



**Research Article / Araştırma Makalesi**  
**COMPARISON OF EXPROPRIATION AND LAND CONSOLIDATION ON  
THE REGULATION OF AGRICULTURAL LAND**

**Tahsin BOZTOPRAK\*<sup>1</sup>, Osman DEMİR<sup>2</sup>, Yakup Emre ÇORUHLU<sup>2</sup>**

<sup>1</sup>*DSİ 12th Regional Directorate, 38010 Kocasinan/KAYSERİ*

<sup>2</sup>*Karadeniz Technical University, Faculty of Engineering, Department of Geomatics, Ortahisar-TRABZON*

**Received/Geliş: 26.03.2015 Revised/Düzelme: 11.06.2015 Accepted/Kabul: 03.08.2016**

**ABSTRACT**

The main problems of the agricultural sector in our country are small land, multi-part areas, and formless land and also scattered plots. Today, expropriation for the purpose of acquisition of land on agricultural land increase the fragmentation on land. Land consolidation applications have been extended in recent years in order to reduce fragmentation of land. This study was conducted within the scope of the Develi Irrigation Project carried out in the responsibility of the 12th Regional Directorate under the authority of the General Directorate of State Hydraulic Works. Parcels in three units in the area of the land consolidation project, due to land acquisition and land consolidation project, were investigated about changes based on the project in terms of the number of parcels, changes in average parcel size and parcel shapes. According to the results obtained from the application, expropriation of land led to the increase in the fragmentation of land, thus, the application was determined to have affected the use of agricultural land adversely. On the contrary, it was determined that more favorable agricultural land was created with land consolidation.

**Keywords:** Land management, expropriation, land consolidation, parcel geometry.

**TARIMSAL ARAZİLERİN DÜZENLENMESİNDE KAMULAŞTIRMA İLE ARAZİ  
TOPLULAŞTIRMASI YÖNTEMLERİNİN KARŞILAŞTIRILMASI**

**ÖZ**

Ülkemiz tarım sektörünün başlıca sorunları arasında arazilerin küçük, çok parçalı, şekilsiz ve dağınık vaziyette olması gelmektedir. Günümüzde kamu yatırımlarının arazi temini amacıyla yapılan kamulaştırmalar, arazi parçalanmasını artırmaktadır. Arazi parçalanmasının azaltılması amacıyla son yıllarda arazi toplulaştırma uygulamaları yaygınlaştırılmıştır. Bu çalışmada, Devlet Su İşleri 12. Bölge Müdürlüğü sorumluluğunda devam etmekte olan Develi Sulama Projesi kapsamında yer alan ve arazi toplulaştırma uygulama sahasında bulunan üç birimdeki parsellerin kamulaştırma ve arazi toplulaştırması projesi nedeniyle parsel sayılarındaki, ortalama parsel büyüklüklerindeki ve parsel şekillerindeki değişimler incelenmiştir. Uygulamalardan elde edilen sonuçlara göre kamulaştırmanın arazi parçalanmasını artırarak tarımsal arazi kullanımını olumsuz etkilediği, bunun aksine arazi toplulaştırması ile daha uygun tarım arazilerinin oluşturulduğu tespit edilmiştir.

**Anahtar Sözcükler:** Arazi yönetimi, kamulaştırma, arazi toplulaştırması, parsel geometrisi.

\* Corresponding Author/Sorumlu Yazar: e-mail/e-ileti: tahsinboztoprak@hotmail.com, tel: (352) 336 28 50 / 1527

## **1. INTRODUCTION**

### **1.1. Status of Agricultural Lands in Our Country**

As it is well known, modern agricultural techniques and methods must be utilized to benefit from agricultural enterprises at the highest level. These agricultural enterprises need to be at an adequate size for the implementation of modern methods in an easy manner and with the least effort [1]. Turkey is dominated by an agricultural structure in which small family enterprises based on private ownership prevail [2]. These enterprises are also scattered and have irregular structures geometrically [3].

Not only is the majority of the agricultural enterprises in Turkey not at an adequate size, their agricultural lands have also been fragmented and they have become impossible to cultivate productively. The distortions observed in the agricultural structure due to fragmentation and disarray have a negative effect on the produce, make taking productive measures difficult, lead to the increase in costs, transportation problems, loss of time and prevents the parcels from using infrastructure facilities. As a result of all of these, the desired product increase cannot be achieved [3] [4]. Moreover, as the shapes of the parcels affect agricultural mechanization and in-parcel irrigation directly, more labor and material will be needed for the irrigation of a parcel which is not of an appropriate shape regardless of the method. This will also raise the production costs [5].

The most important reasons of land fragmentation include fragmentations through inheritance and succession, fragmentation through share division and distribution, expropriations carried out for various purposes [6]. With the entry into force of the Law numbered 6537 amending the Law of Soil Protection and Land Usage numbered.5403, fragmentation through inheritance and succession, and sales via share division and distribution have been aimed to prevented. However, due to expropriation which is the primary method applied in the procurement of the land required for public investments, fragmentation cannot be prevented [7].

### **1.2. Expropriation**

Significant infrastructure investments are made every year within the scope of the development strategies to improve the rural and urban population's standard of life. For the realization of public projects, the required immovable properties must be either public properties or expropriated. Due to these investments made for public interest, expropriation of immovable properties belonging to private and legal persons, such as plots and lands, comes into question [8] [9].

The expropriation activities which has started in our country with the Public Expropriation Decree of 1925 were continued with various regulations made until 1983. The expropriation activities after this date are carried out in line with the Expropriation Law numbered 2942, which is amended by law numberd 4650, introduced in 1983 according to the 46th article of Turkish Constitution. With the 46th article of the Constitution, relevant government institutions have been authorized to exact compulsorily private properties regardless of the consent of their owners when required by the public services and interests [10].

Expropriation emerges as a result of the obligation to fulfill public services aimed towards meeting public requirements in all societies where private ownership is recognized. "Expropriation" which is a constitutional restriction imposed upon the right of property is a method to acquire property which is used by the government to obtain the immovable property of private/legal persons with the aim of fulfilling public services [11] [12]. It is also possible to define the expropriation process, which can be considered as one of the land management implementations, as the transfer of immovable property from the ownership of private and legal persons to the state [13].

The most highlighted aspects of expropriation, which means the imposition of restrictions on private ownership by the government unilaterally, have been the public interest constituting the objective element of expropriation, the phases of expropriation and the cost of expropriation. Imposition of restriction to the right of property which is considered as a fundamental right is also very controversial [14]. However, the effects of expropriation on agricultural land have not been elaborated on.

Land routes, drainage channels, irrigation networks are constructed according to the topography of the land. The ownership status of the land is generally disregarded in the scope of expropriation projects. The expropriation routes create shapeless and small parcels which are not convenient for agriculture as they divide cadastral parcels medially [15].

Whether agricultural activities can be carried out in shapeless and small parcels, which are formed as a result of expropriation in immovable properties which have been subjected to expropriation conducted due to public investments, is not dwelled on. Thus, to both save on the substantial expropriation costs in large-scale projects and to prevent the fragmentations to occur due to expropriation, the below clause has been added to the 3rd article of the Act no. 5403 with the Act no. 5578 and “Legal persons or public institutions such as village legal entities, municipalities, cooperatives, associations” have been authorized to carry out private land consolidation “in a manner which covers the land procurement related to service issues”.

### **1.3. Land Consolidation**

Various applications are included within the land and agricultural reform of many countries to improve the agricultural structure. Land consolidation is among these applications [16] [17]. Land consolidation which has become a tool contributing to the development of rural areas in all over the world has become an increasingly widespread implementation area in our country in recent years [18]. Land consolidation is an important approach to increase the activity of land use, area and quality of the cultivated land and to improve rural standards of life and working conditions [19].

Land consolidation can be defined in various ways due to its scope. In the strict sense, land consolidation is defined as the merger of fragmented properties without the inclusion of infrastructure works. In broad terms, however, consolidation covers irrigation, drainage, transportation, soil-water protection measures and various services required by rural settlements as well as the merger of fragmented properties [20]. By means of the infrastructure investments made to rural areas with land consolidation projects, a new and permanent appearance are added as the shapes of the parcels, transportation to parcels and topographical structure of the parcels are improved upon consolidation. In addition, fragmentations caused by physical facilities which belong to the state such as irrigation canals, drainage canals, land routes, railways are eliminated [17] [18].

Through land consolidation, a decrease in the number of parcels of the agricultural enterprises, an increase in the average parcel size, a decrease in the land cultivation duration, preparation duration, duration of the transportation to the land and the total working duration occur. Furthermore, a substantial increase in the road network is observed with the newly-opened roads in the implementation units. With the adding of road facades to each parcel, making disputed shares independent by division if the situation allows, and the transfer of the inheritance shares to independent parcels contribute to social peace [21].

Land consolidation applications do not have agricultural advantages only. In these applications, the land registry and cadastre information of all the parcels within the application area is renewed and, hence, considered as second cadastre [22]. The cadastre activities carried out in our country have been conducted with different purposes, by different teams at different times, on different bases and in different point accuracy for each point on cadastral bases [23]. It would not be accurate to expect the same point accuracy from some cadastral bases whose cadastral

works were carried out with the graphical method and some cadastral bases whose cadastral works were carried out with the digital method [24]. In addition, the extent of the cadastre's accuracy is debatable when the detections, which are not carried out based on documents in the identification of land ownership in particularly the establishment cadastre works, are taken into consideration. The problems in ownership identification and the cadastral bases whose cadastral works were produced with relatively old methods compared to modern methods still exist [25]. It is quite difficult to keep all these differences with the same expectations under a single system. Therefore, the development of the scope and content of the cadastre becomes mandatory as well as its completion throughout the country. The renewal works of the cadastre in this type of areas are continued at an extremely rapid pace. However, the question of whether the same renewal activity is necessary for the study areas whose cadastre was carried out with methods which require no renewal must not be disregarded along with the existence of this type of areas whose cadastre must be renewed [23]. In other words, renewable studies must be carried out if it is needed and must not be carried out if it is not after the relevant analyses and investigations are conducted [26].

All these process will, of course, have a material aspect. A part of this material aspect is recovered after the cadastre renewal works, through the alterations to be made. As is emphasized in Cadastre 2014, the cost recovery process must be analyzed for these works [27] [28]. The cost recovery process is experienced in cadastre works. This process is considered as an operation which is very fast in areas where the demand-dependent operations after the cadastre are experienced densely and in which the reflection of the gain in recovery to the state is high. The allocation and renewal works of the cadastre are now carried out by the cadastre institution only. However, the labor force of the private sector is utilized in the realization of some activities. This opens new lines of business to the sector and contributes to the development of the private sector [24] [25]. The correction of the errors originating from land registry and cadastre during and after the establishment cadastre in parcels included within the scope of these land consolidation projects' application areas must be corrected through these amendments to be made in legislation. Thus, the progress of the projects in a healthier manner and the correction of the errors which have continued increasingly over the years shall be provided. In addition, savings shall be made from the time and budget required by the second cadastre [22].

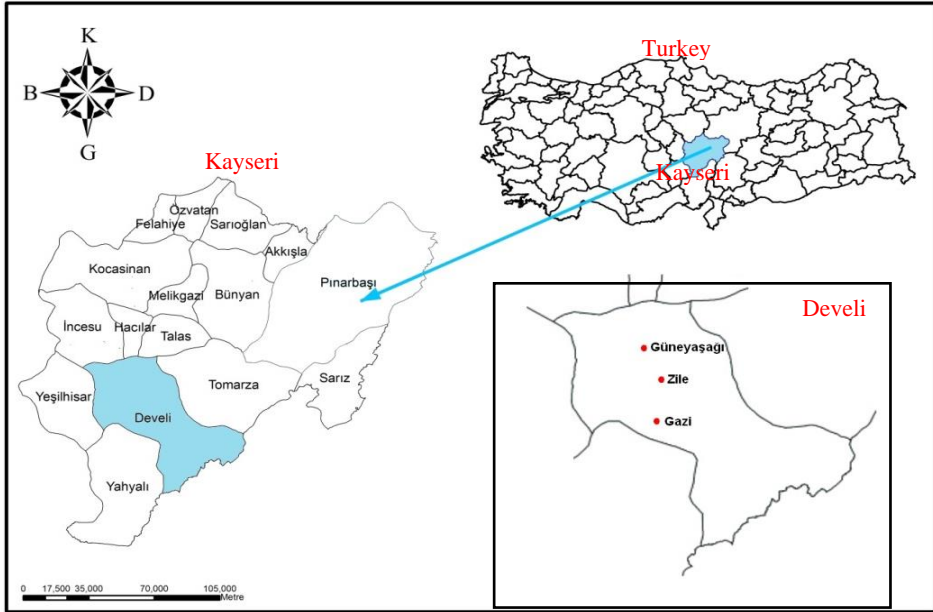
With the completion of the cadastre works, the bases of many subsidiary lines of businesses from tax to expropriation, from large-scale engineering projects to the management of agricultural lands and construction applications will be operationalized in a reliable manner [29]. The e-government system becomes established in parallel with the developments in Turkey and activities are now carried out over these systems [30]. Through the land consolidation application, cadastral bases in the application area are renewed and produced digitally. As a result, land registry and cadastre data formats which are compatible with the Land Registry and Cadastre Information System (LRCIS in Turkish TAKBİS) conducted by the General Directorate of Land Registry and Cadastre (GDLRC in Turkish TKGM), and are readily available to other institutions are prepared. Thus, opportunities are provided for the realization of activities for modeling within these systems including to the institutions carrying out positional works [31].

The parceling status which occurred after consolidation in three units within the Kayseri Province Develi Country land consolidation project application field and the change in the number of parcels, the average parcel size and the distribution of parcel shapes to occur in the case of expropriation without consolidation have been investigated in this study.

## **2. MATERIAL AND METHOD**

The Gazi, Zile and Güneyaşağı districts of the Kayseri Province Develi County, which have been selected as research units within the scope of the study, are located in the application site of the Land Consolidation Project under the responsibility of the Develi Right Coast Irrigation

Project Work carried out by the 12th Regional Directorate of the General Directorate of State Hydraulic Works (Figure 1).



**Figure 1.** Study Areas

As the cadastrals of the research units were not produced digitally, the parcels within the application side were obtained by being digitized from their cadastral sheets (Figure 2).

The cadastre parcels produced as a result of digitization and the irrigation, drainage and road network projects carried out by the General Directorate of State Hydraulic Works have been superposed. Thus, the parcel status of the irrigation, drainage and road networks in the case of expropriation have been obtained (Figure 3).

The new parcelling plan produced within the scope of the land consolidation project of the research units has been provided (Figure 4).

The data related to the cadastral status, the status to emerge in the case of expropriation and the status to occur as a result of land consolidation have been obtained.

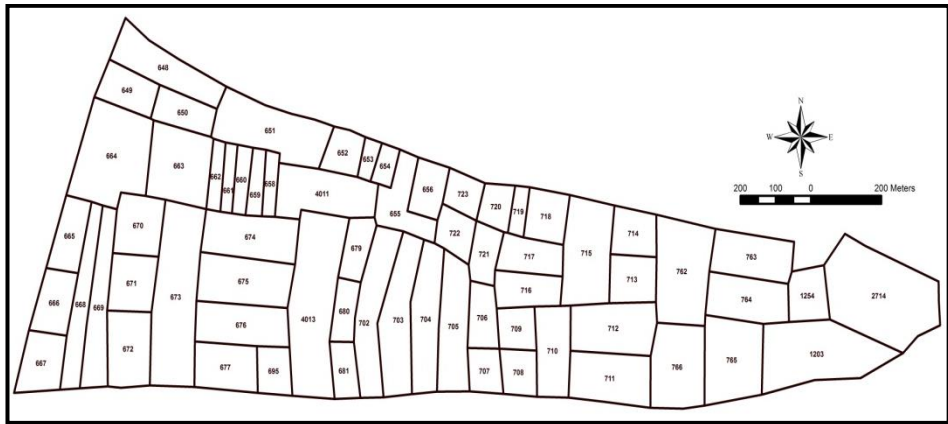


Figure 2. Kayseri-Develi-Gazi District cadastral status

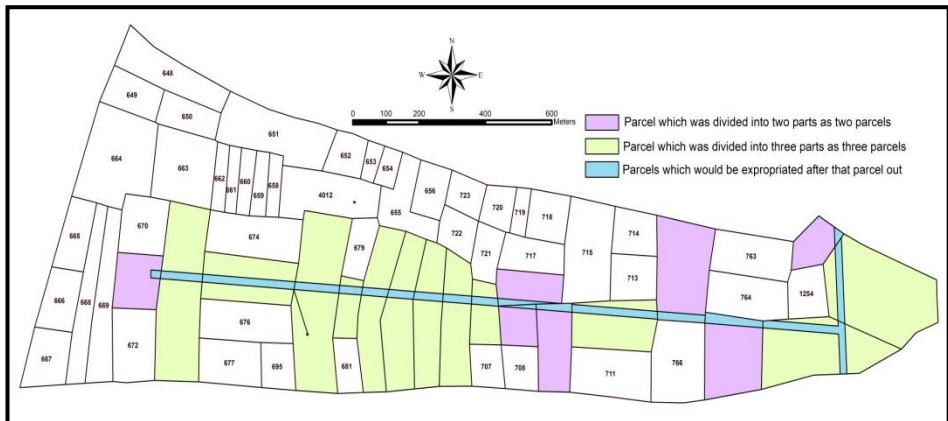


Figure 3. The status to emerge in the case of expropriation in the Kayseri-Develi-Gazi District

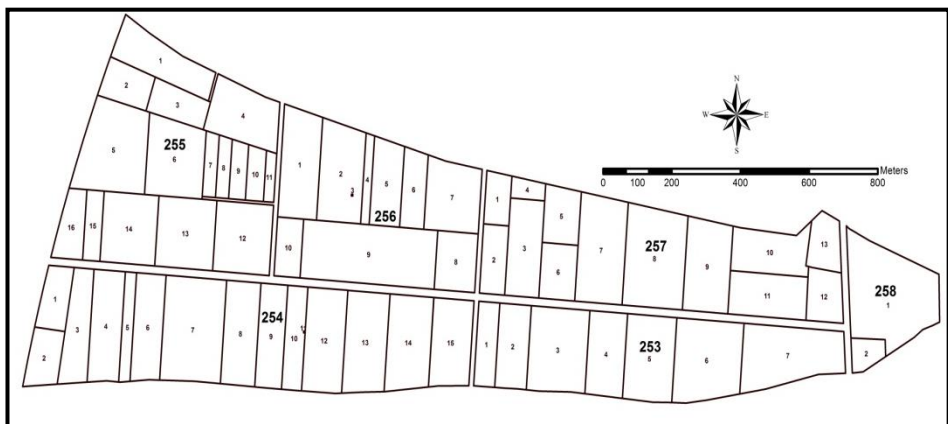


Figure 4. The status to occur as a result of land consolidation in the Kayseri-Develi-Gazi District

### 3. FINDINGS AND DISCUSSION

In this section, the findings which were obtained in relation to the cadastral status, the parcel status to emerge in case of expropriation without consolidation and the parcelling status occurring as a result of consolidation in the Güneyaşağı, Gazi and Zile Districts located within the application site of the Kayseri Province Develi County land consolidation project have been discussed.

#### 3.1. Findings and Discussion on the Number of Parcels

When the Cadastral Status (CS) of the parcels included in the land consolidation application area in the three units analyzed within the study is examined, a total of 2463 cadastral parcels as 817 in the Gazi District, 1205 in the Zile District and 441 in the Güneyaşağı District are within the application site.

While an increase of 13.07% in the total number of parcels, 1.41% in the Zile District, 16.03% in the Gazi District and 39.46% in the Güneyaşağı District would occur in the case of expropriation in network routes, a decrease of 28.75% in the total number of parcels, 13.59% in the Gazi District, 41.99% in the Zile District and 20.63% in the Güneyaşağı District occurred through land consolidation (Table 1).

**Table 1.** Number of Parcels

Unit	Status	Number of Parcels (Figure)	Change (%)
Gazi	Cadastral Status (CS)	817	-
	After Expropriation Status (AES)	948	16.03
	After Land Consolidation Status (ALCS)	706	-13.59
Zile	Cadastral Status (CS)	1205	-
	After Expropriation Status (AES)	1222	1.41
	After Land consolidation Status (ALCS)	699	-41.99
Güneyaşağı	Cadastral Status (CS)	441	-
	After Expropriation Status (AES)	615	39.46
	After Land consolidation Status (ALCS)	350	-20.63
Total	Cadastral Status (CS)	2463	-
	After Expropriation Status (AES)	2785	13.07
	After Land consolidation Status (ALCS)	1755	-28.75

When the comparison of parcel numbers to parcel sizes is examined, while the ratio of the parcels whose areas are smaller than 5 decares (5 da) was 47.10%, this ratio would rise to 52.82% after expropriation. However, this ratio fell to 34.64% through the land consolidation project. In addition, while the ratio of the parcels with areas bigger than 20 decares was 9.95%, this would fall to 7.72% after expropriation. However, this ratio rose to 14.87% through land consolidation.

While an increase of 8.79% in the Gazi District, 2.41% in the Zile District and 16.20% in the Güneyaşağı District would occur in the number of parcels with areas smaller than 5 decares in the case of the expropriation of network routes, a decrease of 619% in the Gazi District, 20.88% in the Zile District and 0.32% in the Güneyaşağı District occurred through land consolidation.

While a decrease of 0.64% in the Gazi District, 0.71% in the Zile District and 14.45% in the Güneyaşağı District would occur in the number of parcels with areas bigger than 20 decares in

the case of expropriation, an increase of 1.07% in the Gazi District, 6.66% in the Zile District and 6.15% in the Güneyaşağı District occurred as a result of land consolidation (Figure 5).

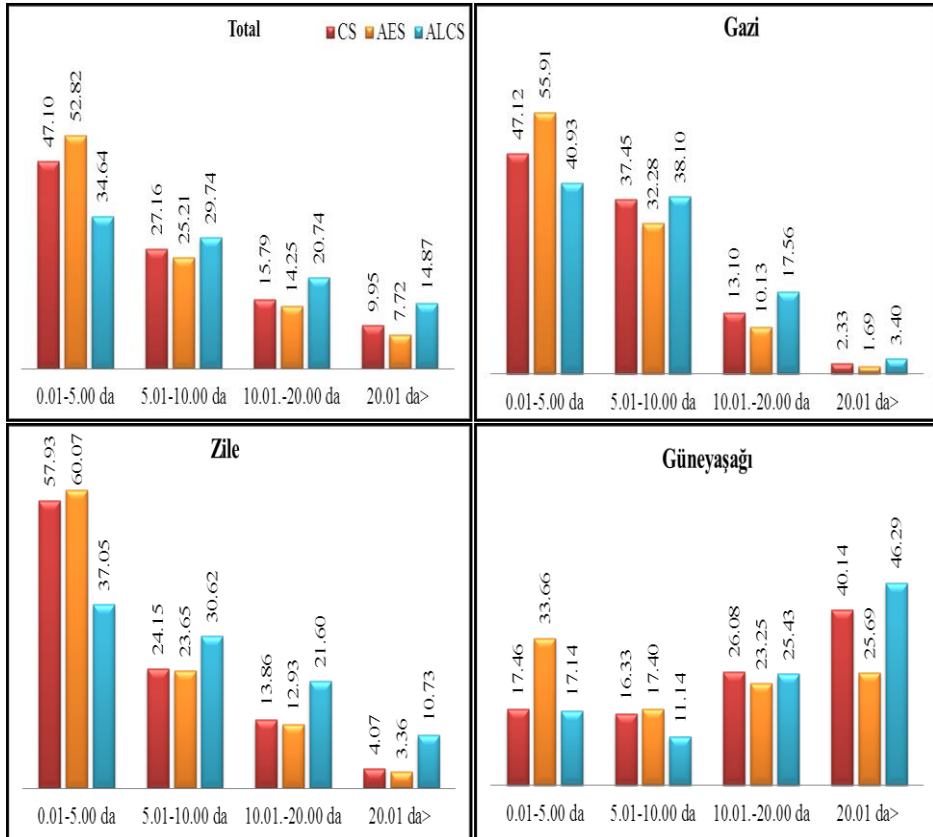


Figure 5. Comparison of Number of Parcels to Parcel Sizes

### 3.2. Findings on the Average Parcel Size

While the average size of the parcels in the three units analyzed within the study would become 7.50 decares by decreasing at the rate of 14.29% as a result of expropriation when it was 8.75 decares, this ratio rose to 11.72 decares by increasing at the rate of 33.94%.

While the average parcel size would fall by 14.71% in the Gazi District, 3.34% in the Zile District and 31.87% in the Güneyaşağı District in the case of the expropriation of network routes, an increase of 10.37% in the Gazi District, 65.72% in the Zile District and 19.51% in the Güneyaşağı District occurred through land consolidation (Table 2).

While the average parcel size of the parcels with areas smaller than 5 decares was 2.42 decares, this rose to 2.79 decares through land consolidation even though it would fall to 2.35 decares after expropriation. In addition, while the average parcel size of the parcels with areas bigger than 20 decares was 35.23 decares, this rose 38.42 decares through land consolidation even though it would fall to 32.80 decares after expropriation.



**Table 2.** Comparison According to the Average Parcel Size

Unit	Status	Smallest Parcel Area (da)	Biggest Parcel Area (da)	Average Parcel Area (da)	Change (%)
Gazi	CS	0.12	104,20	6.46	-
	AES	0.04	65.39	5.51	-14.71
	ALCS	0.32	63.35	7.13	10.37
Zile	CS	0.10	80.80	5.98	-
	AES	0.04	80.80	5.78	-3.34
	ALCS	0.23	105.57	9.91	65.72
Güneyaşağı	CS	0.24	124.98	20.55	-
	AES	0.32	87.02	14.00	-31.87
	ALCS	0.24	137.09	24.56	19.51
Total	CS			8.75	-
	AES			7.50	-14.29
	ALCS			11.72	33.94

While a decrease of 12.84% in the Gazi District, an increase of 8.53% in the Zile District and a decrease of 21.99% in the Güneyaşağı District would occur in the average parcel size of the parcels with areas smaller than 5 da in the case of the expropriation of the network routes, a decrease of 0.69 in the Gazi District, an increase of 28.86% in the Zile District and a decrease of 11.93% in the Güneyaşağı District occurred through land consolidation.

While a decrease of 9.17% in the Gazi District, an increase of 2.33% in the Zile District and a decrease of 8.90% in the Güneyaşağı District would occur in the average parcel size of the parcels with areas bigger than 20 in the case of the expropriation of the network routes, a decrease of 12.02% in the Gazi District, an increase of 16.28% in the Zile District and a decrease of 13.08% in the Güneyaşağı District occurred through land consolidation (Table 3).

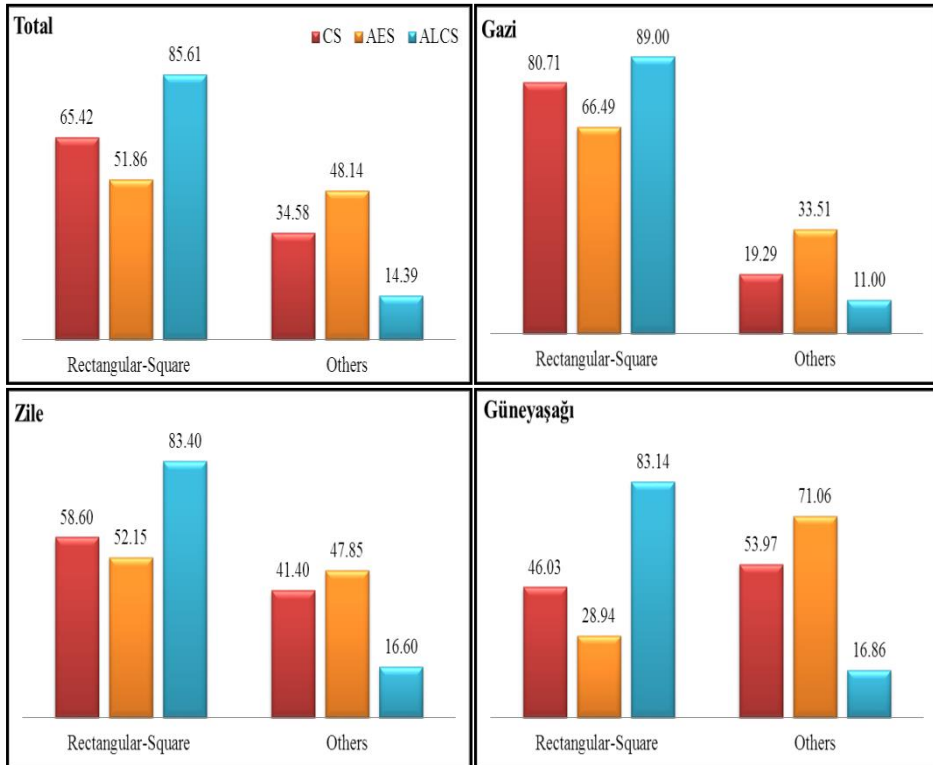
**Table 3.** Distribution of the average parcel size

Unit	Status	0.01-5.00 da		5.01-20.00 da		20.01 da>	
		Av. Size (da)	Change (%)	Av. Size (da)	Change (%)	Av. Size (da)	Change (%)
Gazi	CS	3.05		8.48		31.77	
	AES	2.65	-12.84	8.34	-1.64	28.86	-9.17
	ALCS	3.02	-0.69	8.88	4.72	27.96	-12.02
Zile	CS	2.05		9.55		28.71	
	AES	2.22	8.53	9.45	-1.04	29.38	2.33
	ALCS	2.64	28.86	10.25	7.39	33.38	16.28
Güneyaşağı	CS	2.59		11.98		37.41	
	AES	2.02	-21.99	11.23	-6.24	34.08	-8.90
	ALCS	2.28	-11.93	12.54	4.65	42.31	13.08
Total	CS	2.42		7.08		35.23	
	AES	2.35	-2.70	7.04	-0.62	32.80	-6.91
	ALCS	2.79	15.39	7.14	0.78	38.42	9.05

### 3.3. Findings on Parcel Shapes

While the ratio of the rectangular-square shaped parcels, which is the most suitable shape for agricultural activities in the three units analyzed in this study, would become 51.86% after expropriation even though it was originally 65.42%, this ratio rises to 85.61% through land consolidation.

While a decrease of 14.22% in the Gazi District, 6.45% in the Zile District and 17.09% in the Güneyaşağı District would occur in the ratio of the rectangular-square shaped parcels in the case of the expropriation of network routes, an increase of 8.29% in the Gazi District, 24.80% in the Zile District and 37.11% in the Güneyaşağı District occurs through land consolidation (Figure 6).



**Figure 6.** Comparison According to Parcel Shapes

## 4. CONCLUSIONS AND RECOMMENDATIONS

The distribution in the number of parcels, the average parcel size and parcels shapes after the expropriation and land consolidation project in a total of 2463 parcels in the three units located in the land consolidation application site carried out within the scope of the irrigation project which is still ongoing under the responsibility of the DSI 12th Regional Directorate has been compared in this study.

Even though expropriation is for the benefit of the public, it can sometimes be to the disadvantage of the private/legal persons. According to the Appropriation Act, the parcels on the route of the public investment can be allocated and the areas required by the public are divided.

Even though the price of these areas are paid to their rightful parties in cash, parcels with small areas which are geometrically deformed and are not agriculturally useful can emerge as a result of allotment in particularly the expropriations made in rural areas.

As a result of the conducted research, it has been concluded that one of the elements which exacerbates the small, fragmented, shapeless and scattered nature of the lands, considered as one of the main problems of the agricultural in our country, is expropriation. Therefore, it is evident that the expropriation method, which is the first tool to come to mind in land procurement for public investments in the projects to be carried out in agricultural lands, is of utmost importance for the agricultural lands which is a scarce resource for our country and are under the threat of diminishing with each passing day.

The most effective method for both land procurement and the prevention of land fragmentation in the public investments to be made in rural areas is land consolidation. However, land consolidation projects take a long time. The realization of public investments rapidly depends on the fast completion of land procurement. Hence, investor public institutions and organizations usually prefer the expropriation method instead of land consolidation. Therefore, "urgent expropriation" has become widespread particularly in recent years.

Agricultural lands get increasingly fragmented due to expropriation being the first choice in the investments to be made especially in rural areas even though it should be the last method to be utilized. Therefore, different methods other than expropriation must be investigated in big investments particularly and expropriation must be the last resort.

The fact that the number of parcels should be reduced to reach maximum profitability in especially irrigation projects, as is the case with our research units, is stated on every platform. However, it is apparent that the expropriation method is preferred to land consolidation to complete the investments to be made quickly. When the data collected throughout the study is analyzed, it is emphasized that this reasoning is not healthy and land consolidation, rather than expropriation, achieves better results.

#### **Acknowledgments / Teşekkür**

We would like to thank the employees of the 12th Regional Directorate of the General Directorate of State Hydraulic Works for their help in the provision of the projects belonging to the research units.

#### **REFERENCES / KAYNAKLAR**

- [1] Benek, S., 2007, "İstanbul Avrupa Birliği'ne Uyum Sürecinde Türkiye'deki Tarımsal İşletmelerin Günümüzdeki Durumu" Marmara Coğrafya Dergisi, 15, ss 191-206.
- [2] Miran, B., 2005, "Türkiye'de Tarım" Tarım ve Köy İşleri Bakanlığı, Ankara.
- [3] Ekici, K., Sayılı, M., 2010. "Tarım Arazilerinin Parçalanmasını Önlemeye Yönelik Mevzuat Üzerine Bir İnceleme" Gaziosmanpaşa Üniversitesi Ziraat Fakültesi Dergisi, 27(2), ss 121-129.
- [4] Sönmezıldız, E., Çakmak B., 2013, "Eskişehir Beyazaltın Köyü Arazi Toplulaştırma Alanında Sulama Performansının Değerlendirilmesi" Akdeniz Üniversitesi Ziraat Fakültesi Dergisi, 26(1), ss 33-40.
- [5] Arslan, H., Tunca, E., 2013, "Arazi Toplulaştırmasının Sulama Projelerinin Performansı Üzerine Etkileri" Anadolu Journal of Agricultural Sciences, 28(3), ss 126-133.
- [6] Beyazgül, M., 2012. "Türkiye'de Tarım Arazilerinin Miras Yoluyla Bölünmesi", Gıda Tarım ve Hayvancılık Bakanlığı Teknik Raporu, Ankara.
- [7] Boztoprak, T., 2015. "Kamulaştırmanın Parsel Sayısı Ve Ortalama Parsel Büyüklüğüne Etkisi" Selçuk Üniversitesi Mühendislik Bilim ve Teknoloji Dergisi, C:3, S:2, ss 10-17.

- [8] Kılıç, O., 2011, "Kamulaştırma Davalarında Arsa-Arazi Ayrımı". Akdeniz Üniversitesi Ziraat Fakültesi Dergisi, 24.1, ss 15-18.
- [9] Alkan, R. M., 2014, "Kamu Hizmeti için Gerekli Olan Taşınmazların Edinimi: Hitit Üniversitesi Kampüs Çalışmaları Örneği" *Electronic Journal of Map Technologies*, 6.1, ss 13-24.
- [10] Akyol, N., Yomralıoğlu, T., Uzun, B., 1992. "Türkiye'de ve Gelişmiş Bazı Ülkelerde Kamulaştırma", İmar Planlarının Uygulanması Semineri, Karadeniz Teknik Üniversitesi, Jeodezi ve Fotogrametri Mühendisliği Bölümü, ss 157-165, Trabzon
- [11] Karahan, S. T., 2015, "Mülkiyet Bağlamında Kamu Zararı Kavramı: Olanaklılık ve Anlam" *Ankara Üniversitesi Sosyal Bilimler Dergisi*, 6.1, ss 1-28.
- [12] Ayhan, f., 2011, "Kamulaştırma Kanunu'nun Geçici 6. Maddesi ve Türk Hukukunda" Dolayısıyla Kamulaştırma" Uygulaması Üzerine Bir Deneme" *İstanbul Üniversitesi Hukuk Fakültesi Mecmuası*, 69.1-2, ss 1125-1148.
- [13] Çoruhlu Y.E., Demir O., 2014. Vakıflarda Kamulaştırma Süreçlerinin Araştırılması", *Ankara Barosu Dergisi*, Cilt.72, ss.20-54.
- [14] Mengi, A., Duru B., 2010. "Kamulaştırmanın Çevreye Etkileri Üzerine Bir Değerlendirme." *Kamu Yatırımları İçin Arazi Edinimi ve Kamulaştırma Sempozyumu - Uluslararası Katılımlı*, 14-18 Haziran 2010, Ankara
- [15] Sert, A., 2005. "Kamulaştırma Amaçlı Arazi Toplulaştırması" *Yüksek Lisans Tezi*, Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.
- [16] Karadavut, U., Palta, Ç., Bitgi, S., Okur, O., Çarkacı, D. A., 2011, "Konya İlinde Fig Tarımı Yapılan Bazı Alanlarında Makro ve Mikro Besin Elementi İçeriklerinin Belirlenmesi" *İğdır Üniversitesi Fen Bilimleri Enstitü Dergisi*, 1(3), ss 105-109.
- [17] Kumbasaroğlu, H., Dağdemir, V., 2007, "Erzurum Merkez İlçede Tarım Arazilerinde Parçalılık Durumuna Göre Tarım İşletmelerinin Ekonomik Analizi" *Atatürk Üniversitesi Ziraat Fakültesi Dergisi*, 38 (1), ss 49-58.
- [18] Temizel, K. E., Ayrancı, Y., Okant, M., 2012, "Blok ve Parsel Yönlendirmesinin Arazi Toplulaştırmasındaki Önemi" *Anadolu Tarım Bilimleri Dergisi*, 27(1), ss 1-5.
- [19] Cheng, W. S., Du, Z. Q., Cao, C., & Liu, X. L., 2015, "Assessing Rural Land Consolidation Based on Ecosystem Service: A Case Study of Qingyang İn Western China" *Remote Sensing and Smart City*, 64, 423.
- [20] Küsek, G., 2008, "II. Kadastro Kongresi", 2. Kadastro Kongresi Bildirileri, Ankara.
- [21] [http://www.hkmo.org.tr/resimler/ekler/4dcf3c521a00dbb\\_ek.doc](http://www.hkmo.org.tr/resimler/ekler/4dcf3c521a00dbb_ek.doc)
- [22] Boztoprak T., Demir O., Çoruhlu Y.E., Nişancı R., 2015. Arazi Toplulaştırmasının Tarımsal İşletmelere Etkilerinin Araştırılması, *Selçuk Üniversitesi Mühendislik-Bilim ve Teknoloji Dergisi*, vol.1, pp.1-11.
- [23] Boztoprak, T., 2015. Recommendations For Solutions of Certain Problems Resulting From Land Registry And Cadastre Under The Land Consolidation Project, *Sigma Journal of Engineering and Natural Sciences*, Volume: 33, Issue: 2, (Jun 2015), pp:250-259.
- [24] Demir O., Uzun B., Çete M., 2008. Turkish Cadastral System, *Survey Review*, vol.40, pp.54-66.
- [25] Demir O., Çoruhlu Y.E., 2008. The Graphical Cadastre Problem In Turkey: The Case of Trabzon Province, *Sensors*, vol.8, pp.5560-5575.
- [26] Demir O., Çoruhlu Y.E., 2009. Determining The Property Ownership on Cadastral Works in Turkey, *Land Use Policy*, vol.26, pp.112-120.
- [27] Yıldız O., Çoruhlu Y.E., Demir O., 2015. Kadastrodaki Yenileme Kavramına Vizyonel Bir Bakış, *Sigma Journal of Engineering and Natural Sciences*, vol.1, pp.1-12.
- [28] Demir O., Uzun B., Çoruhlu Y.E., 2015. Progress of Cost Recovery on Cadastre Based on Land Management Implementation in Turkey, *Survey Review*, vol.47, pp.36-48.

- [29] Yıldız O., Çoruhlu Y.E., Demir O., Murat M.Ö., 2015. The Role And Effect Of Private Sector On Turkish Cadastral System, The World Cadastre Summit, Congress & Exhibition, İstanbul, Türkiye, 20-24 Nisan 2015, pp.1-13.
- [30] Çoruhlu Y.E., Demir O., 2013. Kadastro Çalışmalarında Vakıf Taşınmaz Tespitinde Yaşanan Sorunların İrdelenmesi, İstanbul Barosu Dergisi, cilt.87, ss.78-87.
- [31] Çoruhlu Y.E., Demir O., 2015. E-Government Services on Foundation Immovable Properties, Sigma Journal of Engineering and Natural Sciences, vol.33, pp.233-249.
- [32] Çoruhlu Y.E., İnan H.İ., Yılmaz H., Demir O. 2015. Vakıf Taşınmaz Coğrafi Veri Modeli (Geographic Data Model of Foundation Immovable), Sigma Journal of Engineering and Natural Sciences-Sigma Muhendislik ve Fen Bilimleri Dergisi, vol.33, pp.539-559.

