Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 13, Issue 3, 2013
PRINT ISSN 2284-7995, E-ISSN 2285-3952

ECONOMIC EVALUATION OF AGRICULTURAL LAND IN THE TOWN COVACI, TIMIS COUNTY

Anişoara DUMA COPCEA, Nicoleta MATEOC - SIRB, Teodor MATEOC – SIRB, Casiana MIHUT

[1] University of Agricultural Sciences and Veterinary Medicine of Banat, 119 Calea Aradului, Timisoara, Phone/Fax:0265/277009, E-mail: usabtm@mail.dnttm.ro

Corresponding author: duma_anisoara@yahoo.com

Abstract

The goal of the present paper is to get information concerning the technical and fertility features of agricultural lands to be able to determine their present general production capacity in different crops and, implicitly, the uses that underlies technically and scientifically the most proper practical measures of rational use and conservation of the land for the benefit of the specialists. We focussed in the present study on the lands belonging to the cadastral territory of the commune of Covaci (Timiş County), i.e. the soil types identified within this perimeter. They are studied in relation to environmental factors that impact them and making up, with them, homogeneous ecological territory units with specific suitability for different agricultural or forestry uses and with different improvement requirements and technologies. The goals were: - characterising the natural framework; -identifying and characterising soil types and subtypes; -calculating land assessment grades; establishing suitability and classifying agricultural lands into fertility classes.

Key words**:** *fertility, improvement requirements and technologies, soil*

INTRODUCTION

Covaci (Hungarian *Temeskovácsi*, German *Kowatschi*) is a locality in the Timiş County, Banat, Romania. It is part of the Commune of Sânandrei. Due to its suitable location (north from Timisoara), it is positively impacted both economically and socially (urbanistic development, population growth). Covaci is located 45°49’53” North latitude and 21°13’41” East longitude, in the south of the Western Plain (Timişului Plain) [6]. It is 7 km north from Timisoara and 3 km North-East from the closest locality, the village of Cerneteaz.

Fig.1.Geographical position of Covaci locality in Timis County

The climate is a moderate temperate-continental one; the soil is relatively fertile, and the flora and fauna are typical to the plain area and include forested areas. North from Covaci there is the Beregsău rivulet; in the past, the Bega Veche River would flow south from Covaci, but it has dried. West from Covaci, there passes the European Road E671 (overlapping the National Road DN69), to which it connects through the Communal Road DC58 that goes to Cerneteaz. The village of Covaci is located in the central part of the Western Plain, in the southern part of the Vingăi Plain, 89 m above sea level. The soils in the locality belong to the gley soil, molic preluvosoil, and molic-reddish preluvosoil types. [11]

MATERIALS AND METHODS

Assessing agricultural lands is a complex operation aiming at the deep knowledge of the plants’ growth and development conditions and at determining the suitability degree of these conditions for each use and crop (given that a land can be suitable for certain uses and

crops, but unsuitable for others) through a system of technical indices and land assessment grades [3]. As such, land assessment determines how much better a land is compared to other ones taking into account its fertility as shown by the vegetal production. [5]

The object of land assessment is land that is to be divided so that each area taken into account is as homogeneous as possible from the point of view of all environmental conditions and vegetation factors. These land parcels are called land units (LU) or homogeneous ecological lands (HEL), and they represent the basic units of the land with their specific features, distinct from the neighbouring areas. [10]

For the calculus of land assessment grades we have chosen, from the multitude of environmental conditions, only those that characterise each land unit in our soil study, the most important ones for us, the easiest and the most accurate to measure, and the ones that are usually mentioned in literature (e.g., those that are mentioned in the research carried out by the OSPA – Timiş starting with 1976); these land assessment indices are: index 3. C – mean annual temperatures – corrected values; index 4. C – mean annual rainfalls – corrected values; index 14. – gleysation; index 15. – pseudo-gleysation; index 16 or 17 – salinisation or alkalinisation; index 23. A – texture of Ap in the first 20 cm; index 29 – pollution; index 33 – slope; index 38 – land gliding; index 39 – depth of water table; index 40 – liability to inundation; index 44 – total porosity in the restrictive horizon; index 61 – contents of total $CaCO_3$ within 0-50 cm; index 63 – Ap reaction in the first 20 cm; index 69 – base saturation level in the Ap or within 0-20 cm; index 133 – edaphic volume; index 144 – humus supply within 0-50 cm; index 181 – stagnant (surface) moisture excess. [1]

In land assessment for natural conditions, each of these indices – except for index 69, which cooperates indirectly – contributes to the land assessment grade through a land assessment coefficient ranging between 0 and 1, depending on the feature (totally unsuitable or optimal) for the use of crop taken into account). [4]

For each index, depending on its scale of use or crop, we designed tables containing their values.

RESULTS AND DISCUSSIONS

The main physical-mechanical, physical and chemical hydro Gley soil, sandy loam-East /, sandy loam-East on discontinuous medium fluvial material Covaci village, Timis.

The texture is sandy loam medium (SM) from 0-40 cm, loamy medium (MM) between 40-9100 cm;

The total porosity values between 0-22 cm high, medium values between 22-40 cm, low between 40-60 cm;

Field capacity (CC), the average values from 0 to -60 cm;

Wilting coefficient (CO) shows low values between 0-60 cm;

Density (DA) shows very low values between 0-9 cm, small between 9-22 cm, average values between 22-40 cm, 40-60 cm high values;

Soil reaction is slightly acid between 0-60 cm, neutral between 60-100 cm;

The content of calcium carbonate CaCO3 is absent from 0-100 cm;

Supply of humus in the top 50 cm the average values;

Ao nitrogen index has a good supply condition;

Content Ao P assimilate supply the poor condition;

Content Ao K assimilate supply has a very poor condition.

The main physical-mechanical, physical and chemical hydro preluvosoil softness, medium clay loam / clay loam medium on fine discontinuous eluvial material from Covaci village, Timis.

Average texture is clay loam (TT) between 0-66 cm, clay-clay-powder (TP) between 66-92 cm, clay-silty (AP) between 92-125 cm;

The total porosity values between 0-25 cm high, small between 25-125 cm;

Field capacity (CC), the average values from 0 to -66 cm;

Wilting coefficient (CO) shows high values between 0-66 cm;
Density (DA) shows low values between 0-25 cm high values between 25-125 cm;
Soil reaction is slightly acid between 0-35 cm, neutral between 35-125 cm;
The content of calcium carbonate CaCO3 is absent from 0-125 cm;
Supply of humus in the top 50 cm the average values;
Rate of nitrogen in the state of supply Press medium;
The content of digestible P in Ap state of supply shows a middle;
Content Ap K assimilate supply presents a middle condition.
In order to assess the production capacity of the lands studied at Covaci, we have chosen, from the environmental conditions, only 17 that we consider more relevant, and better determined.
Based on these environmental conditions and on value scales, we extracted, from the tables (annexes 3-1 to 3-18) (according to the methodology of soil studies, Part 2) land assessment coefficients that express the suitability of an index for each crop and use category of the land in discussion.

Table 1.Agricultural land assessment at Covaci (Timiş County) in winter wheat, rye, grain maize and sunflower

Soil type	Winter wheat		Rye		Grain maize		Sunflower	
	Land assessment grade	Fertility class	Land assessment grade	Fertility class	Land assessment grade	Fertility class	Land assessment grade	Fertility class
Gley soil	46	VI	46	VI	45	VI	48	VI
Molic preluvosoil	70	IV	72	III	70	IV	72	III
Reddish molic preluvosoil	70	IV	72	III	70	IV	72	III

Results are presented in detail for the different land use categories or for the crop groups with the same biological or cultivation technologies features.
For each index, depending on its scale of use or crop, we designed tables containing the values of the coefficients.
Table 1 shows land assessment grades and fertility classes in winter wheat, rye, grain maize and sunflower.
Table 2 presents land assessment grades and fertility classes in grasslands and hay-making fields.

Table 2. Agricultural land assessment at Covaci (Timiş County) for grasslands and hay-making fields

Soil type	Grasslands		Hay-making fields	
	Land assessment grade	Fertility class	Land assessment grade	Fertility class
Gley soil	65	IV	56	V
Molic preluvosoil	72	III	72	III
Reddish molic preluvosoil	72	III	72	III

CONCLUSIONS

The village of Covaci is located in the central part of the Western Plain, in the southern part of the Vingăi Plain, 89 m above sea level. The soils in the locality belong to the gley soil, molic preluvosoil, and molic-reddish preluvosoil types.
For the calculus of land assessment grades we have chosen, from the multitude of environmental conditions, only those that characterise each land unit in our soil study, the most important ones for us, the easiest and the most accurate to measure, and the ones that are usually mentioned in literature (e.g., those that are mentioned in the research carried out by the OSPA – Timiş starting with 1976);
The soils studied at Covaci for cultivation with winter wheat, rye, grain maize and sunflower range within the fertility classes III and IV, with land assessment grade values specific to these fertility classes, i.e. 70 and 72, respectively.

Hay-making fields require more from the physical and chemical features of the gley soil, which results in a dramatic decrease of land assessment grades, ranging them in fertility classes IV and V, respectively. Molic preluvosoil and reddish molic preluvosoil have land assessment grade 72, ranging within fertility class III.

Preluvisols in agricultural use are suitable for a wide range of crops namely cereals and corn, but are used with good results in fruit growing and viticulture.

Gleiosolurile due to periodic oscillations of groundwater that adversely affect physical and chemical indicators and fertility, crop supports hard alternation of excess and lack of moisture

REFERENCES

[1]Chirita, C.D., 1955, Pedology general agro State Publishing House, Bucharest
[2]Duma-Copcea Anişoara, Stroia, M.S., 2007, Soil Science, Agroprint Publishing House, Timisoara
[3]Duma-Copcea Anişoara,2012, Pedology - course materials - Agroprint Publishing House, Timişoara
[4]Nicoleta Mateoc Sirb, 2003, Agricultural Economics, Publisher Agroprint, Timisoara
[5]Paun Ion Otiman, Nicoleta Mateoc Sirb, Camelia Manescu, 2013, Rural Economy Mirton Publishing House, Timisoara
[6]Stefan, V., Duma Copcea Anişoara, Mihuţ Casiana, 2004, Soil, practical work Lumina, Dr. Tr Severin, Romanian
[7]Process systems of soil classification, ICPA Bucharest, 2012.
[8] *** Methodology for developing soil studies ASAS - I.C.P.A., Bucharest, 1987.
[9] ***Work instructions for conditional evaluation farmland pedological background elements and technological characterization, ICPA Bucharest, 1987.
[10] *** Romanian system of soil classification ASAS - I.C.P.A., Bucharest, 2012.
[11]*** Pedological study to characterize technological and conditional evaluation of agricultural land, 1992.