

Full Length Research Paper

Value differences in development applications and distribution relations: A case study of Trabzon

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In Turkey, when development plans are overlaid with the cadastral maps, some cadastral parcels coincide with areas of public services. All cadastral parcels are not affected equally from the transformation that occurred by this procedure. In application of development plans, there is need for re-organising the cadastral parcels according to the new situation. One of the tools used in Turkey for this process is land readjustment (LR). LR applications are carried out according to the development law numbered 3194 in Turkey. In this approach, all cadastral parcels are taken into consideration as having the same value. In this study, the value differences in cadastral parcels and in the new situation with development plans were examined, separately. Then, the possibility of using these values in production of new development parcels was researched. For this purpose, a general evaluation was carried out by taking into consideration some value factors in the development plan. According to parcel valuation results, cadastre and development parcels were classified and a new proposal for development parcel plan was prepared. Then, in a pilot area where LR application was carried out before, LR based on area principle and LR based on value principle-proposed parcelation plan were compared and the results were analysed.

Key words: Development plan, cadastral and development parcels, land readjustment, land value.

INTRODUCTION

Management of the spatial information has gained importance in all the worldwide studies for the decision-maker authorities and planners, where the necessity of establishing a spatial data infrastructure arose for the control of natural sources and environmental changes (Sesli and Kiliçoğlu, 2010). Land management is based largely on spatial information. Local authorities and planners use spatial information for decision making and applications. The first process of sustainable land management is land readjustment (Çete, 2010). It discusses the importance of the land readjustment (LR) method in implementation of the development plans in Turkey and introduces Turkish LR method, including its primary principles and implementation phases.

The applicable development plans play an important role in formation of modern cities. The applicability of development plans depends on qualified technical employee and economic power of local authorities. By the concept of passing from agriculture to the industry which started after 1950s, big and middle sized

municipalities in particular have met big difficulties against immigration dynamics from villages to cities. Local authorities have not been as successful as desired about preparing development plans and produced development parcels that will respond to the need against rapid population increase and migration dynamics. It has affected the development plan applications negatively and caused modification of development plans continuously. These problems necessitated the preparation of the applicable development plans rapidly and to meet increased development parcel demands within a short time. The making of development plans is obligatory according to provisions of development law, and the application of development plans are left to local authorities. However, requested development parcels should be formed by making development applications rapidly after preparation of the development plans. Thus, benefit-loss balance is established by distributing technical infrastructure facilities which is needed by the city. But development blocks, opened roads, green areas

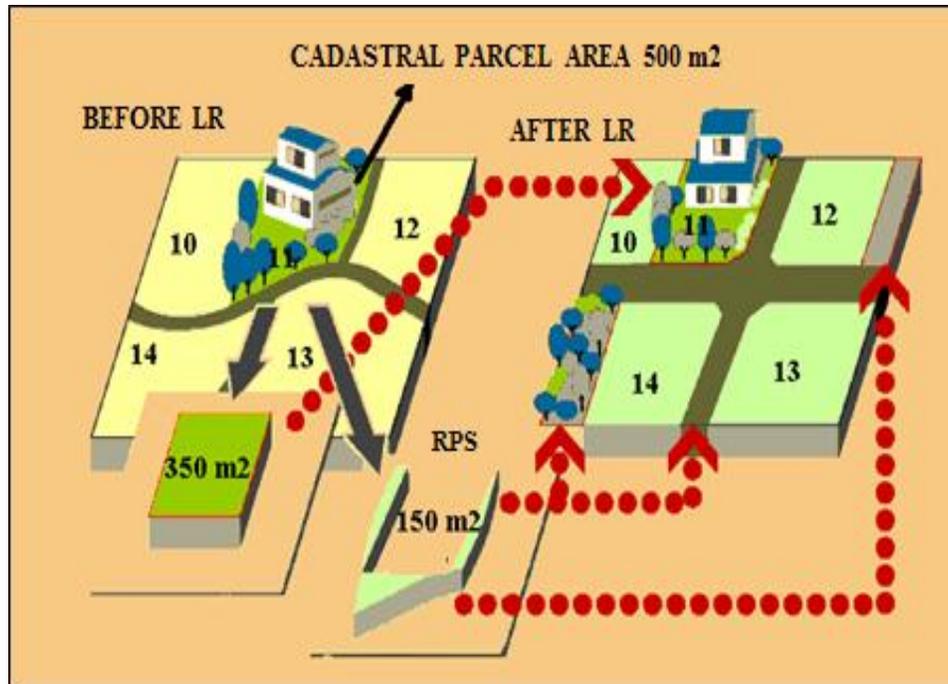


Figure1. LR mechanism applied in Turkey (Uzun, 2000).

and other public services formed on development plans affect the value of development parcels that will be produced.

The values of cadastral parcels differ according to their locations and characteristics as well as value differences with the development plan. However, the core of application of 18th Article of 3194 numbered Development Law, the bases on acceptance that all cadastral parcels have the same value. In Article 18 of 3194 numbered Development Law, the phrase "during distribution of field and lands which are subjected to regulation by municipalities and governments, the regulation may be subtracted as partnership share against value increase that occurred due to the regulation" that exists. It is indefinite whether such deduction meets the value increase.

The task of modern urban development in a number of countries is often to transform and reorganize previously developed areas with an anachronistic property subdivision and infrastructure, and particularly in developing countries, neither the authorities nor the individual owners have the resources for developing the urban structure in step with population growth. When faced with situations of this kind, a number of countries have arranged procedures to organize landowners for joint development. The experience with the application of rural land consolidation procedures by which the ownership and the use of land are rearranged have been introduced in urbanization. This kind of land consolidation using the reallocation process for urban development is usually called land readjustment (Sonnenberg, 1996).

LAND READJUSTMENT

Article 18 of the 3194 numbered Development Law specifies "land readjustment" procedure as follows: "Without seeking consent of owners and other right owners of lands and fields within development boundary, municipalities are authorized to combine places belonging to the municipalities or public organizations with each other together with their road surplus, to separate them again to development blocks and parcels appropriate to the development plan, to distribute to right owners according to separate share, condominium basis or to provide registration procedures *ex officio*. The aforementioned authorities are used if mentioned areas are out of municipalities and urban area" (Şakar, 1996).

A mechanism is required for immovable value changes based on benefit and loss of development plans, to balance all parcels within the scope and to allow providing for the public at least partially. The mechanism shown in Figure 1 is LR. LR is a tool that is used to obtain uncovered values against value increase of areas required for public infrastructure facilities and to form expediently forms, locations and sizes of the immovable values according to provisions of building regulation and rules in the development plan.

As seen in Figure 1 in principle after LR, the owner of real estate owns more valuable development parcels against the decrease in the area proportionally; therefore, the loss arises due to the fact that area deduction by Regulation Partnership Share (RPS) is met. On the other hand, by allocating deducted areas to a public purpose,

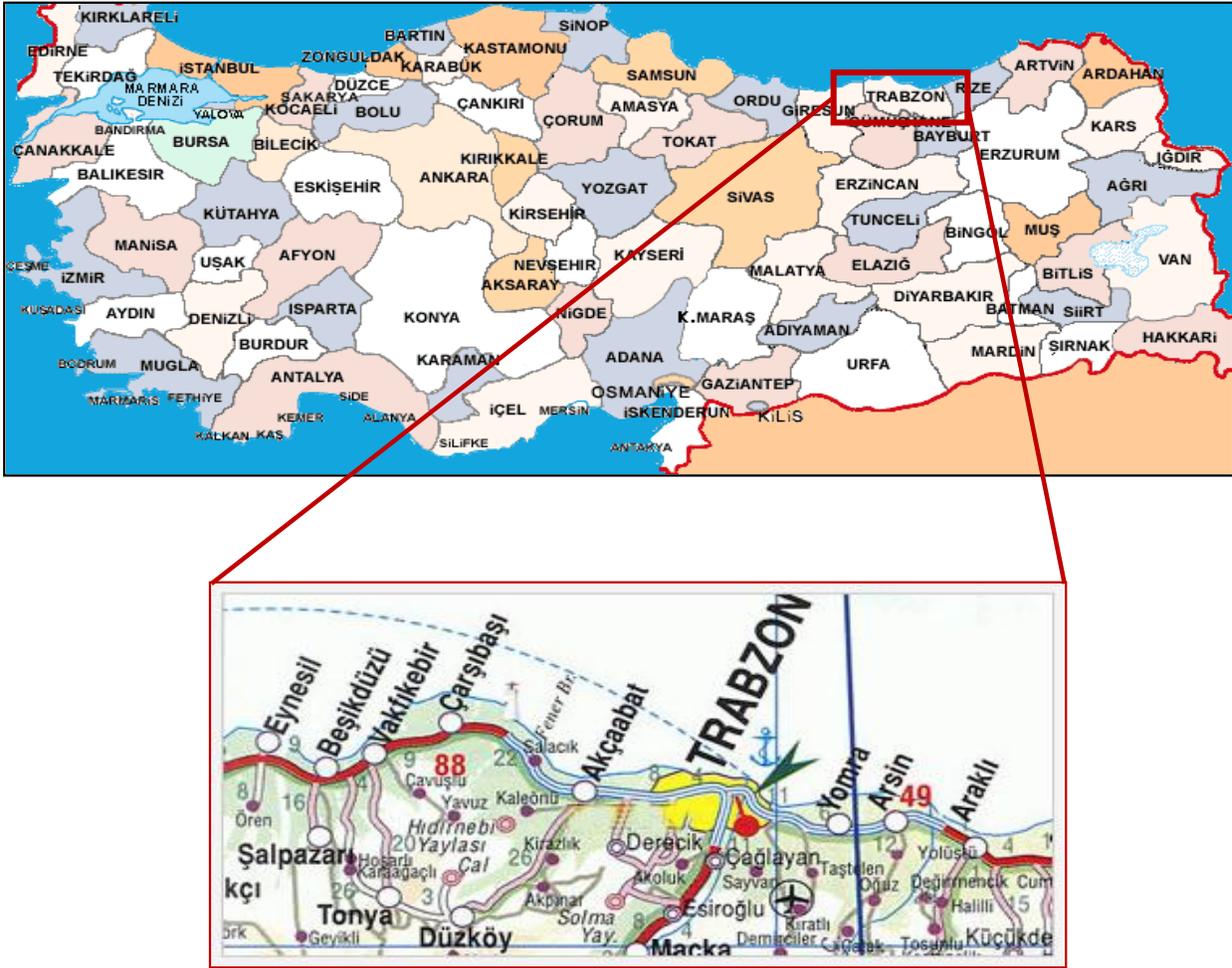


Figure 2. Study area (No.1 Beşirli Quarter of Trabzon, Turkey).

the owner of the real estate gains more benefits.

As seen in Figure 1, a relative value increase occurs, although deduction is by RPS in all real estates within the regulation. However, as a relationship cannot be established between RPS and development rights in LR system, injustice arises in undertaking the same obligation to all real estates within the scope of the regulation. In other words, to apply same deduction ratio on the cadastral parcels having different development rights causes injustice (Uzun, 2000).

The cadastral real estates are reshaped according to the purpose in terms of size location, form, size, and ownership structure by LR. At the same time, some technical and social infrastructure areas are transferred to concerning public organization, free of charge (Yomralıoğlu and Uzun, 2001).

Border correction and allotment are plan application methods which are applicable on a small area. Expropriation is an expensive method. Therefore, LR method is the most applied and an efficient plan application method either being applicable to very large areas or not loading a material load to administrations (Karavelioğlu, 1999).

The selection of application region

Cadastral parcels convert into development parcels with very different value according to their previous values. Characteristics, locations and distances to the public areas of development parcels are different. In LR applications which are performed by application of direction in Article 18 of 3194 numbered Development Law in urban areas in parcelling and distribution step; the phrase "allocation of cadastral parcels in the same location is as close as possible to old parcels provided". Such study area is determined whether "parcel production with same conditions and values" principle is provided. As a study area, No. 1 Beşirli quarter which is 4 km away to the city centre and one of the central quarters of Trabzon, Turkey, and may be shown as an example in terms of modern urbanization and LR applied was selected (Figure 2).

Article 18 application file which was performed in No.1 Beşirli quarter was examined in Trabzon General Directorate of Land Registry and Cadastre, and the study area borders were detected. Parcelling map of the study

area was obtained in digital environment. The areas of cadastral parcels, development blocks and development parcels were calculated in Netcad 4.0 software individually. Land registrations which are needed for cadastral parcels in the study area were obtained from current land registers in the real estate recording office.

Determination of factors that affect parcel values

Locations and economical values change according to pre-regulation of reproduced parcels which were produced according to the development plan. This change has different ratios for every cadastral parcel. Regulation Partnership Share Deduction (RPSD) which was done in proportion with areas of all parcels within the regulation by current application form cannot meet the value difference that arises with different ratios. This deficiency in the application may be decreased only by considering factors that determine values of parcels. Therefore, factors that affect the value of cadastral parcels before the regulation and development parcels after the regulation should be determined.

Different sources were utilized to obtain data on factors affecting the parcel value. Based on the evaluation performed on cadastre parcel, data were obtained from cadastral base, and required development data to evaluate development parcels were obtained from development plans. Besides, required data may be obtained by land measurement methods or by utilizing developing technologies (Nişancı, 2003), as well as the aim of using objective of real estate; the active and high dense area is desired regarding to economic and social efficiency should be near, especially, short distance to market, shopping center, work place, auto park area, child park, school, park, terminal, green area, city center, etc. increases value of the real estate's economically and socially. Yomralioğlu (1995) determined the factors that affect value of cadastral and development parcels. In this study, these factors of evaluation criteria have been considered. Undoubtedly, the different evaluation factors will occur with development plans. According to occurring evaluation factors, and the weight values of these factors have been determined, but determining these criteria has not been included in this study. So, the evaluation criteria have been done according to determined and approved by Yomralioğlu (1995). The topography, parcel shape, current resources, environment, distance to education center, closing to child park, distance to green area, distance to highway, distance to city center, noise, allowed floor number, position in the development block and number of frontage factors are the factors that affect parcel value.

For the cadastral parcels before land readjustment; topography, parcel shape, current resources, scene and road allow factors have been considered. A point value is the selected value factors for the cadastral parcels at the study area. For the weight values belong to value factors;

Table 1. The value factors and weights of cadastral parcels in the study area.

Value factor	Weight
Topography	68.6
Parcel shape	78.9
Current resources	78.5
Scene	83.3
Road allow	78.0

the weight factors that are determined during doctorate thesis which was performed by Yomralioğlu (1993) have been benefitted. The value factors and weight that are considered before LR at the study area have been given in Table 1.

Nominal unit value of the cadastral parcels before LR has been calculated considering point values that have been calculated in pursuant to factors and weight given in Table 1 belonging to cadastral parcels (Ispir, 2006).

For the development parcels after land readjustment, have been considered factors such as parcel shape, environment, distance to education center, closing to playground, distance to green area, distance to highway, distance to city center, noise, allowed floor number, position in the development block and number of frontage factors. The point values according to selected value factors for the development parcels at the study area have been calculated. For the weight values belong to value factors; the weight factors that are determined during doctorate thesis which was performed by Yomralioğlu (1993) have been benefitted. The value factors and weight that are considered before LR at the study area have been given in Table 2.

Following the determination of the point values based on the value factors selected for the development parcels at the study area, the total value of each parcel was calculated. Taking into consideration the value factors and the weights given in Table 2 relating to the development parcels, the nominal unit values of the development parcels following the LR was calculated. After determining the nominal unit values of the cadastral parcels and development parcels, the development parcels allocated for the cadastral parcels were determined. After calculating the areas of development parcels given to the cadastral parcels, the nominal unit values were calculated individually and the nominal unit values of the cadastral parcels and the nominal unit values of the development parcels were compared (Ispir, 2006).

THE ALLOCATION METHOD BASED ON PARCEL FOR DISTRIBUTION OF THE PRINCIPLE OF VALUES

In the method of allocation based on parcel, the minimum parcel dimensions are maintained and the development parcels are formed before land readjustment. During the distribution made based on the principle of values, it is obligatory that the

Table 2. The value factors and their weights relating to the development parcels within the study area.

Value factor	Weight	Value factor	Weight
Parcel form	78.9	Distance to the city center	71.2
Environment	86.6	Noise	78.7
Distance to the education center	67.4	Allowed floor number	72.0
Distance to the playground	57.5	Location within the development block	70.1
Distance to the green zones	64.5	Number of aspect	74.2
Distance to the highway	64.8	-	-

development parcel value is to be determined prior to the distribution. Thus, the distribution is performed after generating the parcels through the method of allocation based on parcels. The distribution based on the principle of area shall take the parcel method as its basis. So, the development parcels will be allocated based on the areas of allocation following the RPSD from the relevant parcels.

At the first stage of the application, the nominal unit values of the development parcels generated based on the principle of area were compared to the nominal unit values of cadastral parcels. At the second stage of the application, by having the development blocks at the study area subject to land subdivision based on the data of the development plan and the maximum number of development parcels was generated. Taking into consideration the value factors following the land subdivision process, the nominal unit values of the point values of generated development parcels were calculated by means of point values. The equalization coefficient was obtained by means of the nominal values before and after the land readjustment:

$V_B = 3932070952.65$ unit (Value before LR); $V_A = 4171033714.19$ unit (Value after LR); $z = 0.942708983$ (Equalization coefficient)

The equalization coefficient obtained was calculated with the nominal unit values by multiplying following the LR and the definite values subject to the distribution were found. The point values and the nominal unit values of the development parcels generated were determined based on these.

The classification of cadastral parcels based on their values

The values of the cadastral parcels and the nominal unit values were calculated based on the calculated point values obtained by means of the value factors. The cadastral parcel having the minimum value is cadastral Parcel no. 1096 and its value is 1055.89. The cadastral parcel having the minimum nominal value is cadastral Parcel no. 1103 and its nominal unit value is 206109.66 units. The cadastral parcel having the highest value is cadastral parcel no. 364 and its value is 27442.70. The cadastral parcel with the highest nominal unit value is cadastral Parcel no. 888 and its nominal unit value is 453895534.36 units. It was seen that the values of all cadastral parcels at the study area was different from one another. Some of the values of cadastral parcels were given in Table 3. The values of the cadastral parcels vary between 10551.89 and 27442.70. The reason that the cadastral parcel values showed differences varies based on the positions of the cadastral parcels and the properties they hold and the value factors determined within the cadastral parcels. The colorized map of the cadastral parcels based on their values is as shown in Figure 3.

The classification of the development parcels based on their values

Based on the point values calculated with the help of the value

factors, the values of the development parcels and the nominal unit values were calculated. The development parcel with the minimum value is the parcel value at development block no. 54, parcel no. 2 and its value is 23629.19. The development parcel at the lowest nominal value is development block no. 43, parcel no. 5 and its unit value is 972389.16 units. The development parcel having the highest value is at development block No. 68 and parcel no. 1 and its value is 48244.90. The development parcel having the highest nominal unit value is at development block no. 68, parcel no. 1 and its nominal unit value is 502909951.56 units. It was seen that the values of all the development parcels at the area of working are different from each other. The values of some of the development parcels were given in Table 4.

As it can be seen in Table 4, the values of the development parcels vary between 23629.19 and 48244.90. The reason that the values of development parcels vary differs based on the positions and properties of the development parcels. The colorized map of the development parcels with their values was presented in Figure 4. The value factors which arise with the development plan (parcel form, environment, noise, permissible allowed floor number, location within the development block, the number of aspect of the parcel to the road and the distance to the public areas) caused the values of the development parcels to vary. It was seen that the development blocks along the coastal public roads have higher values in comparison to the others. The reason to that is the floor number on the development blocks along the coastal public roads is higher and they are closer to public service areas etc.

The applicants are to be in an embarrassing situation in the distribution tasks because of criterions such as the development blocks on the development plan face the roads at different widths, the number of parcels on the same development blocks having a wider area facing the road being higher. After RPSD, it is unfair to grant the owners of the cadastral parcels with irregular topographical structure the development parcels with more regular shapes is an unfair application to the other parcel owners. Since the principle of value is not taken into consideration during the development applications executed in Turkey, such problems may arise. These problems also bring together the issues of unjust distribution and land subdivision.

COMPARISON OF THE PARCEL VALUES BEFORE AND AFTER THE LAND READJUSTMENT

LR based on area is based on the principle of area making the same rate of deduction from each parcel. Before LR, as the cadastral parcels are considered to have the same value, after LR, different locations cannot be submitted based on the areas of entry to the cadastral parcels. Despite the cadastral parcels entering the LR in different values and areas, the deduction made is at the same ratio. The deduction is made against the increased value due to the value differences brought about by the development plan. In accordance with article no. 18 of Development Law no. 3194, it is stated that; "The LR against the increases in the value of lands which are subject to being arranged and distributed by the

Table 3. The nominal values of the cadastral parcels.

Parcel number	Value						
219	18503.79	917	21407.87	1082	24637.40	1347	24656.40
220	20378.87	927	23765.00	1083	24568.80	1474	21716.19
221	16531.75	928	20959.67	1084	24500.20	1475	21167.77
364	27442.70	929	20871.47	1085	20280.80	1476	20528.47
896	20216.90	930	19789.00	1086	18485.60	1477	22010.57
897	22422.37	931	14207.40	1087	21530.37	1820	21530.37
915	27118.70	932	16220.00	1088	23265.20	1821	21667.57
916	21015.80	933	16974.60	1089	15624.27	1822	21378.40
918	21687.17	934	14108.10	1092	20185.47	1823	18818.40
919	25590.30	935	11272.30	1093	22076.00	1824	14347.77
920	15122.20	936	14382.50	1094	11349.20	1994	20322.67
921	23765.00	937	20173.27	1095	12104.00	1995	20459.87
922	14070.20	938	22781.60	1096	10551.89	2031	21938.80
955	22487.60	939	27236.90	1097	18700.30	2032	20116.87
956	20810.00	940	27168.30	1098	21442.17	1118	19705.27
957	13779.37	941	17466.83	1099	21647.97	1119	22007.40
958	20927.67	942	20104.47	1100	23245.60	1120	20223.69
959	20084.87	943	21457.10	1101	24480.60	1121	19575.20
960	15891.70	944	22692.10	1102	19289.20	1122	16576.40
961	22213.20	945	22417.70	1103	24288.20	1123	18614.70
962	15808.20	946	20339.90	1104	25049.00	1124	22422.40
963	21167.39	947	21182.70	1105	24843.20	1125	22353.80
964	18642.40	948	26370.70	1106	23608.40	1126	24137.60
965	20776.00	949	22946.90	1107	21550.20	1127	24343.40
966	18866.50	950	20153.90	1108	22922.40	1128	16406.20
967	20192.90	951	22230.20	1109	21413.00	1129	12365.87
1780	20383.60	952	14349.50	1110	20824.77	1131	23265.20
1948	20917.80	953	18556.30	1111	21644.80	1132	20981.57
1949	12316.87	954	21236.10	1112	19253.89	1137	24568.80
887	25823.20	1074	20040.60	1113	11522.49	1138	21324.57
888	23217.57	1075	20254.07	1114	13230.57	1461	17585.70
889	11865.49	1076	20692.40	1115	12434.47	1462	20075.00
890	11923.89	1078	25137.20	1117	23314.20	1463	22027.00
567	25343.00	1079	20191.50	1133	12365.87	1793	24069.00
568	24108.00	1079	20191.50	1136	23265.20	1794	20492.00
569	23902.20	1081	23128.00	1346	18743.89	1794	20492.00

municipalities and governorships, RPS can be considered in terms of the lands equal to their areas.

It was seen that the nominal values calculated based on the point values of the value factors which affect the cadastral parcel values and the nominal unit values based on this vary compared to each other. The reason to this difference is that the positions and the properties of the cadastral parcels vary one to other. Due to the effects of the value factors caused by the development Plan, their values are also different each other. Before LR, the total unit values sum up to 3932070952.65 while it increased to 4818736556.09 after the LR. The general increase in value with the value differences brought about by the development plan was determined as 23%.

As it can be seen in the map prepared based on the nominal values of the development parcels, the values of the development

parcels vary based on the selected value factors. It was seen that the values of the development sections along the coastal public road are higher compared to the others. Furthermore, it was seen that the value of the corner parcels are higher than the value of the other parcels.

During the AAD performed at the study area; although the principle of granting from the same location was abided by during the distribution performed at the areas of allocation following the deduction, it was also seen that the parcels with equal values to the previous were not granted. Since the area is based on the distribution performed based on LR, the values of the cadastral parcels before the preparation of the development plan was not taken into consideration and no fair distribution could be made. During the distribution made based on the area principle, the cadastral parcels were given the development parcels in the same

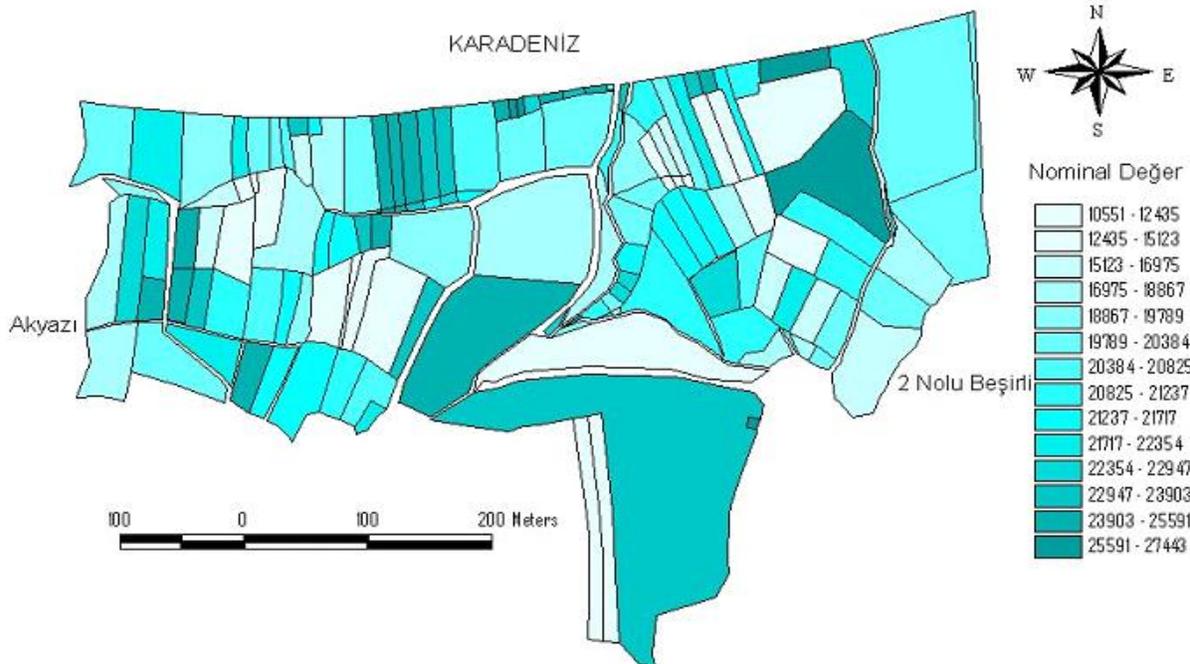


Figure 3. The cadastral parcels classified according to their values.

amount with their areas of allocation, while during the distribution made based on the value principles, the development parcel granted to the cadastral parcel should be equal to the previous nominal unit value of the cadastral parcel. In the distribution based on the principle of area, while some cadastral parcel owners acquire development parcels having more value compared to their previous parcels, some of them have development parcels having less value than their parcels prior to the LR.

In order to determine whether the deduction in question meets the increase in value and whether the parcels to be allocated have equivalent values, two evaluation studies were conducted which can be listed as before and after LR. The nominal unit values of the cadastral parcels were prepared in the study area before LR. In order to determine whether the development parcels having equivalent values have been allocated or not following the distribution, the nominal unit values of the development parcels is generated based on the area principle calculated.

It was determined that 116 of 150 cadastral parcels were allocated with areas having more value than its previous value. If the value of the cadastral parcel having the highest value is compared to the value of the development parcel allocated, we have the following distribution.

The area and the value of the parcel before LR

For the cadastral Parcel no 364;
Parcel area: 1086.15 m²

Nominal unit price of the parcel: (108615 × 27442.70) = 298066888.61 units

The area and the value of the parcel after LR

At development block no. 46, development parcel no. 2 was allocated to the cadastral parcel no. 364 and parcel area 782,96 m²:

Parcel nominal unit value: (782,96 × 38553,36) = 30185738,75 units. The cadastral parcel no. 364 acquired development parcel having less value than it had before. The area which the cadastral parcel no. 364 had to acquire based on the unit value = 298066888,61/38553,36 = 773.13 m². Since the distribution was made on the basis of area, the development parcel allocated had 1% more value compared to the value before LR. RPSD made from cadastral parcel no. 364 met the increase in value by 1% difference.

If we compare the value of the cadastral parcel having the least value before LR with the value of the development parcel allocated following the distribution.

The area and the value of the parcel before LR

For the cadastral parcel no 1096 and parcel area 1398.80 m²:
Parcel nominal unit value = (139880 × 10551.89) = 14759983.73 units.

The area and the value of the parcel after LR

Development parcel no. 4 at development block no. 58 and development parcel no. 9 at development block no. 58 was allocated to the cadastral parcel no. 1096.
For 58/4-parcel area 590,36 m²:

Parcel nominal unit value: (59036 × 28839.81) = 17025870.23 units
For 58/9-parcel value: 415.00 m²:
Parcel nominal unit value: (41500 × 25209.31) = 10461863.65 units
The addition of nominal unit values of two development parcels = 27487733.88 units and the sum of the parcel areas = 1005.36 m²
The cadastral parcel no. 1096 acquired development parcels having more value than before and after the distribution. The area which the cadastral parcel no. 1096 is supposed to acquire on the development parcel based on the nominal unit value is =

Table 4. The nominal values of the development parcels.

Block number	Parcel number	Value
41	1	44903.60
	2	38941.08
	3	36662.19
	4	38290.98
	5	38792.64
	6	37294.83
	7	44949.60
42	1	45524.60
	2	42097.08
	3	41098.29
	4	46439.20
43	1	46814.60
	2	38859.53
	3	38675.39
	4	44637.70
	5	38655.90
	6	40482.57
	7	33316.76
	8	39943.82
44	-	-
	1	45403.20
	2	34304.46
45	3	43948.40
	1	41949.10
	2	31528.99
	3	27787.55
	4	32430.12
46	5	37609.90
	1	47107.80
	2	38553.36
	3	47792.10
47	4	33475.27
	1	37976.50
	2	32798.89
48	3	35855.60
	1	37925.70
	2	30832.47
	3	36859.00
	4	36094.50
49	5	28612.68
	1	40213.70
	2	30480.01
	3	31087.32
	4	31160.45
	5	36282.00
	6	37593.50
7	33156.39	

Table 4. Contd

50	8	30950.99
	1	38350.00
	2	29677.82
	3	31494.40
	4	36152.90
	5	39216.50
	6	33686.95
	7	33950.06
	8	38818.50
51	9	33392.15
	1	41885.70
	2	31082.04
	3	33756.70
	4	40407.70
52	5	35772.15
	1	35247.00
	2	31718.00
	3	25094.47
	4	26152.82
	5	27656.24
53	6	30814.00
	1	40661.60
54	2	38061.20
	1	30647.00
	2	23629.19
	3	26767.00
55	4	31967.00
	1	40692.20
	2	30460.75
	3	31743.20
	4	34125.70
56	5	29699.51
	1	41410.20
	2	36227.75
	3	37159.20
	4	33547.64
	5	39838.20
	6	41658.20
	7	31104.18
57	8	42015.20
	1	36279.60
	2	31122.19
	3	30179.42
58	4	37839.20
	5	35340.20
	6	36105.20
	1	34662.60
	2	30451.87

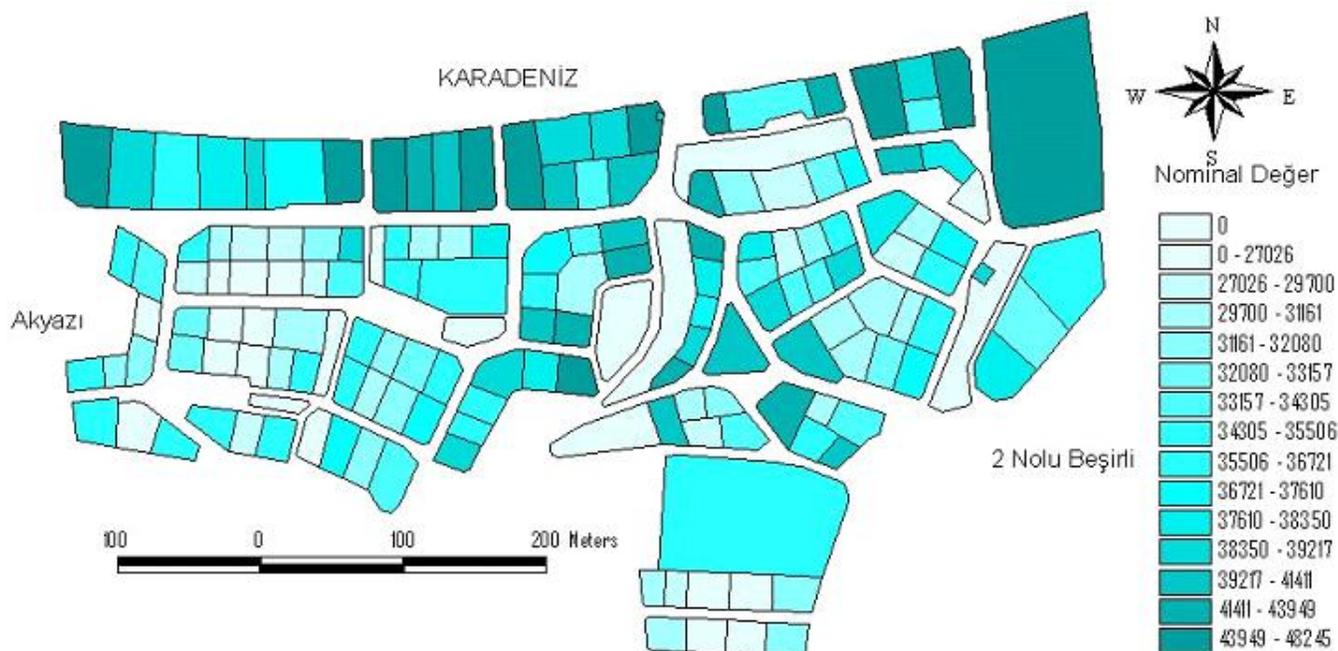


Figure 4. The development parcels classified based on their values.

$14759983.73/54049.12 = 273.09 \text{ m}^2$. Since the distribution was made on the basis of the area, the development parcel granted has a greater value by 73% as compared to its value before the LR. RPSD supposed to be made from cadastral parcel no. 1096 which is equal to 80% of the parcel share area. It was determined that deduction at equal rates failed to meet the different increase in values.

As it can be seen in the calculations made earlier, that the areas of development parcels produced on the basis of area principle is more different than the areas of development parcels produced on the basis of value.

In the distribution made based on the principle of area, it was determined that the development parcel allocation from the locations having equivalent value could not be made in comparison to the values of the cadastral parcels before LR.

Distribution based on the value principle

After determining the nominal unit value of the parcels obtained by means of allocation based on the parcel in the study area, the distribution was performed based on the nominal unit values of the cadastral parcels. Afterwards, the equivalents of the values of the parcels in terms of areas were calculated.

Distribution based on nominal unit value

Distribution was made by comparing the definite values of the development parcels produced with the parcel values before LR. The nominal unit price of a cadastral parcel before LR is equal to the amount of allocation with respect to that parcel in question.

Distribution was made on the development parcels produced based on the nominal unit value which meets the amount of allocation. It was considered that while performing the distribution, parcels were allocated from the same location and dividend less as much as reasonably could be performed. The distribution tables were prepared based on the nominal unit value (Ispir, 2006).

Finding the equivalent area to be allocated based on the nominal unit value

Distribution was made based on the values taking into consideration the nominal values of the cadastral parcels. By converting the nominal unit values into areas, the distribution tables were arranged so as to express the amount allocated on the basis of values in areas.

RESULTS AND DISCUSSION

It is compared that distribution made on the basis of area and value principles are examined effects of cadastral and development parcels. During the distribution and land subdivision applications performed based on the area, 142 cadastral parcels are available within the study area. Based on the applied land subdivision map, it was seen that 150 development parcels were produced. 35 of these parcels are shared.

During the distribution and land subdivision application performed based on the value, the values of the development parcels were determined in the study area prior to distribution. The development parcels were produced at the study area based on the data of the development plan. 183 parcels are produced. 55 parcels of them are generated as shared.

One of the purposes of the method of land subdivision based on allocation is generating dividend less development parcels from the dividend less cadastral parcels which were subject to LR. The cadastral parcel which maintains the smallest development parcel dimension may be granted dividend less development parcels. The cadastral parcels which cannot satisfy this

dimension are granted as shared parcels.

The areas of the development parcels allocated to the cadastral parcels may significantly vary. While the development parcel areas produced at the distribution stage for some cadastral parcels based on area and value principles are very proximate to each other, some are very different. The area allocated based on the area principle is 10920.60 m² more than the area allocated on the principle of value. For instance, during the distribution based on the cadastral parcel no. 1118 in the study area, an area of 2044.09 m² was allocated while 1579.52 m² areas was allocated on the basis of value. Since the distribution was made on the basis of the area, the cadastral parcel no. 1118 was allocated with 464.57 m² of more areas. The development area is $0.40 \times 464.57 = 185.83$ m². The owner of cadastral parcel no. 1118 acquired 185.83 m² more development area based on the area principle.

The land deduction executed over the cadastral parcels in equal rates fails to meet the increase in value. Since the area of the development parcel to be allocated to the cadastral parcel, it varies based on the value which the development parcel holds. So, the distribution performed based on the criterions taken into consideration regarding area principles fail to become fair and just. The criterion which will be subject to distribution is value based on the study made. The principle in distribution is the nominal unit value of the cadastral parcel. The area to be allocated to the relevant cadastral parcel varies based on the nominal values of the development parcels.

Conclusions

This study encompasses the determination of parcel values of the land and lots during the process of LR, before or after the application and the production of the development parcels based on the principle of value. In order to determine the differences in values before and after LR, the values of the cadastral and development parcels were calculated in the pilot area where the development application was performed. During this study, it was seen that there is a difference between the area to be allocated for the cadastral parcels following distribution and the areas to be allocated based on the principle of values. In other words, it was seen that the cadastral parcels were not supplied with development parcels with values equal to their values before LR.

The deduction at same rate from the cadastral parcels does not meet the differences in values which arise with the development plan. The values of the cadastral parcels before and after LR are different. During the distribution made based on the principle of area, the parcel values before and after the LR are not taken into consideration. Moreover, RPSD made from the cadastral parcels against the increase in value do not always meet the differences in values which always occur.

The value of any parcel is rendered to be fit for

development with LR based on the fact that the area principle will not increase at the same rate. Their areas, locations and measurements of usage form various development parcels and their increased values are different from one another. In addition to this, the values of the cadastral parcels are different from each other. The LR applications are performed based on the area, since the value of cadastral and development parcels were not taken into consideration; it is not definite how much these differences were met. If LR is performed on the basis of values, the property owners will have acquired the development parcels equivalent in value to their cadastral parcels.

The parcel values must be related before and after LR. The economic values relating to the property also varies as a requirement of the plan upon the application of the development plan, because the effect of the value factors which affect the values of the parcels is not the same in all parcels. Thus, by relating the parcel values before and after LR, a fair distribution can be made. In this way, the cadastral parcels that are taken into consideration by LR with the value differences which came up with the development plan shall be fairly affected.

The nominal unit value of the cadastral parcel should be taken as the amount of allocation. Although, RPSD was made in the study area, more development parcel area was obtained in many parcels as compared to their previous value as we take into consideration several parcels. The distribution was executed based on the principle of area in the study area, more areas have been supposedly allocated to 77% of the cadastral parcels as compared to those allocated to the area based on the principle of values. However, considering the nominal unit value of cadastral parcel as the amount of allocation, shall eliminate this question.

A solution can be created for the value difference. In the distribution made based on the principle of value, if any development parcel is more valuable than the nominal unit value which was generated for the cadastral parcel, the authority concerned shall be liable to pay the difference between them. If a parcel is less valuable than the nominal unit value generated for the cadastral parcel, the value of the difference between them should be payable to the owner of the real property (Müller-Jökel, 2004).

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