A Comparison Between Current Land Readjustment Implementations In Turkey And Value-Based Approach

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Key words: Value based readjustment, land registry, urban planning, development,

SUMMARY

First steps of Planned Urbanization in Turkey were taken during the last times of the Ottoman Empire. Shortly after establishment of the Republic, preparation of plans was become mandatory for all municipalities in 1930and various legislative regulations regarding the settlement came in to effect until the World War II. After the World War II, due to the globalization and urbanization Turkey became a country searching for a constant renovation of itself. In 1956, Turkey created the legislative framework via the Zoning Law No. 6785 for the purpose of transferring to a real planned settlement. However, it could not be achieved in real implementations. In the mid-1980s, Zoning Law (No. 3194), which is currently in effect, was entered into force for readjustment of rural and urban lands, and various regulations were prepared for planned and unplanned areas in order to ease the implementation of the Law.

When those implementations proceeded based on the current Law and related regulations are analyzed, raw lands are taken into the scope of the plans and lands complying with the zoning plans are generated. Within this framework, under the name of Development Readjustment Share (DRS), a kind of "share" is taken from the land owners. In return to the value increments arising from the readjustment implementation, a deduction up to 40% from the lands currently being readjusted can be made in order to use for the common areas allocated for general services such as roads, squares, parks, green spaces, parking areas which are necessary both for residents and being readjusted areas, and also for primary and secondary schools belong to the Ministry of National Education, prayer halls, police stations and related facilities.

Zoning implementations and legislative regulations which neither meet today's needs nor public expectations are considered in the 10th Development Plan of Turkish Government which is prepared for the period of 2014-2018. In Article 949 it is stated that "Value increases resulted by development plans and their revisions will be assessed by objectivevaluation criteria and the public will be ensured to benefit more from this increase to provide for basic social infrastructure and spaces of common use." Besides, this topic is considered in the Medium-Term Program and 2015-Program of Ministry of Environment and Urbanization. Those documents clearly show that for the calculation of DRS deductions, land values should be the base instead of the land areas, and encourage the related institutions to prepare the infrastructure of such kind of work.

In this study, previous examples and studies in the field of value based zoning implementation are examined. Determination of the values, choosing the best valuation approaches fit for the purpose, inexistence of a database which includes values determined in previous studies and works, legislative amendment requirements which have been constantly proposed in previous academic literature are some of the requirements and obstacles to be overcome for the purpose of value based zoning implementations. In this paper, all right losses stemming from the current legislation and implementations are analyzed, and a method is tried to be proposed which can enable determining the parcel values based on the objective criteria in an analytical approach before the implementation, distributing the Gains arising from value increases after the Zoning Implementation to the all parts in a balanced way, the Public to be able to take share from the value increases. This proposal is also tested in an example zoning implementation in the city of Ankara and a comparison is made between the area-based and value-based implementations.

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1. INTRODUCTION

Today, real estate is among the investment choices of natural and legal person in the first place, and day by day real estate sector is becoming an important component of economic growth. Real estate valuation activities in developing countries have not been institutionalized to a great extent and also basic valuation standards that should be followed in practice that can make valuation services are not defined. Since legal arrangements have not been enacted in this area, the proposals made in academic studies has not yet been answered, and therefore Value-Based Readjustment Implementations have only come to light in scientific meetings and academic studies.

Although there are many public institutions related to the real estate sector in Turkey, leader of real estate management has not been chosen or established. Instead of an integrated state understanding of appraisal, the inadequacy of efforts made by individual efforts also affects lands and land adjustment studies, it gives the opportunity to gain unfair profits to a number of landowners due to the inadequacy of current implementations while causing loss of rights in the other and large part. When the History of Land Readjustment Implementations and results in Turkey is examined, department of treasury or the public institutions cannot obtain the profits to be obtained from their own properties and also it can be seen that the increase in value arising from Readjustment Plan cannot be taxed.

In order to prevent unfair parcel distributions arising from area-based regulations that are far from scientific, the government has begun to establish basic policies and work on new legislative amendments.

In the Government's 10th Development Plan, Article 948 and 949

948. " Utilization of innovative tools, such as transfer of development rights in unbuilt areas, will be rolled out to municipalities to lower financial burden in the development implementation and expand spaces of common use".

949. " Value increases resulted by development plans and their revisions will be assessed by objective valuation criteria and the public will be ensured to benefit more from this increase to provide for basic social infrastructure and spaces of common use." has enacted in the form of these.

Under the government's Medium-Term Program and the ministry of environment and urbanization's 2015th Program, the same direction decisions have been adopted under the heading of responsible measures.

2. LITERATURE OF VALUE-BASED APROACH

When the scientific and academic studies on value-based Readjustment Implementations are examined, it has often been seen that Equivalence-Based Readjustment Implementations have been named to describe the work of Value-Based Readjustment Implementation Studies. In this study all of these identifications has accepted and used with same meanings. The methodology of valuation and the method of analysis to be used for the determination of variable coefficients vary in many studies.

Yalpir and Ekiz (2017), used the Analytic Hierarchy Process (AHP) method in the economic valuation of both the cadastral parcels and the block parcels before the Readjustment Implementation. Analytic Hierarchy Process have been used in their studies in 2017, for the economic valuation of both the cadastral parcels and the block parcels. Likewise, YILDIZ (2008) conducted pilot project work on the same topic and a mathematical model has been created by variables such as weighted construction area points of the parcels, road points and position scores etc. and also it is understood that some variables are quoted from different academic publications which are using AHP for the coefficients calculation.

In a majority of the other national publications, the values of cadastral parcels and zoning parcels are separately calculated and after calculating conversion of coefficients with the help of mathematical models to be created between them. In addition, methods such as Analytic Hierarchy Process, Multiple Regression Analysis, Artificial Neural Networks, Decision Tree Model and Linear Programming have been used in the calculation of coefficients.

Considering academic studies, it is known that the old and new dated real estate values in developed countries are immediately visible and also these values are updated in certain periods and utilized in Value Based Land Arrangements Studies. In developing countries like Turkey, it does not have a guide or index showing the historical value of the parcel. The fact that the values of the cadastral parcels can be taken into consideration in the Readjustment Implementations is possible when the real estate values determined and were to be sure on that price . (Figure 1)

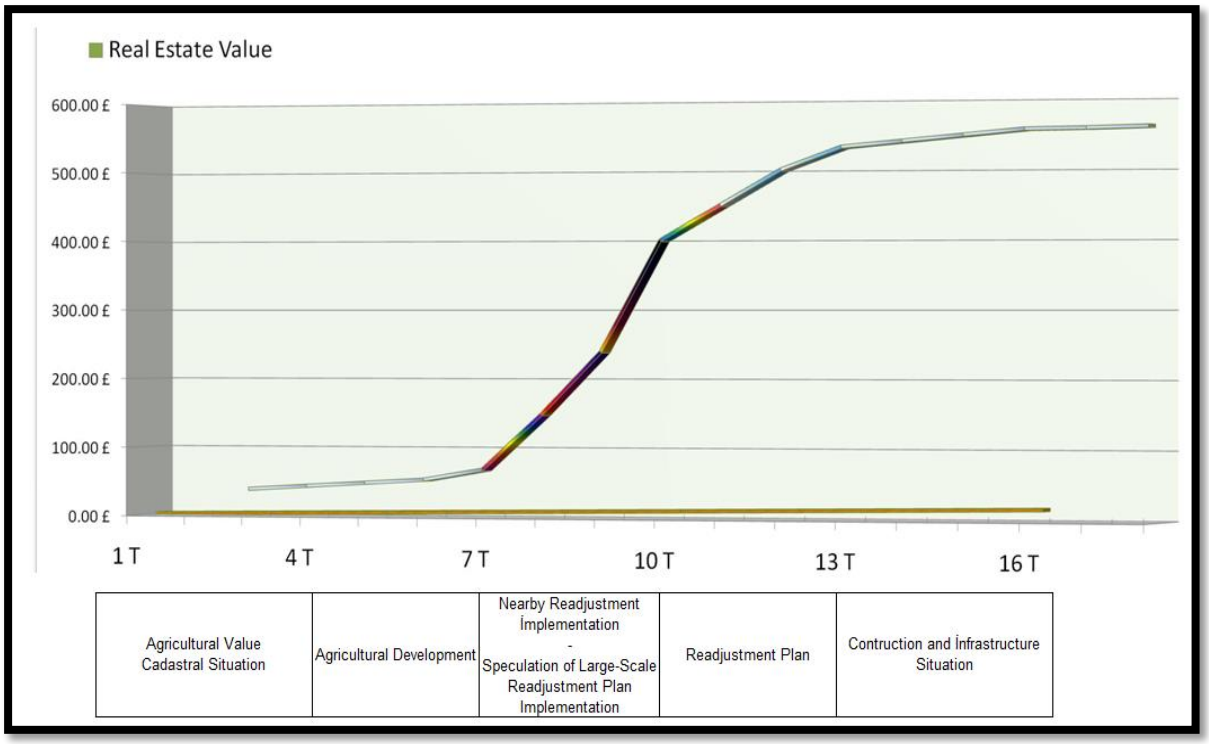


Figure 1: Value Increased In Real Estate Development Period In Turkey

As can be seen above, the value of the Real Estate in the same region shows a significant upward increase, from the hearing of the Readjustment Implementations to the construction of it.
The serious differences between the values of the parcels arise because of Readjustment Plan. As can be seen in the graph and it is impossible to use cadastral parcels values for distribute because making valuation retroactively is almost impossible and also no one can easily calculate the old values with lacking of value indexes.

Another issue that needs to be taken into consideration here is the increase in real estate values due to investments made by the State but it is very important to determine when the parcel values increase.

Nowadays, the Ministry of Environment and Urbanization is working on legal regulations related to the tax that the state should buy from the parcel owners and all of us are waiting for this regulations.

Before readjustment implementations, in order to calculate and / or estimate the values of the parcels closest to the exact value, the variables should be determined considering the market conditions. There are many variables affect real estate values which are changeable with the structure of the region, the socio-cultural conditions of the people living there and the meteorological living conditions. The main parameters in determining the value of a real estates are human emotions and mentalities. The human factor here is oriented according to his wishes and needs.(Nişancı 2005)

DOEBLE (1986) working sheet has been used in the Kahramankazan County in order to determine the variables that can affect the real estate values, and the list is listed below.

- Topography
- Location in Plan Area
- Existing Usages
- Suitable Area Rate,
- Public Funding
- Environment
- Quality Of Agricultural Sources
- Scene - Review
- Far From Natural and Technical Infrastructure
- Sound Power
- Far From Hazardous Area
- Permitted Construction Rate
- Location In Block
- Roads Around the parcel(DOEBLE 1986)

There are many similar national and international scientific studies where broader variable lists are identified to the valuation method to be used in, therewithal city and even regional differences, the purpose of the assessment, the relevant legislation, etc., cause major changes in the lists, so it is not possible to work with an accepted standard list.
It is an inevitable reality to conduct Regional and Specified Analyzes in the Ankara province, which is in the metropolitan status, before determining the valuation method to be used.

In the province of Ankara, the criteria such as Sea, Lake, Forest, Valley views, Silence, Crime rate, Convenient transportation to main arteries, socio-economic status of people, tendencies towards traditional investments in different years, lifestyles, the usual settlement situation of the region have been seen to lead to very serious changes in real estate values.

It is seen that, these changes are named sudden change in some studies and Ultra change in some studies.

In this study, which we have done in terms of being an example of Value Based Readjustment Implementations and contributing to the work to be done. For the purpose of determining the variables affecting the value of the real estate for the parcels of Readjusted area, field studies were carried out with a very wide audience and data on sales from public institutions and organizations, questionnaires, individual interviews and expert opinions were collected and then ,stepwise regression analysis was performed to make a coefficient calculation for all these obtained variables

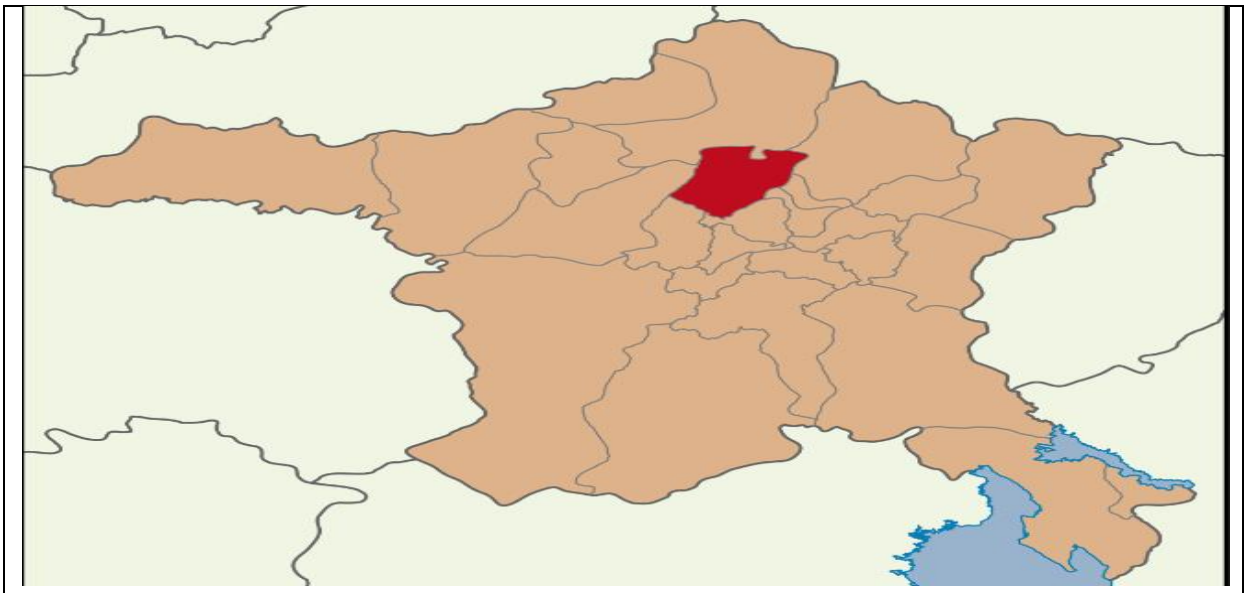
3. MODEL IMPLEMENTATION AREA

Kahramankazan, which is the fastest growing county of the region, is located at a distance of 47 km from the capital city Ankara, which has rich history and culture and has hosted many civilizations. The region in which Kahramankazan was found maintained its presence from the ancient times to the present day. Kahramankazan which is Surrounded by Kızılcahamam, Çubuk, Yenimahalle, Sincan, Keçiören and Ayaş Counties, is a geographical area full of natural beauties. The height from the sea is 890 m. Kahramankazan County, which has a terrestrial climate, has an ideal nature as of climate and vegetation cover.

The agricultural lands of the county are very efficient and greenhouses are important sources of income as well as wheat, barley, chickpea, sugar beet, melon production. Since the 1970's, effective farming activities have been realized thanks to the water supplied from the Kurtboğazı Dam and modern vehicles , which has resulted in significant increases in production. Especially in recent years, newly developing hobby gardening, agricultural supported livestock activities are rapidly gaining importance. Kahramankazan County's proximity to Ankara center and people's willingness to deal with agriculture, which in turn increases the demand for gardens in this region, thus leading to an increasing in the prices of lands suitable for garden farming as well. The population of the county is rapidly increasing and it is hoped that it will become a place to become a center of attraction in the future. The population of the district, which was 36 147 in 2007, reached 52 079 in 2018. The increase in trade and the ease of transportation, caused the immigration of agricultural production.

After the 1970's ,the Saray Neighborhood which was included in our model implementation area, industrial facilities were started to be established , especially these facilities were concentrated around Istanbul road. Although Saray Neighborhood is not an organized industrial zone, it has a greater potential than many organized industrial zones, given the volume of work and the number of employees. In particular, steel, machinery, assembly, defense industry components, manufacturing, petroleum products, pesticide, food, construction, chemical, feed products, cement, and service sectors are produced.

The continuously expanding organized industrial zone is located very close to the Ankara-Istanbul highway and the D-750 motorway. Increased business volume in the industrial zone, easy to produce and high profit margins; industrialists, buyers and brokers, and there are also serious increases in land prices due to increased demand.



Ankara - Kazan

Kazan - Saray

Figure 2: Location of Model Implementation Area

First of all, the geometrical accuracy of the cadastral parcels is ensured and then combined with the construction parcels. it is determined which cadastral parcels are in the development legend.

According to the current legislation, it has been seen that, some cadastral parcels are not distributed in a fair way in the area where the Readjustment Implementation is carried out. In order to prevent such unfair distribution, the total income gain to be obtained from the plan must be distributed equally to the parcel owners.

The operations performed in our model implementation are shown step by step in the work flow chart below.

Figure 3: Workflow Diagram

In order to make acceptable estimates of the real estate values in the Readjustment Implementations area, firstly, the compatibility of independent variables with real estate valuation after, the compatibility of the independent variables with each other has been tested.

After analysis and tests, variables are determined which are effective on parcel value and which are suitable for our model with using of Double's Long List.

- Development Rights
- Location in Block
- Topography
- Roads Around the parcel
- Environment
- Regional Crime Rate
- Permitted Construction Rate
- Far From Public Services
- Far From Natural and Technical Infrastructure

Before calculating the coefficients of these variables, a draft map showing the minimum values was created from the preliminary information and tried to determine the value change zones.

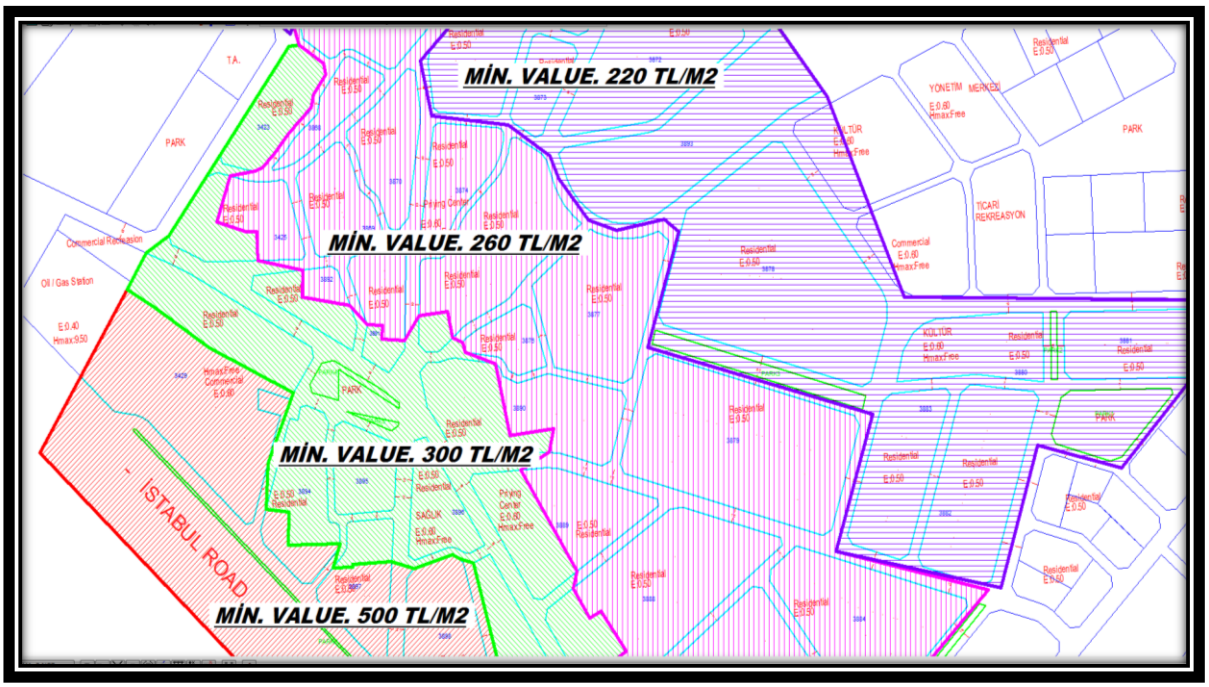


Figure 4: Preliminary - Draft Property Value Map

The purpose of draft valuation studies and mapping is to roughly measure the interactions of the parcels with each other, from the information obtained online before the market researches, and to have a prior knowledge before professionally valuating. Another benefit of this preliminary work is to identify areas of value change that show minimum and maximum real estate values and to identify the variables that are effective in these changes. It is not appropriate to use the property values from the draft map in this model study or in direct comparison. After obtaining some preliminary information, documents such as questionnaires, face to face interviews, land registry titles, plan information papers, notary documents are collected and used in determining the variables which are determined to be used as main effective factors on real estate values in our model area. After all, using Stepwise Regression Analysis, the correlation of variables with each other and with values are analyzed and the coefficients of the variables are calculated.

3.1. Stepwise Regression

3.1.1. Correlations Between The Variables Used In The Modeling Study

Correlation matriceregarding the variables used in the model building is shown on the table below.

Correlations

		Parcel Floor Area	Distance to Istanbul Road (D750)	Construction Type	Total Permitted Construction Area	Location of Parcel in the Block	Distance to Social Places	Topographic Shape	Value
Parcel Floor Area	Pearson Correlation	1	-,115	,313**	,996**	,111	-,112	-,089	,540**
	Sig. (2-tailed)		,063	,000	,000	,073	,070	,150	,000
	N	261	261	261	261	261	261	261	261
Distance to Istanbul Road (D750)	Pearson Correlation	-,115	1	-,143*	-,122*	-,174**	,994**	,449**	-,520**
	Sig. (2-tailed)	,063		,021	,049	,005	,000	,000	,000
	N	261	261	261	261	261	261	261	261
Construction Type	Pearson Correlation	,313**	-,143*	1	,367**	,074	-,148*	-,075	,307**
	Sig. (2-tailed)	,000	,021		,000	,231	,017	,229	,000
	N	261	261	261	261	261	261	261	261
Total Permitted Construction Area	Pearson Correlation	,996**	-,122*	,367**	1	,118	-,119	-,091	,538**
	Sig. (2-tailed)	,000	,049	,000		,057	,054	,141	,000
	N	261	261	261	261	261	261	261	261
Location of Parcel in the Block	Pearson Correlation	,111	-,174**	,074	,118	1	-,182**	,029	,193**
	Sig. (2-tailed)	,073	,005	,231	,057		,003	,636	,002
	N	261	261	261	261	261	261	261	261
Distance to Social Places	Pearson Correlation	-,112	,994**	-,148*	-,119	-,182**	1	,409**	-,526**
	Sig. (2-tailed)	,070	,000	,017	,054	,003		,000	,000
	N	261	261	261	261	261	261	261	261
Topographic Shape	Pearson Correlation	-,089	,449**	-,075	-,091	,029	,409**	1	-,163**
	Sig. (2-tailed)	,150	,000	,229	,141	,636	,000		,008
	N	261	261	261	261	261	261	261	261
Value	Pearson Correlation	,540**	-,520**	,307**	,538**	,193**	-,526**	-,163**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,002	,000	,008	
	N	261	261	261	261	261	261	261	261

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1:Correlations Between Variables

In order to avoid the multicollinearity problem, correlation analysis have a crucial role. Because of the high correlation between Distance to Social Places and Distance to Istanbul Road (99,4%), one of two is omitted from model building process. According to the field works in Kahramankazan and sample area, it is concluded that a perception for the importance of the Istanbul Road is quite common, which is reasonable because it is truly related with the closeness to the transportation. As a result, it is decided to omit the Distance to Social Places variable.

While Total Permitted Construction Area is included to the modeling process, TFA and FAR are omitted since Total Permitted Construction Area is derived from these two variables. Besides, almost all parcels have the same FAR (Floor Area Range) and Total Permitted Construction Area and Total Floor Are highly correlated which may lead to a multicollinearity problem.

As a result, 5 variables listed below are included in the model building process.

Distance to Istanbul Road	(DIR)
Construction Type	(CT)
Total Permitted Construction Area	(TTCA)
Location of Parcel in the Block	(LP)
Topographic Shape	(TS)

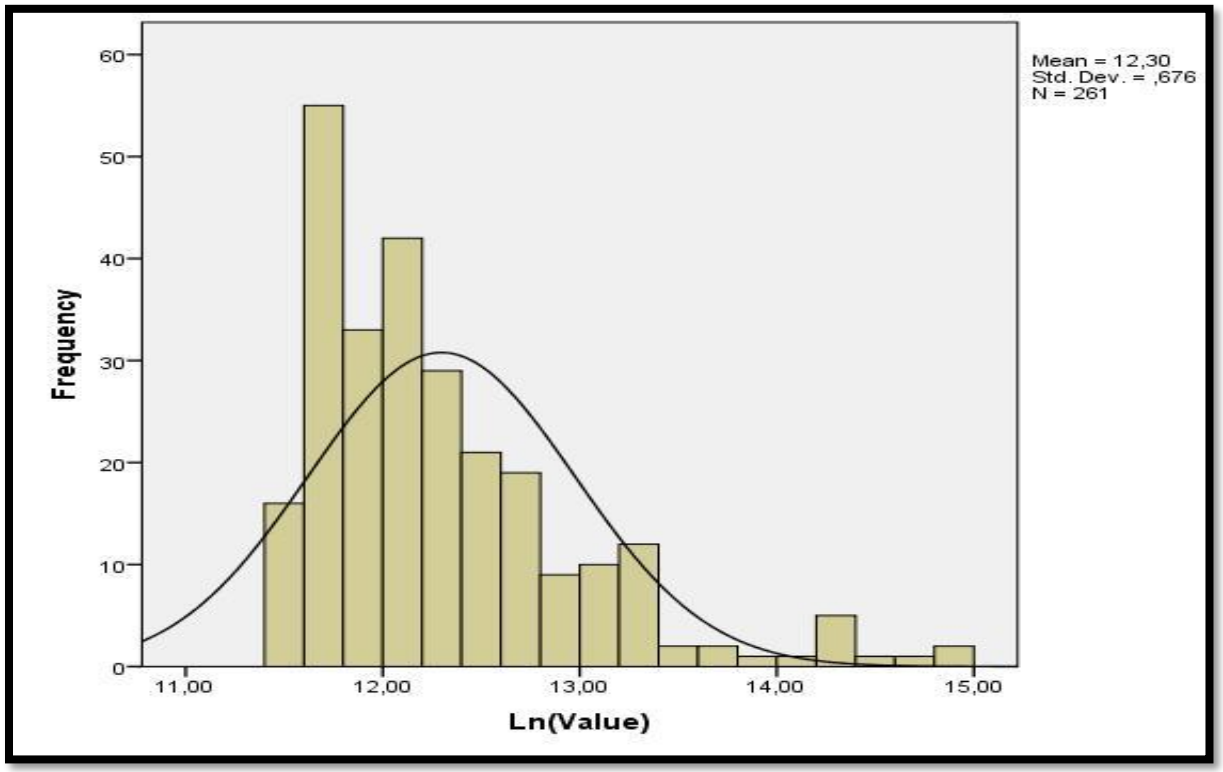


Figure :5Histogram Graph for Ln(Value)

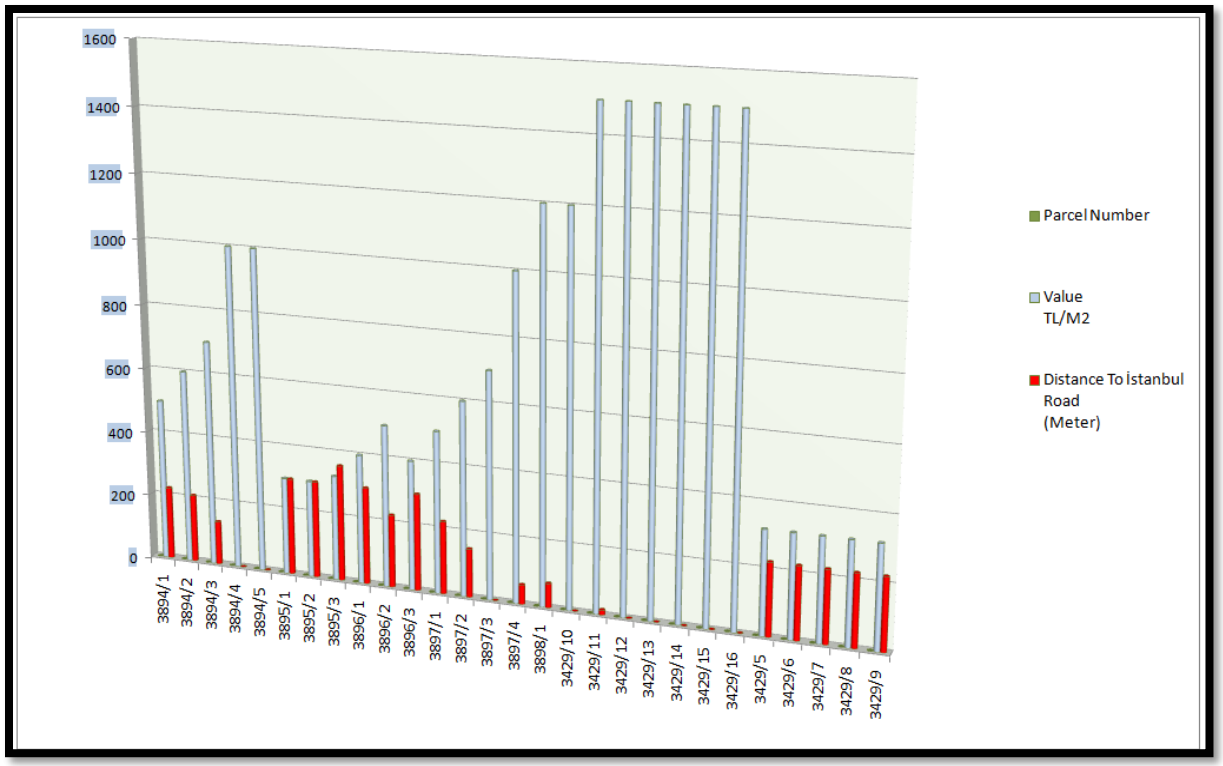


Figure 6: Graph For Value & Distance to Istanbul Road

A semli-logarithmic Stepwise Regression Analysis (natural logarithm of dependent variable 'Value') was applied and the Model Summary is shown below.

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,707[a]	,499	,497	,47951	
2	,897[b]	,804	,803	,30033	
3	,900[c]	,810	,807	,29677	1,559

a. Predictors: (Constant), Total Permitted Construction Area

b. Predictors: (Constant), Total Permitted Construction Area, Distance to Istanbul Road (D750)

c. Predictors: (Constant), Total Permitted Construction Area, Distance to Istanbul Road (D750), Location of Parcel in the Block

d. Dependent Variable: Ln(Value)

Table 2: Model Summary

Adjusted R-Square : %80,7

According to the Adjusted R-Square rate, the variables included in the model explain the dependent variable Ln (Value) at the level of 80.7%.The explanatory power of the model is quite high.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59,385	1	59,385	258,275	,000[b]
	Residual	59,552	259	,230		
	Total	118,937	260			
2	Regression	95,665	2	47,833	530,293	,000[c]
	Residual	23,272	258	,090		
	Total	118,937	260			
3	Regression	96,303	3	32,101	364,493	,000[d]
	Residual	22,634	257	,088		
	Total	118,937	260			

a. Dependent Variable: Ln(Value)

b. Predictors: (Constant), Total Permitted Construction Area

c. Predictors: (Constant), Total Permitted Construction Area, Distance to Istanbul Road (D750)

d. Predictors: (Constant), Total Permitted Construction Area, Distance to Istanbul Road (D750), Location of Parcel in the Block

Table 3: Model of ANOVA Analysis

As it is seen on the ANOVA (Analysis of Variance) table, the model is significant at 95% level ($p=0.000 < 0.05$).

3.1.2. Calculating Coefficients of Variables

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	11,512842	,057		201,445	,000					
	Total Permitted Construction Area	,001749	,000	,707	16,071	,000	,707	,707	,707	1,000	1,000
2	(Constant)	12,344007	,055		225,411	,000					
	Total Permitted Construction Area	,001581	,000	,639	23,016	,000	,707	,820	,634	,985	1,015
	Distance to Istanbul Road (D750)	-,002411	,000	-,556	-20,055	,000	-,635	-,781	-,552	,985	1,015
3	(Constant)	12,321986	,055		225,153	,000					
	Total Permitted Construction Area	,001563	,000	,631	22,912	,000	,707	,819	,623	,975	1,025
	Distance to Istanbul Road (D750)	-,002359	,000	-,544	-19,593	,000	-,635	-,774	-,533	,959	1,043
	Location of Parcel in the Block	,199062	,074	,075	2,691	,008	,244	,166	,073	,960	1,041

a. Dependent Variable: Ln(Value)

Table 4: Coefficients

Coefficients table shows the parameters, in other words the coefficient of the variables. 3 variables are found statistically significant and are included in the model. Semi-logarithmic model produced via stepwise regression is shown below (Tolerance and VIF indicators are proper in terms of multicollinearity).

Ln(Value) = 12,321986 + 0.001563*Total Permitted Construction Area – 0,002359*Distance to Istanbul Road (D)+ 0.199062* Location of Parcel in the Block

Ln(V) = 12,321986 + 0.001563*TTCA – 0,002359 * DIR + 0.199062*LP

Table 5: Model Final Formulation

Parcel Number	Square (M2)	Value TL/M2	DİR	CT	FAR	ΣPCA M2	PB	Distance To İstanbul Road (Meter)	TSP	Definitions	
3894/1	1515.23	500	70	1	0.5	757.62	0	75	0	**Construction Area (ΣPCA)**	
3894/2	813.52	600	60	1	0.5	406.76	0	70	0	• Flor Area Range (FAR)	
3894/3	687.24	700	50	1	0.5	343.62	0	45	0	• Alan = Square (S)	
3894/4	658.03	1000	0	1	0.5	329.02	0	0	0	• PCA = FAR * S	
3894/5	543.98	1000	0	1	0.5	271.99	0	0	0		
3895/1	1250.00	300	120	1	0.5	625.00	0	100	0	**Construction Type (CT)**	
3895/2	553.00	300	120	1	0.5	276.50	0	100	0	• (Residential	1
3895/3	570.00	325	120	1	0.5	285.00	0	120	0	• Commercial	2
3896/1	798.07	400	110	1	0.5	399.03	0	100	0	• Cultural and social	3
3896/2	1037.00	500	90	5	0.6	622.20	0	75	0	• Management Center	4
3896/3	642.93	400	100	1	0.5	321.47	0	100	0	• State Parcel	5
3897/1	500.00	500	60	1	0.5	250.00	0	75	0		
3897/2	500.00	600	50	1	0.5	250.00	0	50	0	**▪ Position İn Block (PB)**	
3897/3	1128.99	700	0	1	0.5	564.49	0	0	0	• Corner	1
3897/4	1211.01	1000	0	1	0.5	605.51	1	20	0	• İntermediate	0
3898/1	6089.00	1200	0	5	0.5	3044.50	1	25	0		
3429/10	2274.13	1200	40	2	0.6	1364.48	0	0	0	**▪ Topographic Shape Of Parcel (Slope, Altitude, Suitability For Construction) (TSP)**	
3429/11	1178.22	1500	0	2	0.6	706.93	0	5	0		
3429/12	1178.23	1500	0	2	0.6	706.94	0	0	0		
3429/13	1000.00	1500	0	2	0.6	600.00	0	0	0		
3429/14	1112.36	1500	0	2	0.6	667.41	0	0	0	▪ Suitable	0
3429/15	1631.00	1500	0	2	0.6	978.60	0	0	0	▪ Unsuitable	1
3429/16	2024.07	1500	0	2	0.6	1214.44	0	0	0	**Distance to Public and**	
3429/5	688.06	320	80	1	0.5	344.03	0	75	0	Meter	
3429/6	939.32	320	80	1	0.5	469.66	0	75	0		
3429/7	960.65	320	80	1	0.5	480.32	0	75	0	**Distance to İstanbul**	
3429/8	1137.07	320	80	1	0.5	568.54	0	75	0		

Table 6: Definitions and Calculating of The Coefficients of Variations

3.1.3.Planning, Implementation And Technical Calculations

The Model Implementation Area covers the area of 42 hectares within Kahramankazan County Saray Neighborhood of Ankara Province. In the following figure, The area-based readjustment implementation has been carried out on the project site which shows the current cadastral situation.

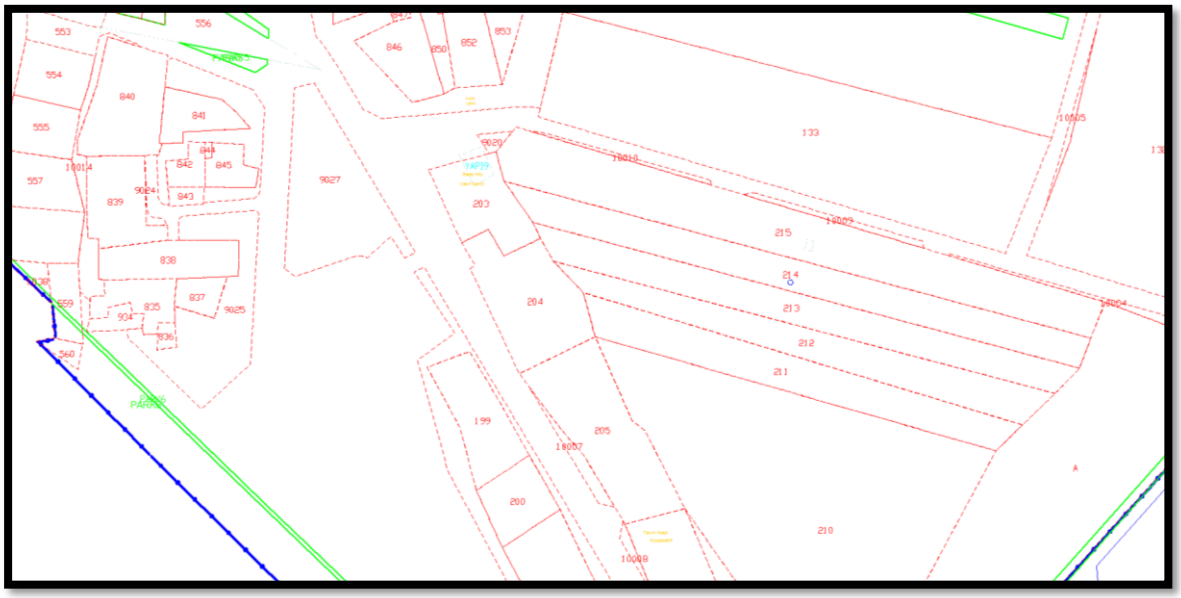


Figure 7: Cadastral Map

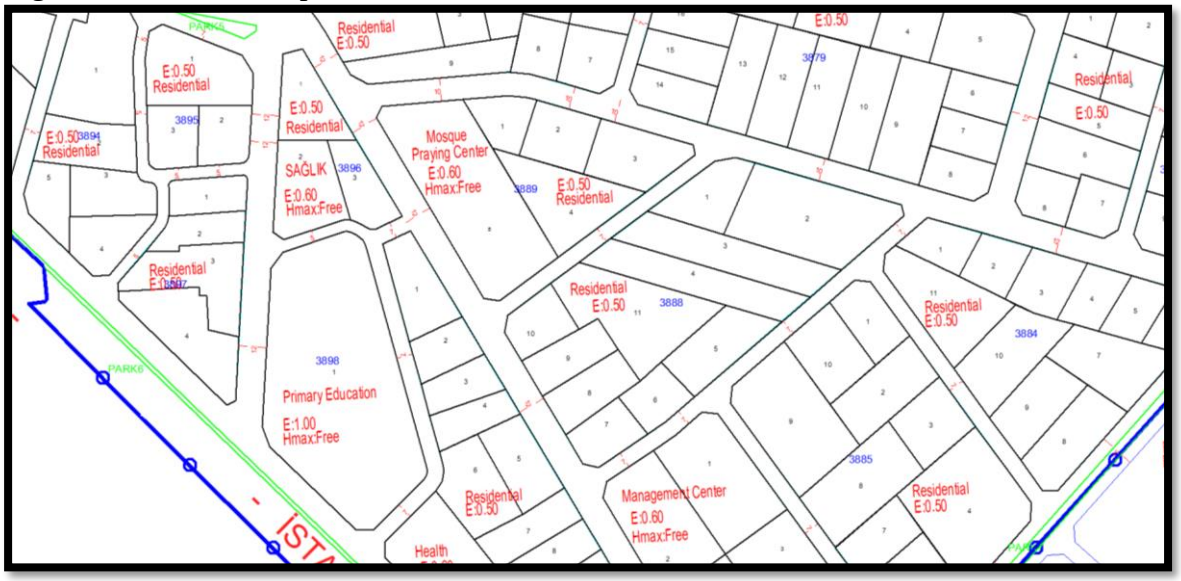


Figure 8: Readjustment Plan

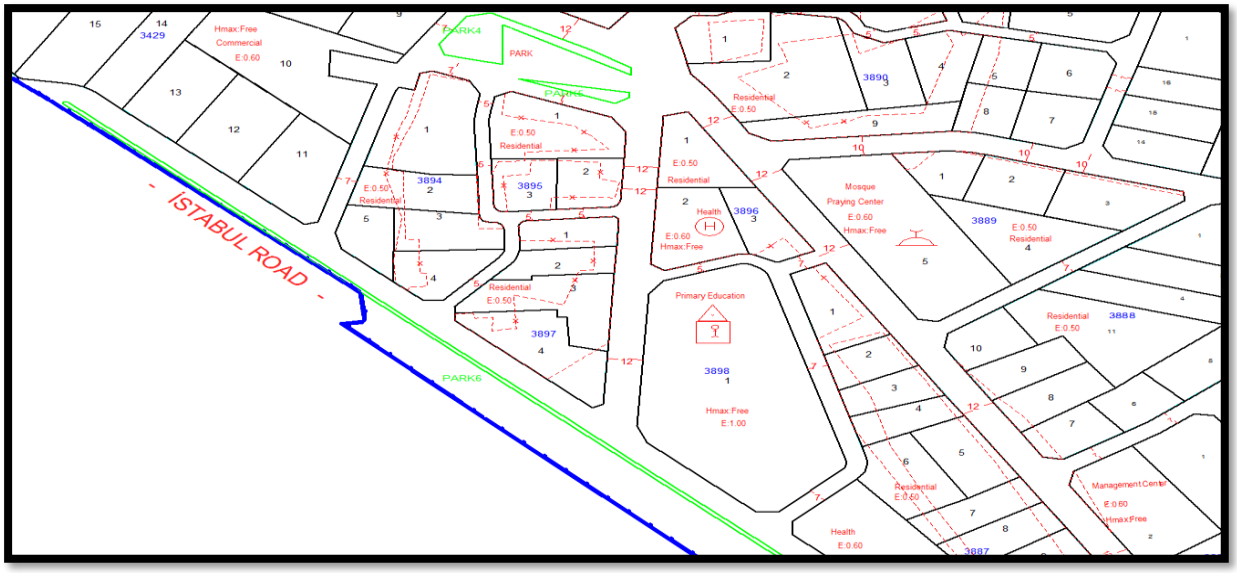


Figure 9: Superposition - Overlaying The Common Base

3.1.4. Development Readjustment Share (DRS=DOP)

Because of the public areas needed for regulation were indicated as the area-based, the same ratio was accepted in our value-based practice where the DRS rate was unchanged.

Calculation Of Development Readjustment Share (DRS - DOP)

Total Allacated Area	=	260804.00				
Total Block Area	=	260804.00				
Public Partnership Share (PPS)	=	1476.04				
Total Area (DRS to be cut)	=	285132.00				
Total Area (DRSnot to be cut)	=	24390.00				
Total Expropriated Area	=	0.00				
Total Cadastral Parcel Area	=	310643.00				
Public Partnership Share Rate (PPSR)		=	0.0051767			
Development Readjustment Share Rate (DRSR)		=	0.1708612			
Development Readjustment Share Rate (DRSR) + (PPSR)		=	0.1760379			
Interrupted Area For Public Usage	=	309522.00	-	260804.00	=	48718.00
DRS	=	48718.00	/	285132.00	=	0.1708612

Table 7: Calculating DRS Rate

In this study all real estates have been converted to economic values so that there is no debt or receivable account between the parcel owners. In the current readjustment, area-based distributions have been carried out value-based and then all parcel owners have to get the same share of the increase in value as the basic principles of this study. In addition, the State will easily convert the development charge or the tax rate of investments to value, therefore, it will be able to solve these problems, which are frequently mentioned in government policies, within the scope of value-based readjustment implementation.

4. COMPARISON BETWEEN CURRENT LAND READJUSTMENT IMPLEMENTATIONS AND VALUE BASED APROACH

Differences based on Turkish Liras between the area-based land readjustment implementation according to the current legislation and Value-Based Model Implementation are shown on the result table below. For instance, owners of the cadastre parcels which are distributed to the block parcel written in the first row of the table are given the 3423/4 parcel valued 192299.21 Turkish Liras. If these owners would benefit from the rant equally, they would have taken more land with value of 38327.71 Turkish Liras, accordingly they would have been given parcels which account for 230,686.92 Turkish Liras. Same operations are made for all parcels within the scope of the whole implementation respectively and profit/loss or right/forfeiture tables are created.

Parcel Number	Area (M2)	Value TL/M2	Distance To İstanbul Road (M)	Types Of Permitted Construction	FAR	ΣPCA M2	Location In Block	Distance to Public and Social Area (M)	Topographic Shape Of Parcel (Slope, Altitude,	VALUE S*V	Mean Value TL/ M² ∑S.V/ ∑S	FİXED VALUE S.MV	DIFFERENCE
3423/4	641.00	300	350	1	0.6	384.60	1	300	0	192,299.21 TL	359.89 TL	230,686.92 TL	**-38,387.71 TL**
3423/7	621.00	300	340	1	0.5	310.50	1	300	0	186,300.08 TL	359.89 TL	223,490.21 TL	**-37,190.13 TL**
3425/10	534.00	260	340	1	0.5	267.00	0	300	0	138,839.32 TL	359.89 TL	192,178.96 TL	**-53,339.64 TL**
3425/11	625.01	260	340	1	0.5	312.50	0	300	0	162,501.39 TL	359.89 TL	224,931.59 TL	**-62,430.20 TL**
3425/12	688.46	300	345	1	0.5	344.23	0	300	0	206,536.89 TL	359.89 TL	247,766.79 TL	**-41,229.90 TL**
3425/13	757.00	300	340	1	0.5	378.50	0	300	0	227,099.73 TL	359.89 TL	272,434.48 TL	**-45,334.76 TL**
3425/7	594.00	300	335	1	0.5	297.00	0	300	0	178,199.28 TL	359.89 TL	213,772.28 TL	**-35,573.01 TL**
3425/8	598.00	260	330	1	0.5	299.00	0	305	0	155,480.08 TL	359.89 TL	215,212.81 TL	**-59,732.73 TL**
3425/9	508.00	260	325	1	0.5	254.00	0	295	0	132,079.49 TL	359.89 TL	182,822.12 TL	**-50,742.63 TL**
3429/10	2,274.13	1200	40	2	0.5	1,137.07	0	0	0	2,728,956.05 TL	359.89 TL	818,430.89 TL	**1,910,525.16 TL**
3429/11	1,178.22	1500	0	2	0.5	589.11	0	5	0	1,767,323.37 TL	359.89 TL	424,025.02 TL	**1,343,298.35 TL**
3429/12	1,178.23	1500	0	2	0.5	589.12	0	0	0	1,767,347.14 TL	359.89 TL	424,030.72 TL	**1,343,316.42 TL**
3429/13	1,000.00	1500	0	2	0.5	500.00	0	0	0	1,499,996.43 TL	359.89 TL	359,886.61 TL	**1,140,109.82 TL**
3429/14	1,112.36	1500	0	2	0.5	556.18	0	0	0	1,668,534.73 TL	359.89 TL	400,323.16 TL	**1,268,211.58 TL**
3429/15	1,631.00	1500	0	2	0.5	815.50	0	0	0	2,446,498.50 TL	359.89 TL	586,976.09 TL	**1,859,522.41 TL**
3429/16	2,024.07	1500	0	2	0.5	1,012.03	0	0	0	3,036,097.50 TL	359.89 TL	728,435.62 TL	**2,307,661.88 TL**
3429/5	688.06	320	80	1	0.5	344.03	0	75	0	220,179.20 TL	359.89 TL	247,624.17 TL	**-27,444.97 TL**
3429/6	939.32	320	80	1	0.5	469.66	0	75	0	300,582.40 TL	359.89 TL	338,049.49 TL	**-37,467.09 TL**
3429/7	960.65	320	80	1	0.5	480.32	0	75	0	307,407.68 TL	359.89 TL	345,725.53 TL	**-38,317.85 TL**
3429/8	1,137.07	320	80	1	0.5	568.54	0	75	0	363,862.40 TL	359.89 TL	409,217.24 TL	**-45,354.84 TL**
3429/9	900.90	320	80	1	0.5	450.45	0	75	0	288,288.00 TL	359.89 TL	324,222.62 TL	**-35,934.62 TL**
3862/1	500.00	180	580	1	0.5	250.00	0	490	1	90,000.34 TL	359.89 TL	179,944.41 TL	**-89,944.07 TL**
3862/2	525.00	180	580	1	0.5	262.50	0	490	1	94,499.97 TL	359.89 TL	188,940.85 TL	**-94,440.88 TL**
3862/3	500.00	180	560	1	0.5	250.00	0	475	1	89,999.48 TL	359.89 TL	179,942.69 TL	**-89,943.21 TL**
3862/4	865.88	180	560	1	0.5	432.94	0	480	1	155,858.83 TL	359.89 TL	311,620.22 TL	**-155,761.39 TL**
3862/5	500.07	180	540	1	0.5	250.04	0	475	1	90,013.49 TL	359.89 TL	179,970.70 TL	**-89,957.21 TL**
3862/6	512.12	180	560	1	0.5	256.06	0	485	1	92,182.46 TL	359.89 TL	184,307.28 TL	**-92,124.82 TL**
3862/7	549.00	180	580	1	0.5	274.50	0	490	1	98,820.12 TL	359.89 TL	197,578.46 TL	**-98,758.34 TL**
3862/8	500.00	180	580	1	0.5	250.00	0	490	1	89,999.72 TL	359.89 TL	179,943.18 TL	**-89,943.46 TL**
3863/1	500.00	180	535	1	0.5	250.00	0	475	1	90,000.86 TL	359.89 TL	179,945.46 TL	**-89,944.59 TL**
3863/10	700.00	180	490	1	0.5	350.00	0	450	1	125,999.95 TL	359.89 TL	251,921.13 TL	**-125,921.18 TL**
3863/11	700.00	180	510	1	0.5	350.00	0	460	1	125,999.50 TL	359.89 TL	251,920.22 TL	**-125,920.72 TL**
3863/12	500.00	180	515	1	0.5	250.00	0	460	1	89,999.87 TL	359.89 TL	179,943.48 TL	**-89,943.61 TL**
3863/13	500.00	180	520	1	0.5	250.00	0	460	1	89,999.57 TL	359.89 TL	179,942.87 TL	**-89,943.30 TL**
3863/2	1,199.99	180	535	1	0.5	600.00	0	475	1	215,998.66 TL	359.89 TL	431,862.27 TL	**-215,863.62 TL**
3863/3	1,098.70	180	535	1	0.5	549.35	0	475	1	197,765.40 TL	359.89 TL	395,407.16 TL	**-197,641.76 TL**
3863/4	935.72	180	535	1	0.5	467.86	0	475	1	168,429.27 TL	359.89 TL	336,753.25 TL	**-168,323.97 TL**
3863/5	555.00	180	535	1	0.5	277.50	0	475	1	99,900.80 TL	359.89 TL	199,739.14 TL	**-99,838.34 TL**
3863/6	794.99	180	535	1	0.5	397.50	0	475	1	143,098.87 TL	359.89 TL	286,108.26 TL	**-143,009.40 TL**
3863/7	1,071.29	180	535	1	0.5	535.65	0	475	1	192,833.03 TL	359.89 TL	385,545.50 TL	**-192,712.47 TL**
3863/8	1,207.02	180	535	1	0.5	603.51	0	475	1	217,263.21 TL	359.89 TL	434,390.60 TL	**-217,127.38 TL**
3863/9	1,005.29	180	510	1	0.5	502.64	0	460	1	180,951.32 TL	359.89 TL	361,789.50 TL	**-180,838.19 TL**
3864/1	857.14	180	540	1	0.5	428.57	0	475	1	154,285.30 TL	359.89 TL	308,474.14 TL	**-154,188.84 TL**

3893/1	9,375.00	180	380	1	0.5	4,687.50	0	380	1	1,687,499.95 TL	359.89 TL	3,373,944.88 TL	**-1,686,444.93 TL**
3894/1	1,515.23	500	70	1	0.5	757.62	0	75	0	757,615.69 TL	359.89 TL	545,312.78 TL	**212,302.91 TL**
3894/2	813.52	600	60	1	0.5	406.76	0	70	0	488,113.94 TL	359.89 TL	292,776.81 TL	**195,337.13 TL**
3894/3	687.24	700	50	1	0.5	343.62	0	45	0	481,066.27 TL	359.89 TL	247,328.17 TL	**233,738.10 TL**
3894/4	658.03	1000	0	1	0.5	329.02	0	0	0	658,034.00 TL	359.89 TL	236,818.19 TL	**421,215.81 TL**
3894/5	543.98	1000	0	1	0.5	271.99	0	0	0	543,982.70 TL	359.89 TL	195,772.55 TL	**348,210.15 TL**
3895/1	1,250.00	300	120	1	0.5	625.00	0	100	0	375,000.00 TL	359.89 TL	449,859.33 TL	**-74,859.33 TL**
3895/2	553.00	300	120	1	0.5	276.50	0	100	0	165,899.51 TL	359.89 TL	199,017.19 TL	**-33,117.67 TL**
3895/3	570.00	325	120	1	0.5	285.00	0	120	0	185,249.74 TL	359.89 TL	205,135.57 TL	**-19,885.83 TL**
3896/1	798.07	400	110	1	0.5	399.03	0	100	0	319,226.65 TL	359.89 TL	287,214.17 TL	**32,012.48 TL**
3896/2	1,037.00	500	90	5	0.6	622.20	0	75	0	518,500.99 TL	359.89 TL	373,204.01 TL	**145,296.98 TL**
3896/3	642.93	400	100	1	0.5	321.47	0	100	0	257,172.55 TL	359.89 TL	231,382.95 TL	**25,789.61 TL**
3897/1	500.00	500	60	1	0.5	250.00	0	75	0	250,000.48 TL	359.89 TL	179,944.08 TL	**70,056.40 TL**
3897/2	500.00	600	50	1	0.5	250.00	0	50	0	300,000.11 TL	359.89 TL	179,943.80 TL	**120,056.31 TL**
3897/3	1,128.99	700	0	1	0.5	564.49	0	0	0	790,291.53 TL	359.89 TL	406,308.59 TL	**383,982.94 TL**
3897/4	1,211.01	1000	0	1	0.5	605.51	1	20	0	1,211,014.30 TL	359.89 TL	435,828.86 TL	**775,185.43 TL**
3898/1	6,089.00	1200	0	5	0.5	3,044.50	1	25	0	7,306,802.40 TL	359.89 TL	2,191,355.49 TL	**5,115,446.91 TL**
TH1	3,397.60	300	160	1	0.5	1,698.80	0	160	0	1,019,280.00 TL	359.89 TL	1,222,753.65 TL	**-203,473.65 TL**
	260,804.00								A =	93860089.98	B =	93860089.98	0.00 TL
				1. CHECK CONTROL IF A = B THEN FIXED VALUE CALCULATION VALIDATED									
				2. CHECK CONTROL IF SUM OF DIFFERENCES = 0 THEN ALL OF DISTRUBUTION VALIDATED									

Table 8: Comparison Tables

DISTRIBUTION

which parcels were distributed to 3894

3894/1	0/840	1130.48	1130.48/1515.23
3894/1	9006	384.75	384.75/1515.23
3894/2	0/839	81.08	81.08/813.52
3894/2	0/843	8.65	8.65/813.52
3894/2	9003	81.08	81.08/813.52
3894/2	9006	178.91	178.91/813.52
3894/2	9013	382.72	382.72/813.52
3894/2	0/839	81.08	81.08/813.52
3894/3	0/839	135.13	135.13/687.24
3894/3	0/839	135.12	135.12/687.24
3894/3	0/839	135.13	135.13/687.24
3894/3	9006	281.86	281.86/687.24
3894/4	0/835	176.00	176.00/658.03
3894/4	0/838	137.54	137.54/658.03
3894/4	0/838	137.54	137.54/658.03
3894/4	9025	206.95	206.95/658.03
3894/5	0/557	65.93	65.93/543.98
3894/5	0/557	65.94	65.94/543.98
3894/5	0/557	65.93	65.93/543.98
3894/5	0/557	65.92	65.92/543.98
3894/5	9025	280.26	280.26/543.98

Table 9: Distribution Tables

Distribution file and tables regarding the 3894-Block/1-Parcel which is produced with the readjustment implementation according to the current legislation show that;

For the parcel numbered 3894/1 produced from the cadastral parcels numbered with 840 and 9006;
Based on the area-based implementation, cadastral parcel numbered 840 has the right valued 406,791.92 Turkish Liras for 1130.48 m2. If value-based implementation were adopted, this parcel would have 248400,37 Turkish Liras.
Based on the area-based implementation, cadastral parcel numbered 9006 has the right valued 138,464.08 Turkish Liras for 384.75m2. If value-based implementation were adopted, this parcel would have 84552.72 Turkish Liras.
In case of the value-based implementation, equivalent return will be provided to property owners in the same readjustment area while government and intitutions that can make zoning plans will be able to collect taxes from all stakeholders in an equilavent way.

5. CONCLUSION

In this study, it is aimed to make contribution to those activities to be carried out in future in the field of value-based land readjustment implementations. Various data sources are used in order to gain sufficient information and various proposals are brought forward to be used in a New Land Readjustment Model by benefitting from the scientific methods. In developing countries, like Turkey, availability of objective and reliable property values is extremely difficult and making valuation retroactively is almost impossible. Unavailability of historical values of properties makes difficult to carry out some activities such as Value Based Land Readjustment Implementation, Urban Transformation and Land Consolidation etc. which are required a sensitive and fair approach. Besides, this leads to that parcel owners file lawsuits in order to compensate their right losses stemming from those implementations. Establishment of the legislative structure is the urgent need of Turkey in order to produce Property Value Maps and Indexes, and using them for any Land Readjustment Implementations should be provided.

As seen in this paper concretely, current readjustment approach in Turkey cannot satisfy the requirements and causes injustices among the land owners. Within this context, an objective and comprehensive law should be created in order to put into practice of the Value-Based Land Readjustment Implementations in the country.

Parcels located in the same area and same zoning plan should be taken into consideration within the same parceling implementation and the rant should be distributed to the land owners equally.

In case value of the parcels in the readjustment implementation area would increase substantially, reasons of the value increases should be analyzed elaborately and if need they should be included in to the implementation through developing valuation models regarding to them.

Cadastral data has a great importance for Value-based Readjustment Implementations. Participatory cadastre and property ownership systemshould be established, which considers all parties and institutions as stakeholders for the purpose of updating current cadastral data to include property data and provides data integration among the related institutions and agencies within a common database in a secure and transparent data sharing approach.
A modern and multipurpose cadastre information system, which enables changes and developments and takes into account the needs both today and future, should be adopted. Legislative regulations regarding the integration challenges should be made and administrative structures which have one central point and appeal to various points should be adopted (Yilmazer and Saskin 2015).

REFERENCES

Doebla W.A., (1986) ConceptualModels of Land Readjustment, in Minerbi, L. Et.al., ed., Land Readjustment: TheJapaneseSystem, A Lincoln Institute of Land PolicyBook, Boston, USA.

Nişancı, R. (2005),TheProduction Of PixelBased Urban Land Value Mapswith Nominal ValuationMethod Using GIS, PHD Thesis, Blacksea Technical University, Institute of Science, Trabzon.

Yildiz,F. vd.,(2008) An Investigation on Application of ModelsBased on Value Equality in DeterminingImplementation Essentials in ArrangingAreas, HKM ScienceBulletin, ReleaseNumber: 99. Ankara.

Yilmazer,S. Saskin,O.,(2015),Updating of Cadastral Data forthe Development of ValuationStudyingandCriticising of the Integration Issues, The World CadastreSummit, p 1002, Istanbul.

Yalpir, Ş. Ekiz, M.,(2017), Use Of AnalytıcHıerarchyProcessInEquıvalenceBasedArrangıng Lands AndPlots, OmerHalisDemirUniversityJournal of EngineeringSciences, Volume 6, Number 1, 59-7, Konya.

Turkey'sTenth Development Plan (2014-2018)http://www.mod.gov.tr/Lists/RecentPublications/Attachments/75/The%20Tenth%20Development%20Plan%20(2014-2018).pdf

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