

THE ECONOMIC EFFICIENCY OF AGRICULTURAL LAND FROM THE LUGOJ LOCALITY PERIMETER, TIMIȘ COUNTY

Casiana MIHUȚ, Anișoara DUMA-COPCEA

*University of Agricultural Sciences Banat Veterinară „King Michael I of Romania”
Timisoara, Arad Way, no. 119, Romania, Phone: +4025627475, Fax: +40256200296,
Emails: casianamihut@yahoo.com, duma_anisoara@yahoo.com, Center: Sustainable Agriculture
Corresponding author: casiana_mihut@usab-tm.ro*

Abstract. *In our country, due to the high variation of pedogenetical factors, the soil layer is very diversified. At the level of the entire monitoring network, one can encounter 10 of the 12 classes at national level, and 23 soil types of the 29 mentioned by SRTS, 2012. The best represented soil classes are Chernisols (36.0 %), followed by Luvisols (21.2 %), Protisols (19.1%) and Cambic soils (15.2 %). Natural conditions from the western part of Romania, including the perimeter of the town of Lugoj have been and still are extremely favourable for the development of a complex agricultural economy. Climatic conditions, humidity, rock and even relief conditions determined a diversity of soil types pertaining to most classes. Regionally, these can be found north from Mureș in the Carpathian-Crișana province, and to the south in the Carpathian-Banat province, which are part of the central European pedogeographic region. For the most part, they are high fertility soils. Within Timis county, Lugoj is located in the central eastern part, counting as the second town in the county in terms of size, economic development and population. Morphologically, the territory belongs to the High Lugojuului Plain and the Lugojuului Hills. Lying on the contact area of these units, the town was developed on the inferior Timiș terrace, on both shores of the river. The relief unit, where the city lies in, is the Lugojuului Plain, which deeply penetrates the piedmont hill area. The average area altitude is of 124 m above sea level. At the basis of the soils identified and delimited within the perimeter, generally the following parental material groups were found: clays, argils and fluvial deposits. Deposit and evolution conditions for these sedimentary materials can provide information on the current argillaceous materials. Of the total surface of the researched area, almost 80% represents agricultural land with predominant tillable land (75 – 90%). The rest of 4% of the land fund is represented by forest groups, 4% by settlements, communication ways, non-productive land and 1.5% is covered by water (GR. POSEA, 1995). Of the tillable land, 10 – 25 % are concentrated either in low plains (grass land on saltings and on excess humidity land) or in glacial plains (orchards, vineyards, grass land).*

Keywords: *soil, economic efficiency, agricultural, Lugoj*

INTRODUCTION

The town of Lugoj is located in the contact area between High Lugojuului Plain and the Lugojuului Hills, which pertain to the Banatului Hills, in the south-eastern part of the country, eastern area of the Timiș county, being crossed by the river bearing the same name.

The greatest part of the terrain on which the locality lies shows a plain relief, with a few elevations which do not exceed 2-3 m altitude as compared to the terrace surface. In the NW of the plain the Lugojuului Hills are located, which morph into the Poiana Ruscă Mountains.

MATERIALS AND METHODS

The data used in the paper were obtained from observations in the field as well as taken over from former research. The studied material is represented by the main types and subtypes of soils identified in the field.

The studies took place simultaneously in the field, laboratory and in the office, aiming at the following during several years: identification and study of soil types and subtypes, as well

as their morphological, physical, hydro-physical and chemical characteristics; study of climatic conditions in the researched area; study of relief, hydro-relief and hydrology conditions, flora and fauna elements, as well as collecting data regarding the sustainable management of soil resources for the establishment of the economic efficiency of the identified soils.

RESULTS AND DISCUSSIONS

Main classes and types of soils with agricultural potential:

Class Protisoils. Of this class, Alluvioisols occupy quite large surfaces, namely 38.7% of the researched area, followed by Psamosoils.

Alluvioisols are concentrated in the river everglades (Timiș river); they are fertile, being used for all agricultural crops, but are best suited for vegetable crops.

Chernisoils are located predominantly in the western part, the main subtypes being determined by relief, rock and humidity degree.

In low plains, on dry ground, there are chernozems (Nădlac plains), and on higher humidity ground, there are gleyed chernozems (Timișului plains). On transferring to higher plains, cambic chernozem spots occur.

These are fertile soils, suited for all crops and gleyic and stagnic subtypes are suited for agriculture if drained (the water excess is eliminated).

Cambic soils, are spread in the Lugojuului hills, next to luvisoils, including the Eutricambic soil type.

Eutricambic soil is found on a reduced surfaces within the studied area.

These soils present an average natural fertility, which can be increased through a proper fertilization and qualitative agro-technical works.

Luvosoils are largely spread in high plains. They include typical luvisoils and albic luvisoils. To the north, under local excess humidity conditions, they receive a gleyed character.

They are soils showing a good fertility, their surfaces being used in agriculture.

From the total surface of the studied area, almost 80% represents agricultural land with predominant tillable land (75 – 90%). The rest of 4% of the land fund is represented by forest groups, 4% by settlements, communication ways, non-productive land and 1.5% is covered by water (GR. POSEA, 1995).

Of the tillable land, 10 – 25 % are concentrated either in low plains (grass land on saltings and on excess humidity land) or in glacial plains (orchards, vineyards, grass land).

Plant culture finds an essential place in the agricultural production. Under its framework, *cereal crops* occupy the first place (33% of the tillable land concentrated especially in high plains). Wheat is planted (especially in the north and south), corn (on the first place after 1989), rye, autumn barley, oat, rice (in the south), two-rowed barley (for beer). On significant surfaces, *technical plants* are planted. Sun-flower is planted in low plains, including the Timișului plain, sugar beet can be found on large areas in plains neighbouring sugar factories. On small surfaces between the rivers Timiș and Bega medicinal plants are cultivated (GR. POSEA, 1995).

In the everglades of large rivers and in low plains *vegetable crops* (tomatoes, onion, cabbage, cucumbers, lettuce etc.) are planted.

The potato, although cultivated everywhere, presents a significant percentage on sandy land in the Lugojuului Plain and west of Timișoara. Also, *alfalfa* in low plains (Timișului) and *clover*.

Viticulture, a branch with tradition, occupies small areas.

Pomiculture is practiced in high plains. Significant surfaces are cultivated with apple, plum, cherry, apricot and peach trees.

Animal breeding is a traditional occupation which benefits from a varied fodder base and natural grass land.

In Banat, where significant surfaces bear mulberry plantations, there is the tradition of *silk worms*, their cocoons being processed in Lugoj.

Natural conditions (especially large plains with small slopes and slightly fragmented, the warm, more humid climate, fertile soils etc.) insure a potential extremely suited for agricultural activities. However, there were and still is a series of important factors limiting this potential. Among these, the most significant are: high underground water level in low plains which facilitates swamping and soil degrading, then salting, sand deflation, flooding etc. In order to limit these factors improvement works were carried out on the entire plain space (excess water drain and drainage channels, main river bed banking). Since during the summer months long dry periods and even droughts are possible, irrigation systems were set up (Timișului Plain).

The soil quality is affected at various degrees by pollution produced by various industrial activities, as one can infer from the data obtained through partial inventory carried out during 2004 – 2008.

The pollution degree was appreciated on 5 classes, either depending on the crop reduction percentage from a quantitative and/or qualitative point of view as compared to the production obtained on unpolluted soil, or through exceeding, by various degrees, the thresholds established by Ord. 756/1997.

The main classes and types of soils with very low productive potential or unproductive:

Hydro-soils are largely spread, linking to the water excess and the phreatic level with a higher position especially in low plains (Timișului). In this class we include chernic soils, typical gley soils and stagnic soils.

The gley soil fertility is mainly due to humidity excess, a fact that limits the placement of agricultural crops, but after the application of hydro-ameliorative works, these soils can be successfully cultivated.

Vertic soils occupy restricted areas in the south of the Timișului Plain in the Oravița region and the basin of the Tăuț river, linking to the argillaceous sublayer. Vertic soil subtypes are spread in the studied area as well, however they occupy small surfaces.

The vertic soil shows a low fertility, due to the presence of gliding surfaces, on structural elements.

Salsodisols (halomorphic soils) are connected to areas with excess salt in the low plains. White alkali and solonchak soils, generally distributed as stripes on small surfaces, can also be found in the Timișului plain. These soils are partially used for grazing, being only slightly productive, not suited for agriculture.

CONCLUSIONS

The studied perimeter falls under a moderate temperate continental climate, with the annual average temperature of 10.7°C. The annual average value of the De Martonne indices is of 30.5 (semi-humid silvosteppe) in the plain area and of 35 (humid silvosteppe) in the hilly area.

The multiannual average of atmospheric precipitations registered at the Meteorologic Station Lugoj oscillates between 605.5-725.9 mm.

The total surface of the researched perimeter is of 8,805 ha which incorporates the built in area and is thus distributed: 53% tillable land, 38% grass land, 5% vineyards, 2% orchards, 2% hay land.

Climatic conditions, humidity, rock and even relief conditions determined a diversity of soil types pertaining to several classes.

The main soil types identified on the Lugoj town territory include: Preluvosoils; Luvosoils; Eutricambic soils; Gley soils and Alluviosoils.

Of the Protisoil class, Alluviosoils occupy quite large surfaces, namely 38.7% of the researched area, followed by Psamosoils. Alluviosoils are concentrated in the river everglades (Timiș river); they are fertile, being used for all agricultural crops, but are best suited for vegetable crops.

Chernisoils are located predominantly in the western part, the main subtypes being determined by relief, rock and humidity degree. These are fertile soils, suited for all crops and gleyic and stagnic subtypes are suited for agriculture if drained (the water excess is eliminated).

Eutricambic soil is found on a reduced surfaces within the studied area. These soils present an average natural fertility, which can be increased through a proper fertilization and qualitative agro-technical works.

Luvosoils are largely spread in high plains. They include typical luvosoils and albic luvosoils. To the north, under local excess humidity conditions, they receive a gleyed character. They are soils showing a good fertility, their surfaces being used in agriculture.

The main classes and types of soils with very low productive potential or unproductive:

Hydro-soils are largely spread, linking to the water excess and the phreatic level with a higher position especially in low plains (Timișului). In this class we include chernic soils, typical gley soils and stagnic soils.

The gley soil fertility is mainly due to humidity excess, a fact that limits the placement of agricultural crops, but after the application of hydro-ameliorative works, these soils can be successfully cultivated.

Vertic soils occupy restricted areas in the south of the Timișului Plain in the Oravița region and the basin of the Tăuț river, linking to the argillaceous sublayer. Vertic soil subtypes are spread in the studied area as well, however they occupy small surfaces. The vertic soil shows a low fertility, due to the presence of gliding surfaces, on structural elements.

Salsodisoils (halomorphic soils) are connected to areas with excess salt in the low plains. White alkali and solonchak soils, which, on small surfaces, generally distributed as stripes, can also be found in the Timișului plain. These soils are partially used for grazing, being slightly productive, not suited for agriculture.

BIBLIOGRAPHY

- AURELIA PURDA, A ȚĂRĂU, D. DICU, L. NIȚĂ - Evolution of some components of ecosystems productivity from Dumbrava, Timis County, The 9th International Symposium "Young People and Agriculture Research" Timisoara, 29 November 2013, Research Journal of Agricultural vol. 45(4), www.rjas.ro/
- BORZA I., 1997, Ameliorarea și protecția solului [Soil Improvement and Protection], Editura Mirton, Timișoara.
- CANARACHE A., 1997, Însușirile fizice ale solurilor agricole din Banat [Physical Characteristics of Agricultural Soils in Banat], Lucrări științifice SNRSS Timișoara.
- DAVIDESCU D., DAVIDESCU VELICICA, 1972, Testarea stării de fertilitate prin plantă și sol [Testing the Fertility State through Plant and Soil], vol.1. Edit. Academiei, București.

- MICLĂUȘ V., 1990, Pedologie ameliorativă [Ameliorative Pedology], Editura Dacia, Cluj-Napoca.
- MIHUȚ CASIANA, RADULOV ISIDORA, 2012, Științele Solului [Soil Science]. Ed. Eurobit, Timișoara.
- L. NIȚĂ, K. LAȚO, SIMONA NIȚĂ, ALINA LAȚO, CASIANA MIHUȚ, ANIȘOARA DUMA COPCEA - Quantitative and qualitative assessment of soil resources in the Aranca Plain, Research Journal of Agricultural vol. 45(1), www.rjas.ro/
- G. Căbăroiu, L. Niță - Land quality classes and natural landscape of the mining area Valea Mănăstirii 2, Gorj county, The 9th International Symposium "Young People and Agriculture Research" Timisoara, 29 November 2013 Research Journal of Agricultural vol. 45(4), WWW.RJAS.RO/
- POPESCU D., 1993, Ghid turistic Lugoj și împrejurimi [Tourist Guide Lugoj and Surroundings] Ed. Fundația Europeană Drăgan.
- RUSU I., ȘTEFAN V., NIȚĂ L., STROIA M., ANIȘOARA DUMA –COPCEA - Favorabilitatea solurilor din județul Timiș pentru principalele culturi agricole, Sesiunea anuală omagială de referate și comunicări științifice “ 80 de ani de la nașterea Prof.dr.doc. Iulian Drăcea” Lucr.șt. vol XXXIV Ed. Orizonturi universitare Timișoara.