit perception, tailored communication strategies should be developed for this group that address their current situations, expectations, and potential concerns, and that present the specific advantages of the project to them. In the post-implementation period, the continuous monitoring and evaluation of the impacts of consolidation projects, and making necessary improvements by taking farmer feedback into account, will make significant contributions to the sustainability of satisfaction and the success of future projects. Finally, for future research, conducting similar studies in regions with different socio-economic and geographical characteristics to

test the generalizability of the findings; investigating the long-term sustainability of farmer satisfaction and the change in benefit perception over time; exploring the complex interaction between the "Knowledge Level" and "Pre-Process Information" factors in-depth with qualitative methods; and a more detailed analysis of the correlation between farmers' benefit perception and the project's actual economic and social impacts will offer valuable contributions to the literature. The implementation of these recommendations will be instrumental in the greater adoption of land consolidation projects by farmers, a more effective contribution to rural development, and a more efficient use of resources.

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The authors declare that they have contributed equally to the article.

Conflict of Interest

The authors declare that there is no conflict of interest among them.

REFERENCES

Akkaya Aslan, Ş. T., Gündoğdu, K. S., Yaslıoğlu, E., Kirmikil, M., & Arıcı, İ. (2007). Personal, physical and socioeconomic factors affecting farmers' adoption of land consolidation. *Spanish Journal of Agricultural Research, 5*(2), 204–213. https://sjar.revistas.csic.es/index.php/sjar/article/view/240

Bayram, R., & Değirmenci, H. (2018). Arazi toplulaştırma projelerinde parsel şekillerinin analizi: Niğde Misli Ovası 2. kısım Yıldıztepe örneği. *Kahramanmaraş Sütçü İmam Üniversitesi Tarım ve Doğa Dergisi, 21*(4), 500–510. https://doi.org/10.18016/ksudobil.369729

Bilgin, C. (2014). *Trakya Bölgesindeki uygulanan arazi toplulaştırmasının çiftçiler üzerindeki etkinliğinin irdelenmesi* [Yüksek lisans tezi, Namık Kemal Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 364267)

Boztoprak, T. (2010). *Arazi toplulaştırma çalışmasının kültürteknik özelliklerinin sürdürülebilir arazi yönetimi açısından irdelenmesi: Kayseri örneği* [Yüksek lisans tezi, Karadeniz Teknik Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 276732)

Boztoprak, T., Demir, O., Çoruhlu, Y. E., & Nişancı, R. (2015). Arazi toplulaştırmasının tarımsal işletmelere etkilerinin araştırılması. *Selçuk Üniversitesi Bilim ve Teknoloji Dergisi, 3*(3), 1–11. https://dergipark.org.tr/tr/download/article-file/215589

Dağdelen, N., Tunalı, S. P., Gürbüz, T., Akçay, S., & Yılmaz, E. (2017). Aydın Yenipazar–Hamzabali Köyünde toplulaştırma etkinliğinin araştırılması. *Adnan Menderes Üniversitesi Ziraat Dergisi, 14*(1), 45–50. https://doi.org/10.25308/aduziraat.295348

Demiraslan, M., Özer, Ü., & Eraslan, H. (2019, Nisan 25-27). *Arazi toplulaştırması uygulamalarında karşılaşılan sorunlar ve çözüm önerileri* [Kongre bildirisi]. 17. Türkiye Harita Bilimsel ve Teknik Kurultayı, Ankara, Türkiye.

Döner, H., & Kaya, S. (2021). Bingöl ili merkez ilçe köylerinde uygulanan arazi toplulaştırma projesinin kırsal alan planlaması yönüyle değerlendirilmesi. *Türk Doğa ve Fen Bilimleri Dergisi, 10*(2), 34–41. https://doi.org/10.46810/ tdfd.839340

Durduran, S. S., Cora, T., Bozdağ, A., & Okka, C. T. (2018). Konya İli Topraklık Mahallesi arazi toplulaştırma uygulamasının mekansal ve işlevsel olarak değerlendirilmesi. *Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi, 7*(2), 661–671. https://doi.org/10.28948/ngumuh.444683

Ekinci, K., & Sayılı, M. (2010). Tarım arazilerinin parçalanmasını önlemeye yönelik mevzuat üzerine bir inceleme. *Gaziosmanpaşa Üniversitesi Ziraat Fakültesi Dergisi, 27*(2), 121–129. https://dergipark.org.tr/tr/pub/gopzfd/issue/7332/95955

Eser, Ö., & Uçan, K. (2012). Arazi toplulaştırması etkinliğinin belirlenmesi. *Kahramanmaraş Sütçü İmam Üniversitesi Doğa Bilimleri Dergisi, 15*(2), 38–45. https://dergipark.org.tr/tr/pub/ksudobil/issue/22833/243763

Eskici, B. (2020). *Çorum Alaca Bolatcık Köyü arazi toplulaştırmasının tarımsal altyapı hizmetlerine etkisi* [Yüksek lisans tezi, Selçuk Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 624933)

Gorgan, M., & Bavorova, M. (2022). How to increase landowners' participation in land consolidation: Evidence from North Macedonia. *Land Use Policy, 123*, 106424. https://doi.org/10.1016/j.landusepol.2022.106424

Gözener, B., Sayılı, M., & Mollaoğlu, E. (2016, Mayıs 25-27). *Çiftçilerin arazi toplulaştırması konusundaki davranışlarının belirlenmesi: Samsun ili Bafra ilçesi örneği* [Kongre bildirisi]. XII. Tarım Ekonomisi Kongresi, Isparta, Türkiye.

Gürgenç Irmaklı, P., & Aydın, A. (2022). Arazi toplulaştırmanın tarıma ve tarımsal mekanizasyona katkısı; Çanakkale–Biga–Dereköy örneği. *Tekirdağ Ziraat Fakültesi Dergisi, 19*(3), 582–599. https://doi.org/10.33462/jotaf.1033732

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5. baskı). Prentice Hall.

Hristov, J. (2009). *Assessment of the impact of high fragmented land upon the productivity and profitability of the farms* [Derece tezi, Swedish University of Agricultural Sciences].

İkikat Tümer, E., & Akbay, C. (2016, Mayıs 25-27). *Arazi toplulaştırılmasının üreticiler üzerine olan etkilerinin analizi: Şanlıurfa İli örneği* [Kongre bildirisi]. 12. Ulusal Tarım Ekonomisi Kongresi, Isparta, Türkiye.

İkikat Tümer, E., Keskin, A., & Birinci, A. (2010). Analysis of factors affecting land fragmentation in Erzurum Province, Turkey. *African Journal of Business Management, 4*(8), 1614–1618. https://academicjournals.org/journal/AJBM/edition/18_July_2010

İyisöz Bulut, E., & Unakıtan, G. (2023). Arazi toplulaştırma uygulamalarında çiftçi algılarının belirlenmesi: Tekirdağ Malkara Yörük Köyü örneği. *Balkan Sosyal Bilimler Dergisi, 12*(24), 14–21. https://doi.org/10.55589/bsbd.1400201

Kahramanoğlu, E., & Dağdelen, N. (2018). Aydın Dalama Ovasında arazi toplulaştırma çalışmalarının tarla içi geliştirme hizmetleri ve çiftçi memnuniyeti açısından irdelenmesi. *Adnan Menderes Üniversitesi Ziraat Fakültesi Dergisi, 15*(2), 59–66. https://doi.org/10.25308/aduziraat.425516

Karaönder, İ., & Gürel, A. (2021). Tarımsal arazi maliklerinin arazi toplulaştırma projelerinin çeşitli aşamalarındaki davranış ve görüşlerinin değerlendirilmesi: Çanakkale İli örneği. *Türkiye Arazi Yönetimi Dergisi, 3*(1), 25–31. https://doi.org/10.51765/tayod.842543

Karkacıer, O., & Karabaş, S. (2019). Farmer's satisfaction regarding land consolidation in Turkey. *Turkish Journal of Agriculture – Food Science and Technology, 7*(1), 36–42. https://doi.org/10.24925/turjaf.v7i1.36-42.2020

Kır, M. (2012). *Sinop Boyabat Cemalettin Köyü arazi toplulaştırmasının tarımsal altyapı hizmetleri yönünden değerlendirilmesi* [Yüksek lisans tezi, Gaziosmanpaşa Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 322722)

Kızılaslan, N., & Almus, S. (2002). Tokat–Zile–Güzelbeyli kasabasında uygulanan arazi toplulaştırmasını çiftçilerin benimsemesini etkileyen sosyo-ekonomik faktörlerin belirlenmesi üzerine bir araştırma. *Turkish Journal of Agriculture and Forestry, 26*, 101–108. https://dergipark.org.tr/tr/pub/gopzfd/issue/7350/96174

Kuzu, H., Arslan, F., & Değirmenci, H. (2018). Arazi toplulaştırma projelerinde yol uzunluklarının analizi: Şanlıurfa Türkeli Köyü örneği. *Süleyman Demirel Üniversitesi Ziraat Fakültesi Dergisi, 1. Uluslararası Tarımsal Yapılar ve Sulama Kongresi Özel Sayısı,* 19–25. https://dergipark.org.tr/tr/pub/sduzfd/issue/40528/451535

Kuzu, H., & Değirmenci, H. (2020). Arazi toplulaştırma projelerinin tarımsal mekanizasyon işletmeciliğine etkisi. *Kahramanmaraş Sütçü İmam Üniversitesi Tarım ve Doğa Dergisi, 23*(3), 655–662. https://doi.org/10.18016/ksutarimdoga.vi.623467

Küsek, G. (2014a). Arazi toplulaştırmasının parsel şekli ve tarımsal mekanizasyon uygulamalarına etkileri: Konya-Ereğli-Acıkuyu ve Özgürler Köyleri örnekleri. *Çukurova Üniversitesi Ziraat Fakültesi Dergisi, 29*(2), 1–14. https://dergipark.org.tr/tr/pub/cuzfd/issue/23795/253604

Küsek, G. (2014b). Arazi toplulaştırmasının arazi parçalanlığı ve işletme ölçeğine etkileri: Konya-Ereğli-Kuskuncuk Köyü örneği. *Çukurova Üniversitesi Ziraat Fakültesi Dergisi, 29*(2), 15–28. https://dergipark.org.tr/tr/pub/cuzfd/issue/23795/253605

Luo, W., & Timothy, D. J. (2017). An assessment of farmers' satisfaction with land consolidation performance in China. *Land Use Policy, 61,* 501–510. https://doi.org/10.1016/j.landusepol.2016.12.002

Mesci, O., & Karlı, B. (2018). Isparta ilinde arazi toplulaştırması yapılan alanlardaki tarım işletmelerinin sosyo-ekonomik analizi. *Mustafa Kemal Üniversitesi Ziraat Fakültesi Dergisi, 23*(1), 106–114.

Nguyen, H. O., & Warr, P. (2020). Land consolidation as technical change: Economic impacts in rural Vietnam. *World Development, 127,* 104750. https://doi.org/10.1016/j.worlddev.2019.104750

Oğuz, C., & Bayramoğlu, Z. (2004). Konya İli Çumra ilçesinde arazi toplulaştırması sonrası farklı parsel genişliklerinin birim maliyetler üzerine etkisi; Küçükköy örneği. *Selçuk Üniversitesi Ziraat Fakültesi Dergisi, 18*(34), 70–75. https://dergipark.org.tr/tr/pub/selcukjafsci/issue/76656/1277281

Peterson, R. A. (2000). A meta-analysis of variance accounted for and factor loadings in exploratory factor analysis. *Marketing Letters, 11*(3), 261–275. https://doi.org/10.1023/A:1008191211004

Polat, H. E., & Manavbaşı, İ. D. (2012). Arazi toplulaştırmasının kırsal alanda yakıt tüketimi ve karbondioksit salınımına etkisinin belirlenmesi. *Tarım Bilimleri Dergisi, 18*, 157–165. https://doi.org/10.1501/Tarimbil_0000001203

Sağlam, Ö. (2022). *Arazi toplulaştırmasının tarım arazilerine etkisi* [Yüksek lisans tezi, Bursa Uludağ Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 731615)

Sayılan, H. (2013, Haziran 10-13). *Türkiye kırsal arazi kaynaklarının sürdürülebilir kullanımında, arazi toplulaştırmanın yeri ve önemi* [Sempozyum bildirisi]. 3. Uluslararası Coğrafya Sempozyumu, Antalya, Türkiye.

Şişman, C., & Bilgin, C. (2016). Trakya bölgesinde arazi toplulaştırma uygulamalarının üretici boyutundaki başarısı. *Tekirdağ Ziraat Fakültesi Dergisi, 13*(4), 52–60. https://dergipark.org.tr/tr/pub/jotaf/issue/29443/315459

Takka, S. (1993). *Arazi toplulaştırması*. Kültür Teknik Derneği Yayınları.

Tunalı, S. F., & Dağdelen, N. (2018). Denizli–Tavas ovasında yapılan bazı arazi toplulaştırma çalışmalarının değerlendirilmesi. *ÇOMÜ Ziraat Fakültesi Dergisi, 6*(2), 58–65. https://dergipark.org.tr/tr/pub/comuagri/issue/41582/421985

Tunalı, S. F. (2019). *Arazi toplulaştırma projelerinde farklı modellerin karşılaştırılması: Aydın Yenipazar Ovası örneği* [Doktora tezi, Aydın Adnan Menderes Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 600892)

Türk, M. (2021). *Arazi toplulaştırma başarısının analizi: Kocaeli-Derince İlçesi Kaşıkçı Mahallesi örneği* [Yüksek lisans tezi, Bursa Uludağ Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 697695)

Vitikainen, A. (2004). An overview of land consolidation in Europe. *Nordic Journal of Surveying and Real Estate Research, 1*, 25–44. https://journal.fi/njs/article/view/41504

Yamane, T. (2001). *Temel örnekleme yöntemleri*. Literatür Yayıncılık.

Yeniay, K. (2020). *Konya-Şatır Mahallesi arazi toplulaştırma uygulamasının tarımsal altyapı hizmetlerine etkisi* [Yüksek lisans tezi, Selçuk Üniversitesi]. Yükseköğretim Kurulu Ulusal Tez Merkezi. (Tez No. 610753)

Yoğunlu, A. (2013). *Arazi toplulaştırma faaliyetleri, TRB1 bölgesi (Bingöl, Elazığ, Malatya, Tunceli)*. Fırat Kalkınma Ajansı.