

Comparison of the Thematic Data on the Use of Land in Urbanized Areas in Selected European Countries

Olga MATUK, Elżbieta BIELECKA, Poland

Key words: cadastre, land use, land cover

SUMMARY

The real estate cadastre is certainly one of the most important sources of information on land use, i.e. the division of land into types by actual use or development. The land use classification depends on many geographical factors, including climate, relief, soil, geology, water relations, as well as historical and economic conditions. The purpose of this study was to compare the classification of information on land use in urban areas collected in the cadastre of seven European countries: Austrian, Bulgarian, Czech Republic, Estonian, German, Poland and Portugal. The research focused on determining similarities and differences in the number of registered levels of classification and of object classes at individual levels of land use classification. The analysis was conducted on documentation, including legal acts regulating land use issues, made available in national languages by the relevant authorities. The mentioned problem is extremely important due to many initiatives aimed at harmonizing the land use classification. The conducted research showed discrepancies in the number of registered levels of classification and differences in the number of land use classes object in urban areas. The presented results are the first stage of the analysis of land use, which is registered in cadastral systems.

Comparison of the Thematic Data on the Use of Land in Urbanized Areas in Selected European Countries

Olga MATUK, Elżbieta BIELECKA, Poland

1. INTRODUCTION

The real estate cadastre is one of the most important sources of information on land use. The content of real estate cadastres functioning in various European countries depends on i.e. climate, relief, soil. Land information is of great importance. They are a tool for implementing specific policies, primarily agriculture and environmental protection. Land information plays a large role in the economic development of each country. There is a significant increase in initiatives to improve access to and exchange of cadastral information to support the implementation of pan-European information services (Permanent Committee on Cadastre in the European Union from 2008 and 2009).

The purpose of this study was to compare the number of distinguished levels of classification and of land use object classes at individual levels of detail. The research concerns the registration of land use in seven European countries, namely: Austria, Bulgaria, the Czech Republic, Estonia, Germany, Poland and Portugal.

Each country has its own land cover classification (Parsova V, Celms A, Gurskiene V, Jurgenson E, 2018). The diversity of land use classification requires a systematic review of the scope of content and how to group individual land use. The purpose of this study is to analyze methods of land use classification. In particular, the following research issues were raised:

1. How detailed is the land use classification in urban areas with a distinction of classification levels?
2. Are the analyzed countries characterized by a similar land use registration method in terms of the number of land use classes at individual levels of detail?

2. DATA AND METHODS

The study of the range of the number of classification levels and the number of land use classes located in urban areas was carried out for seven European countries.

To achieve the assumed goals were used:

- a statistical method based on the separation of classification levels of object classes of registered land use;
- an analytical method consisting in the analysis of legal acts and materials obtained from government institutions.

The comparative analysis was made on the basis of legal acts and materials related to running cadastral systems. Research materials were made available by the competent authorities. These documents are prepared in national languages and are characterized by different structure and detail.

The analysis of various materials necessitates the adoption of certain work patterns. These tables refer primarily to the search for objects that are definitionally and functionally similar. The analysis involved determining the number of thematically related objects to indicate the number of levels of land use registration classification. In addition, the purpose of the study was to indicate the number of classes of land use objects registered at individual levels of detail.

For the purpose of assessing the classification detail, the fundamental criterion was the number of distinguished levels of detail. To this end, three levels of classification detail have been distinguished.

Those are:

- level 1 with a very range of detail – 4 or more levels of land use detail;
- level 2 with an average level of detail – from 2 to 3 levels of detail in land use;
- level 3 with a narrow level of detail – 1 level of detail in land use.

3. RESEARCH AND RESULTS

For the purposes of the study, the assumption adopted applied:

1. There are 8 registered classes at level 1 in Austria. 5 class out of 8 is not associated with urbanized areas. Therefore, 3 classes of land use were adopted for the analysis. There are 23 registered classes at level 2. 11 class out of 23 is not associated with urbanized areas. Therefore, 12 classes of land use were adopted for the analysis.
2. There are 7 registered classes at level 1 in Bulgaria. 3 class out of 7 is not associated with urbanized areas. Therefore, 4 classes of land use were adopted for the analysis.
3. There are 10 registered classes at level 1 in the Czech Republic. 7 class out of 10 is not associated with urbanized areas. Therefore, 3 classes of land use were adopted. There are 29 registered classes at level 2. 10 class out of 29 is not associated with urbanized areas. Therefore, 19 classes of land use were adopted for the analysis.
4. There are 13 registered classes at level 1 in Estonia. 2 class out of 13 is not associated with urbanized areas. Therefore, 11 classes of land use were adopted for the analysis.
5. There are 7 registered classes at level 1 in Germany. 2 class out of 7 is not associated with urbanized areas. Therefore, 5 classes of land use were adopted for the analysis. There are 42 registered classes at level 2. 17 class out of 42 is not associated with urbanized areas. Therefore, 25 classes of land use were adopted for the analysis. There are 41 registered classes at level 3. 6 class out of 41 is not associated with urbanized areas. Therefore, 35 classes of land use were adopted for the analysis.
6. There are 6 registered classes at level 1 in Poland. 3 class out of 6 is not associated with urbanized areas. Therefore, 3 classes of land use were adopted for the analysis. There are 14 registered classes at level 2. 7 class out of 14 is not associated with urbanized areas. Therefore, 7 classes of land use were adopted for the analysis. There are 12 registered classes at level 3. 8 class out of 12 is not associated with urbanized areas. Therefore, 4 classes of land use were adopted for the analysis.
7. There are 5 registered classes at level 1 in Portugal. 4 class out of 5 is not associated with urbanized areas. Therefore, 1 class of land use were adopted for the analysis. There are 15 registered classes at level 2. 11 class out of 15 is not associated with urbanized areas. Therefore, 4 classes of land use were adopted for the analysis. There are 43 registered classes at level 3. 32 class out of 43 is not associated with urbanized areas. Therefore, 11 classes of land use were adopted for the analysis. There are 98 registered

classes at level 4. 69 class out of 98 is not associated with urbanized areas. Therefore, 29 classes of land use were adopted for the analysis. There are 225 registered classes at level 5. 193 class out of 225 is not associated with urbanized areas. Therefore, 32 classes of land use were adopted for the analysis. There are 16 registered classes at level 6. 16 classes is associated with urbanized areas.

Ord. no.	Country	Number of classification levels	Number of classes at the 1st level of detail	Number of classes at the 2nd level of detail	Number of classes at the 3rd level of detail	Number of classes at the 4th level of detail	Number of classes at the 5th level of detail	Number of classes at the 6th level of detail
1	Austria	2	3	12	-	-	-	-
2	Bulgaria	1	4	-	-	-	-	-
3	Czech Rep.	2	3	19	-	-	-	-
4	Estonia	2	11	2	-	-	-	-
5	Germany	3	5	25	35	-	-	-
6	Poland	3	3	7	4	-	-	-
7	Portugal	6	1	4	11	29	32	16

Table No. 1. The number of classification levels and the number of classes at each classification level

Source: Own studies

The study revealed that the highest number of levels of land use classification related to urbanized areas is in Portugal (6 levels). The smallest is in Bulgaria (1 level). Austria, the Czech Republic and Estonia are characterized by an average level of detail (2 levels each), as well as Germany and Poland (3 levels each).

The results of examining the number of registered of classes of land use objects at individual levels of detail are presented in Table No. 2.

Level	The minimum number	Country	The maximum number	Country
Level I	1	Portugal	11	Estonia
Level II	2	Estonia	25	Germany
Level III	4	Poland	35	Germany
Level IV (29 land use classes), level V (32 land use classes) and level VI (16 land use classes) only occurs in Portugal				

Table No. 2. Number of class at particular levels of detail

Source: Own studies

The study showed that the number of distinguished classes of objects at the first level of detail is similar in Austria, the Czech Republic and Poland (3 levels each). In relation to the remaining countries, a large degree of diversity was noted in the manner of distinguishing classes of land use objects at individual levels of detail.

4. CONCLUSIONS

The study provided relevant information regarding the diversity of the scope of land use information collected in the real estate cadastre in the countries analyzed. The land use classification currently functioning in European countries is not extensive. The exception is

Portugal, which has six levels of land use. In addition, the registration of subgroups of feature classes at different levels of detail shows little similarity.

The tests showed:

- a) discrepancy in the number of distinguished levels of classification;
- b) discrepancy in the number of distinguished of object classes registered at particular levels of detail.

REFERENCES

1. Bundesgesetz vom 3. Juli 1968 über die Landesvermessung und den Grenzkatas- ter (Vermessungsgesetz) [Federal Law of July 3, 1968 on Land Surveying and the Boundary Cadastre – Surveying Law] – Austria.
2. Vyhláška ze dne 1. listopadu 2013 o katastru nemovitostí (katastrální vyhláška), č. 357/2013 Sb. [Decree of 1 November 2013 on the Real Estate Cadastre (Cadastral Decree), No. 357/2013 Coll.] – the Czech Republic.
3. Kinnistusraamatuseadus, Vastu võetud 15.09.1993, RT I 1993, 65, 922 [Land Reg- ister Act, adopted on 15.09.1993, RT I 1993, 65, 922] – Estonia. [12] Rozporządzenie Ministra Rozwoju Regionalnego i Budownictwa z dnia 29 marca 2001 r. w sprawie ewidencji gruntów i budynków. Dz.U. 2001 nr 38, poz. 454 [Regu- lation of the Minister of Regional Development and Construction of 29 March 2001 on the land and buildings register. Journal of Laws of 2001, no. 38, item 454] – Poland.
4. Katastriüksuse sihtotstarvete liigid ja nende määramise kord, Vastu võetud 23.10.2008, RT I 2008, 46, 260 [Types of purposes of the cadastral unit and the procedure for determining them, adopted on 23.10.2008, RT I 2008, 46, 260] – Estonia.
5. Verordnung des Bundesministers für Wirtschaft, Familie und Jugend über die Anga- be und Definition der Benützungsarten und Nutzungen im Grenzkataster, BGBl. II Nr. 116/2010 [Ordinance of the Federal Minister for Economic Affairs, Family and Youth on

the indication and definition of the types of use and uses in the border cadastre, BGBl. II No. 116/2010] – Austria.

6. Zakon za ustroystvo na teritoriyata, v sila ot 31.03.2001 g. [Spatial development Act, in force from 31.03.2001] – Bulgaria.
7. Parsova V, Celms A, Gurskiene V, Jurgenson E, Application of remote-sensing technologies for determination of types of land use, Engineering for Rural, Development, Jelava, 23-25.05.2018
8. Permanent Committee on Cadastre in the European Union (Austria, Belgium, Czech Republic, Germany, Italy, Spain, Slovakia, Sweden), Cadastral Information System, 2008
9. Permanent Committee on Cadastre in the European Union (Cyprus, Finland, Greece, Poland, Hungary, Slovenia) and (Estonia, Lithuania, Luxembourg, Denmark, Romania, Portugal), Cadastral Information System, 2009
10. Technical specifications of the land use plan (COS) in mainland Portugal in 1995, 2007, 2010 and 2015, Portugal

Olga Matuk
Military University of Technology
Faculty of Civil Engineering and Geodesy
2 gen. Sylwestra Kaliskiego St., Warsaw
POLAND
Tel. (+48) 261 83 94 51
Email: olga.matuk@wat.edu.pl

Elżbieta Bielecka
Military University of Technology
Faculty of Civil Engineering and Geodesy
2 gen. Sylwestra Kaliskiego St., Warsaw
POLAND
Tel. (+48) 261 83 90 76
Email: elzbieta.bielecka@wat.edu.pl