

Capability Classification of the Land Belonging to the Bužim Municipality

Mirsad Ičanović¹, Husnija Kudić², Irma Ičanović¹

¹*Biotechnical Faculty of Bihać, Federation of Bosnia and Herzegovina, BiH*

²*Second Secondary School, Velika Kladuša, Federation of Bosnia and Herzegovina, BiH*

Abstract

One of the primary soil functions is the production of food and raw materials, but the soil is used for other purposes as well, outside the sphere of agricultural production, e.g. road construction and housing, exploitation of mineral resources. The research in this paper, appropriate agricultural land capability classification, was carried out in the Bužim Municipality using the guideline of unique methodology regarding the classification of agricultural land in the rating categories and criteria for individual soil properties, based on which land capability classes are determined. As a result of the research, six agricultural land capability classes (LCC) and land capability subclasses (LCS), ranging from III to VII, were determined, and areas were also marked as forest and built land. The most common land areas were marked under the VI LCC with the total area of 18.99% of the territory of the municipality. The V LCC was represented with a percentage of 11.65, while the IVa LCS was only represented with 1.02%.

Key words: land capability class, land capability subclass, Bužim Municipality

Introduction

Bužim Municipality is located in the southern part of the northern temperate climate zone and is influenced by continental air currents.

Administratively and geographically, it is a part of Una-Sana Canton, i.e. the Federation of Bosnia and Herzegovina, it covers the total area of 13.026,27 ha, which makes it the smallest municipality of the Una-Sana Canton. According to 2013 Census, the population of the municipality was 20.298. In this municipality there are two repartitions of soils/land with associated classes and types, namely automorphic/terrestrial and hydromorphic soils. The total of eight types of soils has been identified: regosol, calcomelanosol, calcocambisol, terra rossa, eutriccambisol, districcambisol, luvisol and fluvisol, and six land capability classes including two related land capability subclasses.

Currently, the relationship between high-quality land and lower quality categories moved towards fewer quality categories. The purpose of this paper is to generally protect agricultural land from use in a variety of non-agricultural purposes and to facilitate the work of spatial planners in order to make quality spatial planning decisions.

Materials and Methods

Land capability classification was made based on data from the Basic Soil Map of Bosnia and Herzegovina with the scale of 1:50.000, together with accompanying interpretations, satellite and aerial images of the study area, then the study of Land potential of the Una-Sana Canton (Resulović et al., 1998), as well as data obtained through an additional study of the soil at selected sites of Bužim Municipality, for comparison and correlation with the old soil data. The total of eight profiles was analyzed for the morphological, physical and chemical parameters (Škorić, 1982; Hadžić et al., 2004; Čustović and Tvica, 2005).

The land classification was made according to Resulović et al., 2008. Soil map of Bužim Municipality was prepared in accordance with the results obtained in the scale of 1: 25.000, and the entire mapping and processing of the obtained data was performed using GIS technology.

For the development of the above mentioned map, the basic pedological map of BiH was used, and additionally a well-drainage was performed in the total of 113 wells during the preparation of this dissertation, and one fully explored profile was opened on each represented type of soil.

Interpretation of the results of the land capability classification was obtained using the methodology prescribed in the Guideline of unique methodology regarding the classification of agricultural land in the rating categories and criteria for individual soil properties ("Official Gazette of Federation of BiH", number 52/09).

Results and Discussion

The basis for preparing land use capability map of Bužim Municipality was the Soil Map of the Municipality in the scale of 1:25.000 including a total of eight types of soils (Figure 1, Table 1) clearly separated and representing mapping units.

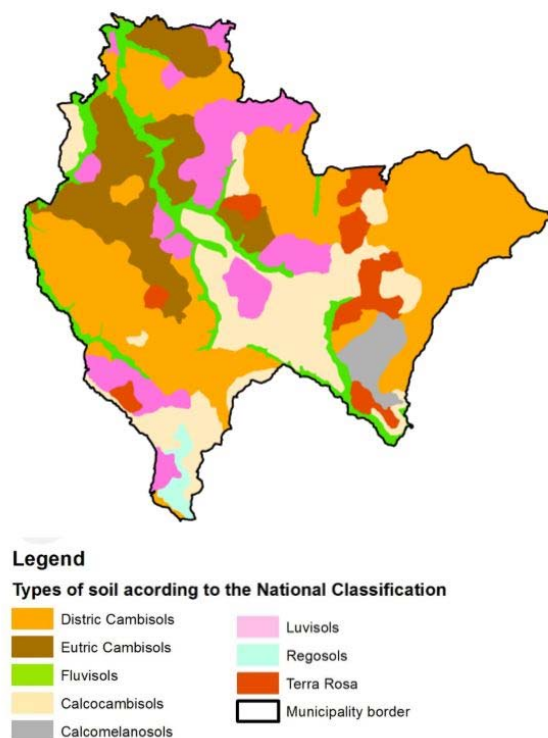


Fig. 1. Soil map of Bužim Municipality
Мапа земљишта општине Буџим

Land Capability Classification is a method for research and evaluation of the land according to its production and use value. Natural permanent properties are taken as criteria for land capability classification. There are several ways of classifying a soil/land in the world today.

One of the most commonly used classification systems of land is the "Land capability classification". This classification includes eight classes of land-ranking from the best (Class I) to the worst (class VIII).

Tab. 1. Occurrence of soil types in Bužim Municipality
Заступљеност типова земљишта у општини Бужим

Soil type / <i>Тип земљишта</i>	Area (ha) / <i>Површина (ха)</i>	Occurrence (%) / <i>Заступљеност</i>
Regosol / <i>регосол</i>	128.01	0.99
Calcomelanosol / <i>калкомеланосол</i>	331.60	2.54
Calcocambisol / <i>калкокамбисол</i>	2,272.20	17.45
Eutric cambisol / <i>еутрични камбисол</i>	1,867.45	14.33
Distric cambisol / <i>дистрични камбисол</i>	5,266.51	40.42
Tera Rossa / <i>црвена земља</i>	709.16	5.44
Luvisol / <i>лувисол</i>	1,550.98	11.91
Fluvisol / <i>флувисол</i>	900.31	6.92
Total / <i>Укупно</i>	13,026.27	100.00

Within the classification of agricultural land all classes can be divided into two groups:

- I. Land suitable for cultivation I, II, III and IV class and
- II. Land limited in use, less suited or not suited for cultivation V, VI, VII and VIII.

In accordance with applicable laws and regulations (Official Gazette of FBiH no. 52/09 Guideline of unique methodology regarding the classification of agricultural land in the rating categories and criteria for individual soil properties, Article 28), land-use projects in spatial plans shall be determined on the basis of agricultural land use capability map as follows:

- I. Land of I to IV cadastral or land capability classes shall be determined solely as agricultural or forest land;
- II. Land of V and VI cadastral or land capability classes shall be determined as agricultural land, forestland and, exceptionally, as land for other purposes;
- III. Land of VII and VIII cadastral or land capability classes shall be determined as land to be used for other purposes as needed.

Land capability classification, among other things, is determined on the basis of climate and relief in relation to the specific requirements of individual crops or generally for a specific branch of agricultural production (Guideline of unique methodology regarding the classification of agricultural land in the rating categories and criteria for individual soil properties ("Official Gazette of FBiH no. 52/09), Kovačević et al, 1987). Within the parameters for defining land capability classes of Bužim Municipality data on climatic characteristics were missing, because there is no weather station in this area, thus data from Bihać weather station were used for these surveys. Six land capability classes including two sub-classed were identified in the municipality (Figures 2, 3).

The VI LCC is the most dominant and it is represented with a total area of 2,607.86 ha, while the smallest area is IVa LSC with a total of 138.94 ha.

Within the classification of agricultural land all classes can be divided into two groups:

- Land suitable for cultivation (classes I- IV) and
- Land limited in use, less suited or not suited for cultivation (classes V-VIII).

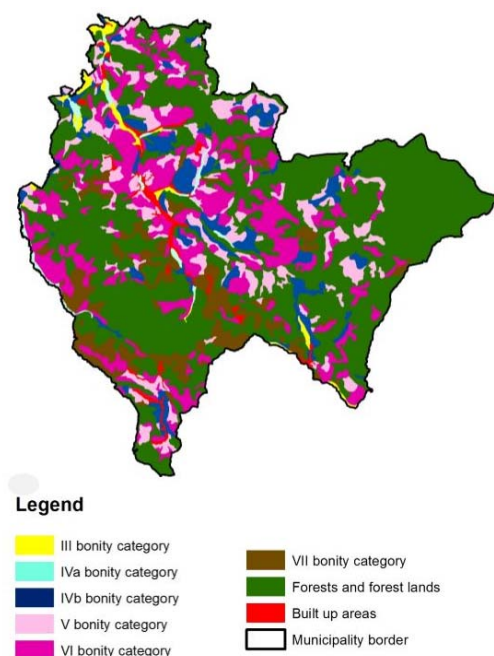


Fig. 2. Land use capability map of Bužim Municipality
Карта могућности искориштења земљишта општине Буџим

Land capability class III is related to the flatter parts of the municipality and there are real conditions for intensive crop and vegetable production in these areas, with the achievement of high and quality yield. These lands are not very widespread and cover about 170.58 ha.

Land capability class – III

The most important areas of the third class are located in the Bužimnica River valley, which flows through the following locations: center of Bužim, Varoška Rijeka, Aleševići, Bajraktarević Polje, Bezi, Čaglica and partially through Čava Local Community.

It is important to say that these are the most fertile and best quality soils in the municipality, which allow an uninterrupted use of heavy agricultural machinery. These lands are marked on soil map as the fluvisol soil type. If we take the climate into consideration, we can conclude that there are conditions for intensive farming, fruit and vegetable production in these areas. The limiting factor of these areas is territorial representation in relation to the overall area of the municipality, and can considerably alter the basic orientation of production, because there are very small areas evaluated as land capability class III. The defects might be the consequences of one or more of the following factors: mediocre depth of the soil (60-90), the degree of slope (up to 8°), mediocre erosion by wind or water, occasional flooding, poor permeability. Soils of this class mainly require a farming system that maintains or improves soil structure and fertility.

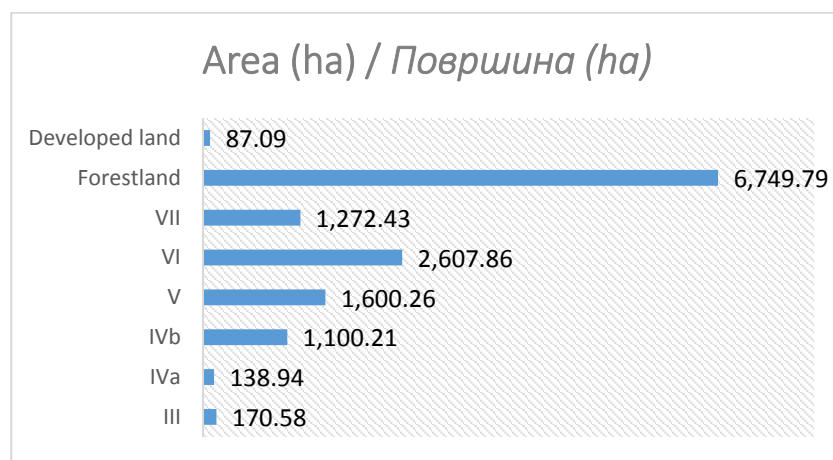


Fig.3. Land use capability of Bužim Municipality (ha)
Карта могућности искориштења земљишта општине Буџим (ha)

Land capability class – IV

Land capability class IV is used mainly as orchards and meadows or pastures, and partly as arable land in the hilly part of the municipality. Cultivation of crops is limited by action of several disadvantages such as: slope (12°), the depth of the ground (40-60 cm), susceptibility to erosion, low permeability, excessive humidification (upper and lower water), often flooding and the like. This class is represented by two subgroups/subclasses as follows:

- IVa land capability subclass occurs on flat terrains that are under the influence of excessive humidification.

It is mostly under meadow vegetation, while a smaller area is used as arable land. This subclass covers 138.94 ha of total agricultural land area of the municipality. The largest areas of this subclass occur in the valleys of minor or major waterways, the area that extends from center of Bužim to the bridge connecting Bužim with Kudelići village. The significant area of IVa land capability subclass occurs in Jusufovići Local Community, to Malovan village. These areas are mainly represented by fluvisol soil type. Since the total area of land marked by this land capability class is relatively small in a lot of local communities in the municipality, as previously mentioned (only 138.94 ha), it can be concluded that it does not cover larger areas in the places where it occurs.

- IVb land capability subclass covers the total area of 1,100.21 ha, i.e. a greater area compared to IVa land capability subclass.

This land capability class includes distric and eutric medium and deep soils on silica and calcareous substrates of hilly areas, on the terrain with the slope of up to 12°. This is a subclass, which mainly occurs in the center of the municipality, and on smaller areas at the boundary of the Municipality. It covers the significant area of Konjodor Local Community. This subclass covers significant areas in Čava village, and those are areas bordering with III land capability class, with a gentle slope of the terrain covering relatively large areas extending from Salkići village to Čava village - upstream to the Svetinja source at the right side of a local creek. Flattened parts of Mrazovo, Mrzovac, Biljeg and Čerimača are also marked as IVb land capability subclass. These are quite large areas of land solely privately owned, intensively farmed, suitable for use of heavy agricultural machinery and slightly wavy. All soils classified in IVb subclass are very well evaluated and generally represent arable land alternating with areas under cereal crops, orchards, fields and artificial lawns.

Land capability class – V

This land capability class is represented by large areas of brown soil on limestone substrates in the karst terrain of mild relief forms. These soils cover the area of 1.600,26 ha in Bužim Municipality. They are prone to erosion because of the slope on which they are located, but also due to land use. These soils are spread over the entire municipality with relatively small or large complexes. The largest areas are located in the central part of the municipality, but they can also be found in peripheral locations: Konjodor, Čaglica, Bućevci and Radoč.

Land capability class – VI

Land capability class VI has significant disadvantages that make it unsuitable for cultivation, as well as a large slope, but it could be used for meadows, pastures and forests (Kovačević, 1983). It covers 2607.86 ha of total agricultural land in Bužim Municipality, so, given the significant share, special care must be taken with agricultural techniques and increasing production capacity. This land capability class occurs in the entire municipality and covers bigger or smaller areas. Area of Elkasova Rijeka is completely covered by land capability class VI, as well as: Šabića Brdo, Hrgar, Durakovići, Pala Gora, Remetići, Ćorići, Metla and Zimonje. Most of them are settlements connected to the center of the municipality by roads. The local population produces food for its own needs.

Land capability class – VII

Land capability class VII has very distinct disadvantages, so it is unsuitable for cultivation and use; it is used as mountain pastures and forests. It can be used for bad pastures, mediocre forests or some combination under special stewardship. This land capability class covers 1,272.43 ha of the total area of the Municipality. The largest areas are located in Dervića Glavica, Hrgar, Kaukovići, Brigovi, and partially in Elkasove Rijeke and Radoč.

Conclusion

The total of eight types of land have been identified in Bužim Municipality: regosol, calcomelanosol, calcocambisol, terra rossa, eutric cambisol, distric cambisol, luvisol and fluvisol, and six land capability classes including two related land capability subclasses. The area and percentage representation of certain classes of land in the Municipality were also established. It is also obvious that relationship between high-quality land and lower quality categories moved towards less quality categories (land capability class VI with the total area of 2,607.86 ha). It can be concluded that the area of Bužim Municipality is more suitable for livestock and fruit production rather than crop and vegetable production.

The most important areas of the third class are located in the Bužimnica River valley, which flows through the following locations: center of Bužim, Varoška Rijeka, Aleševići, Bajraktarević Polje, Bezi, Čaglica and partially through Čava Local Community.

The largest areas of this IV subcategory are found in the valleys of smaller or larger watercourses, at the locations of Bužim center to the bridge towards the small town Kudelici. When it comes to the IVb subcategory, it is located in the places: Mrazovo, Mrzovac, Biljeg and Čerimač, and it occupies a total area of 1,100.21 ha. The largest areas of the Vbonitet categories are in the central part of the municipality of Bužim, but they are also located in the marginal areas: Konjodor, Čaglica, Bučevci and Radoč.

Area of Elkasova Rijeka is completely covered by land capability class VI, as well as: Šabića Brdo, Hrgar, Durakovići, Pala Gora, Remetići, Čorići, Metla and Zimonje.

The largest part of the land areas within the VII credit rating category is located in: Dervića Glavica, Hrgar, Kaukovići, Brigovi, and one part of the rivers Elkas and Radoč. The smallest portion of the land area is reserved for housing and construction, and most of the land is forested. From all of the above mentioned, it is important to allocate optimal land use, in order to adequately use and protect the aforementioned land locations against losses.

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Бонитетно вриједновање земљишта општине Бужим

Мирсад Ичановић¹, Хуснија Кудић², Ирма Ичановић¹

¹Биотехнички факултет Бихаћ, Федерација БиХ, Босна и Херцеговина

²ЈУ III средња школа, Велика Кладуша, Федерација БиХ, Босна и Херцеговина

Сажетак

Једна од основних функција тла је производња хране и сировина, али тло служи и за друге намјене ван сфере пољопривредне производње, за изградњу стамбених објеката, цеста, површинских копова и минералних сировина. Истраживање у овом раду, односно бонитетно вриједновање земљишта је проведено на подручју општине Бужим, на основу Упутства о јединственој методологији за разврставање пољопривредног земљишта у бонитетне категорије и критерија за поједина својства на бази којих се издвајају категорије бонитетне вриједности земљишта. Укупно је установљено шест бонитетних категорија земљишта (од III до VII бонитетне категорије), те подручја означена као шумска и изграђена земљишта. Најзаступљенија земљишта су означена VI бонитетном категоријом са укупном површином од 18,99% територије општине, затим V бонитетна категорија са 11,65%, а најмање је заступљена IVa подкатегија са свега 1,02%.

Кључне ријечи: бонитетно вриједновање, бонитетна категорија, општина Бужим

Mirsad Ičanović
E-mail address: icanovicmirsad@yahoo.com

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