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## AN AGRICULTURAL LAND VALUE ASSESSMENT MODEL

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## Summary

The aim of this article is to establish and present a model which is possible and necessary to apply when assessing the value of an agricultural land in the existing economic, legal and market framework of the Republic of Serbia. This article is a preliminary and integral component of a broader research project titled Value Assessment for Various Types of Real Estate in the Republic of Serbia and the Possibility of Their Expression in Accounting, realized at the Faculty of Real Estate Management, Union Nikola Tesla University, Belgrade. The article presents only those preliminary results and the model related to the specified topic, and uses the methods which are successfully employed, in this domain, in the developed countries, primarily in the USA, Germany and France and which are modified with respect to the legal framework and market conditions in the Republic of Serbia. The topic is significant and relevant in light of the announced privatization of 10,000 ha of agricultural land. It is also possible to use this model to re-examine the validity of earlier agricultural land value assessments within the process of privatization of certain agricultural properties.

**Key words**: assessment, value, agricultural land, assessor.

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### Introduction

The property (capital) assessment is a process carried out by a team of trained, certified assessors which needs to result in giving an opinion about the value of the property or specific components of the property on the given day<sup>4</sup>.

Legal regulations in this area on the level of the Republic of Serbia consist of:

- 1) Ownership Transformation Act,
- 2) Regulation on the requirements that a certified assessor has to meet and the procedure of revoking a certificate,
- 3) Regulation of the capital value assessment procedure,
- 4) Instructions for the application of methods of capital value assessment and the way in which the value assessment is presented<sup>5</sup>.

In order to carry out the assessment procedure correctly and construct a valid report, it is necessary to understand the meaning of some widely used terms appropriately. For example, the notion of assessment should include the procedure of determining the value as well as giving an opinion about the value of the property (in the present case it is an agricultural property), exclusively on the determined day<sup>6</sup>.

The notion that is probably most widely used is value, which in itself is quite vague because there are many acceptable definitions, of which the most correctly used one is *fair* value. Fair value is the amount of money for which the seller is ready to transfer the ownership of the property to the buyer in a wilful transfer while both side are well informed about the relevant facts (a transfer under usual trade conditions). It is also understood that the buyer and seller are not known in advance, i.e. the transfer is hypothetical and the property is considered as it is, without significant investments, which is what has to be completely applied in agricultural property assessment. It is important to note that the amount of money that is paid for a certain property is almost never identical to the one stated in the report of a certified assessor, and this is usually due to the following reasons: special motivation, negotiation skills, as well as the method of financial transaction or other specifics.

In this paper, we will present and analyse, on a hypothetical example, a model of agricultural land value assessment model, which is, in our opinion, the most suitable given the market, economic and other conditions in the Republic of Serbia

<sup>4</sup> Majstorović, A., Research project of the Defense Ministry of the Republic of Serbia, 306/12-10, 2008, *Projection of development of the financial function of the defense system by 2020*, pg. 6, Belgrade.

<sup>5</sup> A. Majstorović, Research project of the Defense Ministry of the Republic of Serbia. 306/12-10, 2008, *Projection of development of the financial function of the defense system by 2020*, pg. 11-12, Belgrade.

<sup>6</sup> Bubić, J, Hajnrih, J. (2012): The analyses business performances of agricultural enterprises in Vojvodina during the current crisis, Economics of Agriculture, BSAAE, IAE, AES, No. 2, pg. 183-195, Belgrade.

# Basic elements of agricultural land value assessment

Different authors emphasize different factors – elements of real estate value assessment. Those elements are assigned greater or smaller significance depending on the component of the property being assessed (buildings, infrastructural objects, land, forest, etc.). The model of agricultural land value assessment proposed in this paper will take into account the following most important aspects:

- 1) Location (cadastre municipality),
- 2) Land capability (type, class),
- 3) Use (applicability for some kind of agricultural production),
- 4) Distance from a settlement,
- 5) Distance from a hard road,
- 6) Distance from an electricity supply source,
- 7) Distance from a water supply source,
- 8) Possibility of irrigation<sup>7</sup>.

The abovementioned factors can be established by examining registry lists, copies of cadastre service plans, the sketch of land tracts (this is the most important and most widely used method for agricultural land), pedological maps and analysing the property on the spot (this method is also very widely used under our current conditions).

For determining the market value, it is possible to use the data on market prices of agricultural land on a specific territory as well as the data on the tax base level for agricultural land which is established by the local tax office. The value which is thereby determined has to be increased by adding the values of the real estate located on the property (which should be assessed according to the model and methodology appropriate for that type of real estate), e.g. stationary part of the irrigation system, buildings, fence, wells, roads and crops.<sup>8</sup>

## **Methods and Materials**

Present research project of analysing and creating a model of agricultural land value assessment has been carried out by using the methods of projection, statistical analysis, probability theory, descriptive methods and methods of inductive and deductive reasoning. The main hypothesis is that it is possible to create a model of agricultural land value assessment which can be successfully implemented in the Republic of Serbia. The main goal is to provide a model that can serve as a basis for future agricultural land value assessment and to engage scientific and research institutions in its further development.

Broadly stated, real estate is a part of the surface of the Earth, i.e. something that cannot be relocated from one location to the other without changing its substance. In that light, an agricultural land is a part of the surface of the Earth which is geometrically bound and has a

<sup>7</sup> Leko, V., Vlahović, A., Poznanić, V. (1997): Procena vrednosti kapitala, Ekonomski institut, Beograd, pg. 88-89.

<sup>8</sup> Faculty of Economics and engineering management, *Value assessment for fixed assets at the Public company Zelenilo, Novi Sad*, project no. 8/2012, pg. 23, Novi Sad.

special mark (cadastre mark) and use (for agricultural production), which makes it essentially different from other land properties. The value of the agricultural land, therefore, represents the total income that can be collected from that property expressed in money. While making an assessment of the value of an agricultural land, it is necessary to choose a method by which to carry out the procedure (the methodological framework of assessment), based on predefined and presented elements that determine the value. The assessor of agricultural property value has the task of employing appropriate methods in order to predict the selling price of the agricultural land. In addition, he has to determine the possible benefits, or income, that the property can generate in the predefined period, and all of that has to be expressed in money on a given day.

The notion of assessment denotes an expert's opinion about the value of an agricultural land as a consequence of application of an appropriate methodological framework, and the output result is the value of the property expressed in money determined according to the following algorithm respectively:

- Physical and legal identification of the agricultural land,
- Identification of rights of ownership of the agricultural land,
- Determining the purpose of assessment,
- Determining the effective date of assessment,
- Collecting and analysing the methodological framework of assessment,
- Application of an assessment method (possible methods and their effects on an appropriate sample will be presented in the following sections),
- Making a conclusion about the value and writing a report about the assessment with an opinion of a certified assessor.

The basic assumption in the process of assessment is the assessor's objectivity and lack of any sort of conflict of interests, and it is necessary to take into account specific professional and ethical standards. A fact that tells a lot about the significance of a correctly applied methodological framework is that completely correct applications of different methods can yield different values of the agricultural land, under the assumption that everything is carried out in a methodologically correct way, which is a choice and responsibility of a certified assessor. The market conditions are uncertain and changeable and the results of agricultural land value assessment should be interpreted in light of those uncertainties.

The choice of an assessment method should depend on the quality and availability of data, theoretically, in the conditions of having perfect and equally accessible data, the correct application of any of the methods would yield identical results. However, in practice, where there is no perfect information, methods should correspond one to the other and assessments should be made by applying at least two or three methodological approaches. In assessing the value of agricultural land, it is possible to successfully employ three different methodological groups:

- Expense method (the method of determining real values, expense approach, a static method),
- Comparative method (the method of sales comparison, direct comparison of sale prices),

- Method of income capitalization (method of income assessment, crop approach, dynamic method, profit capitalization method).

Before defining these methods theoretically and presenting the effects of application of each of them to the assessment of value of an agricultural land, it is important to point out that the process of evaluation should contain the following formal and substantial elements:

- Defining the assessment arrangement,
- Collection, selection and analysis of data,
- General data (macroeconomic, statistical, regional, etc.),
- The data specific for the property assessed (history, expenses, prices, profits, exploitation),
- Comparative (competition, similar transactions, etc.),
- Analysis of the property's best use,
- Assessment of property value,
- Application of the methodological framework of assessment (related to the expenses, market and crops),
- Reaching the conclusion about the value, and
- Writing the assessment report.

Apart from the application of an appropriate methodological framework and the knowledge and skills of the certified assessor, the value of agricultural land stated in a report of a certified assessor is also influenced by political, natural and market factors. The influence of political and market factors is the same as with the assessment of other types of real estate, while the influence of natural factors is different so it has to be specially analysed.

When speaking about these factors, it is primarily about the impact that nature, independently of human will, can make in the sense of change of the value of the agricultural property. The question of climate change and natural disasters is here crucial and the value of the property can vary with respect to the degree in which some of these factors are present or non-present.

The first item on this list of factors is the susceptibility to floods. Heavy rains and melting of snow and/or the rise of the sea —level on the one hand, and the expansion of urban areas, one the other, have caused floods to become one of the most frequent natural catastrophes in the world. In our conditions, the susceptibility of agricultural land to floods influences its value extremely negatively, while, one the other hand, one-hundred-per-cent absence of the possibility of floods has almost no impact on the price of real estate, which is a phenomenon that will be interesting to further explore. According to our research<sup>9</sup>, similar situation is found when it comes to the value assessment of an agricultural property susceptible to draughts.

The next on the list of natural factors is the earthquake. Interestingly, this factor has almost no influence on the value of agricultural properties in our region, but it has a significant,

<sup>9</sup> Faculty of Economics and engineering management, *Value assessment for fixed assets at the Public company Zelenilo Novi Sad*, project no. 8/2012, pg. 28-33, Novi Sad.

we would say, rather psychological than real, effect when it comes to constructions sites, especially buildings on those sites. This definitely makes sense because the construction of buildings in earthquake-prone and highly earthquake-prone areas entails high risks, which are related to significantly higher expenses than usual.

Among other natural factors, in the Republic of Serbia, the climate factors have the greatest impact on the value of agricultural land. As it is known, the Republic of Serbia is located in the North hemisphere and as such it has a moderate continental climate and a moderate Mediterranean climate, which means that there is no impact of extreme climate factors and that there is a complete cycle of all four seasons, which definitely increases the value of agricultural land. Land that is located in the areas of moderately increased humidity and constant temperature in the interval of 22-25° C, like, for example, on some islands in tropical regions, has the highest price.

The market value of agricultural land can be defined as the amount of money that can be received for it in an open and competitive market, under normal conditions, with consent of both sides, in a transaction between interested sides that possess an optimal level of information about the relevant facts<sup>10</sup>. Getting the most accurate values of agricultural property on the market is the main motif for the implementation of assessment models, and the value thus arrived at is never 100 per cent correct because it is, after all, a consequence of assessment, evaluation and valorisation, and as such, it is subjective. Nevertheless, it is important, and in the following cases, it can be said to be necessary:

- · The need to secure a financing source,
- · Making appropriate investment and business decisions,
- · For the purposes of financial and accounting reports,
- · In different kinds of property lawsuits,
- · For taxation, insurance, etc.

In practice, the market value of an agricultural property is the price which can be obtained under the given conditions on the market and it is located in the interval: the lowest market value (the price which can be obtained with great certainty on a market with a higher number of buyers) — realistically expected market value (the price which can be obtained in a reasonable period with most of the buyers) — maximal expected market value (the price which can be obtained with limited certainty in a short period of time with a small number of buyers who are, for subjective reasons, particularly interested in the agricultural property in question). Certainly, the relation between supply and demand is defined by the part of the interval value in which the obtained price is located. In case supply is greater than demand, the temporal period needed for arriving at the selling price will be longer and the price will mostly be located between the lowest market value and realistically expected market value. In case supply is smaller than demand, the temporal period for arriving at selling price will be shorter and the selling price will be located between the realistically expected market value and maximal expected market value of the agricultural property.

<sup>10</sup> Ljumović, I., Cvijanović, J., Lazić, J., (2012): *Valuation of biotechnology companies: Real options approach under uncertainty*, Economics of Agriculture, IAE, no. 1, pg. 51-63, Beograd.

#### Results

In this section, we present the results of our research in the form of application of the model on the assessment of value of a concrete agricultural land. In the following example, we will illustrate a practical implementation of the proposed model of agricultural property value assessment and present a summary of effects of implementation of different, but allowed methods of assessment, whose framework we presented in the part of the article that defines the methodology. Example: The assessment of market value of the agricultural property Dobrava 2, surfacing 17.8 ha in Novi Sad, Cadastre site no. 23 cadastre municipality Novi Sad – III 2012/07/27.

**Table 1.** Basic information about the assessed real estate

Real estate as a part of assessment:	Agricultural property Dobrava 2		
Surface kp. Br. 23 KO NS - III	S=178000 m2	The year of ownership: 1950. First class of agricultural property	
Basic information about the owner	Farm XY, Novi Sad	Manager XX, Novi Sad	
PIN	Transfer account	Personal number	

**Table 2.** Basic information about the assessor

The name of the company	XXX
PIN	3216521789
Assessor's first name and last name	Yyy Xxx
Register No	2154/8
Phone number	000/23152993
Proof of ownership	Ownership document No 521/12-3

Location of the agricultural land – micro-location description:

The location of the agricultural property is on the outskirts of the city's industrial zone, on an attractive location beside the highway E-75 and near the international railway route, 4.4 km away from the port Dunav 1<sup>11</sup>. It is characterized by traffic connections, which gives it greater transformability into a construction site, which would make its value several times greater. The type of soil on the property on this location is I class humus. The property is rectangular in shape with dimensions given in the appendix, ideally even and just 500m away from an irrigation channel. It is possible to enter the property from the main road and by the longer side there is a macadam road which is its integral part. There is no information about recent trade with similar property, but there have been some sales of smaller properties , up to 1.5 ha, with agreed prices ranging from 8.000 to 12.000 €/ha. Through immediate examination, it was determined that there is no negative impact of natural factors on the property, nor the possibility of sudden natural or artificial pollution. The value of the property was assessed as stagnating in the lower region of maximal expected market price and that the interest in buying it is low and the interest in renting it is non-existent. Also, the average time period for selling a property of this kind is 12 months.

<sup>11</sup> Cvijanović, D., Vuković, P. (2012): *Uloga marketinga u turizmu dunavskog regiona Srbije*, Institut za ekonomiku poljoprivrede, Beograd.

**Table 3.** Final results of the application of the value assessment model according to the three methods presented

Total urface	Estimated value – expense method	Estimated value – comparative method	Estimated value – profit capitalization method	Expected selling value	Date of assessment	Median exchange rate of Euro
17.8	240 300.00	178 000.00	156 640.00	175.000.00	31/12/2012	113.68

Source: Created by the authors, according to the research project - Value Assessment for Various Types of Real Estate in the Republic of Serbia and the Possibility of Their Expression in Accounting, realized at the Faculty of Real Estate Management, Union Nikola Tesla University, Belgrade, 2012-2014, pp. 66-82.

#### Discussion

If we carefully analyse the data arrived at, it might be possible to draw appropriate conclusions and spot certain regularities. It is important to know that during every assessment of value, the so-called Elaboration of value assessment is created, which has to contain all the working papers of the certified assessor. The Elaboration is an official document and it can serve to make a reconstruction of the whole process of value assessment. Similarly, it is possible to accurately calculate the number of working hours that each member of the assessment team invested, and based on that it is possible to calculate the compensation for the service of assessing the value of an agricultural property. That elaboration can also be used as evidence in case of a lawsuit between the client and the certified assessor.

As can be seen in table 3, the highest assessment of value of the property in question of 13 500 Euro/ha or 240 300 Euro in total was arrived at via the expense method, and the lowest one of 8 800 Euro/ha or 156 640 Euro in total, was arrived at via the profit capitalization method. Examination of the working papers of the assessors enabled us to establish that such results reflect high expenses of investment in production on that property and bad estimation when it comes to the possibility of finding a similar property (trade method) which would, in this case, be very expensive. On the other hand, a few years of weaker agricultural production in the last decade and a lot of anomalies in on our stock market of agricultural products caused such a low price to be arrived at through the application of profit capitalization method. The application of comparative method included taking the average selling price of 10 000 Euro (which was admittedly received for much smaller properties of similar characteristics), which gave the sum of 178 000 Euro and the value that should be expected from selling the property is in that area. According to the Elaboration of the assessment of value of the agricultural property Dobrava II, we can see that the expected selling value of the property was reduced by 3000 Euro as a proof of the owner's determination to really sell the property to the unknown potential buyer. It often happens that instead of fixed value, the assessor determines the narrowest possible range of values, which is also acceptable and, sometimes, the only possible procedure. It is also important to note here that it is crucial to specify the day for which the assessment of value of the agricultural property holds. In our case, it is December 31, 2012 because the commercial, market and other conditions that hold for that day perhaps might not hold for some other

day. In the end it is necessary to list the exchange rate according to which the calculation is made, because it is a legal obligation that all financial reports be expressed in the national currency, i.e. Dinar.

The presented model of agricultural land value assessment was created with the basic aim of serving as a basis for future agricultural land value assessments in the Republic of Serbia and analyses of sales of agricultural land that have already been carried out. Its primary advantage is flexibility. This flexibility is evident from the choice of the relevant assessment method, but also in the choice and consideration of appropriate factors that, in the end, influence the final value of an agricultural land according to the presented model.

This model also leaves enough room for scientific and other institutions in the Republic of Serbia which operate in this domain to, based on the hypothesis of this research which claims that it is possible to create and apply agricultural land value assessment model, improve it continually in accordance with present market, economic, political, social and other factors which have a greater or lesser degree of impact. Taking all this into account, we think that this is a pioneering attempt at establishing a consistent model which could successfully be used in the Republic of Serbia for a number of years.

#### Conclusion

The assessment of value of an agricultural property is a subjective projection of expected value which it is possible to achieve according to the given market conditions and available information. Certified assessors of value of agricultural property (but also all other forms of real estate) have an obligation to apply rules, standards and the methodological framework of value assessment with utmost professional care and according to strict ethical requirements of the profession, and to make a formalized report about the completed assessment, whose most important part is the assessor's opinion about the value of the assessed agricultural property. Everyone who uses those value assessment reports should know some of the most important limitations of the procedure itself as well as the fact that the assessment is to a certain extent based on the professional judgment of the assessor, which can often be subjective.

Nonetheless, if the methodological framework of assessment is correctly employed, if the assessor is educated and trained enough to meet the requirements of such a demanding process as value assessment and if the model of agricultural property value assessment is correctly created and implemented, the result should be an assessment that corresponds to given economic, commercial and market conditions, and it can be expected with great probability that the value arrived at will get its full affirmation on the real market. Otherwise, unnecessary expenses are made through the employment of professional assessors. Those expenses are usually not small because the assessment of value of an agricultural property demands work of highly educated and trained professionals, and incorrect results can only confuse the users of the report about the assessment of value, which is, by all means, a situation which no one would desire in real life.

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# MODEL PROCENE VREDNOSTI POLJOPRIVREDNOG ZEMLJIŠTA

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#### Rezime

Cilj rada je da uspostavi i prezentira model koji bi bilo potrebno i moguće primenjivati za procenjivanje vrednosti poljoprivrednog zemljišta u postojećem ekonomskom, tržišnom i pravnom okviru Republike Srbije. Rad je preliminarni integralni deo šireg naučno-istraživačkog projekta pod nazivom Procena vrednosti različitih oblika nekretnina u Republici Srbiji i mogućnosti njihovog računovodstvenog iskazivanja, realizovan na Fakultetu za menadžment nekretnina Univerziteta Union Nikola Tesla Beograd. U radu su prezentirani samo oni preliminarni rezultati i model koji se odnose isključivo na definisanu temu, a korišćene su naučne metode koje se uspešno primenjuju u ovoj oblasti u razvijenim zemljama, pre svega u SAD, Nemačkoj i Francuskoj, modifikovane u skladu sa normativno-pravnim okvirom i tržišnim uslovima relevantnim za Republiku Srbiju. Tema je značajna i aktuelna u sklopu najavljene privatizacije 10.000 ha poljoprivrednog zemljišta. Navedeni model takođe bi se mogao koristiti za preispitivanje validnosti ranije izvršenih procena vrednosti poljoprivrednog zemljišta u sklopu privatizacije pojedinih poljoprivrednih dobara.

Ključne reči: procena, vrednost, poljoprivredno zemljište, procenjivač.

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