

UDK 332.324.001.57(474.3)  
Ba 875

## IMPROVEMENT POSSIBILITIES OF LAND CADASTRAL ASSESSMENT MODELS IN LATVIA

V. Baumanė

Latvia University of Agriculture  
Department of Land Management and Geodesy

**Key words:** real property data, cadastral assessment, land cadastral assessment models, land cadastral value.

### Introduction

Cadastral value of the common cadastral assessment principles specified date according to cadastral data by the cadastral value of the object in terms of money. Cadastral value excludes the value of forestry plantations [1]. Cadastral valuation is in accordance with the laws and regulations to implement the principles of operation of a set of objects to determine the cadastral and real property tax value of the object to be used for the purposes of the laws and regulations.

Cadastral valuation process includes [3]:

- 1) cadastral value of the basic design;
- 2) cadastral value of the calculation.

The notion cadastral assessment model is used in the assessment practice and found in several scientific research papers; however, until now the explanation of this notion has not been offered in laws and regulations or publications. Therefore, based on the performed analysis of the theoretical and legal aspects of real property assessment, the author offers the definition of a cadastral assessment model. A cadastral assessment model is a mathematical equation or a schematic representation of cadastral assessment to determine the value of real property objects, based on the indicators characterizing it.

The study hypothesis – research of cadastral assessment models creates scientific foundation for their purposeful improvement. Consequently, the study aims is explore cadastral object data and its possible use in the calculation of cadastral value. The study addressed the following objectives:

- to study the normative basis regulating cadastral assessment;
- to evaluate the data necessary for the cadastral assessment of building land and rural land;
- to develop recommendations for the improvement of cadastral assessment models observing the equality principle and basing on the assessment methods.

### Material and methods

To determine the direction for the improvement of cadastral assessment models, it has to be clarified what indicators should be included in these models. Therefore the assessment of the indicators of the cadastral assessment model of building land and of the cadastral assessment model of rural land was performed. The assessment was based on the following criteria:

- indicators provided by laws and regulations;

- author's suggested indicators included in the survey of real property specialists of municipalities;
- assessment offered by the real property specialists of municipalities participating in the survey;
- author's suggested indicators for experts' assessment;
- experts' assessment.

At the end of the assessment it is possible to conclude that the directions for the improvement of the cadastral assessment model of building land are [6]:

- to actualize and improve the quality of data for the following indicators included in the model:

- purpose of use of the building land;
- encumbrances;
- pollution;
- real property market;

- to summarize qualitative data and include the following indicators in the model:

- geological situation;
- provision with engineering communications.

As a result of the assessment, it can be concluded that the directions for the elaboration of the cadastral assessment model of rural land are [6]:

- to actualize and improve the quality of data for the following indicators included in the model:

- agriculture use of the land qualitative assessment;
- assessment of the quality of forest land;
- encumbrances;
- pollution;
- real property market;
- types of land use;
- influence of the residential house;

- to summarize qualitative data and include the following indicator in the model:

- influence of the non-residential building.

For marking the calculation operations was used PowerSim Studio software [4; 5].

In the schematic representation of the model labels are used to depict:



variables



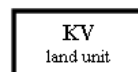
adding and subtraction operations



constant quantities



multiplication and division operations



resulting quantities

### Discussions and results

Opportunities for improving the cadastral assessment model of building land are evaluated based on the schematic representation of the model. The scheme, in turn, was based on the Regulations No.305 of the CM (18.04.2006.) [2]. The opportunities are also based on the assessment of the indicators of the cadastral assessment of building land.

The opportunities for the improvement of the cadastral assessment model of building land were resolved in the following way (Fig.1):

- first, qualitative improvement of the variable, based on actual and qualitative data and their acquisition opportunities;
- second, characterization of new variables, as well as the opportunities of obtaining and storing data characterizing them;
- an improved cadastral assessment model of building land has been developed.

As the research described in the previous chapters indicated, the improvement of the indicator of the purpose of use of building land – variable  $P_{LM}$ , should be ensured by improving the quality of data in the National Real Property Cadastre information system. This, in fact, is possible through receiving information from municipalities about the actual and perspective use of land according to the territorial planning. Every owner of real property should also be responsible for whether the real property is used according to the determined purpose of use, as well as whether corresponding areas for the purpose of use of real property are determined.

It is also necessary to perform the elaboration of the land pollution variable  $P_p$ , supplementing the National Real Property Cadastre information system with data about polluted areas. Acquiring such information can be implemented by facilitating data exchange between the SLS programme and the State Environment Agency.

To elaborate the variable  $B_v$  of the indicator of the real property market of the cadastral assessment model of building land, the quality of the data in the information system of the Real Property Market has to be improved. Based on the research results, the author concludes that in obtaining data, cooperation should be continued with the Land Register and additional information should be obtained from notaries and real estate agencies, within the framework of the data exchange programme. Thus, the use of the market supply information in particular value zones would be excluded from determining the basis of cadastral values, including determining the base value.

Based on the author's research, the assessment of municipality specialists and experts, the author has supplemented, thus elaborated, the cadastral assessment model of building land with the variable of engineering communications indicator (in the form of a coefficient)  $K_{ikom}$  and with the variable of the geological situation of land indicator (in the form of a coefficient)  $K_{geol}$ . To include these variables in the cadastral assessment model, qualitative data for their determination are required.

To determine the variable of engineering communications indicator, the data in the National Real Property Cadastre information system have to be supplemented, which is possible through enhancing the data exchange programme between land surveying companies and municipalities. Thus, building land property would be acknowledged, its value would reduce if there are no engineering communications in its territory.

Amendments to the Regulations No.305 of the CM that set in force on 23.02.2011., for the first time, provide that if there are no engineering communications on the building land to be assessed, then determining the purpose of use of a building site "non-acquired land", the base value should be decreased by 50%. However, it does not solve the problem because the impact is not differentiated.

The resulting quantity is the cadastral value  $KV$ , the independent variables are the area of land for the purposes of use of real property  $PLM$  and the base value  $B_v$ , but the pollution coefficient  $K_p$ , the encumbrances correction coefficient  $K_{apgr}$  and the area correction coefficient  $K_{samaz}$  are dependent variables in this model, because every quantity is calculated applying a respective formula in which the existing quantities are independent variables and constants. For marking the calculation operations, the labels of PowerSim Studio software were used: square boxes with round corners – for the multiplication and the division process, a circle with the sum symbol – for the addition and the subtraction process, a circle with the sum symbol and with + or – to indicate the size of the quantity entering the process.

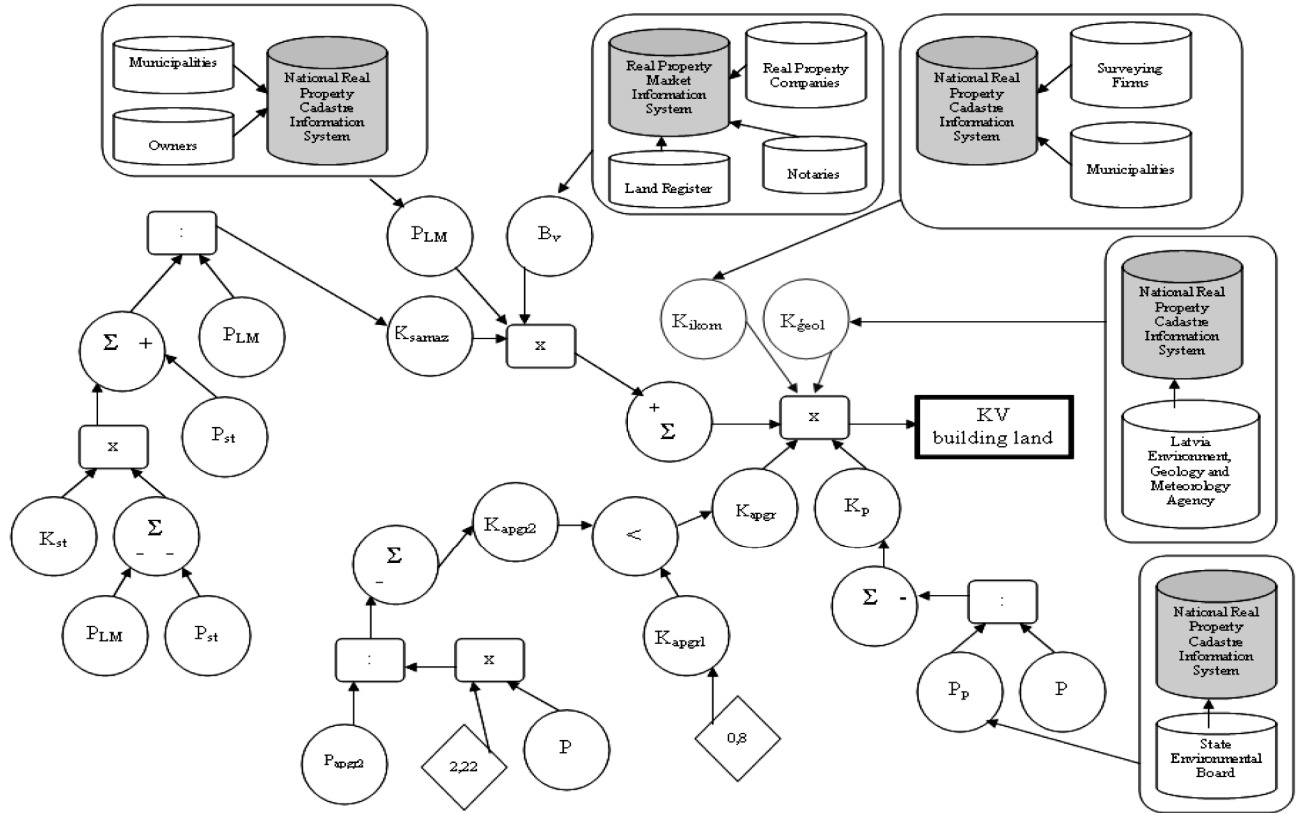
The improvement opportunities for the cadastral assessment model of rural land are evaluated based on the schematic representation of models, were based on the Regulations No.305 of the CM. The improvement opportunities are also based on the assessment of the indicators of cadastral assessment of rural land.

The opportunities for the improvement of the cadastral assessment model of rural land were resolved in the following way (Fig. 2):

- first, qualitative improvement of the variable, based on actual and qualitative data and their acquisition opportunities;
- second, characterization of new variables, as well as the opportunities of obtaining and storing data characterizing them;
- an improved cadastral assessment model of rural land has been developed.

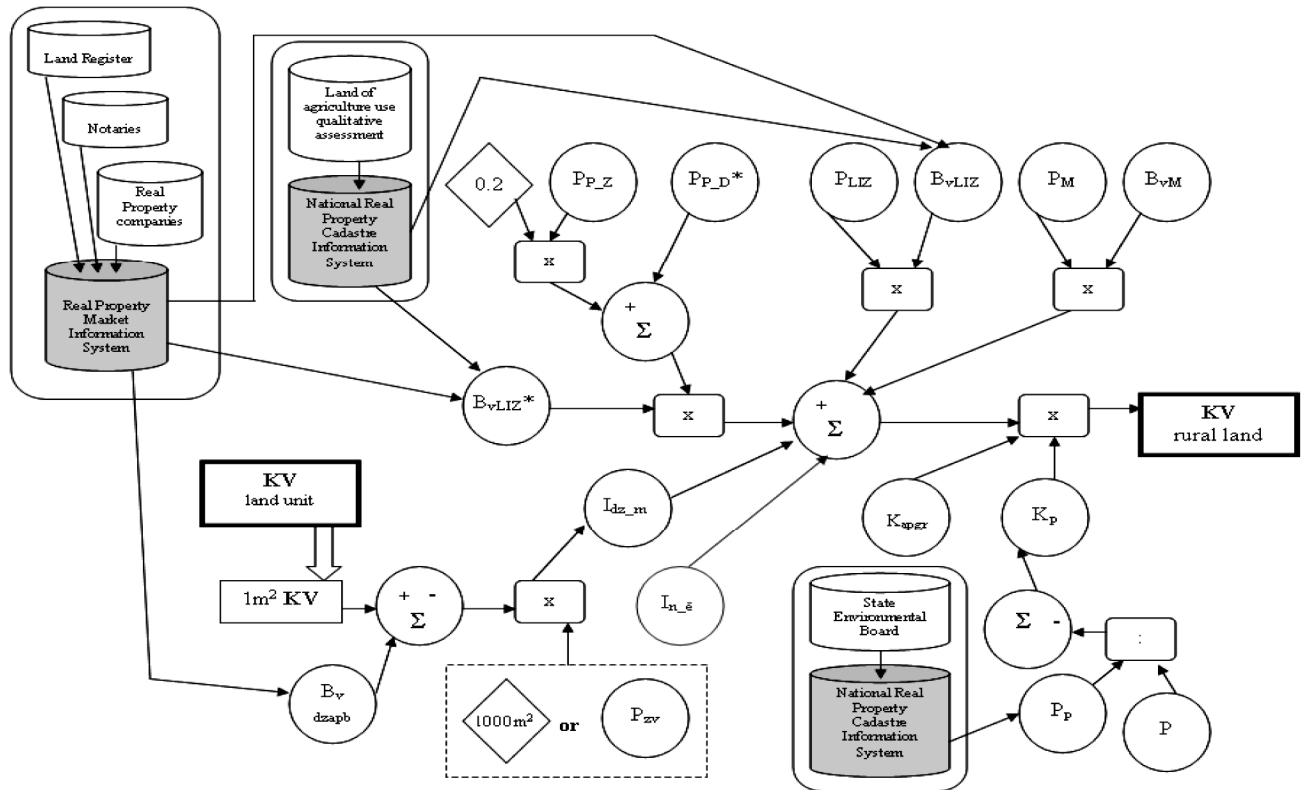
Improvement of the variable  $P_p$  of the pollution indicator is also necessary to be performed by supplementing the information of the National Real Property Cadastre information system with data about polluted areas. Such information can be acquired by enhancing the SLS data exchange programme with the State Environment Agency.

To improve the variables  $B_{vLIZ}$  and  $B_{vLIZ*}$  of the real property market indicator of the cadastral assessment model of rural land and the indicator of LIZ qualitative assessment, the quality of the data in the information system of the Real Property Market and in the National Real Property Cadastre information system should be improved. Based on the research results, the author concludes that to acquire market data, cooperation with the Land Register should be continued and additional information should be received from notaries and real property companies, within the framework of the data exchange programme. Thus, the use of the market offer information in particular value zones is excluded from determining the basis of cadastral values, including determining the base value. Whereas, to improve the quality of data in the National Real Property Cadastre information system, the country has to actualize the qualitative assessment of the land useful for agriculture with a complex of national-scale measures, then supplementing the information of the National Real Property Cadastre information system with actual objective data that would allow determining objective cadastral assessment.



Source: author's developed construction

Fig. 1. Improvement opportunities for the cadastral assessment model of building land



Source: author's developed construction

Fig.2. Elaboration opportunities for the cadastral assessment model of rural land

Regarding obtaining the variable  $I_{dz, m}$ , which was considered in Chapter 2 of the present Ph.D. Thesis, integrating the cadastral assessment model of a land unit within the cadastral assessment model of rural land, the improvement of the variable  $B_{vdzab}$  of the real property market indicator of the cadastral assessment model of building land is also therefore necessary, which can be realized through the above mentioned opportunities. Taking into consideration the results of the assessment of the indicators, the cadastral assessment model of rural land should be supplemented with the variable  $I_{n, \bar{e}}$  in cases when the yard consists of only non-residential buildings. To determine this variable, it is possible to use the integrated cadastral assessment model of a land unit, correcting the constant size of non-defined areas, by increasing it.

The assessment model of rural land is developed as a hybrid mixed model, including the basic principles of addition and multiplication. The resulting quantity in this improved model is the cadastral value KV, the independent variables are the area for the purpose of use of real property  $P_{LIZ}$  and the base value for the agriculture use of the land  $B_{vLIZ}$ , the base value for the quality group III of the agriculture use of the land  $B_{vLIZ^*}$ , the area of forest  $P_M$  and the base value of the zone of forest land  $B_{vM}$ , the lien correction coefficient  $K_{aper}$ , but the pollution coefficient  $K_p$ , and the influence of the residential house  $I_{dz, m}$  and  $I_{n, \bar{e}}$  are dependent variables in this model, because every quantity is calculated using the respective formula in which the current quantities are independent variables and constants.

### Conclusions

1. Problems are defined and recommendations for their resolution are offered, the execution of which will facilitate the improvement of the cadastral assessment models of rural and building land for obtaining a more objective cadastral value.

2. The cadastral assessment model of rural land can be improved by integrating the assessment model of a land unit in it, also in cases when the yard has only non-residential buildings, thus changing the influence of the residential house for the influence of non-residential buildings.

3. Based on the evaluation of the benefits of the improved cadastral assessment models of building land and rural land, it can be concluded that qualitative real property data are obtained, which allow obtaining a more objective cadastral value, as well as a real property tax for every piece of real property.

### References

1. Nekustamā īpašuma valsts kadastra likums, LR likums, LV, 22.12.2005, Nr. 205;
2. Kadastrālās vērtēšanas noteikumi, Ministru kabineta 2006.gada 18.aprīļa noteikumi Nr. 305, LV, 10.05.2006., Nr. 72;
3. Baumane V. Nekustamā īpašuma vērtēšana. Teorētiskie aspekti / LLU, 2009 – 74 lpp.
4. Richardson A.W., Roubi R., Hearsh S.B. (2003) Real Option Based Equity Valuation Models. New Yourk: MC Graw-Hill, p. 35
5. Malme J. (2004) Mass Valuation for Land Taxation in Transitional economies. *Land lines*, April 2004, Vol. 16, No 2, p. 36

6. Baumane V. (2010<sup>a</sup>) Cadastral Valuation Models. **In: Economic Science for Rural Development: proceedings of international scientific conference No.22.** Jelgava: LUA, p. 68.–75

### Можливості удосконалення моделей кадастрової оцінки землі в Латвії

В. Баумане

Мета статті – удосконалити моделі кадастрової оцінки для сільської землі і землі забудови. Охарактеризовано параметри моделей кадастрової оцінки для сільської землі і землі забудови. Зроблено такі висновки: модель кадастрової оцінки сільської землі може бути покращена за рахунок інтеграції моделі оцінки земельної одиниці, а також у випадках, коли у дворі є не лише житлові будівлі, але і нежитлові; модель кадастрової оцінки землі забудови може бути покращена за рахунок поліпшення даних в інформаційних системах і з інтеграцією в модель нових показників, які дадуть змогу отримати об'єктивнішу кадастрову вартість, а також об'єктивніший податок на нерухомість.

### Возможности усовершенствования моделей кадастровой оценки земли в Латвии

В. Баумане

Цель статьи заключается в усовершенствовании моделей кадастровой оценки для сельской земли и земли застройки. Охарактеризовано параметры моделей кадастровой оценки для сельской земли и земли застройки. Сделан вывод, что модель кадастровой оценки сельской земли может быть улучшена за счет интеграции модели оценки земельной единицы, а также в случаях, когда во дворе имеются не только жилые здания, но и нежилые, и что модель кадастровой оценки земли застройки может быть улучшена за счет улучшения данных в информационных системах и с интеграцией в модель новых показателей, которые позволят получить более объективную кадастровую стоимость, а также налог на недвижимость будет объективней.

### Improvement possibilities of land cadastral assessment models in Latvia

V. Baumane

Purpose of the article was to improve the cadastral valuation models for rural land, and development land. This paper describes the construction of rural land and cadastral valuation model parameters. The main conclusions, that the cadastral assessment model of rural land can be improved by integrating the assessment model of a land unit in it, also in cases when the yard has only non-residential buildings, thus changing the influence of the residential house for the influence of non-residential buildings and that based on the evaluation of the benefits of the improved cadastral assessment models of building land and rural land, it can be concluded that qualitative real property data are obtained, which allow obtaining a more objective cadastral value, as well as a real property tax for every piece of real property.