USING BARE VALUATION METHOD IN VALUATION OF RURAL AREA

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1. INTRODUCTION

Valuation of real estate in our country has been come up in urban areas, but has been neglected in agricultural areas. The reasons are;

a) Acceleration of migration from Rural to urban (urban population is 62% of the country in 2000 whereas it is 79% in 2013) demand for land in cities has increased for that reason real property demand traffic become more than villages,

b) Buyers and sellers in the urban area are in a wide range in cities while they are in very narrow range in villages,

c) The lack of importing freedom and inventiveness in agricultural sector.

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This method is based on the principle of “the arithmetic average of the ratio of annual net income over sale value”.

The most difficult point in agricultural valuation is to determine the local capitalization rate. The most difficult part of this is

a) The difficulty in obtaining necessary data,

b) The lack of information,

c) Variation of the rate from region to region and even from land to land in the same village.

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The correlation $k = \frac{\left[\frac{G_1}{D_1} + \frac{G_2}{D_2} + \frac{G_3}{D_3} + \ldots + \frac{G_n}{D_n}\right]}{[n]}$ is used in the calculation of rural area capitalization. In this correlation;

G: Annual net income

D: The value of land,

n: The number of Comparison land.

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Therefore, an agricultural area may have;

a) Different yield strength,

b) Different location advantages

so, not just one but a few ***local capitalization rate*** should be calculated.

Because of these and other similar reasons, all the village lands cannot be accepted as equal in location and yield aspects and cannot be put into the same cluster. Instead, all lands should be purified from their ***land value points*** (ADP=LVP) namely they become bare, capitalization rates of irrigated and arid lands should be calculated in their class.

Since the capitalization rate is calculated by using cheapened prices, this new method is called ***bare valuation method***.

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Table 1: Land Classification according to use ability

Criterion	1st Class Land	2nd Class Land	3rd Class Land
Slope (%)	0 - 2	2 - 4	4 - 6
Texture	Loamy	Clay	Sandy
Depth (cm)	+ 90	90 - 50	50 - 25
Water Permeability	Early absorbtion	Middle absorbtion	Early absorbtion
Physical Properties	Dark brown (high organic matter and iron oxide)	Light brown (moderate organic matter and iron oxide)	Stony (grey– white) (low levels of organic matter and iron oxide)
Erosion	Never	Middle	Happened

Regional capitalization rate should be done after net income was calculated.

Local capitalization rate can be calculated with $k = \frac{G}{D}$ correlation.

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2 RURAL VALUATION CRITERIA

a) The opportunity of producing a new parcel,
b) The size of the land,
c) The overgrowth of the population of the city or town,
d) The cadastre,
e) Population density,
f) The ease of purchase - sale,
g) The ease of transport,
h) Having a building and its accessories,
i) The proximity to a city or town,
j) The facility of irrigation,,
k) Land planting plan,
l) The regional variety of products
m) Land usage facility,
n) Land shape,
o) Proximity to Forestry border,
p) The status of wild animals (pigs, mice, moles),
q) Being consolidated land or not
r) The source of agricultural workers,
s) Having grassland

However, these criteria can be divided into two main groups. These are:

a) The ***fertility*** criteria affect amount of product taken from the field.

b) The ***positional*** criteria affect the location value.

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2.1 Fertility Criteria

a) The size of the land and opportunity of producing a new avin parcel,
b) Having a structure and equipments,
c) Irrigation facility,
d) Land planting plan,
e) Local crop variety,
f) Land usage facility,
g) Land shape,
h) Proximity to Forestry border,
i) The existence of wild animals,

2.2 Positional criteria

a) The overgrowth of the population of the city or town,
b) Population density,
c) The ease of purchase - sale,
d) The ease of transport,
e) The proximity to a city or town,
f) The source of agricultural workers,
g) Having grassland.

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2.3 Calculating Land Value Point (ADP= LVP)

The scoring is done for a land according to the existing criteria which is described above and the points are added. This total score is a ***percent (%) value*** addition to its own existence value of the land.

+1 (100 points) is added to the percent value and ***Land Valuation Point*** (ADP = LVP) for the land is calculated. Land value point; is an average value for that field points, and each unit is assumed to be in the area.

Accordingly, ADP correlation may be formulated as in the presentation:

$$ADP_i = 1 + (k_{byüp} + k_{yd} + k_{so} + k_{epüç} + k_{akk} - k_b - k_{osyh} \pm k_{ny} - k_{ask} \pm k_{uay} \pm k_{ukm} \pm k_{upi} \pm k_{uam} \pm k_{ky} \pm k_{tik} \pm k_{mv}) \; x \; \frac{1}{100}$$

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3 APPLICATION

3.1 Introduction of Application Village

K1, K2, …: Comparison parcels

D1, D2, …: Evaluation parcels

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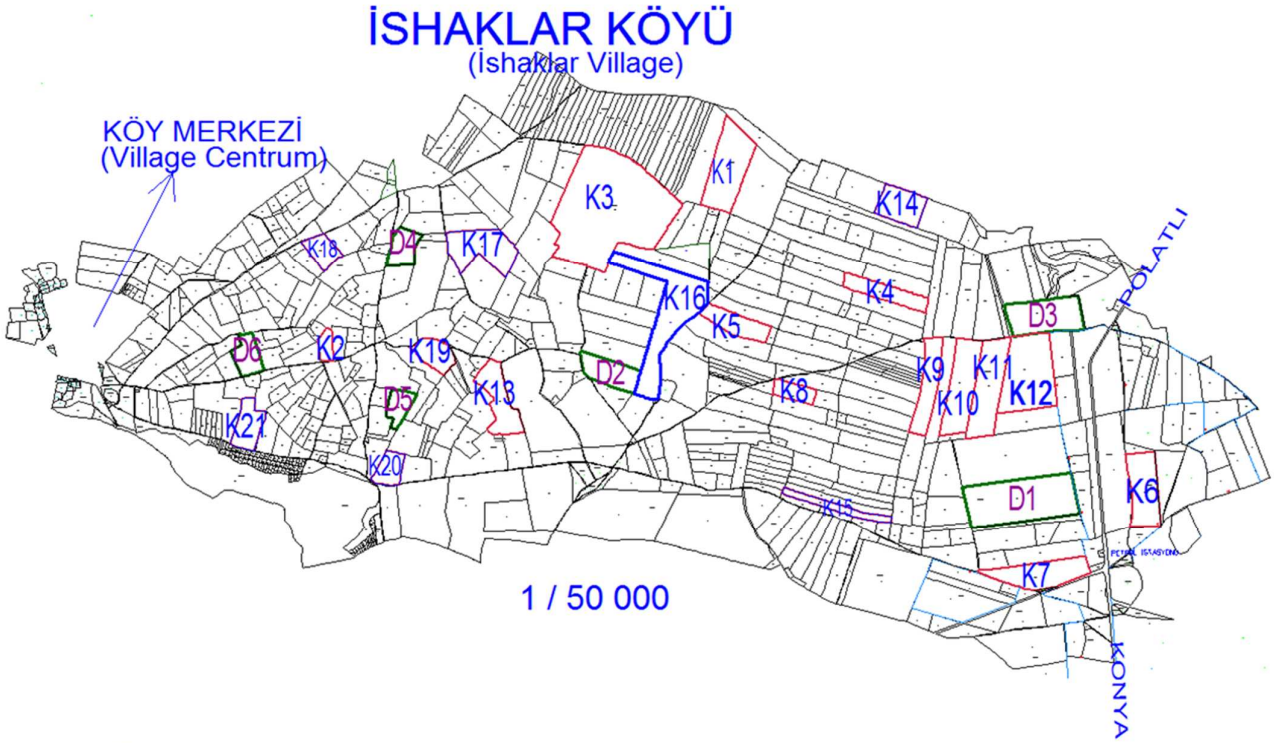

Map 1: The study area

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The process steps for evaluation were followed as below;

a) The village's farmers are generally buying land from the treasury lands,

b) Interpersonal trading is negligibly rare,

c) Therefore, for the valuation of treasure (not the declared value for property tax, but value occurs in a free market) 21 of them were included in the sample set,

d) Sales value has been updated to September 2013,

e) The features and the valuation data of the lands which are taken to the cluster was transferred to Table 6,

f) After determining the types of this land, irrigation facility and planting plans, annual net income of the land in each class is calculated according to the average planting habits of the village (Tables 4 and 5).

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Table 4: Local crops and production grown in the 1st class irrigated and arid lands.

PLANTS	Production in irrigated (kg/da) (V_s)	Production in arid (kg/da) (V_k)	Net income Rate (%) (K)	Price (TL/kg) (F)	Annual net income(TL/da) $G = V_s \times K \times F$	
Wheat	500	350	40	0.80	160.00	112.00
Barley	400	250	40	0.65	104.00	65.00
Wheat straw	400	250	90	0.40	144.00	90.00
Barley straw	300	180	90	0.35	94.50	56.70
Sunflower	300	200	55	1.35	222.75	148.50
Sugar Beet	5000	---	50	0.125	312.50	---
NET INCOME (main crop) $G_A = (G_b + G_a + G_{ac} + G_{sp})$	799.25	325.50				
NET INCOME (secondary crop) $G_Y = (G_{bs} + G_{as})$	238.50	146.70				
TOTAL NET INCOME (TL/da) $G_{NY} = G_A + G_Y$	1037.75	472.20				
ANNUAL NET INCOME $(G_N = (G_{NY} / Period)$	1037.75/5= **207.55 TL/da**	472.20/4= **118.05 TL/da**				

1st class irrigated land planting plan = SB+S+W+B+F = 5 years

1st class arid land planting plan = S+W+B+F = 4 years

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Table 5: Local crops and production grown in the 2nd class arid land.

PLANTS	Production in arid (kg/da) (V_k)	Net Income rate (%) (K)	Price (TL/kg) (F)	Annual net income(TL/da) $G = V_s \times K \times F$
Wheat	300	40	0.80	96.00
Barley	200	40	0.65	52.00
Wheat straw	225	90	0.40	81.00
Barley straw	150	90	0.35	47.25
NET INCOME (main crop) $G_A = (G_b + G_a + G_{ac})$	148.00			
NET GELİR (secondary crop) $G_Y = (G_{bs} + G_{as})$	128.25			
TOTAL NET INCOME (TL/da) $G_{NY} = G_A + G_Y$	276.25			
ANNUAL NET INCOME $(G_N = (G_{NY} / Period)$	276.25/3 = **92.08 TL/da**			

2nd class arid planting plan = W+B+F = 3 years

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Table 6: Value points of comparison lands

Valuation Criteria	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20	K21
$k_{bypü}$	8	0	29	0	0	5	6	0	0	1	2	2	6	4	0	12	1	1	1	1	1
k_t	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
k_{yd}	1	0	1	0	0	2	1	0	0	0	0	0	0	1	0	2	0	0	0	0	0
k_{so}	15	3	15	3	3	15	15	3	5	5	5	5	3	15	5	15	3	3	3	3	3
$k_{epüç}$	10	5	10	5	5	10	10	5	10	10	10	10	5	10	5	10	5	5	5	5	5
k_{akk}	15	10	15	10	10	15	15	10	15	15	15	15	10	15	15	15	10	10	10	10	10
k_b	-5	-6	-3	-7	-7	-3	-2	-5	-2	-9	-13	-7	-12	-5	-2	-3	-4	-5	-4	-5	-4
k_{osyh}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
k_n	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
k_{ny}	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
k_{ask}	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
k_{uay}	-5	-6	-5	-1	-2	5	5	-1	2	3	3	4	-5	-2	3	-2	-5	-7	-5	-5	-6
k_{ukm}	2	4	3	-1	2	-3	-2	2	-1	-2	-2	-2	3	-2	-1	2	2	3	3	4	5
k_{upi}	-2	-3	-2	2	0	5	5	2	3	3	3	4	1	1	4	0	-3	-4	1	-2	-3
k_{uam}	2	4	3	-1	2	-3	-2	2	-1	-2	-2	-2	3	-2	0	1	2	2	3	5	5
k_{ky}	-18	-18	-18	-18	-18	-17	-17	-18	-18	-18	-18	-18	-18	-18	-17	-18	-18	-18	-18	-18	-18
k_{tik}	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
k_{mv}	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Land Valuation Point (LVP= ADP)	**40**	**10**	**65**	**9**	**12**	**48**	**51**	**17**	**30**	**23**	**20**	**28**	**13**	**34**	**29**	**51**	**10**	**7**	**16**	**15**	**15**

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Table 7: Capitalization rate calculations of the comparison lands considering the known method

SN	Area (da)	Land Class	Land Planting Plan	Current Price (RB) TL/da	Annual Net Income (TL/da)	k=(G_n/D)
K1	416	1st Irrigated	SB+S+W+B+F	4250	207.55	0.0488
K2	60	2nd Arid	W+B+F	1200	92.08	0.0767
K3	1464	1st Irrigated	SB+S+W+B+F	5150	207.55	0.0403
K4	188	2nd Arid	W+B+F	1200	92.08	0.0767
K5	186	2nd Arid	W+B+F	1300	92.08	0.0708
K6	299	1st Irrigated	SB+S+W+B+F	4900	207.55	0.0424
K7	308	1st Irrigated	SB+S+W+B+F	5000	207.55	0.0415
K8	99	2nd Arid	W+B+F	1500	92.08	0.0614
K9	270	1st Arid	S+W+B+F	2500	118.05	0.0472
K10	344	1st Arid	S+W+B+F	2100	118.05	0.0562
K11	389	1st Arid	S+W+B+F	2000	118.05	0.0590
K12	530	1st Arid	S+W+B+F	2300	118.05	0.0513
K13	253	2nd Arid	W+B+F	1300	92.08	0.0708
K14	206	1st Irrigated	SB+S+W+B+F	4000	207.55	0.0519
K15	106	1st Arid	S+W+B+F	2500	118.05	0.0472
K16	619	1st Irrigated	SB+S+W+B+F	4750	207.55	0.0437
K17	321	2nd Arid	W+B+F	1250	92.08	0.0737
K18	114	2nd Arid	W+B+F	1200	92.08	0.0767
K19	140	2nd Arid	W+B+F	1300	92.08	0.0708
K20	114	2nd Arid	W+B+F	1350	92.08	0.0682
K21	165	2nd Arid	W+B+F	1350	92.08	0.0682

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When k values are analyzed in the last column of Table 7; we see that the lowest rate is 0.0403 and the highest rate is 0.0767.

Since one capitalization rate is calculated for the whole of the village in known method, arithmetic mean of the 21 values must be taken.

If the arithmetic mean of the clusters where 90% difference between the lowest and the highest value is taken, the ratio $k = \frac{G}{D} = 0.0592$ is found which is an incorrect result ($m_0 = \pm 0.013$) because

a) The difference ratio between the values in the clusters is much,

b) The village has irrigated and arid regions and their annual net income is very different.

c) Lands are located in very different places.

Instead, the capitalization of all lands should be calculated within their class as irrigated or arid after their land valuation points (ADP= LVP) are reduced or become ***bare***.

These calculations can be seen in Table 8.

Bare value is calculated with $YD = \frac{RB}{(1+ADP)}$ relation.

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Table 8: Capitalization rate calculations considering the ADP account of the comparison lands

SN	Area (da)	Land Class	Land Planting Plan	Current Price (RB) TL/da	Land (%) ADP	Bare Value YD=RB/(1+ADP)	Annual Net Income (TL/da)	k=(G_n/YD)
K1	416	1st Irrigated	SB+S+W+B+F	4250	40	3035.714	207.55	**0.0684**
K2	60	2nd Arid	W+B+F	1200	10	1090.909	92.08	**0.0844**
K3	1464	1st Irrigated	SB+S+W+B+F	5150	65	3121.212	207.55	**0.0665**
K4	188	2nd Arid	W+B+F	1200	9	1100.917	92.08	**0.0836**
K5	186	2nd Arid	W+B+F	1300	12	1160.714	92.08	**0.0793**
K6	299	1st Irrigated	SB+S+W+B+F	4900	48	3310.811	207.55	**0.0627**
K7	308	1st Irrigated	SB+S+W+B+F	5000	51	3311.258	207.55	**0.0627**
K8	99	2nd Arid	W+B+F	1500	17	1282.051	92.08	**0.0718**
K9	270	1st Arid	S+W+B+F	2500	30	1923.077	118.05	**0.0614**
K10	344	1st Arid	S+W+B+F	2100	23	1707.317	118.05	**0.0691**
K11	389	1st Arid	S+W+B+F	2000	20	1666.667	118.05	**0.0708**
K12	530	1st Arid	S+W+B+F	2300	28	1796.875	118.05	**0.0657**
K13	253	2nd Arid	W+B+F	1300	13	1150.442	92.08	**0.0800**
K14	206	1st Irrigated	SB+S+W+B+F	4000	34	2985.075	207.55	**0.0695**
K15	106	1st Arid	S+W+B+F	2500	29	1937.984	118.05	**0.0609**
K16	619	1st Irrigated	SB+S+W+B+F	4750	51	3145.695	207.55	**0.0660**
K17	321	2nd Arid	W+B+F	1250	10	1136.364	92.08	**0.0810**
K18	114	2nd Arid	W+B+F	1200	7	1121.495	92.08	**0.0821**
K19	140	2nd Arid	W+B+F	1300	16	1120.69	92.08	**0.0822**
K20	114	2nd Arid	W+B+F	1350	15	1173.913	92.08	**0.0784**
K21	165	2nd Arid	W+B+F	1350	15	1173.913	92.08	**0.0784**

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When k values are analyzed in the last column; we see that the lowest rate is 0.0609 and the highest rate is 0.0844.

Here the difference between the highest and lowest value is 39% (the difference in known method was 90%).

The main reasons is reducing the real estate prices from their location and productivity values and make them bare.

However, the arithmetic mean of all 21 values must be taken in this condition. Because there are 3 groups in terms of either land class or irrigation facility within 21 values. These are:

a) 1st class irrigated lands,

b) 1st class arid lands,

c) 2nd class arid lands.

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Table 9: Average capitalization interest calculation with taking into account the Bare Value

SN	Land Class	k=(G_n/YD)	k_{ort}	m_0
K1	1st Irrigated	0.0634	0.0655	± 0.003
K3		0.0660		
K6		0.0662		
K7		0.0618		
K14		0.0695		
K16		0.0660		
K9	1st Arid	0.0714	0.0706	± 0.006
K10		0.0720		
K11		0.0738		
K12		0.0748		
K15		0.0609		
K2	2nd Arid	0.0815	0.0805	± 0.002
K4		0.0801		
K5		0.0792		
K8		0.0796		
K13		0.0829		
K17		0.0810		
K18		0.0821		
K19		0.0822		
K20		0.0784		
K21		0.0784		

As we have seen the average errors are quite low and in the order of ***k*** s; the lowest in the best quality of land, the highest in the least quality land. This proved scientifically that ***bare valuation method*** is correct.

$$k_{1^{st}\ irrigated} \langle k_{1^{st}\ arid} \langle k_{2^{nd}\ arid}$$

$$0.0655 \langle 0.0706 \langle 0.0805$$

If the current price wanted to be calculated according to these rates;

$$RB = YD\ x\ (1 + ADP) \qquad RB = \frac{G_n}{k_i}\ x\ (1 + ADP)$$

correlation should be used.

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4 Application with Bare Valuation Method

Which of these two values is the most likely value?

The answer to the question of course must be found according to the formula 13 because;

a) The calculated value is very close to current price as K1, K2,

b) Since the m_0= 0.013 TL/m^2 mean square error found with the correlation 2 is bigger than (m_{01}= 0.003 TL/m^2, m_{02}= 0.006 TL/m^2, TL/m^2, m_{03}= 0.002 TL/m^2) the mean square error found according to correlation 13, it is natural to obtain quite large deviations compared to correlation 2.

Table 10: Value Points of the lands to be valuated

Valuation Criteria	D1	D2	D3	D4	D5	D6
$k_{bypü}$	6	4	1	1	0	5
k_t	5	5	5	5	5	5
k_{yd}	1	1	0	0	0	0
k_{so}	15	15	5	3	3	3
$k_{epüç}$	10	10	5	5	5	5
k_{akk}	15	15	10	5	5	5
k_b	-2	-2	-1	-1	-3	-3
k_{osyh}	0	0	0	0	0	0
k_n	0	0	0	0	0	0
k_{ny}	5	5	5	5	5	5
k_{ask}	-3	-3	-3	-3	-3	-3
k_{uay}	4	-6	-2	-4	-2	-7
k_{ukm}	-4	3	-2	-2	4	5
k_{upi}	5	1	4	-3	-1	-3
k_{uam}	2	2	-2	2	3	4
k_{ky}	-18	-18	-18	-18	-18	-17
k_{tik}	5	5	5	5	5	5
k_{mv}	5	5	5	5	5	5
Land Valuation Point (ADP/LVP)	**51**	**42**	**17**	**5**	**5**	**14**

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Table 11: Features and prices of the lands to be evaluated and their capitalization rate calculation according to known method

SN	Area (da)	Land Class	Land Planting Plan	Annual Net Income (TL/da)	ADP	RB=(G_n/k) (correlation 2)	RB=(G_n/k)(1+ADP) (correlation 13)	Diff. (TL)
D1	663	1st Irrigated	SB+S+W+B+F	207.55	51	3506	4785	1279
D2	200	1st Irrigated	SB+S+W+B+F	207.55	42	3506	4500	994
D3	345	1st Arid	S+W+B+F	118.05	17	1994	1956	-38
D4	131	2nd Arid	W+B+F	92.08	5	1555	1201	-354
D5	101	2nd Arid	W+B+F	92.08	5	1555	1201	-354
D6	129	2nd Arid	W+B+F	92.08	14	1555	1304	-251

TS 05F – Valuation, 6850, Mehmet ERTAS, Using Bare Valuation Method in Valuation of Rural Area
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5 CONCLUSIONS

Rural land valuation in Turkey has been done according to the **income management** because of a legal requirement. However, land value point and conjuncture are consistently ignored in evaluation. If the rural land valuation is done according to the ***Bare Valuation Method*** most likely results can be obtained.

As can be seen from the calculation results ***bare valuation method*** reduced from productivity and location effects gives fairly reliable results.

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SELÇUK ÜNİVERSİTESİ

6 ABBREVIATIONS

A : Barley,
AÇ : Sunflower,
ADP : Land Value Point,
B : Wheat,
C_i : Total circumference length of land of ideal dimension,
C_p : Total circumference length of land,
D_{yd} : One-year value of structures and equipments,
D1, D2 : Lands, whose valuation will be made,
daa : Measurement unit for the area (1000 m^2),
f_d : Distribution norm field,
f_p : Land field,
f_i : Land field of ideal dimension,
G_n : One-year net income,
K1, K2 : Comparison lands,
k : Capitalization interest rate,
k_{akk} : The criterion for the potential of land use,
k_{ask} : The criterion for the convenience of purchase and sale,
k_b : The criterion of land shape,
$k_{bypü}$: The criterion of the size of land and the state of being able to produce new parcel,
$k_{epüc}$: The criterion for land planting plan and product diversity,
k_{kv} : The criterion for closeness of land to urban or town,
k_{mv} : The criterion for closeness of meadow presence,
k_n : The criterion for overflow population of urban or town,
k_{nv} : The criterion for population density,
k_{osyh} : The criterion for closeness of land to forest boundary and wild animal,
k_{so} : The criterion of the potential of land for irrigation,
k_{tik} : The criterion for source of agricultural laborer of land,
k_{uam} : The criterion for closeness of land to purchasing center,
k_{uav} : The criterion for closeness of land to main road,
k_{ukm} : The criterion for closeness of land to village center,
k_{upi} : The criterion for closeness of land to gas station,
k_{yd} : The criterion for structures and equipments in land,
m_0 : Quadratic average error,
N : Fallowing,
RB : Market Value,
ŞP : Sugar Beet,
YD : Bare Value

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