Using Bare Valuation Method in Valuation of Rural Area

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Key words: Valuation, valuation of rural area, local capitalization rate, bare valuation method

SUMMARY

In today's Turkey where the migration from the village to town has been experienced, real estate valuation of lands is tried to be organized as discipline, act and model. Thus, some public and corporate institutions issued regulations and circulars regarding the part of valuation that concerns to them. F subsection of 11th item of Publicizing Law numbered 2942 has been applied in publicizing agricultural areas, selling lands belonging to the General Directorate of National Real Estate and real estate valuation in order for owners to obtain bank credit. For this purpose, a state is stated this: "Committee of experts estimates disposable income that real estates and source bring with the report they arranged in the situation of using real estate or source in lands according to place and conditions on the publicizing date and based on existing value". Income method is used in accordance with this provision.

Those who want to make valuations in rural areas in our country face many models and data deficiencies such as the criterion and method of valuation, land planting plan and annual disposable income belonging to that agricultural field. What is more, because most of those who deal with valuation focus their energy on urban areas, the valuation of rural areas is somewhat neglected. Also, it cannot be said that those dealing with the valuation of rural areas develop valuation standards (and weight) and methods in accordance with village conditions.

Without considering the land in terms of irrigated or dry farming in the applications to date, the interest rate of local capitalization was estimated and from this point, the value of real estate was reached. However, there exist both the watery and arid fields in an agricultural zone and these are divided into groups as 1st, 2nd, 3rd and so forth according to their yield. Thus, instead of calculating just one interest rate for local capitalization for the whole area, it is more accurate to estimate separate rates for each kind of field of that whole area. Furthermore, in this study valuation standards used in the calculation of interest rates for local capitalization that are estimated depending on annual disposable income of the land are divided into two groups as yield and positional valuation standards in the valuation of agricultural fields.

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1. INTRODUCTION

In our country where population is gravitating to towns, food consumption is increasing, urban lands are continuously spreading into agricultural lands, application of agricultural insurance is being common, bank credits have started to be received using agricultural lands as collaterals and public lands are being sold to their users, valuation of rural areas has began to gain importance. The market for rural land is further developed because foreign capital has bought large lands from some Anatolian regions for agricultural purpose which increased the importance of this subject more.

In our country, the real estate valuation of rural area in the urban and agricultural fields has gained importance since the beginning of 1990 when liberal economy began to be applied. The real estate valuation in urban areas has been considerably organized in terms of criteria and***weight, and methods and modeling***(url-1). The reasons for this are:

a) That the scientists (Aclar, Demir, Cagdas, Erkan and et al.) who began academically studies about this smatter in the 1970's care about only the urban areas,
b) The rapid urbanization,
c) The liberal economy order,
d) The great construction firms,
e) The Administration of Housing Development and
f) The foreign capital.

The real estate valuation has become a current issue generally in the urban areas but it has been ignored in the agricultural areas in our country. The reasons for this are:

a) That much more lands are needed in the urban because the migration to the urban increases (The urban population was 79% while it was in 2000 was 62%) (url-3) and because of this reason the dynamism of real estate in the urban is more than in the village.
b) That the groups of purchasers and sellers in the urban have a wide range while those who are in the village have a narrow range.
c) The lack of the independence of importation and the encouragement.

Because of these three basic reasons, the real estate valuation in the agricultural fields has been applied in bank hypothec and credit facilities, the selling of the government lands more than the selling among the individuals. However, in the recent year because of some reasons such as the increasing in the facilities of banking and credit, the selling of the government lands, corporatizations, the large farm owners' investments in the technology, the real estate valuation of the agricultural fields has also gained importance (Eves, 2004).

With the increase in World population, the number of people needing to have adequate andbalanced nutrition is increasing. This increase comes with technological developments in agriculture and also the necessity for reclamation. New agricultural areas are areas that have

lost their forest features and are owned by government or those which are in village lands or around them, have not been planted previously and which have been used as threshing field or meadow land. In recent years, the selling of these lands has been brought to the agenda and the General Directorate of National State has sold public domains and lands to the users and interested purchasers. It has made possible the valuation of sold real estate's using **the method of income capitalization interest** (url-1).

2. REAL ESTATE VALUATION

The global definition of real estate valuation is to determine the potential transaction cost at a particular moment in a real estate market without considering the unusual and personal behaviors by using one of the valuation methods that is appropriate for the situation of real estate. Valuation of real estate is made via one or more of comparison, income and cost methods of valuation (Seele, 1987). As for agriculture fields, income method are applied as a legal obligation (The Expropriation Law and General Directorate of National Estate Annunciation numbered 312). This method is based upon principle of the arithmetic average of one-year net income of lands on an agricultural area to achieve their capital values.

The most difficult point in the valuation of rural area is to determine the interest ratio of local capitalization. Because of the difficulty of obtaining necessary data, information insufficiencies this ratio can change from region to region, from area to area and even in a village since in a village where topography, dominant wind direction and ecology may change the yield of land because they affect depth of soil and its potential of being irrigated.

3. CAPITALIZATION INTEREST RATIO AND CALCULATION

Interest is the cost paid to capital owner in return for using a specific quantity of capital over a specific period of time. Local capitalization interest rate is the right for using capital invested in land (Cagdas, 2007). The rate of one-year net income of land to its value is called as ***capitalization interest rate.*** That is to say, it is the rate of net income's meeting the capital value.

For local capitalization interest rate, market bank deposit interest rate can be used.
However;
a) If national income is under 25,000 $,
b) Long-term average of inflation is above 5%,
c) Rate of rural population is above 10%
bank deposit interest rate cannot be used because the markets of such countries may be easily affected by any conjectural movements such as the market, industry and real estate and this may cause speculations. In such a situation, separate rate needs to be calculated for each agriculture area.

In calculating the capitalization interest rate in a rural area, this formula exists(Mulayim, 2008):

$$k = \frac{\left[\frac{G_1}{D_1} + \frac{G_2}{D_2} + \frac{G_3}{D_3} + \ldots + \frac{G_n}{D_n}\right]}{[n]} \quad (1)$$

In this formula, G is one-year's net income, D is the value of land and n is the number of comparison lands. Using this formula, all the lands in a village are assumed to be similar regarding positional and yield. Thus, only one capitalization rate calculation can be made for all land inone. This rate may be applicable in adjacent villages.

However, this argument is not automatically correct because sale values of lands even having the same yield power in a village may differ considerably. The reason of this is the positional superiority of lands compared to each other. For this reason in an agricultural field, considering the facts that there are lands having

a) Different yield power and
b) Different positional superiorities, not only one but a few local capitalization rates should be calculated (Ertas, 2013).

Because of such reasons, all the lands of the village cannot be accepted as equal in terms of yield and positional in the same group. Instead of this, after all the lands are evaluated without ***land valuation points (ADP=LVP)*** and they become "bare", the capitalization interest rates of the arid and watery lands in their own classes should be calculated. Because the capitalization rates without the values are calculated with the selling prices, this method is called as ***"the bare valuation method".***

A rural area should be classified according to its characteristics and the potential for land use in Table 1 (Ertas, 2011) and each class should be divided into two major groups: irrigated and arid. Whichever class the agricultural area includes, local capitalization rates of those classes should be calculated.

Table 1: The classification table according to the potential of land use

Criterion	**1st Class Land**	**2nd Class Land**	**3rd Class Land**
Gradient (%)	0 – 2	2 - 4	4 - 6
Structure	Loamy	Clayey	Sandy
Depth (cm)	+ 90	90 - 50	50 - 25
Water conductivity	Late absorption	Medium absorption	Early absorption
Physical feature	Dark brown (having high level of organic materials and iron oxide)	Light brown (having medium level of organic materials and iron oxide)	Stony (grey-white) (having low level of organic materials and iron oxide)
Erosion	Not exposured	Medium exposured	Exposured

After this, land planting schemes of available classes in village should be determined and their product yields, product costs, annual average net incomes and sale values should be found.Information such as about the planning of land planting, the yield of the crops, the selling prices and unit costs of the crops can be provided from various institutions For this, institutions suggested on Table 2 should be utilized (Cagdas, 2007).

Product sale prices in the research working area were taken from the District Directorate of Agriculture and Agriculture Market. For product yields, product costs data of the District Directorates of Agriculture were used. The land sale prices, they were obtained from the Real Estate Commissioners and the Directorate of National Real Estate.

Table 2: The institutions where the data are provided

<table>
<tr><td rowspan="2">Product Sale Prices (TL/kg)
• The District Directorate of Agriculture,
• The Soil Products Office,
• The Chamber of Agriculture Engineers,
• The Chambers of Commerce and Industry,
• The Agriculture Markets,
• The Directorates of Marketplace,
• The Municipalities</td><td>Product yields (kg/daa)
• The Provincial/ District Directorates of Agriculture,
• The Turkish Statistical Institute,
• The Chamber of Agriculture Engineers</td><td>Product costs (TL/daa) (TL/kg)
• The Provincial/ District Directorates of Agriculture,
• The Agricultural Credit Cooperatives</td></tr>
<tr><td>Land sale prices and dates
• The Real Estate Registration Office (sales over last three years),
• The Directorate of National Real Estate,
• The Municipalities,
• The Real Estate Commissioners</td><td>Other information
• The Data of Turkish Statistical Institute (Consumer price index, inflation, etc.)
• The Individual Works regarding to local price changes)
• Other economical indicators
• The Results of expropriation works</td></tr>
</table>

Local capitalization interest rate should also be calculated after the net income is calculated (Aclar, 2002). According to this,

a) Gross income calculation (TL/daa)
- Gross income (main product) = average yield (kg/daa) x product price (TL/kg)
- Gross income (side product) = average yield (kg/daa) x product price (TL/kg)
- Total gross income = gross income (main product) + gross income (side product)

b) Net income calculation (TL/daa)
- Net income (G) = total gross income – production costs

c) Capitalization rate calculation
- Local capitalization rate can be calculated with this cohesion: $k = \frac{G}{D}$ (2)

4. LOCAL VALUATION CRITERIA

All of the criteria used in valuation of rural area can be lined up like this (Eves, 2004/ Mulayim, 2008/url-2):
a) The potential of producing new parcel,
b) The size of the land,
c) Overflow of urban or village population,
d) The cadastre,
e) Population density,

f) Convenience of purchase and sale,
g) Convenience of transportation,
h) Structures and equipments,
i) The closeness to urban or town,
j) The potential for irrigation,
k) The planning of land planting,
l) Regional product diversities,
m)The potential of land use,
n) The shape of the land,
o) The closeness to forest boundary,
p) The presence of wild animals (pigs, mice, moles)
q) The degree of consolidate
r) Source of agricultural laborer,
s) Presence of meadow land.

However, we can divide these criteria can be divided into two main groups.
These are:
a) ***Yield*** criteria affecting the quantity of product given from the land
b) ***Positional*** criteria affecting locational value of land

Because positional and yield criteria affect the value of products together, they affect the capitalization interest rate directly or indirectly and this affects unit value of land (Ertas, 2008).

There are twenty-one criteria listed above but some of these criteria have no mathematical equivalent (Ertas, 2013).

4.1 Yield Criteria

As yield criteria
a) The size of land, the potential of producing new parcel,
b) Structures and equipments that it has,
c) The potential for irrigation,
d) The planning of land planting,
e) Regional product diversities,
f) The potential of land use,
g) The shape of land,
h) The closeness to forest boundary,
i) Presence of wild animal,
can be taken.

4.1.1 The size of land and the potential of producing new parcel ($k_{bypü}$)

Because agriculture land is a field of occupation that is made via economical and physical

contributions of family members, the land should be inherited from the owner after death by the family members in order for their land-based livelihood. To continue in this respect, the potential of land to produce big and new parcel should also be much. For this the criterion (according to The Consolidation Law numbered 3083) is the quantity of ***distribution norm*** calculated for each consolidation area. This size is about 49 daa in irrigable lands in 1st class lands for Konya and 188 daa in arid fields. Thus, in order that each land produced is not smaller than these quantities, land should be 49 daa or the multiples of 188 daa according to its being irrigable and arid. According to this, for each parcel produced, the following formula can be used;

$$k_{bypü} = \frac{f_p}{f_{dn}} \qquad (3)$$

4.1.2 The structures and equipments that it has (k_{yd})

We can identify these structures and equipments as:

- Electrical installations,
- Drainage facilities ,
- Storage and
- Dwelling.

Presence of these increases the yield and quality of product by easing harvest. For a land having these structures and equipments in them, costs of these structures and equipments are calculated and after depreciations are taken away, the value obtained is divided by remaining Presence/ life (D_{yd}). This division value is divided by whole field (in daa unit) and multiplied by 0.10.

$$k_{yd} = \frac{D_{yd}}{f_p} x\,0.10 \qquad (5)$$

4.1.3 The potential for irrigation (k_{so})

300 liters of raining for each year occur in the Middle Anatolian Region. The irrigation network of the lands is supplied sometimes by the government and sometimes by the owners. For this reason, the potential for irrigation is an important criterion. It is an important criterion. Agriculture with water or without accessing to water in a land directly affects planting. Because when agriculture without water is possible in a land from the same class, planning of land planting is applied as: **planning of land planting: wheat + barley + fallow= 3 years** and when agriculture with water is made, it is applied as: **planning of land planting: sugar beet + sun flower (or corn) + wheat + barley= 4 years.** In agriculture without irrigation, one year of three years is fallowing and the other two years land can be planted with cereals whose market value is low whereas in irrigated agriculture, 4 full years pass and according to cereals sugar beet, sun flower (or corn) whose market price is at least double. According to the experieces obtained by expert applications (from court orders), for the

potential for irrigation, a transition coefficient can be shown in Table 3.

Table 3: Transformation indexes according to the classes of land

Index	Watery	Point	Arid	Point
1st Class Land	800	15	240	5
2nd Class Land	350	7	130	3
3rd Class Land	140	3	100	1

4.1.4 Planning of land planting and regional product diversity ($k_{epüç}$)

Planting of crops It depend upon regional planting habits, geography and farmers' knowledge. It is very important in Marmara, Aegean and Mediterranean because with an appropriate planting planning, three products can be produced. In the Central Anatolian Region, where industrial production or fruit growing is possible, planting cereals shows itself as unprofitable lost. From this respect, the one appropriate product type for the region of planning of land planting should be used because it has effect of increasingly on annual net income. For instance, because Cumra Plain and Celtik Plain of Konya are more fertile and have a better quality soil compared to their surroundings (Sarayönü and Altınekin Plains), their range of products is extensive. In these places, sugar beet, sunflower, wheat, barley are grown but rarely vegetables such as potato, onions, orchard and fruit growing are commonly made. In this respect, if regional product diversity is possible, 10 points and if it is not only, 5 points are given.

4.1.4 The potential of land use (k_{akk})

In this system, land is defined according to criteria of gradient, structure, depth, water conductivity, physical feature, erosion. All these criteria contribute to ***the potential of land use.*** Thanks to this formation, agricultural lands can be grouped as the 1st class, 2nd class and 3rd class lands. In terms of valuation, this classification is sufficient. We can form criteria mentioned above and limit values as in Table 1.

4.1.5 The shape of land (k_b)

Because the corners of land are sinuous, loss of plough able lands exist much because tractor cannot easily maneuver and come close to property boundary. Thus the areas of the field that cannot be planted increases. Thus, the field of

$$\textit{The field that cannot be planted} = 0.50 \; x \; \textit{Parcel circumference} \qquad (6)$$

cannot be planted. Here comes this question: what is the size of the ideal land? For this, a series of ***golden ratios*** comes to our minds that exists in nature and human body and creates esthetical appearance in creatures. In this series, rate of the latter term to the former term is about 1.60.

From here, we can make this determination; ***land should be rectangular geometrically and the rate of 1.60 should exist among its sides.*** After this comment, we can form weight

criterion like this:
$f_i = a^2.1,6$ and if we accept $f_i = f_p$, ideal a dimension of land is found. From here, $f_p = a^2.1,6$ and if a is pulling out, this is found: $a = \sqrt{\frac{f_p}{1.6}}$. The circumference of ideal land is $C_i = a + 1.6a + a + 1.6a = 5.2a$. If a is placed in C_i, it is like this: $C_i = 5.2\sqrt{\frac{f_p}{1.6}}$.

From here, shape criterion of land is calculated as like this: $k_b = -\left(\frac{5.2\sqrt{\frac{f_p}{1.65}}}{C_p} \right) x\,5$ (7)

4.1.6 Closeness to the forest boundary and the presence of wild animal (k_{osyh})

This closeness comes with two threats. The first one is that the forest shelters wild animals harming products such as mice, pigs, moles. The total cost of expenses for agricultural pesticides and traps (D_{yh}) is divided by the total field as "daa" and the result gets in the transaction as "-". The second one is the extending of the forest boundaries with the legal regulations. This caauses you to lose your land with publicization.

However, the forest can be useful because it creates a natural environment. For instance, you do not have to struggle against the wheatworms such as stink bugs because in the forest birds such as sparrows and starlings live. From this respect, the closeness to the forest boundary and the presence of the wild animals are useful.

$$k_{osyh} = -\frac{D_{yh}}{f_p} \quad (8)$$

4.2 Positional Criteria

Positional criteria are
a) Overflow population of urban areas,
b) Population density,
c) Convenience of purchase and sale,
d) Convenience of transportation,
e) Closeness to the urban areas,
f) Source of agricultural laborers and
g) Presence of meadow lands.

4.2.1 Overflow population of urban and town (k_n)

According to The Metropolitan Municipality Law (numbered 5216) places whose central population is over 750000 are accepted as ***metropolis.*** Thus, this criterion is important for the agricultural fields around metropolis. Overflow of urban population is actually the criteria for

that this land will one day become urban land (unprocessed zoning land) but how many years later? As the urban population increases, it threatens agricultural areas around to become urban lands (Killing, 2007). The mathematical weight of this depends upon conjecture.

4.2.2 Population density (k_{ny})

The larger the population of the village where the land exists is, the easier the agriculture is in the village. As the density increases, agricultural fertilizer factories and agricultural laborers will come more easily and cheaply available at this level. However, population should not exceed 5000 because above 5000, it becomes into a municipality according to Construction Law (according to the item of 7/a of the Devoloping Law numbered 3194). Thus, the village changes its feature into urban areas. The ideal village population is between 750 and 3000. If the population is in these boundaries, its value is given as 5 points and if not, 5 points are reduced.

4.2.3 Convenience of purchasing and sale (k_{ask})

There are many difficulties preventing a land from being purchased and sold. These difficulties are,

- Tribalism and
- That farmers have no intention of paying their credits or taxes.

If there exists tribalism in an area as in the Southeastern Anatolia Region, this is a negative situation for both the purchasers and sellers. If a purchaser buys a land not belonging to the tribe that he is not involved in, this is a humiliating situation for that tribe. The land seller is also alienated by the tribe. This causes the market to narrow for both the purchasers and sellers.

The farmers in some regions cannot pay their loans to the banks because of excessive debts. This difficulty is determined with this coefficient: Banks give credits for a 25% of the land value (75% of its value) in order that they recoup their loan on a forced sale. Lower credit the banks give credit for that area, the more value is reduced. The loan in Central Anatolian Region is between 75% and 70%. From the unit value of land, the value as k_{ask} is reduced.

$$k_{as1} = 0.75 - 0.75 = 0.0 \quad k_{as2} = 0.75 - 0.70 = 0.5 \quad k_{as} = -\frac{k_{as1} + k_{as2}}{2} \tag{9}$$

4.2.4 Convenience of transportation (k_u)

From the farmer's house, the distances to,

- Main roads (k_{uay}),
- Village centers (k_{ukm}),
- Gas stations (k_{upi}),
- Purchase centers such as sugar and sauce factories (k_{uam}).

are important. Here the determining distance is 10 kilometers because agriculture vehicles can

move 30 km/h most when empty and 20 km/h when full. Because transportation experts say that travels above 30 minutes tire people and decreases the willingness of working, the distance is found as 10 kilometers (Gocer O, 1989). For these four basic standards, separate scoring table can be made like this:

$$k_{uay} = (10 - U_k)\ x\ 0.5 \quad k_{ukm} = (10 - U_k)\ x\ 0.5$$
$$k_{upi} = (10 - U_k)\ x\ 0.5 \quad k_{uam} = (10 - U_k)\ x\ 0.5 \qquad (10)$$

4.2.5 Closeness to urban or town (k_{ky})

The distance of land to urban areas is important. The ideal distance is between 50 km and 70 km because if it is closer than 50 km, it loses its agricultural feature and has a transition to urban inter-speculation. Each 8 km after 70 km increases transportation cost (transportation vehicles take 8 km with petrol of 1 liter) . Thus, the cost of product increases 1 point at each 8 km. Therefore, to reflect such distance 1% is reduced.

$$k_{ky} = \frac{70 - U_k}{8}\ x\ 1 \qquad (11)$$

4.2.6 Source of agricultural laborer (k_{tik})

In each step of agricultural facilities (plowing, planting, applying pesticide, hoeing, harvest, etc.) human labor is needed. Therefore, agricultural laborers should be employed if possible from the same village and if not from near villages. If they are coming from another province or area, transportation, accommodation and health expenditures should be met by the property owner as extras. Therefore, if agricultural laborers can be employed from the same village or near villages, 5 points are given and if not 5 points are reduced.

4.2.7 Presence of meadow land (k_{mv})

In our country, 33% of farmer families only do agriculture and 67% of them both do **agriculture and ranch** [10]. Where these two facilities are done together both reduces expenditures and risk because the necessary forage of non-livestock animals is obtained by meadow land, nutrition input considerably decreases. If meadow land exits in village, 5 points are given and if not 5 points are reduced.

4.3 Calculation of Land Value Point (ADP)

For a land, a scoring is made according to the valuation criteria discussed. The total points are an additional percentage value (%) to Presence of land itself. To this percentage value, +1 (100% point) is added for that land. ***The land Value Point (ADP=LVP)*** is calculated. Land value point is a value point for that land and it is accepted and it exists in each unit field. According to this, ADP cohesion can be formulated like this:

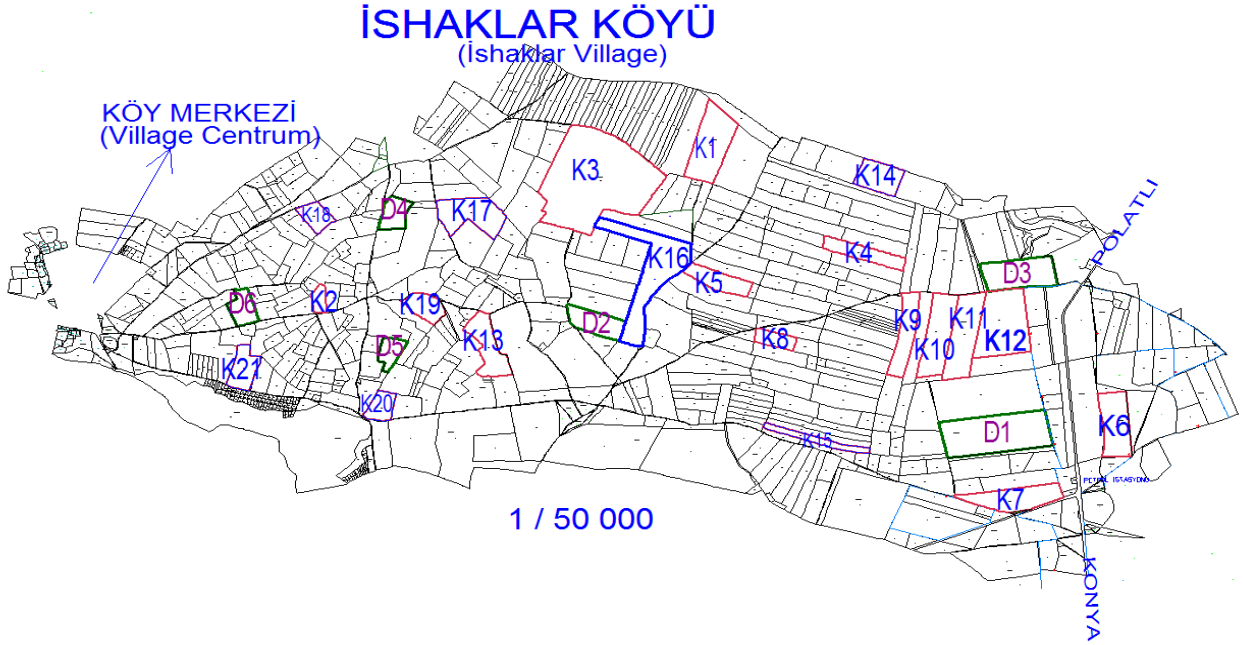
$$ADP_i = 1 + (k_{byüp} + k_{yd} + k_{so} + k_{epüç} + k_{akk} - k_b - k_{osyh} \pm k_{ny} - k_{ask} \pm k_{uay} \pm k_{ukm} \pm k_{upi} \pm k_{uam} \pm k_{ky} \pm k_{tik} \pm k_{mv}) \, x \, \frac{1}{100} \quad (12)$$

5 APPLICATION

5.1 Describing Application Village

For this study, for the sale of public domains in Ishak Usagı Village that is dependent to Konya, Celtik district was chosen as the application area. Ishak Usagı Village is to the northeast of Konya at a distance of 210 km to the main road and Konya. It has a surface of 6250 hectare and a population of 850. Also its livelihood is relied on agriculture. It has continental climate, irrigable lands and a large range of products (Map 1).

K1, K2, Comparison lands
D1, D2, Lands whose valuation will be made



Map 1: The work field

In this village for valuation purposes, the following steps were taken:

a) Farmers in the village mostly purchase lands from government lands,
b) Purchase and sale among the individuals is quite a little,
c) Therefore, 21 of those purchasing from government lands were taken in sample group,
d) Sale values were fixed in September, 2013,
e) Features and valuation information of lands taken into the group are transferred to Table 6,
f) After determining product classes, the abilities to be irrigated, planting plans of these lands, the annual net income of land in each class was calculated according to average planting habits in the village (Table 4 and 5).

Lands in the village are genereally in groups of the 1st class watery, 1st arid and 2nd arid land. According to these groups, net income calcuations unit field (1 decare) were made in Table 4 and 5 according to plannings of land planting that are dominant in the village.

Table 4: The regional products growing in 1st class watery and arid field and their yield (url-2)

PLANTS	**Yield in irrigated (kg/daa)** (V_s)	**Yield in arid (kg/daa)** (V_k)	**Net Profit Rate (%)** (K)	**Sale Price (TL/kg)** (F)	**Annual Net Income(TL/daa)** $G = V_s \times K \times F$	
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 product) $G_A=(G_b+G_a+G_{aç}+G_{sp})$	799.25	325.50				
NET INCOME(side product) $_Y=(G_{bs}+G_{as})$	238.50	146.70				
TOTAL NET INCOME (TL/da) $G_{NY} = G_A + G_Y$	1037.75	472.20				
ANNUAL NET INCOME $(G_N = (G_{NY}/Dön.Say.)$	1037.75/5= **207.55 TL/daa**	472.20/4= **118.05 TL/daa**				

Land planting plan at 1st class at watery= SB + SF + W+ B + F= 5 years (ŞP+AÇ+B+A+N)
Land plan planting at 2nd class arid= SF+W+B+F =4 years (AÇ +B + A + N)

Table 5: The regional products growing in 2nd class in arid field and their yield (url-2)

PLANTS	**Yield in arid (kg/daa)** (V_k)	**Net Profit Rate (%)** (K)	**Sale Price (TL/kg)** (F)	**Annual Net Income (TL/daa)** $G = V_s \times K \times F$
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 product) $G_A=(G_b+G_a+G_{aç})$	148.00			
NET INCOME (side product) $G_Y=(G_{bs}+G_{as})$	128.25			
TOTAL NET INCOME (TL/daa) $G_{NY} = G_A + G_Y$	276.25			
ANNUAL NET INCOME $(G_N = (G_{NY}/Dön.Say.)$	276.25/3 = **92.08 TL/daa**			

Land planting plan in 2nd class arid = W + B + F = 3 years
Yield and positional points of 21 lands whose valuation are to be made are seen at Table 6 Valuation criteria and land value points of comparison lands in work field were calculated as shown the last line of the table.

Table 6: The value points of the 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 Value Point (ADP)	**40**	**10**	**65**	**9**	**12**	**48**	**51**	**17**	**30**	**23**	**20**	**28**	**13**	**34**	**29**	**51**	**10**	**7**	**16**	**15**	**15**

After this, the features and sale values of comparison lands were obtained and they were transferred to the Table 7 by being updated.

Table 7: The capitalization interest rate calculation of comparison lands according to the known method

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

When ***k*** values in the last column of Table 7 are examined, it is seen that the lowest rate is 0.0403 and the highest rate is 0.0767. Because one capitalization interest rate is calculated for a whole village through the known method, the arithmetic average of all these 21 values should be taken. If arithmetic average of the group where there is difference of 90% between the lowest and the highest values is taken, the rate of $k = \frac{G}{D} = 0.0592$ is found ($m_0 = \pm 0.013$), which is an incorrect result because

a) The rate difference among the values in the group is excessive.
b) In the village, watery and arid fields exist and annual net incomes of these are very different,
c) Lands are located in different places.

For this and such reasons, all the land of the village cannot be accepted equivalent yield and positional and taken at the same group. Instead of this, after their land value points (ADP=LVP), are omitted from all lands, that is to say, they become ***bare,*** capitalization interest rates of watery and arid lands should be applied separately to their own classes. This calculation is seen at Table 8.

Table 8:The capitalization interest rate of comparison lands considering (ADP) LVP

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

Bare value is calculated with this cohesion: $$YD = \frac{RB}{(1 + ADP)} \qquad (13)$$

When ***k*** is examined in the last column, the lowest rate is 0.0609 and the highest rate is 0.0844. The difference between the lowest and highest value is 39% (The difference in the known method was 90%). Main reason for this is that real estate prices are arrived at by cleaning them of positional and yield values. However, there are three groups in 21 values in terms of both land class and the potential of being irrigated. They are:

a) For the 1st class watery lands k,
b) For the 1st class arid lands k,
c) For the 2nd class arid lands k

Thus, when these data are divided into three groups, capitalization interest rate of ***k*** should be calculated.

If the market value of any land is to be calculated according to these rates, this cohesion should be used. According to this situation, Table 9 can be formed.

Table 9: The average capitalization calculation considering bare value

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

k capitalization rates and the average errors calculated according to the Table 9 are seen in the last two columns. As seen, the average errors are quite low and the lining of k is that the land of highest quality has the lowest rate and the land of lowest quality has the highest rate. This proves us that ***the bare valuation method*** is scientifically true.

$$k_{1.sınıf\ sulak} \langle k_{1.sınıf\ kıraç} \langle k_{2.sınıf\ kıraç} \qquad (14)$$

$$0.0655 \langle 0.0706 \langle 0.0805$$

According to these rates, if the market value of any land is desired to be calculated, this cohesion should be used:

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

5.2 Application through Bare Value Method

For the valuations of D1,D2…lands that the General Directorate of National Real Estate offers for sale, land value points (ADP) should be found first (Table 6). After that, market value for valuation is calculated separately according to the cohesions of numbered as 2 and 13 (Table 11). As seen at the last column, there is a difference between the two values that cannot be underestimated. Which one of these two values is the most probable value?

The answer of the question is the one found with number 13 of course because
a) Calculated value is quite close to the current sale values like K1,K2

b) Quadratic average error m_0= 0.013 found with the number 2 cohesion is bigger than quadratic average errors (m_{01}= 0.003, m_{02}= 0.006, m_{03}= 0.002) found with the number 13, it is usual that there exist quite big variations in values found according to the number 2.

Table 10: The valuation points of lands whose valuation will be made

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}	-	-	-	-	-	-
k_{tik}	5	5	5	5	5	5
k_{mv}	5	5	5	5	5	5
Land Value Point(ADP)	**51**	**42**	**17**	**5**	**5**	**14**

Table 11: The features and sale values of the lands whose valuation will be made and capitalization interest rate calculation according to the known method

SN	**Area (daa)**	**Land Class**	**Land Planting Plan**	**Annual Net Income (TL/daa)**	**LVP**	**RB=(G_n/k) (cohesion 2)**	**RB=(G_n/k)(1+ADP) (cohesion 13)**	**Difference (TL)**
D1	663	1. Watery	ŞP+AÇ+B+A+N	207.55	51	3506	4785	1279
D2	200	1. Watery	ŞP+AÇ+B+A+N	207.55	42	3506	4500	994
D3	345	1. Arid	AÇ+B+A+N	118.05	17	1994	1956	-38
D4	131	2. Arid	B+A+N	92.08	5	1555	1201	-354
D5	101	2. Arid	B+A+N	92.08	5	1555	1201	-354
D6	129	2. Arid	B+A+N	92.08	14	1555	1304	-251

6 CONCLUSION

The real estate valuation in our country concerns many institutions such as:
a) The Municipalities,
b) The Directorate of Land Registry and Cadastre,
c) The Administration of Housing Development,
d) The Provincial Special Administrations,
e) The Provincial Directorates of Agriculture,
f) The Provincial Banks,

g) Banks,
h) The Capital Market Board (CMB).

The legal licensed valuation firms have been serving (especially to the CMB) in our country since 2002. For this reason, institutions need is more of the valuers. Because of this, institutions generally obtain the purchasing and selling data they need for the real estates from the municipalities because the municipalities collect the taxes of the real estates. However, the number of the valuers in municipalities is very limited apart from the metropolitan municipalities. The purchasing and selling data in municipalities is the valuation the owners declare for the taxes of the real estates. These valuations mostly reach one-third of the market values. This causes not only important data loss but also the fact that other institutions obtaining data from these institutions produce incorrect results.

Because of the reasons explained above, the selling values belonging to 21 real estates are not the declaration values but the market values. Therefore, considering that this could affect the result negatively, the market values of 21 real estates are considered as sufficient.

The use of land which is one of the fundamental factors of human life increases day by day for a range of purposes such as urban, industry, transportation and agricultural. The value of agricultural lands is continuously changing because of intense demand and nutrition for agricultural demands from different people. Because of this, the valuation of agricultural lands has gained importance. The valuation of lands is made for various aims such as expropriation, purchasing, credit facility, bank hypothec. Whatever the aim is, as a legal obligation, valuation is made according to the income method in Turkey. However, in these valuations the bland value score and conjecture are being ignored. As understood from the previous part, it is vital that the most possible results are approached if the valuation of rural areas are made according to the ***Bare Valuation Method*** .

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,
$k_{epüç}$: The criterion for land planting plan and product diversity,
k_{ky} :,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_{ny} : 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_{uay} : 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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BIOGRAPHICAL NOTES

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