

STUDIES REGARDING THE PRODUCTION CAPACITY OF SOILS OUTSIDE THE BUILT-IN AREA OF THE POJEJENA COMMUNE, CARAȘ-SEVERIN COUNTY. CASE STUDY

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Abstract

The objectives of the paper were: to characterize the natural framework, to identify, study and describe the types and subtypes of soils, to establish the expenses needed for wheat and maize crops and to estimate the production capacity of the agricultural land, compared to the yields obtained, as well as the economic efficiency of the studied farm. The studied material was represented by the land belonging to the Pojejena administrative-territorial unit, Caraș-Severin County, respectively the soils identified in the national perimeter. They were studied in relation to the environmental factors conditioning their existence. The paper presents the fertility of the agricultural land in the studied area, the necessary costs for wheat and corn cropping per hectare, in relation to these soils' production capacity, reflected by the obtained productions and the farm's economic efficiency. In the studied farm, the luvisol soil covers a surface of 24 ha. The widest surface is cultivated with corn, namely 19 ha, and the rest of 5 ha with wheat, whereas the eutricambosol covers 18 ha, of which 12 ha are cultivated with wheat and 6 ha with corn. For the founding and maintaining of the two crops, corn and wheat, we have made up a cost chart, necessary for one hectare of each crop. The average for the corn crop over the two studied years, 2014 and 2015 respectively, was of 5150 kg/ha. With regards to the production average, without taking the soil type into account, it was of 3050 kg/ha. Although, from the two studied soil types eutricambosols yielded higher productions, their fertility can still be increased by complex fertilizations and the introduction of adequate crop rotations.

Key words: economic efficiency, pedogenesis processes, potentially productive, production capacity, soil

INTRODUCTION

The Pojejena commune is situated in the south-western part of a Romania, at the border with the Serbian Republic, on the left Danube shore, 12 km upstream from Moldova - Nouă. [9]

The commune lies at the foot of the Locvei Mountains, the maximum altitude being registered on the Piatra Alba peak, 525m, gradually descending to the Danube, made up of calcareous sedimentary areas. [3] The commune relief's make-up is 50% mountain, 40% hill and 10% plain. The Pojejena commune is included in the Iron Gates Natural Park. [8]

The Pojejena commune climate is moderate continental, with sub-Mediterranean influences, characterized by mild winters due to Mediterranean Sea warm air mass

influences. Precipitations are characteristic to the Mediterranean type, with maximum temperatures usually in May and minimum ones in October. The annual precipitation average ranges from 800 to 1000 mm. [10]

From a hydrographical point of view, the hydrologic network of the Pojejena commune is represented by the Danube river to the south, the Radimna rivulet to the west 1 km from the commune limit, the Pojejena rivulet 50-100 m to the south-east, both flowing onto the Danube. [7]

MATERIALS AND METHODS

The studied material is constituted by the land belonging to the Pojejena administrative-territorial unit, Caraș-Severin county, respectively the soils identified in the national perimeter. They are studied in

relation to the environmental factors conditioning their existence. [6]

The paper observed the fertility of the agricultural land in the studied area, necessary costs for the founding of a wheat and corn hectare, in relation with these soils' production capacity, reflected by the obtained productions and the farm's economic efficiency. [5]

In order to learn the physical, hydric and chemical properties of the soils in the studied perimeter, we used data obtained from OSPA Caraş-Severin, as well as those from the Pojejena Mayor hall. [4]

The total studied surface is of 42 ha. The soil types identified in the field based on OSPA Caraş-Severin and the Pojejena Mayor Hall studies are: [2]

Luvisol soil, with a 24 ha surface;

Eutricambosol soil, with an 18 ha surface.

RESULTS AND DISCUSSIONS

In the Pojejena commune, the agricultural land occupies 46.91% of the total surface, amounting to 5,284 ha. From the usage point of view, the land is divided as follows: agricultural use (pasture and hay land) 72.63 %, tillable land 26.36%, and vineyards 0.4%. The surfaces occupied by pastures and hay land are the most important ones, since they insure the growth of the live stocks..

Forests occupy 43.97 % of the total commune surface, representing an important regenerative resource, whose potential is not yet fully capitalized.

Necessary costs for founding and maintaining crops. In the studied farm, the luvisol soil covers a surface of 24 ha. The widest surface is cultivated with corn, namely 19 ha, and the rest of 5 ha with wheat, whereas the eutricambosol soil covers 18 ha, of which 12 ha are cultivated with wheat and 6 ha with corn. Thus, the total family type farm surface is of 42 hectares, used as follows:

- Corn cultivated surface - 25 hectares;
- Wheat cultivated surface - 17 hectares.

For the founding and maintaining of the two crops, corn and wheat, we have made up a cost chart, necessary for one hectare of each

crop, as one can infer from the data presented in tables 1. and 2.

Table 1. Costs necessary for the founding and maintaining of a CORN crop,

The following materials are necessary:

Ct. no.	Material	M. U.	Quantity	Price	Total cost (RON)
Soil preparation and seeding					
1	Diesel oil	L	79	5	395
2	Complex fertilizers	Kg	100	2.4	240
3	Seed	Kg	25	23	575
Crop maintenance and harvesting					
1	Ammonium nitrate	Kg	350	1.84	644
2	Herbicides and phytosanitary treatment	-	-	120	120
3	Harvested	-	-	250	250
TOTAL					2,224

From Table 1, one can observe the fact that costs necessary for founding and maintaining one hectare of corn amount to RON 2,224.

From this sum we deduce the UE subvention sum of Euro 180, that is: $180 \times 4.25 = \text{RON } 765$.

Thus, in the end, our costs amount to: $2,224 - 765 = \text{RON } 1,459/\text{ha}$.

$1,459 \times 25 \text{ ha surface} = \text{RON } 36,475$

Table 2. The needed materials and related Costs for the founding and maintaining of a WHEAT crop

Ct. no.	Material	M. U.	Quantity	Price	Total cost (RON)
Soil preparation and seeding					
1	Diesel oil	L	79	5	395
2	Complex fertilizers	Kg	100	2.4	240
3	Seed	Kg	250	1.5	375
Crop maintenance and harvesting					
1	Ammonium nitrate	Kg	300	1.84	552
2	Herbicides and phytosanitary treatment	-	-	100	100
3	Harvested	-	-	250	250
TOTAL					1,912

From table 2., one can observe the fact that costs necessary for founding and maintaining one hectare of wheat amount to RON 1,912.

From this sum we deduce the UE subvention sum of Euro 180, that is: $180 \times 4.25 = \text{RON } 765$.

Thus, in the end, our costs amount to: $1,912 - 765 = \text{RON } 1,147 \text{ RON/ha}$.

$1,147 \times 17 \text{ ha surface} = \text{RON } 19,499$

Corn and wheat productions, obtained from the two studied soil types, respectively luvisol and eutricambosol soil, differed, as one may observe in tables 3. and 4. and figures 1. and 2.

Table 3. Corn production (kg/ha) obtained on luvisol and eutricambosol soils

Soil type	Year/Production obtained (kg/ha)		Average
	2014	2015	
Luvisol	4,500	5,300	4,900
Eutricambosol	5,100	5,700	5,400
Obtained production average			5,150

With the corn crop, the productions obtained on luvisol soil, varied from 4,500 kg/ha in 2014 to 5,300 kg/ha, in 2015, with an average of 4,900 kg/ha.

With eutricambosol soils, the corn productions were higher, namely 5,100 kg/ha in 2014, respectively 5,700 kg/ha, in 2015, with an average of 5,400 kg/ha over the two years.

The average for the corn crop over the two studied years, 2014 and 2015 respectively, was of 5,150 kg/ha.

Table 4. Wheat production (kg/ha) obtained on luvisol and eutricambosol soils

Soil type	Year/Production obtained (kg/ha)		Average
	2014	2015	
Luvisol	2,900	2,700	2,800
Eutricambosol	3,500	3,100	3,300
Obtained production average			3,050

Regarding the wheat crops on luvisol soils, they varied between 2,900 kg/ha, in 2014, to 2,700 kg/ha, in 2015, with an average of 2,800 kg/ha over the two years.

On eutricambosol, same as for the corn crop, productions were higher, namely 3,500 kg/ha, in 2014, respectively 3,100 kg/ha, in 2015, with an average of 3,300 kg/ha over the two years. With regards to the production average, without taking the soil type into account, it was of 3,050 kg/ha.

Although the same fertilizers and treatments were applied to both crops, in 2013, as well as 2014, the obtained productions varied a great deal. This fact is due especially to climate conditions in 2014, because the precipitations during the vegetation period were a lot more numerous, thus helping to obtain higher productions, as compared to those obtained in 2013.

CONCLUSIONS

Agriculture, with its important branches: land cultivation and animal breeding, alongside with fishing, tourism and commerce are the

main economic activities undertaken by the commune inhabitants. The area's soil and climate conditions facilitate vegetal crops, the total cereal cultivated commune surface being of 5,286 ha.

With the corn crop, productions obtained on luvisol soil, ranged from 4,500 kg/ha in 2013 and 5,300 kg/ha in 2014, with an average of 4,900 kg/ha. In the case of the eutricambosol soil, corn productions were higher, namely 5,100 kg/ha in 2013, 5,700 kg/ha in 2014 respectively, with an average of 5,400 kg/ha over the two years.

The corn crop production average over the two studied years, 2013 and 2014 respectively, was of 5,150 kg/ha.

Regarding the wheat crop, on luvisol soil, it ranged from 2,900 kg/ha in 2013 to 2,700 kg/ha in 2014, with an average of 2,800 kg/ha over the two years.

On eutricambosol soil, just as in the corn crop's case, higher productions were obtained, namely of 3,500 kg/ha, in 2013, respectively 3,100 kg/ha, in 2014, with an average of 3,300 kg/ha over the two years. Regarding the production average, without taking the studied soil type or year into account, it amounted to 3,050 kg/ha.

Although fertilizers and treatments were equally applied to the two crops, during 2013, as well as during 2014, the obtained productions greatly varied. This was especially due to climatic conditions in 2014, when there were more numerous precipitations, thus helping obtain higher productions, as compared to those obtained in 2013.

Although, from the two studied soil types eutricambosol soils yielded higher productions, their fertility can still be increased by complex fertilizations and the introduction of adequate crop rotations.

Likewise, in order to increase the fertility of these soils, adequate agritechnical works are necessary, which should facilitate water penetration into the soil, and, in some cases, even hydro ameliorative works (drainage).

Since luvisol soils are acid soils, poor in fertilizing elements, here measures of calcareous amendment and complex nitrogen, phosphor and kalium fertilization must be

applied.

Periodically, once in 3-4 years, there is a need either for organic fertilization or for a clover crop rotation.

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