The Influence of Single Criteria Based Valuation to The Land Evaluation in Land Consolidation Projects

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Key words: Valuation, land consolidation, land evaluation, soil index

SUMMARY

Land consolidation is a procedure of new arrangement of agricultural parcels or their parts in a selected area. Land consolidation is used for specific purposes according to different conditions in the agricultural, economic, environment and economic sphere in each country. The land consolidation applications were begun in 1961 in Turkey. It is applied by General Directorate of Land Reform based on No: 3083 law in land reform area. In the others areas it is applied by Special Provincial Administration based on 2009 land Consolidation Regulation. There is no specific Consolidation Law in Turkey. The applications are made according to the Land Reform Laws and establishment laws, related rules and regulations of some related institutions.
In Land Consolidation Projects, land evaluation is one of the most important phase. The aim of evaluation is to obtain the land values according to the certain criteria's. In Turkey, the land evaluations of land consolidation applications are made according to Land Consolidation Regulations in Special Provincial Administration and Land Consolidation Technical Rules in General Directorate of Land Reform. It causes important differences in these institutions. According to General Directorate of Land Reform, all parcels in project areas are marked related to market value indexes and soil indexes. According to Special Provincial Administration, Parcels which are located in consolidation areas are ranked for computed transformation values. Land index is obtained from soil index, productivity of the soil and location index. Each of these criteria increases duration and cost of the project. In addition, the confidence of farmers in land evaluation should be increased.

In this study, market value index, soil index, productivity of the soil and location index, which affect land evaluation in land consolidation projects, were examined in Kizik village of Karaman Province in Turkey. Additionally, the effects of each index to the land consolidation projects have been investigated in the way of cost, duration and reliability.

ARAZİ TOPLULAŞTIRMA PROJELERİNDE TEK KRİTERE BAĞLI DEĞERİN ARAZİ DEĞERLEMESİNE ETKİSİ

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Anahtar Sözcükler: Derecelendirme**,** arazi toplulaştırma, değerleme, toprak endeksi

ÖZET

Arazi toplulaştırma seçilmiş bir alanda tarımsal parsellerin veya onların bir bölümlerinin yeniden düzenleme işlemidir. Arazi toplulaştırma, tarımsal, ekonomik, çevresel ve ekonomik alanlarda farklı koşullara göre özel amaçlar için kullanılır. Toplulaştırma uygulamaları Türkiye' de 1961 yılında başladı. Bu uygulama Tarım Reformu Genel Müdürlüğü tarafından 3083 sayılı kanuna göre Tarım reformu alanlarında yapılmaktadır. Diğer alanlarda İl Özel İdaresi tarafından2009 tarihli Arazi Toplulaştırma Tüzüğüne dayalı uygulamalar yapılmaktadır. Türkiye' de Arazi toplulaştırmanın özel yasası yoktur. Uygulamalar, Toprak Koruma ve Arazi Kullanımı Kanunu'na göre bazı ilgili kurumların ilgili kanunları ve yönetmeliklerineuygun olarak yapılmaktadır.

Arazi toplulaştırma projelerinde, arazi değerlemesi en önemli aşamalarından biridir.Değerlemenin amacı, belirli kriterlere göre arazi değerlerini elde etmektir. Türkiye' de arazi toplulaştırmada değerleme uygulamaları, İl Özel İdaresi tarafındanArazi Toplulaştırması Tüzüğüne ve Tarım Reformu Genel Müdürlüğü tarafındanTarım Reformu Kanununa göre yapılır. Bu kurumların uygulamalarında önemli farklılıklar vardır. Tarım Reformu Genel Müdürlüğüne göre, proje alanında ki tüm parsellerin piyasa rayiç değerleri ve toprak endeksleri belirlenir. İl Özel İdaresine göre, toplulaştırma alanında bulunan parsellerinparsel endeksleri hesaplanan dönüşüm değerleri için sıralanır.Konumendeksi, Toprak endeksi ve toprağın verimlilik indeksinden parsel endeksi elde edilir. Bu kriterlerin her biri projenin maliyetini ve süresini arttırır. Buna ek olarak toprağın değerlendirilmesinde, çiftçilerin güveni arttırılmalıdır.

Bu çalışmada, arazi toplulaştırma projelerinde, piyasa rayiç değeri, toprak endeksi, toprağın verimlilik endeksi ve konum endeksinin arazi değerlemesine etkileri, Türkiye Karaman ili Kızık Köyünde incelenmiştir. Ayrıca, arazi toplulaştırma projelerinde her bir endeksin maliyet, süre ve güvenilirlik yolunda etkileri araştırılmıştır.

The Influence of Single Criteria Based Valuation to The Land Evaluation in Land Consolidation Projects

Fatih ISCAN and Tayfun CAY, Turkey

1. INTRODUCTION

In the whole countries, land consolidation is applied to improve the rural areas. Because rural areas comprise substantial parts of the regions and are subject to a range of pressures including water shortage, land degradation, failing commodity prices and depopulation. Land consolidation means to unite and reregister the lands, which were divided because of heritage, sales or irrigation canals. In Turkey, the application of land consolidation officially commenced in 1961 in Konya region. Turkish Land Consolidation Regulations is based on 3083 and 1757 numbered acts and provides for landscape renovation within land consolidation areas, which focuses, among other things, on the planting of shrubs and trees, the creation of small parks/recreation/areas, in non-agricultural land and the protection/conservation of the cultural heritage and physical environment within land consolidation areas, such as the restoration of traditional fountains, old watermills and railway lines. Consolidation works are carried out by Provincial Special Administrations and Directorate General of Agricultural Reform in Turkey (Banger and Sisman, 2001).

In Turkey, 14.000.000 hectares area are proper for consolidation.8.500,000 hectares of these areas are irrigable. There are still 5.000 000 irrigable areas. In Turkey 1.000 000 ha areas are consolidated. 13.,000 000 ha areas are still waiting for consolidation. (Anonymous 2010, Turker 2010).

The purposes of land consolidation as given in the 3083 numbered and 22.11.1984 dated law, "Agricultural Reform Law for Land Consolidation in Well-Watered Areas" and "Application Regulations" are as follows:

- Connection of highly fragmented plots according to the principles of modern management
- Improvement of land and soil
- Reorganization and improvement of agricultural managements
- Building roads, drainage and water management systems
- Leveling and tree planting of mountainous areas
- Arrangement and reallocation of land and enlargement of managements
- Arrangement of settlements (electrification etc.), joining of scattered plots, improvement of all aspects of agricultural life in order to obtain highest productivity of land and labor, and taking measures in technical, social, cultural and economic aspects to increase agricultural life (Banger, 1992, Cay, 2013).

According to the law 3083, "Agricultural lands distributed or given to its owner at the end of the consolidation are registered to its owner and left is registered to The Treasury. The land registered to its owner cannot be divided into smaller parts than the normal size, defined for

this region, and not be divided into lots. This situation is defined in the register of title deeds. The law 3083 has defined the smallest agricultural holding size as distribution norm (Gur and Demirel, 2002).

In Land Consolidation Projects, land evaluation is one of the most important phases. The aim ofevaluation is to obtain the land values according to the certain criteria's. Land exchange betweendifferent land degrees is only possible with calculation of parcel value number of each parcel.

Land valuation is a core element in any land consolidation process. The objective of land valuation is to facilitate the land consolidation (re-allotment) process throughestablishing a platform for the formation of the land prices that can be common accepted by the participants.

In land consolidation projects, available parcels' land evaluations must be applied with respect to certain criteria in order to give equal land to landowners as before consolidation project.

The aim of evaluation is to obtain values of lands in accordance with certain criteria. Land evaluation is a process of predicting the productive ability of land and contains the applications which are carried out in general to compare the need of various land types and characteristics of land, in other words in order to make comparison between certain valuation manners that are based on interpretation of soil, topography and other characteristics of land (FAO, 1977; Gundogdu, et. al., 2003).

In this study, market value index, soil index, productivity of the soil and location index, which affect land evaluation in land consolidation projects, were examined in Kizik village of Karaman Province in Turkey. Additionally, the effects of each index to the land consolidation projects have been investigated in the way of cost, duration and reliability.

2. LAND VALUATION METHODS IN LAND CONSOLIDATION

In Turkey, evaluation processes in land consolidation projects are carried out in accordance with Land Consolidation Regulations (LCR) by Provincial Special Administrations; in accordance with the law no. 3083 by General Directorate of Agrarian Reform(GDAR). The evaluation criteria used in LCR are soil index, productivity index and position index. According to the law no. 3038, soil index and market value index were in use as evaluation criteria until 2010. After 2010, evaluation has been made according to Soil Grade, Road Grade, Residential Grade, Property Grade and Committee Grade.

2.1 Land Valuation in Accordance with Land ConsolidationRegulations

Parcels that are located in consolidation areas are ranked for computed transformation values. Equation (1) is used to compute Land Index (PE)

$$PE = 0{,}70 * SI + P + L \qquad (1)$$

Where SI is defined soil index and derived from the soil profile, soil structure, and slopes of the land, salinity of the soil, pH, erosion, microroliyef and other soil qualifications and then marked as 100 point. P is referred productivity of the soil, and marked as 10 points. Where L is the location index of the parcel and marked as 20 points.

According to this law, agricultural lands are grade 10 degrees. Between 1-7 degree lands are arranged in a one group. Between 8-10 degree lands are not evaluated (Demir, et. al., 2002, Cay, 2013).

Unique index value is established depending on the index and areas of the index values which are inside the same degree scale. The ratio of these different degree index values between each other gives the transformation table. If different degree value apart from the participation degree is determined to the holdings; this table can be used for transformation between degree values (Demirel, 2003).

In application is used number of parcel value (**P**arsel **D**eğer **S**ayısı - **PDS**) instead of transformation value.

Equation (2) is used to compute number of parcel value

$$PDS = PE * (Area) / 100 \qquad (2)$$

2.2 Land Valuation in Accordance with the Law No.3083(Before the year 2010)

Technical instruction arranges land consolidation made independently from land reform. For ranking process of application of land consolidation, all parcels in project areas are marked as related to market value indexes and soil indexes.

Market value index is estimated related to the soil productivity, the variety of production, the features of soil, location, the irrigation condition, the distances to the holdings center, the village and the market, size and shape of the parcel and transportation condition.

The land index and market value index (MVI) are marked as 100 point. Then, unit value of the parcel (UVP) is computed by the mean values of these indexes. When the parcels that have more than one land index and market value index the UVP is more than one. Thus, with computing the weighted mean values of these indexes, a weighted mean value of the parcels (WMNP) is obtained. After the highest WMNP is accepted as first rank, the parcels in application area are ranked. If there are the approximately same WMNPs in application, the mean values of them are obtained and this is called as rank mean point (RMP).By rating of RMPs with themselves, the equivalency of degrees is provided (Demir et.all., 2002).

$$UVP= (\text{Soil Index} + \text{Market value index}) / 2 \qquad (3)$$

2.3 Land Valuation in Accordance with the Law No.3083 (After 2010)

In General Directorate of Agrarian Reform, it has been created 50% soil map and 50% evaluation map based on market value until 2010. With novel regulation in 2010, by evaluation committee 30% points is added as property grade for each cadastral parcel in project area. Besides, the Committee is entitled to use up to 10% points, provided that it gives any justification. The evaluation map consists of 20% of position index and 40% of soil index.

3. APPLICATION

3.1 Introduction of Application Area

Kızık Village is north of Karaman and is 7.4 miles from city centre. The population of the village is 305 and there are 90 houses in it. The economy of the village is based on agriculture and stockbreeding. There is an elementary school. The road, which enables access to village, is tarmac. By means of the land reform in 2011, its impact on agricultural economy increases. The land consolidation applications were started by GDAR in 2013. Total number of parcels is 837. The blocks no. 405, 406, 407, 408, 409, 410 and 411 have been chosen as application area for the analysis of valuation criteria in project site (Figüre 1).

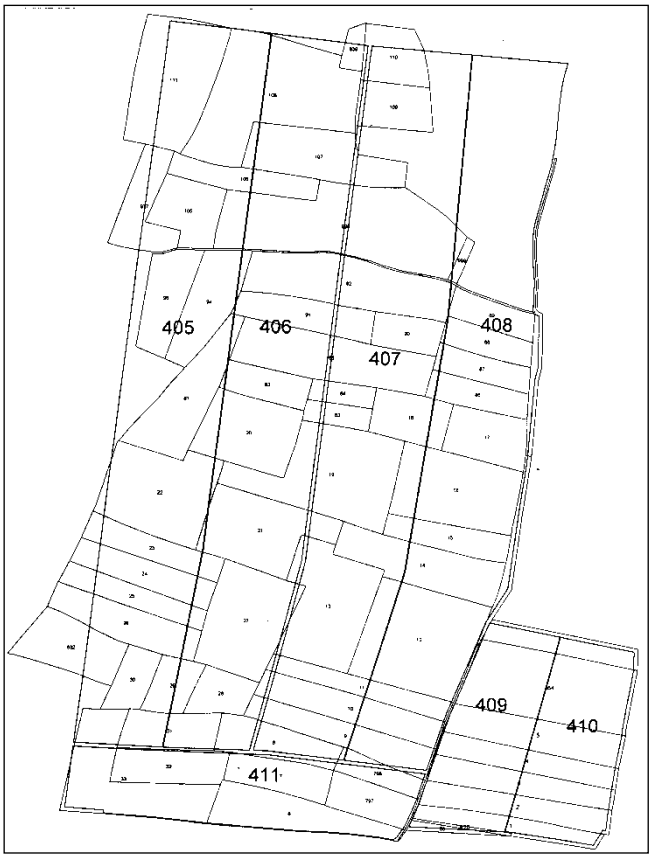

Figure 1. Application Area of Karaman-Kizik Village

3.2 Analysis of Land Valuation Methods in Land Consolidation

The land valuation applications in land consolidation site are made in the form of soil graduation. The parcel areas of the blocks no. 405, 406, 407, 408, 409, 410 and 411 in project area, soil index (SI) , location grades (LG) , location index (L), market values (MV) and market value indexes (MVI) are given in Table 1.

Table 1. Data of Project Area

Number of Parcel	Area(m2)	SI	LG	L	MV (TL)	MVI
1	19826.64	100	8	80	9	90
2	28265.55	100	8	80	9	90
3	28171.72	100	8	80	9	90
4	26175.91	100	9	90	9	90
5	36037.06	100	9	90	9	90
6	36447.874	98	7	70	5	50
7	21258.465	99	7	70	5	50
8	25390.89	99	7	70	7	70
9	32129.255	99	8	80	10	100
10	34366.918	99	8	80	10	100
11	22269.944	99	8	80	10	100
12	72436.757	99	9	90	10	100
13	57492.43	99	8	80	7	70
14	42129.5	99	10	100	10	100
15	20469.04	99	10	100	10	100
16	54402.965	99	10	100	10	100
17	25674.241	87	10	100	10	100
18	23195.247	87	9	90	7	70
19	72045.725	98	8	80	7	70
20	41940.428	98	7	70	6	60
21	49074.32	98	7	70	6	60
22	56852.42	99	5	50	5	50
23	22660.60	98	5	50	5	50
24	25426.53	98	5	50	5	50
25	20709.29	98	5	50	5	50
26	31885.23	98	5	50	5	50
27	52080.463	98	7	70	6	60
28	15721.891	98	7	70	6	60
29	15242.448	98	5	50	5	50
30	14821.636	98	5	50	5	50
31	22486.864	98	5	50	6	60
32	24034.801	98	5	50	5	50
33	52905.835	98	5	50	5	50
53	3303.819	100	7	70	9	90
81	40696.58	99	7	70	5	50
82	17488.079	99	8	80	6	60
83	9444.198	87	8	80	7	70
84	8918.98	87	8	80	7	70
85	54734.333	87	8	80	7	70

86	17514.74	87	10	100	10	100
87	15965.812	87	10	100	10	100
88	15491.241	87	10	100	10	100
89	15144.239	87	10	100	10	100
90	15090.91	87	9	90	9	90
91	26203.355	87	9	90	9	90
92	58223.295	87	10	100	10	100
94	31674.374	99	8	80	9	90
95	26803.18	99	8	80	9	90
96	27895.246	99	5	50	5	50
105	24636.65	99	8	80	9	90
106	21461.346	99	8	80	9	90
107	43882.02	99	10	100	10	100
108	90531.449	99	10	100	9	90
109	21313.356	99	10	100	10	100
110	21875.994	99	10	100	10	100
111	63075.731	99	9	90	7	70
797	19267.035	99	7	70	5	50
798	12436.228	99	7	70	5	50
820	1560.379	100	7	70	9	90
832	31879.43	98	5	50	5	50
839	5517.489	99	10	100	10	100
854	45320.61	100	10	100	9	90
977	25483.90	99	8	80	7	70
998	99492.90	99	10	100	10	100
999	2802.19	65	10	100	10	100

Coefficients of transformation of the application, which is carried out in accordance with the law no. 3083 is given in Table 2.

Table 2. Coefficients of Transformation of the Application

	1^0 (85)	**2^0 (80)**	**3^0 (75)**	**4^0 (70)**	**5^0 (65)**
1^0 (85)	1.0000	1.0625	1.1333	1.2143	1.3077
2^0 (80)	0.9412	1.0000	1.0667	1.1429	1.2308
3^0 (75)	0.8824	0.9375	1.0000	1.0714	1.1538
4^0 (70)	0.8235	0.8750	0.9333	1.0000	1.0769
5^0 (65)	0.7647	0.8125	0.8667	0.9286	1.0000

Coefficients of transformation prepared according to soil index criteria is given in Table 3. Productivity index has not been taken into account, because it has parallels with soil index.

Table 3. Coefficients of Transformation Prepared According to Soil Index Criteria

	1^0 (100)	**2^0 (99)**	**3^0 (98)**	**4^0 (87)**	**5^0 (87)**
1^0 (100)	1.0000	1.0101	1.0204	1.1494	1.5385
2^0 (99)	0.9900	1.0000	1.0102	1.1379	1.5231
3^0 (98)	0.9800	0.9899	1.0000	1.1264	1.5077
4^0 (87)	0.8700	0.8788	0.8878	1.0000	1.3385
5^0 (87)	0.6500	0.6566	0.6633	0.7471	1.0000

Coefficients of transformation prepared according to location index criteria is given in Table 4.

Table 4. Coefficients of Transformation Prepared According to Location Index Criteria

	1^0 (100)	**2^0 (90)**	**3^0 (80)**	**4^0 (70)**	**5^0 (50)**
1^0 (100)	1.0000	1.1111	1.2500	1.4286	2.0000
2^0 (90)	0.9000	1.0000	1.1250	1.2857	1.8000
3^0 (80)	0.8000	0.8889	1.0000	1.1429	1.6000
4^0 (70)	0.7000	0.7778	0.8750	1.0000	1.4000
5^0 (50)	0.5000	0.5556	0.6250	0.7143	1.0000

Coefficients of transformation prepared according to market value index criteria is given in Table 5.

Table 5. Coefficients of Transformation Prepared According to Market Value Index Criteria

	1^0 (100)	**2^0 (90)**	**3^0 (70)**	**4^0 (60)**	**5^0 (50)**
1^0 (100)	1.0000	1.1111	1.4286	1.6667	2.0000
2^0 (90)	0.9000	1.0000	1.2857	1.5000	1.8000
3^0 (70)	0.7000	0.7778	1.0000	1.1667	1.4000
4^0 (60)	0.6000	0.6667	0.8571	1.0000	1.2000
5^0 (50)	0.5000	0.5556	0.7143	0.8333	1.0000

In the application area, new assigned lands are calculated in Table 6 for 16 parcels chosen from different blocks according to soil index, location index and market value index. The influence of valuation methods, which are based on single parameter, on reallocation is seen in this Table. The average of new assigned lands, which is calculated according to single parameter based valuation methods, is seen in Table 7. As 16 parcels' place changing is taken into consider from these average values, it is seen that the nearest parcel number to the average value is 5 parcels according to new evaluation method 3038 (for from 2010 on); 3 parcels according to soil index; 6 parcels according to position index and 3 parcels according to market value index.

Table 6. New Assigned Lands in Single Parameter Based Valuation

Block/Parcel Number	Area (m^2)	Law no:3083 Degree	SI Degree	L Degree	MVI Degree	New Block	Law no:3083 Derece	SI Degree	L Degree	MVI Degree	Area according to Law no:3083 Degree	Area according to SI Degree	Area according to L Degree	Area according to MVI Degree
410/4	26175.91	3	1	1	2	406	3	3	4	4	26175.91*1=26175.91	26175.91*1.0204=26709.898	26175.91*1.4286=37394.905	26175.91*1.5000=39263.865
408/12	72436.757	3	2	2	1	405	3	3	3	2	72436.757*1=72436.757	72436.757*1.0102=73175.611	72436.757*1.125=81491.352	72436.757*1.1111=80484.481
407/13	57492.43	3	2	3	3	410	2	1	2	2	57492.43*0.9375=53899.153	57492.43*0.9900=56917.505	57492.43*0.8889=51105.021	57492.43*0.7778=44717.612
405/22	56852.42	3	2	5	5	407	2	4	3	3	56852.42*0.9375=53299.143	56852.42*1.1379=64692.368	56852.42*0.6250=35532.763	56852.42*0.7143=40609.684
406/27	52080.46	2	3	4	4	409	2	1	1	2	52080.46*1=52080.46	52080.46*0.9800=51038.85	52080.46*0.7000=36456.322	52080.46*0.6667=34722.042
405/30	14821.636	2	3	5	5	411	3	3	4	5	14821.636*1.0667=15810.239	14821.636*1=14821.636	14821.636*0.7143=10587.094	14821.636*1=14821.636
411/32	24034.801	2	3	5	5	408	2	4	1	1	24034.801*1=24034.801	24034.801*1.1264=27072.799	24034.801*0.5000=12017.4	24034.801*0.5000=12017.4
406/82	17488.079	3	2	3	4	405	2	2	3	2	17488.079*0.9375=16395.074	17488.079*1=17488.079	17488.079*1=17488.079	17488.079*0.6667=11659.302
407/84	8918.98	3	4	3	3	405	2	3	5	5	8918.98*0.9375=8361.544	8918.98*0.8878=7918.270	8918.98*1.6=14270.368	8918.98*1.4000=12486.572
408/88	15491.241	3	4	1	1	407	2	2	1	1	15491.241*0.9375=14523.038	15491.241*0.8788=13613.702	15491.241*1=15491.241	15491.241*1=15491.241
407/90	15090.905	3	4	2	2	408	3	2	2	1	15090.905*1=15090.905	15090.905*0.8788=13261.887	15090.905*1=15090.905	15090.905*0.9000=13581.814
405/95	26803.178	3	2	3	2	406	2	2	1	1	26803.178*0.9375=25127.979	26803.178*1=26803.178	26803.178*0.8000=21442.542	26803.178*0.9000=24122.86
411/797	19267.035	3	2	3	5	410	3	1	2	2	19267.035*1=19267.035	19267.035*0.9900=19074.364	19267.035*0.8889=17126.466	19267.035*0.5556=10704.764
409/820	1560.379	3	1	4	2	407	3	4	3	3	1560.379*1=1560.379	1560.379*1.1494=1793.500	1560.379*0.8750=1365.332	1560.379*1.2857=2006.179
410/854	45320.61	2	1	1	2	408	3	4	1	1	45320.61*1.0667=48343.494	45320.61*1.1494=52091.509	45320.61*1=45320.61	45320.61*0.9000=40788.549
408/999	2802.19	4	5	1	1	409	2	1	2	2	2802.19*0.8750=2451.916	2802.19*0.65=1821.423	2802.19*1.1111=3113.513	2802.19*1.1111=3113.513

Tablo 7: Comparison of Single Parameter Based Valuation Methods

Number of Parcel	Area according to Law no:3083 Degree	Area according to SI Degree	Area according to L Degree	Area according to MVI Degree	Average
410/4	26175.91	26709.898	**37394.905**	39263.865	32386.14
408/12	72436.757	**73175.611**	81491.352	80484.481	76897.05
407/13	53899.153	56917.505	**51105.021**	44717.612	51659.82
405/22	**53299.143**	64692.368	35532.763	40609.684	48533.49
406/27	52080.46	51038.85	**36456.322**	34722.042	43574.42
405/30	15810.239	**14821.636**	10587.094	**14821.636**	14010.15
411/32	**24034.801**	27072.799	12017.4	12017.4	18785.6
406/82	**16395.074**	17488.079	17488.079	11659.302	15757.63
407/84	8361.544	7918.270	14270.368	**12486.572**	10759.19
408/88	**14523.038**	13613.702	15491.241	15491.241	14779.81
407/90	15090.905	13261.887	15090.905	**13581.814**	14256.38
405/95	25127.979	26803.178	**21442.542**	24122.86	24374.14
411/797	19267.035	19074.364	**17126.466**	10704.764	16543.16
409/820	1560.379	**1793.500**	1365.332	2006.179	1681.348
410/854	48343.494	52091.509	**45320.61**	40788.549	46636.04
408/999	**2451.916**	1821.423	3113.513	3113.513	2625.091

4. CONCLUSION

Different criteria are used in evaluation applications of land consolidation projects. The applicability and accuracy of these criteria have always been a matter of debate. What is important here is that farmers do not undergo loss of any right after evaluation. And this depends upon accurately application of it.

According to results of the project; as the average areas are taken into account, it is seen that evaluation applications carried out in land consolidation areas (in accordance with the law no. 3083) have values that are near to the results in evaluation applications only according to position index. Besides, it is clearly seen that evaluation applied only according to market value index and soil index do not have such accurate results.

The accuracy and applicability of evaluation projects could increase, if more decided studies on position based evaluation were carried out and developed. Therefore, the expenditure needed for evaluation process in land consolidation projects drops. Besides that project duration decreases, as well.

The evaluation projects in Turkey are carried out according to different laws and evaluation criteria (soil index, productivity index, market value index, location index). Because the impact of evaluation difference in land consolidation projects on land reallocation has a negligible extent, new legislative regulations must be authorized.

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