

Analysis of Different Reallocation Results in Land Consolidation Project

Tayfun Çay^{1*}, Ela Ertunç¹

¹Selçuk University, Faculty of Engineering, Department of Geomatics Engineering, Konya-Turkey

E-Mail: tcay@selcuk.edu.tr, elaertunc@selcuk.edu.tr

Received September 25, 2017; Accepted December 20, 2017

Abstract: The most important, complex and time-consuming process of land consolidation is known as the reallocation phase. Reallocation processes in land consolidation projects in Turkey is made according to farmer preferences (interview). Besides, the optimization studies based on the mathematical models for the reallocation process in many scientific researches in addition to reallocation model based on interview have been conducted. But, because there isn't a precise mathematical model for the reallocation process, many different solutions have been suggested.

In this study, importance of reallocation in land consolidation and interview-based and block priority-based reallocation models has been described. Also, the results of the block priority-based reallocation model that makes land reallocation by being take into account respectively the largest parcels belong to the farmers have been obtained. The results which are obtained from the block priority-based reallocation model has been compared with the results which are obtained from the interview-based reallocation model. In the consolidation area of the Bogazici neighbourhood (Kocanlı-Aydin-Turkey), previously the number of cadastral parcels were 74. The number of this parcels according to the block priority-based reallocation model that is applied in this study have decreased to 50. Average parcel size was 1.25 hectares before consolidation in this region. Average parcel size has increased to 1.44 hectares according to the interview-based reallocation model and to 1.72 hectares according to the block priority-based reallocation model.

Keywords: Land consolidation, reallocation, the interview-based reallocation, the block priority-based reallocation

INTRODUCTION

Land consolidation is a necessary study in order to modernize rural areas, make economically a livable place and facilitate the environmental management ^[6,7,8,1,2]. This process can be realized that economic, environmental and social factors are considered versatile ^[4,2]

Block reallocation that is the most important, complex and a time-consuming part of land consolidation studies consists of two sections ^[3].

In block reallocation stage of land consolidation studies, after being passed road and irrigation network in the project area, cadastral parcels are placed as areal on land pieces, that is block, at which road and irrigation network surround according to progress payments by taking into account qualification of the soil. After this placement, regular parcels are created as a graph according to the shape of the blocks; and these are given to owners of farmers. The reallocations and new parcels should be created as equal and in a fair way in terms of owners of farmers. Otherwise, it will be continuously object to the project, satisfaction of farmers may not provide, and the project will be accepted. When it is viewed from this angle, it can be said that block reallocation is the most delicate phase of land consolidation and it has to be care to block reallocation ^[5].

In this study, it was investigated that the block priority-based reallocation model that is made by being take into account respectively the largest parcels belong to the farmers could be applied. land consolidation project of Bogazici neighborhood (Kocanlı-Aydin-Turkey) has been selected as the project area. Results of block priority-based reallocation model with results of the traditional method that is known as interview-based reallocation model were compared with each other according to average parcel size with the number of parcels and shares.

MATERIAL AND METHODS

*Corresponding E-mail: tcay@selcuk.edu.tr

This paper has been presented in 6th International Conference of Ecosystems, Tirana, Albania, June 2016.

According to Agrarian Reform Law in accordance with regulation of land on the irrigation areas with number 3083, the block reallocation is made according to interview-based reallocation model in land consolidation projects. In this study, the block reallocation has been made according to interview-based reallocation model and block priority-based reallocation model.

Description of Application Area

Boğaziçi neighborhood is the region belonging to Koçarlı county of Aydın province. Boğaziçi neighborhood is away 17 km from Aydın province and is away 15 km from Koçarlı county. Here's altitude is 40 meters. It is influenced by of the Mediterranean climate. A total of 217 people exist in this neighborhood.

The area of land consolidation project that is made for Boğaziçi neighborhood is 92.28 hectares. There are 101 farmers, so farmers, and 74 cadastral parcels in the consolidation area (Figure 1). 33 pieces of this cadastral parcels are jointly owned parcel. The average size of the cadastral parcels is 1.25 hectares.

The rate of participation share to the joint facilities has been calculated as 0.017637%. With reallocation based on interview that is made in Bogazici neighborhood, the number of new parcels which are created in 10 blocks is 60 (Figure 2a). After the reallocation is made according to model based on interview, the average size of consisting parcels has increased to 1.44 hectares. With the reallocation that is made according to block priority-based model in Bogazici neighborhood, the number of new parcels which are created in 10 blocks is 50 (Figure 2b). The reduction in the rate of new parcels which occur with this reallocation are 32%.

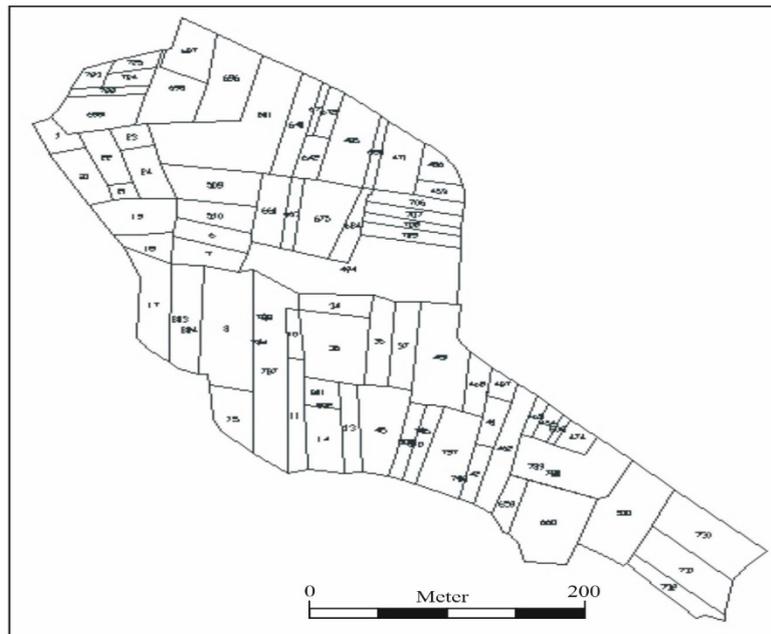


Figure 1. The cadastral status of Boğaziçi neighborhood

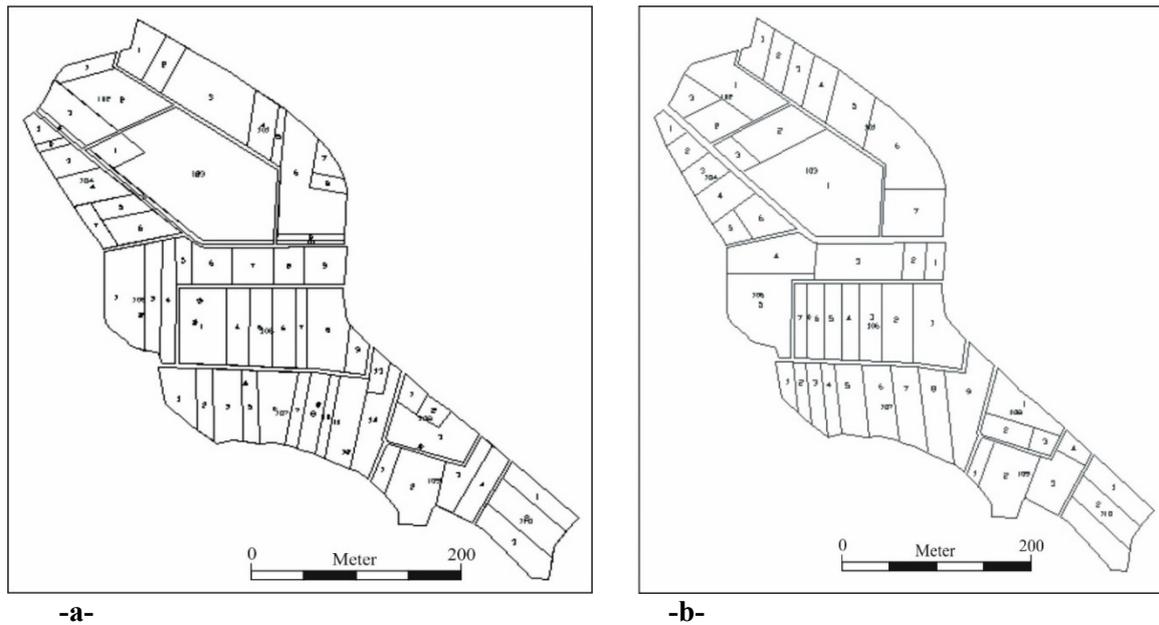


Figure 2. Parcelation plans **a)** According to the interview-based reallocation model **b)** According to the block priority-based reallocation model

In the block priority-based reallocation model, the new parcels of 83 farmers has been allocated from the block which the largest parcel is located in. Also, there are farmers which have only to 1 parcel in the block. While some of the blocks has been covered in full, some of them has filled excessively. Therefore, the parcels could not be given to all farmers from the block in which the largest parcel is located. The new parcels of 9 farmers has been given from the block in which second from the largest parcels belonging to them is located. The new parcels of 9 farmers which remain has been given from different blocks. With the model, the rate that The parcels are given to the farmers from the block in which the largest parcels of the farmers is located is 82% according to the number of the farmers. After the reallocation is made according to the block priority based model, the average size of consisting parcels has increased to 1.72 hectares.

RESULTS

Interview-based reallocation model and block priority-based reallocation model have been examined in terms of the number of parcel, the average size of parcel, the number of share, the farmers, and situations with owners of other farmers being close relatives of owners of farmers.

The Number of Parcel

In the area where the research is carried out, the old and new cases of parcels belong to the farmers in terms of the number of parcel are shown in Table 1. The rate of decline in number of parcel is 19% in interview-based reallocation model and is 32% in block priority-based reallocation model. It indicates that block priority-based reallocation model model is a more preferable model in terms of reduction of the number of parcel.

Table 1. Examination of the models in terms of the number of parcels

The Size of Parcel (Decares)	Cadastral Status	Interview-Based Reallocation Model	Block Priority-Based Reallocation Model
	The Number of Parcel	The Number of Parcel	The Number of Parcel
0-5	20	8	7
5-10	20	19	16
10-20	21	25	20
20-30	9	6	5
30+	4	2	2
Total	74	60	50

Before land consolidation, the average number of parcels per enterprise is 0.73. While this number decreased to 0.59 according to interview-based reallocation model, it decreased to 0.50 according to block priority-based reallocation model.

The Average Size of Parcel

The average sizes of parcels belonging to the study area are seen in Table 2.

Table 2. The average sizes of parcels of the reallocation models

The Average Size of Parcel	Area (m ²)	Increase Percentage (%)
In the old statu	12500	-
Interview-based reallocation model	14400	15.2
Block priority-based reallocation model	17200	37.6

The difference between the growth rates of parcels is 22.4% according to these two models (Table 2).

Investigation in Terms of the Number of Shares of the Reallocation Methods

Table 3. The number of jointly owned parcels occurred with the reallocation methods

The Number of Share in Parcel	The Number of Jointly Owned Parcel		
	Cadastré	Interview-Based Reallocation Model	Block Priority-Based Reallocation Model
1	42	33	23
2	7	6	13
3	9	7	4
4	1	5	6
5	4	5	2
6	2	1	1
7	8	1	1
8	-	1	-
11	1	-	-
15	-	1	-
The number of jointly owned parcel	32	27	27
Total	74	60	50

The number of jointly owned parcels were 32 before the reallocation (Table 3). After the reallocations that is made block priority-based and interview-based, the number of jointly owned parcels decreased to 27.

The Investigation in Terms of Farmer of the Reallocation Results

The four farmers have been selected in the application area to constitute the examples. The number of cadastre and the number of parcel which occurs with interview-based reallocation and block priority-based Reallocation belonging to these farmers are shown in Table 4.

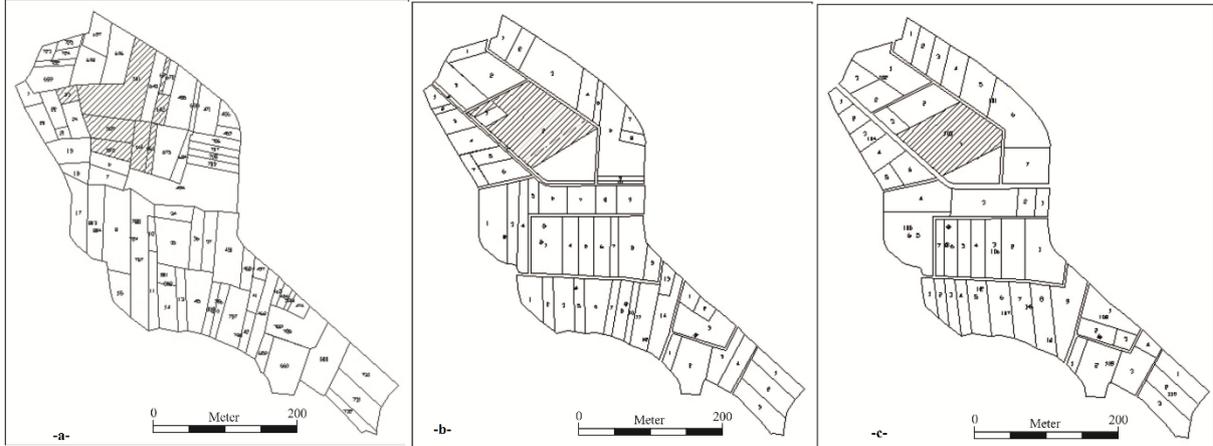


Figure 3. The status of the cadastral parcels (a), its new parcels which occur with interview-based reallocation (b) and its new parcels which occur with block priority-based reallocation (c) belonging to the farmer whose number is 17

Table 4. The number of new parcels on the basis of farmers.

Farmer Number	Surname-Name	The Number of Cadastre	The Number of Parcel in Interview-Based Reallocation	The Number of Parcel in Block Priority-Based Reallocation
17	Çetin Ali	8	3	1
44	Kaya Hafize	5	2	1
72	Paşa Kamil	3	1	1
88	Güner Tuncel	6	3	1

The status of the cadastral parcels and its new parcels which occur with interview-based reallocation and block priority-based reallocation belonging to the farmer whose number is 17 are shown in Figure 3.

Evaluation of Situations with Owners of Other Farmers Being Close Relatives of Owners of Farmers

Owners of farmers would like to have in the same block with their close relatives. This preference has been fulfilled in interview-based reallocation method. Whereas, This preference has not been fulfilled in block priority-based reallocation method. This situation may be accepted as disadvantage of block priority-based reallocation method.

CONCLUSION

According to the results of the reallocations which are obtained, when the number of parcels and the number of shares which occur after the reallocation and the average number of parcel and the average size of parcel per farmer are commentated in terms of the number of parcels which are given to farmer, it has been shown that block priority-based reallocation method gives to more successful results. But, when it is commentated that owners of farmers would like to have in the same block with their close relatives, interview-based reallocation method has given to more successful results according to block priority-based reallocation method.

If the block priority-based reallocation method can fulfill to the requests, which are in the same block with their relatives, of farmer owners during the reallocation process, that it will be reached to more successful results is thought. Even if the reallocation studies are made according to interview-based reallocation method in practice, that preliminary reallocation studies is done according to block

priority-based reallocation method will accelerate the studies and will increase the satisfaction of farmers before the interview studies does not start.

REFERENCES

- [1] Crecente, R., Alvarez, C. and Fra, U., 2002. Economic, Social and Environmental Impact Of Land Consolidation in Galicia. *Land Use Policy*, 19, 135–147.
- [2] Çay, T., İşcan, F. and Ayten, T., 2009, Arazi Toplulaştırması Projelerinde Mülakat ve Blok Öncelik Esaslı Dağıtım Modellerinin Karşılaştırılması, 4. Ulusal Mühendislik Ölçmeleri Sempozyumu, Trabzon-Turkey, 418-427.
- [3] Demetriou, D., Stilwell, J. and See, L., 2012, Land Consolidation in Cyprus: Why is an Integrated Planning an Decision Support System Required ?, *Land Use Policy*, 29, 131-142.
- [4] Gonzalez, X.P., Alvarez, C.J. and Crecente, R., 2004, Evaluation of Land Reallocations With Joint Regard to Plot Size and Shape. *Agricultural Systems* 82, 31–43.
- [5] İnceyol, Y., 2014, Arazi Düzenleme Çalışmalarında Genetik Algoritma Uygulaması, PhD Thesis, Selçuk University, Graduate School of Natural Sciences, Konya-Turkey.
- [6] Sonnenberg, J., 1996, The European Dimensions and Land Management-Policy Issues (Land Readjustment and Land Consolidation As Tools For Development). *Land Management in The Process Of Transition. FIG Commission 7*, Budapest.
- [7] Van den Brink, A., 1999, Sustainable Development and Land Consolidation. In: Dixon-Gough, R.W. (Ed.), *Land Reform and Sustainable Development*. Ashgate, Aldershot, Pp. 61–68.
- [8] Van Lier, H.N., 2000, Land Use Planning and Land Consolidation in The Future in Europe. *Zeitschrift Fu R Kulturtechnik Und Landentwicklung*, 41 (3), 138–144.