



ULST Timisoara  
**Multidisciplinary Conference on  
 Sustainable Development**  
 30-31 May 2024



# EVALUATION OF AGRICULTURAL LANDS IN THE OUTSKIRTS OF PERIAM TOWN, TIMIȘ COUNTY

O.EREMI, MIHUȚ CASIANA, A.OKROS

University of life science "King Mihai I" From Timișoara 119, Aradului Avenue, Timișoara 30064, Romania

## Abstract:

The importance of the land evaluation activity consists in the fact that, through the data provided by these studies, they form the basic documentation for establishing the most appropriate practical protection measures, improving and rational use of soils for the purpose of biomass production in an optimized and rigorously correlated dynamic with the growing environmental protection requirements. The data presented in this paper was obtained from soil probes obtained from the location ground, as well as data taken from previous soil maps. In order to carry out the chemical and physical mechanical analyses, soil samples were collected from 5 profiles, respectively 3-5 soil samples in a disturbed structure and soil samples from 3 profiles, respectively 9 soil samples in 3 and 4 repetitions for the determination of hydrophysical indices. The soils encountered in the analyzed perimeter are of the chernozem type, with good drainage. Within this type of soil, several subtypes are separated, the predominant one being wet phreatic chernozem. Thanks to all the good properties that these soils have, their natural fertility is high, the productions obtained are superior for cereals, technical plants and fodder plants. The texture of the chernozem is loamy-sandy throughout the profile. The soil reaction (pH) is slightly alkaline with values in the Am horizon of 7.34, in the A/C horizon the value increases to 7.65, and at the base of the profile, in the Cca horizon, the value reaches 8.04. The humus content is medium with values between 2.07 and 1.02%. The content of phosphorus (P) is low and the content of potassium (K) is medium to low. Typical gleosol is also present. The texture is undifferentiated on the profile, being medium clay with the values of fine sand content between 25.7 and 29.2%, dust between 26.2 and 32.6%, and clay between 37.4 and 41.4%. The soil reaction is acidic in the upper horizons and weakly acidic in the lower horizons. The humus content is relatively high in the upper horizons with a content of 2.97-2.42% decreasing in the lower horizons to 1.67-1.31%. The soil is poorly supplied with mobile P and K; shows weak microbiological activity. Cernic Gleisol is also present in the area of the locality. The soil reaction is weakly alkaline on the entire profile with values between 8.0 and 8.15. The humus content is relatively high in the Am horizon 3.78 but decreases in the A/CGo3 horizon to 3.32%.

## • Introduction

In today's agronomic vision, it can be stated that agriculture cannot exist without soil nor without a plant, in the absence of which there can be no talk of plant production, whose size it is determined by soil and climatic conditions. The atmosphere, the earth and the plant activate together in different places around the globe forming "a complete system", that is what we call ecosystem. (Blaga, 1996). The soil together with the nearby atmospheric layer represent the living environment of plants, the place in where their vital processes take place, the accumulation and transformations of substances and energy.

The soil provide's plants the water and nutrients necessary for the process of photosynthesis, process that is the basis of obtaining crops. Regardless of the level of development of the society, the soil was and remains the main means of agricultural production. (Borza, 1997).

The main source of nutrients that plants need is found in the soil, being released from organic matter with the help of microorganisms. Nutrient elements found in the soil reflect its chemical properties. At the same time, the physical properties of the soil are just as important for the growth and development of plants. (Lixandru, 1990).

The territory of the town of Periam is part of the Low Plain of Torontal, a component part of the Western Plain. From a geographical point of view, the territory falls within the area characteristic of the lithogenesis evolution of the Pannonian Plain, formed by the silting of the Pannonian Lake, at the end of the Tertiary and the beginning of the Quaternary. (Lotreanu, 1985).

From a climate point of view, the area studied in this paper has a temperate continental climate with mediterranean influences. The average amount of precipitation is lower than in the other surrounding areas, with 550 mm annually. It can be said that this climate, from an agricultural point of view, is especially favorable for the cultures that demand high temperatures. (Ghibedea, 1970)

The main purpose of this paper is the evaluation of agricultural lands in Periam commune, county Timiș for different agricultural crops.

## • Material and method

The data presented in this paper was obtained from soil probes obtained from the location ground, as well as data taken from previous soil maps. In order to carry out the chemical and physical mechanical analyses, soil samples were collected from 5 profiles, respectively 3-5 soil samples in a disturbed structure and soil samples from 3 profiles, respectively 9 soil samples in 3 and 4 repetitions for the determination of hydrophysical indices.

The samples were processed and the following analyzes were performed:

- determination of soil reaction (PH);
- determination of hydrolytic acidity (Ah);
- determination of cationic exchange capacity;
- determination of soluble salts;
- humus determination;
- determination of carbonates;
- determination of total nitrogen;
- determination of mobile phosphorus and potassium;
- determining the granulometric composition;
- determination of apparent density;
- determination of soil density.

## • Results and discussions

The soils encountered in the analyzed perimeter are of the chernozem type, with good drainage. Within this type of soil, several subtypes are separated, the predominant one being wet phreatic chernozem. Thanks to all the good properties that these soils have, their natural fertility is high, the productions obtained are superior, for cereals, technical plants and fodder plants. In depression areas, where the groundwater level is higher and the waters are rich in potassium, gleysols formes. Cernoziom is the main type of soil found in the studied area.

Horizon	Am	AC	Cca
Depth (cm)	0-33	33-41	41-100
Coarse sand (2.0-0.2mm%)	4,4	4,2	4,0
Fine sand (0,2-0,02 mm%)	60,3	65,6	65,0
Dust (0,02-0,002 mm%)	14,4	13,9	14,5
Clay (under 0,002 mm%)	20,9	16,3	16,5
Texture	LN	SM	SM

The physical properties of chernoziom

Bathyleic chernoziom is one the subtypes of chernoziom soil which we met in the studied area.

Horizon	Af	Amk1	Amk2	A/Ccaac	Ccaac1g	C/Go3	C/Go4
Depth	0-5	5-18	18-50	50-75	75-140	140-165	165-200
Coarse sand (2.0-0.2mm%)	0,3	0,4	0,3	0,2	0,3	0,3	0,5
Fine sand (0,2-0,02 mm%)	46,7	48,0	45,8	45,3	43,6	48,6	39,3
Dust (0,02-0,002 mm%)	22,7	22,9	23,8	23,5	25,7	26,2	23,2
Clay (under 0,002 mm%)	30,3	28,7	20,1	21,0	30,4	24,9	32,0
Physical clay	40,4	38,1	40,5	40,7	41,3	37,7	46,5
Texture	LL	LL	LL	LL	LL	LL	LL
Specific density (Dg/cm³)	2,53	2,55	2,53				
Apparent density (DA g/cm³)	1,1	1,35	1,24	1,14			

The physical properties of typical bathyleic chernoziom

Clay, oscillates between 24.9% in the C/Go3 horizon and 32.0% in the Cgo4 horizon. According to the granulometric composition, the soil falls into the textural class "medium textures", medium clay subclass.

Gleosoil is the second predominant type of soil found in the studied area.

Horizon	Ap	Ao	ABGo	BtGo	Gr
Depth	0-12	12-26	26-41	41-62	62-120
Coarse sand (2.0-0.2mm%)	4,3	3,1	2,5	2,5	3,8
Fine sand (0,2-0,02 mm%)	26,9	25,7	27,5	25,6	29,2
Dust (0,02-0,002 mm%)	29,5	29,8	32,6	32,0	26,2
Clay (under 0,002 mm%)	39,3	41,4	37,4	39,9	40,8
Physical clay	56,3	58,7	57,8	59,5	54,5
Texture	TT	TT	TT	TT	TT
Density (Dg/cm³)		2,50	2,51	2,54	
Total porosity (PT%)		-6,52	-8,83	-6,92	

Physical properties of typical gleosoil

Cernic Gleosoil is one the subtypes of Gleosoil soil which we met in the studied area.

Horizon	Ap	Ao	ABGo	BtGo	Gr
Depth	0-25	25-40	40-60	60-80	80-150
Coarse sand (2.0-0.2mm%)	0,2	0,5	0,5	0,5	0,5
Fine sand (0,2-0,02 mm%)	36,7	36	34,6	32,7	44,7
Dust (0,02-0,002 mm%)	26	36,5	40,1	28,3	32,2
Clay (under 0,002 mm%)	36,7	36,5	40,1	28,3	32,2
Physical clay	52,9	51,6	53	50,9	45,4
Texture	TT	TT	TT	TT	LL
Density (Dg/cm³)		1,39	1,49	1,53	
Total porosity (PT%)		49	45	43	

The coarse sand shows small variations from one horizon to another, with small values between 0.2-0.5%. The fine sand is much better represented quantitatively presents values that oscillate from 32.7% in CGo4 and 44.7% in CGr5. The dust shows percentage variations on the whole profile between 22.6% and 32.6%. The clayey fraction has the same fluctuating values but with a decreasing tendency towards depth, from 36.7-40.1% in the upper horizons to 28.3% in the CGo4 horizon. By the percentage variety of the three granulometric categories and of the higher or lower weight of some minerals, this soil falls into textural class fine textures subclass medium clay loam up to a depth of 60 cm, after which texture becomes medium, medium clay subclass.

The apparent density oscillates between 1.39 g/cm<sup>3</sup> in the Am horizon and 1.53 g/cm<sup>3</sup> in the CGo4 horizon. The total porosity shows low values between 43% in the CGo4 horizon and 49% in the Am horizon.

## • Conclusions

The soils found within the studied perimeter are those of the chernozem type, with good drainage. Within this type of soil, several subtypes can be separated, among which wet phreatic chernozems predominate. Due to its good physical, chemical and biological properties that they have, chernozioms show a high natural fertility.

Gleisols, due to the periodic oscillations of the phreatic water that negatively influence the physico-chemical indices and fertility, the cultivated plants hardly bear the alternation of excess and lack of moisture.