



6th Intercontinental Geoinformation Days

igd.mersin.edu.tr



Value based land regulation model and its applicability in Türkiye

Mehmet Koçoğlu ¹, Mehmet Ertaş ^{*2}, Mevlüt Uyan ²

¹Munzur University, Vocational School of Pertek Sakine Genç, Tunceli, Türkiye

²Konya Technical University, Vocational School of Technical Sciences, Konya, Türkiye

Keywords

Land readjustment
Value-based land readjustment
Cadastral parcels

Abstract

Land and land arrangement works in Türkiye are carried out in accordance with Article 18 of the Zoning Law No. 3194. According to the legislation, all cadastral parcels within the regulation boundary are considered as a whole and converted into zoning parcels. It is usual to experience an increase in value in these areas that gain the status of zoning parcel. However, in practice, while some cadastral parcels within the regulation boundary benefit a lot from this increase in value, some parcels are satisfied with less value increase. This problem experienced in practice often leads to objection to the application or legal process for citizens. According to Article 18 of the Zoning Law No. 3194, the implementation of value-based distribution instead of area-based distribution, which is created by making a deduction at the same rate from all parcels within the regulation boundary, is of great importance in terms of eliminating the existing problems. However, the uncertainties regarding the valuation of the land and land arrangement weaken the strength of the value-based land and land arrangement approach. In this study, in order for the value-based land and land arrangement model to be applicable and adopted by practitioners, the "development right", which directly and most affects the value of immovable property, is taken as the basis.

1. Introduction

With population growth and urbanisation, the planned and healthy development of built-up areas depends on the preparation of zoning plans and the reflection of the prepared plans to the land in terms of technical and legal aspects.

In Türkiye, "Land and Land Arrangement" (AAD) applications, which is one of the methods of implementing large area zoning plans, are carried out in accordance with Article 18 of the Zoning Law No. 3194.

With the Land and Land Regulation (AAD) applications, the cadastral parcels within the regulation boundary according to the zoning plans are transformed into zoning parcels, and the economic values of the immovables change along with the cadastral boundaries. The fact that the gain provided to the owners by this economic change is not of the same value for all immovable properties brings along certain problems.

The approach of Yıldız (1977), who presented the value-based distribution proposal for the first time in Türkiye, has been evaluated by many researchers and

studies have been carried out on its applicability in Türkiye with various methods. However, regional differences in the parameters affecting the value of immovable property and the existence of uncertainties regarding the value calculation weaken the strength of the value-based approach method (Ertunç and Uyan 2022).

"In order to eliminate these weaknesses, there is a need for an allocation model based on another criterion other than value but directly affecting the value, such as development rights or construction area" (Çağdaş 2019).

In this study, in order for the value-based ECL model to be applicable and adopted by the practitioners, the amount of the debiting of the value differences arising from the length of the parcel frontage and the width of the road frontage (road debt) is evaluated as the progress payment construction area and included in the equalisation based on the "zoning right", which directly and most directly affects the value of the immovable. The allocation values calculated by applying this method in a pilot study area were compared with the current application method.

* Corresponding Author

(mehmetkocoglu@munzur.edu.tr) ORCID ID 0000-0002-3583-0544
(mertas@ktun.edu.tr) ORCID ID 0000-0002-9458-3395
(muyan@ktun.edu.tr) ORCID ID 0000-0002-3415-6893

Cite this study

Koçoğlu, M., Ertaş, M., & Uyan, M. (2023). Value based land regulation model and its applicability in Türkiye. *Intercontinental Geoinformation Days (IGD)*, 6, 411-414, Baku, Azerbaijan

2 Regulation model based on zoning rights

The development right-based AAD is a method that ensures that the value increases that will occur after the implementation are transferred to the public and the zoning parcels formed are allocated at their pre-regulation values. The model developed by Çağdaş (2019) was applied in the determined regulation area.

In the model; in addition to the increase in value generated by the EAD, the theoretical construction area deserved by the parcel before the plan is equalised with the construction area of the parcel that will be formed after the implementation according to the zoning plan, and the total construction area increase provided is transferred to the public. The value difference arising according to the emsale can be distributed to the owners in a fair manner when desired. Spatial value differences are prevented by preserving the rule of allocation to the parcel from its current location (Ertaş and Uşak, 2020).

According to the AAD model based on the zoning right, the construction areas of participation and allocation should be equal, as shown in Equation (1).

$$\sum_{i=1}^n \dot{A}_{k_i} = \sum_{j=1}^m \dot{A}_{t_j} \quad (1)$$

A_{k_i} = Participation construction area of cadastral parcel before the arrangement

A_{t_j} = Construction area allocated to the zoning parcel after the arrangement

Total participation and allocation construction areas are found by Equation (2). In the proposal approach, the construction precedent before the regulation is determined according to the Regulation on Unplanned Areas, and the construction precedent after the regulation is determined according to the implementation zoning plan.

$$\sum_{i=1}^n A_i e_i = \sum_{j=1}^m A_j e_j \quad (2)$$

A_i = Area of the parcel before regularisation

e_i = Precedent before adjustment

A_j = Area of the parcel after regularisation

e_j = Precedent after adjustment

Since the total participation and allocation values will vary with the zoning plan decisions, the equivalence cannot always be achieved and there will be an increase in the ratio (δ). This ratio is obtained by dividing the total allocation construction area by the total participation construction area as in Equation (3).

$$\delta = \frac{\sum_{j=1}^m \dot{A}_{t_j}}{\sum_{i=1}^n \dot{A}_{k_i}} \quad (3)$$

The difference between the total area of the parcels participating in the implementation and the total area of the allocation parcels formed after the implementation meets the public service areas in the regulation area according to the zoning plan. The amount of public service areas is found by Equation (4).

$$\sum A_{kh} = \sum_{i=1}^n A_i - \sum_{j=1}^m A_j \quad (4)$$

A_{kh} = Public service areas

The proposed method aims to allocate zoning parcels equivalent in size to the pre-application construction area, while at the same time transferring the excess construction area gained through the zoning plan to the public. The amount of land to be transferred to the public ($\Sigma\Delta$) can be found by both Equations (5) and (6).

$$\Sigma\Delta = \sum_{j=1}^m \dot{A}_{t_j} - \sum_{i=1}^n \dot{A}_{k_i} \quad (5)$$

$$\Sigma\Delta = (\delta - 1) \cdot \sum_{i=1}^n \dot{A}_{k_i} \quad (6)$$

In cases where the increase in construction area is large, it may be possible to allocate some of this increase to the parcels that will be affected by the regulation and some of it to the public instead of transferring it to the public. In this case, the value increases to be allocated to the parcels and the public are found by Equations (7) and (8), respectively. The expressions p_p and p_k in the equations denote the sharing ratio of the increase in construction area between the public and the parcels.

$$\Sigma\Delta_p = \Sigma\Delta \cdot p_p \quad (7)$$

$$\Sigma\Delta_k = \Sigma\Delta \cdot p_k \quad (8)$$

$\Sigma\Delta_p$ = Construction area to be allocated to parcels

$\Sigma\Delta_k$ = Construction area to be allocated to the public

The progress payment value of a parcel within the regulation boundary is equal to the sum of the parcel participation value and the value increase amount allocated to the parcel in Equation (2.10), as given in Equation (9).

$$\dot{A}_{h_i} = \dot{A}_{k_i} + \Delta_{p_i} \quad (9)$$

$$\Delta_{p_i} = A_{k_i} \cdot (\delta - 1) \cdot p_p \quad (10)$$

\dot{A}_{h_i} = Parcel progress payment area after adjustment

\dot{A}_{k_i} = Pre-regulation construction area

Δ_{p_i} = Amount of increase in construction area allocated to the parcel

The area of the zoning parcel to be allocated is calculated by proportioning the progress payment construction area calculated for the parcel to the precedent of the zoning island to be allocated, as given in Equation (11).

$$A_j = \frac{\dot{A}_{h_i}}{e_j} \quad (11)$$

A_j = Area of zoning parcel to be allocated

\dot{A}_{h_i} = Parcel progress payment construction area

e_j = Development island precedent value

Construction progress payment and construction allocation areas should be equal to each other. If the parcel area is not sufficient and this equivalence cannot be achieved, the difference (γ) between the construction progress payment and construction allocation areas found by equation (12) can be converted into a price (B_i) by multiplying it with the official building unit cost price

(M) of that year according to the date of application by Equation (13).

$$\gamma_i = \dot{A}_{t_i} - \dot{A}_{h_i} \quad (12)$$

$$B_i = \gamma_i \cdot M \quad (13)$$

According to the proposal method, the areal deduction rate of a parcel is calculated by dividing the allocated parcel area by the participation parcel area as in Equation (14).

$$k_i = 1 - \frac{A_j}{A_i} \quad (14)$$

According to the arrangement model based on the zoning right, the allocation schedule in the application area is created.

2.1 Debiting the value differences arising from the length of the parcel frontage and the width of the road frontage

Taking into account the frontage lengths and road widths of the zoning parcels after the arrangement, the resulting value differences were debited as "road debt" (Yıldız et al., 2008). The road debt amounts were evaluated as progress payment construction area according to the method based on development rights and included in equalisation. In the distribution model based on development rights, while the value differences arising from the increase in precedent are taken into consideration, road widths and frontage lengths are not evaluated. As the precedents of the development islands may be different, the road widths surrounding the development islands may also be different.

According to the frontage lengths and road widths of the regulation area, the weighted frontage length is calculated for each zoning parcel separately by Equation (15).

$$AC = \frac{\sum_{i=1}^n YG_i \cdot PC_i}{\sum_{i=1}^n YG_i} = \left(\frac{YG_1 \cdot PC_1 + YG_2 \cdot PC_2 + YG_3 \cdot PC_3}{YG_1 + YG_2 + YG_3} \cdot n \right) \quad (15)$$

AC = Weighted façade length

YG = Road width

PC = Parcel frontage length

n = Number of facades

At the same time, since the road widths of each parcel cannot be the same, weighted road widths are calculated by Equation (16).

$$AYG = \frac{YG_1 \cdot PC_1 + 2 \cdot YG_2 \cdot PC_2 + 3 \cdot YG_3 \cdot PC_3}{\sum_{i=1}^n PC_i} \quad (16)$$

AYG = Weighted road width

According to the suggestion of (YALPIR, 2007); the multiplication coefficient of the widest road was taken as 1, and the weights of the road widths were determined by successively increasing towards the narrowest road.

The overall weighted road width on island basis was found by Equation (17).

$$GAYG = \frac{\sum_{i=1}^n YG_i \cdot PC_i}{PC_i} \quad (17)$$

GAYG = General weighted road width

Then, the weighted road debt is calculated for each zoning parcel using Equation (18). Since the amounts of receivables or payables are assessed on an island basis, the average road debt for each zoning island is calculated. The difference between the weighted road debt and the average road debt calculated on an island basis will constitute the actual road debt.

$$\text{Road Debt (YB)} = \frac{AC_i(AYG_i - GAYG)}{10} \quad (18)$$

According to the result obtained, negative values are considered as creditor while positive values are considered as debtor. The debts and credits of the parcels on island basis should be equal to each other. Thus, it will be mathematically controlled.

2.2 Evaluating the road debt amounts as progress payment construction area and including them in equalisation

In land use right based land use applications, the value differences that occur according to the precedent values that change with the zoning plans are not sufficient for equalisation alone. As the precedents may differ in zoning islands, the frontage lengths and frontage road widths of the zoning parcels formed after the arrangement may also differ. A more equitable distribution will be ensured with the approach of mathematically evaluating the road debt as the progress payment construction area according to the method based on the development right and including it in the equalisation. Thus, it can be realised that the right holders gain the same value.

The inclusion of the road debt amounts in the equalisation is achieved by using the generated Equation (19).

$$YBD = (Y_b \cdot E) \cdot M \quad (19)$$

YBD = Road debt equalisation

Y_b = Amount of road debt

E = Precedent

M = Construction cost

For the construction cost (M); the value determined for 2019 based on the Building Approximate Unit Costs schedule used in the calculation of the compensation fee based on the development right was taken into consideration.

With the Equation (19), the road debt amounts of the zoning parcels in the regulation area are evaluated together with the right of way construction area and included in the equalisation

2.3 Area Based Distribution of the Regulation Area

In the area determined as the study area, DOP calculation should be made after the regulation limit is passed according to the AD regulation.

3 Results and Conclusions

The distribution method based on area, which is one of the methods for the comprehensive reflection of zoning plans on the land, is constantly criticised due to legal and technical problems. Because, due to the nature of this application, the parcel values before and after the regulation are not taken into consideration. In addition, the DOP deductions made from the cadastral parcels subject to the regulation in proportion to their area are not parallel to the increase in value after the implementation. Although this situation leads to value differences, it does not change the value of the parcels within the regulation boundary at the same rate. Considering the location and characteristics of the parcels, the value parameters affecting the parcel values before and after the implementation should be determined and evaluated according to objective methods.

In value-based AD applications, it is desired that the values of the parcels entering the regulation should be parallel to their values after the regulation. The increase in value should be a gain for the public. For a proposal approach that will be accepted by the practitioners and the society, each parameter should be evaluated. The proposal method provides the rule of allocating parcels from the same or close to the same place as in the existing AD applications. In addition, the construction areas of the parcels before the regulation and the construction areas of the parcels after the regulation are equalised and the increase in value gained with the zoning plan is provided to the public.

The value differences arising from the frontage lengths of the zoning parcels formed after the arrangement and the width of the road frontage, which are considered as a deficiency of the application method based on the zoning right, have been included in the application. In practice, the value expressed as road debt is found on parcel basis. The road debt amounts are evaluated as progress payment construction area and included in equalisation.

Before the implementation of value-based AD in Türkiye, a valuation system is needed in order to produce the parameters affecting the value fairly and objectively. Academicians, practitioners and legislators should act in coordination on a good valuation system and value-based AD application method and meet the need for regulation clearly. Effective utilisation of technology and computer software will accelerate the transition process. In particular, value maps to be created with the effective use of Geographical Information Systems within the Land Registry and Cadastre Directorates should be made available to practitioners through databases.

It should be ensured that the interview stage in land consolidation applications is also carried out with value-based AD, and the opinions of the owners in the area where the implementation decision is taken should be taken into consideration. In this way, objections to the courts will be reduced and the judicial burden will be lightened.

Before the implementation of value-based AD in Türkiye, a valuation system is needed in order to produce the parameters affecting the value fairly and objectively.

Academicians, practitioners and legislators should act in a coordinated manner and clearly meet the need for regulation regarding a good valuation system and value-based AD application method. Effective utilisation of technology and computer software will accelerate the transition process. In particular, value maps to be created with the effective use of Geographical Information Systems within the Land Registry and Cadastre Directorates should be made available to practitioners through databases.

It should be ensured that the interview stage in land consolidation applications is also carried out with value-based AD, and the opinions of the owners in the area where the implementation decision is taken should be taken into consideration. In this way, objections to the courts will be reduced and the judicial burden will be lightened.

In value-based AD applications, the creation and use of advanced software where the distribution can be calculated and made easily and quickly according to the parameters and weight ratios affecting the immovable value will make a great contribution to the transition process.

Training should be provided to the students studying Surveying Engineering at universities, especially to the practitioners, and the technical and legal infrastructure should be established by academicians.

Existing implementation proposals should be revised by stakeholders and an implementation method that will be accepted by both implementers and right holders should be established.

References

- Çağdaş, V. (2019). İmar Hakkı Esasına Dayalı Arazi ve Arsa Düzenlemesi Modeli, *Harita Dergisi*, 161, 57-66.
- Ertunç, E., & Uyan, M. (2022). Land valuation with Best Worst Method in land consolidation projects. *Land Use Policy*, 122, 106360.
- Koçoğlu, M. (2019). Değer Esaslı Arsa Düzenlemesi Modeli ve Ülkemizde Uygulanabilirliği, *YL Tezi*, Konya Teknik Üniversitesi, Konya
- Ertaş, M., & Uşak, B. (2020). İmar Planlarında Farklı Yoğunlukların Taşınmaz Birim Değerine Etkisi, *Türkiye Arazi Yönetimi*, 2(2), 48-55
- Yalçır, Ş. (2007). Bulanık Mantık Metodolojisi ile Taşınmaz Değerleme Modelinin Geliştirilmesi ve Uygulaması: Konya Örneği, *Selçuk Üniversitesi, Fen Bilimleri Enstitüsü, Doktora Tezi*, 245s, Konya.
- Yıldız, F., Özkan, G., Yalçır, Ş., Yıldırım, H., Gökmen, A., & Öztaş, M. (2008). Alan Düzenleme Esaslarının Belirlenmesinde Değer Eşitliğini Esas Alan Modellerin Uygulanması Üzerine Bir Araştırma, *Jeodezi, Jeoinformasyon ve Arazi Yönetimi Dergisi*, 99, 5-14.
- Yıldız, N. (1977). Arsa Düzenlemesi, *Yıldız Teknik Üniversitesi, Profesörlük Takdim Tezi*, 62s, İstanbul. 3194 Sayılı İmar Kanunu, R.G.: 18749/ 09.05.1985. www.mevzuat.gov.tr