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ANALYSIS OF THE AGRICULTURAL SYSTEM AND PRODUCTIVE RESOURCES IN THE RECAȘ AREA, TIMIȘ COUNTY, ROMANIA

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Abstract

Agriculture remains a cornerstone of the local economy in the town of Recaș and its surrounding villages, where the pedo-climatic conditions favor a diverse range of crops and a strong winemaking tradition. This study presents the structure of the land fund (2024), the degree of arable land suitability, and the main limiting factors, correlated with the level of mechanization and the crop structure. Of the total area of 23,198.48 ha, 85.1% is agricultural land, including 56% arable land and 7.5% vineyards; non-agricultural land accounts for 14.9%. Within the arable category, the distribution by quality class is as follows: Class II – 14.8%, Class III – 44.2%, Class IV – 29.4%, and Class V – 11.6%. The dominant limiting factors include soil acidity (low pH values over approximately 21% of the surface), slope (affecting around 31.7%), excess moisture (about 22%), and low total porosity in soils with a Bt horizon (approximately 32%). The analysis of the technical base reveals a diverse but uneven fleet of agricultural machinery across small farms, a factor that may affect production stability. The results are discussed in relation to literature on agricultural management, mechanization, the integration of weed control technologies, and trends in agro-economic and rural development. The conclusions highlight key directions for improving performance: integrated soil and weed management, optimization of input use, and strengthening of technical capacity, while leveraging the competitive advantage of local viticulture.

Key words: Agricultural systems, rural development, strategy, soil.

INTRODUCTION

Agriculture is an essential component of rural development and socio-economic cohesion in Romania, and management policies and practices directly influence the stability of production and the resilience of farms (Dumitru et al., 2019). At the European level, technological options – from efficient mechanization to the integration of weed control strategies – are discussed within integrated approaches that simultaneously pursue economic performance, environmental protection, and food safety (Hatcher & Melander, 2003; Riemens et al., 2022; Koning et al., 2019; Koricheva & Gurevitch, 2014). In field systems, crop yields are strongly conditioned by the interaction of agrotechnical and meteorological factors (Szabó & Pepó, 2005), and the role of grasslands in food security and climate change mitigation remains relevant on both regional and local scales (O'Mara, 2012). Over the past decade, interest in organic farming and the consumption of organic products has increased in the EU (European Commission, 2025; Toth et al., 2016; Sîrbu et al., 2015), highlighting the need to adapt technologies to pedo-climatic specificities. In western Romania, including Timiș and Caraș-Severin counties, rainfall and

climatic variability in recent years have significantly influenced production (Mircov et al., 2021). In addition, the national literature points to the importance of assessing land quality and crop suitability to local conditions (Mihuț et al., 2018), as well as to the efficiency of mechanization and aggregate selection, in correlation with costs and optimal working windows (Duma Copcea et al., 2022; Duma Copcea et al., 2024). Overall, studies on agricultural systems in Romania highlight the continuous transition of production structures and the need for modernization (Grad et al., 2014).

The town of Recaș, together with the villages of Izvin, Bazoș, Petrovaselo, Herneacova, Stanciova, and Nadaș, falls into a typology with mixed activities, in which agriculture and viticulture have a major weight. The local database for 2023 indicates predominantly agricultural land use (85.1%), with 56% arable land and 7.5% vineyards, on a varied soil background and with specific limiting factors (acidity, slope, excess moisture, low porosity in Bt horizons). In this context, the objective of the study is to characterize the structure of the land fund, to describe the distribution of quality classes for arable land and the major limiting factors, and to correlate these aspects with the level of mechanization and crop structure, considering the benchmarks provided by the aforementioned literature (Dumitru et al., 2019; Hatcher & Melander, 2003; Riemens et al., 2022; Koning et al., 2019; Koricheva & Gurevitch, 2014; O'Mara, 2012; European Commission, 2025; Toth et al., 2016; Sîrbu et al., 2015; Mircov et al., 2021; Mihuț et al., 2018; Grad et al., 2014; Duma Copcea et al., 2022; Duma Copcea et al., 2024).

MATERIALS AND METHODS

The study uses administrative and statistical data for 2024 from MADR, INSSE, APIA, and the Agricultural Chamber of the Recaș City Hall.

The structure of the land fund at the level of the city and its constituent villages was taken from the cadastral/agricultural register and synthesized by categories of use (arable land, pastures, meadows, vineyards, orchards, non-agricultural land). For arable land, the classification into favorability classes (II–V) was made according to the existing local data on land quality, and the limiting factors were interpreted descriptively according to pH, slope, humidity regime, and total porosity (especially for soils with a Bt horizon).

The processing included: (i) calculation of the proportions (%) by category of use in relation to the total area; (ii) consolidation of the proportions by favorability classes for arable land; (iii) inventory and synthesis of the technical base (number and type of machinery); and (iv) contextualization of the results in relation to the literature on agricultural management, mechanization, the regional climate regime, and current agricultural policy orientations (Mircov et al., 2021; Duma Copcea et al., 2022; Duma Copcea et al., 2024; Grad et al., 2014; European Commission, 2025). The analysis is descriptive; no inferential tests were applied, given the diagnostic objective concerning land structure and limiting factors.

RESULTS AND DISCUSSIONS

The paper presents a series of studies carried out in 2024 in the locality of Recaș, Timiș County. Among the main concerns of the inhabitants of this locality, the agricultural sector occupies an important place.

Thus, about 50% of the active population works in agriculture. In Table and Figure 1, the situation regarding the land fund of the studied area and the main categories of land use (in 2024) is presented. From the data presented (Table 1), it appears that at the level of Recaș, the total area is 23,198.48 ha, of which 19,911.35 ha (85%) represent agricultural land and 3,279.13 ha (14.8%) represent non-

agricultural land, while arable land accounts for 56%, i.e., 13,112.12 ha, and vineyards for 7.5%, i.e., 1,762.96 ha. Therefore, agricultural land represents over 85%, while non-agricultural land is almost 15%, and only 0.8% is represented by non-productive land.

If we compare the situation regarding the use of these lands in the main villages (land in private and associative systems, except for S.C. Recatim S.A.), the situation is shown in Table and Figure 2 (according to the cadastral register)

Table 1.The land fund of Recaş, in 2024

Use	Area (in hectares)	%
Arable land	13.112,12	56
Pastures	3.934,68	16,9
Meadows	878,86	3,9
Vineyards	1.762,96	7,5
Orchards	328,82	1
Agricultural total:	**19.911,35**	**85,1**
Forests and bushes	1.886,58	8,1
Waters and ponds	482,89	2
Unproductive land	164,27	0,8
Roads and railways	518,89	2,2
Construction	395,38	1,8
Total non-agricultural land	**3.279,13**	**14,9**
Grand total	**23.198,48**	**100**

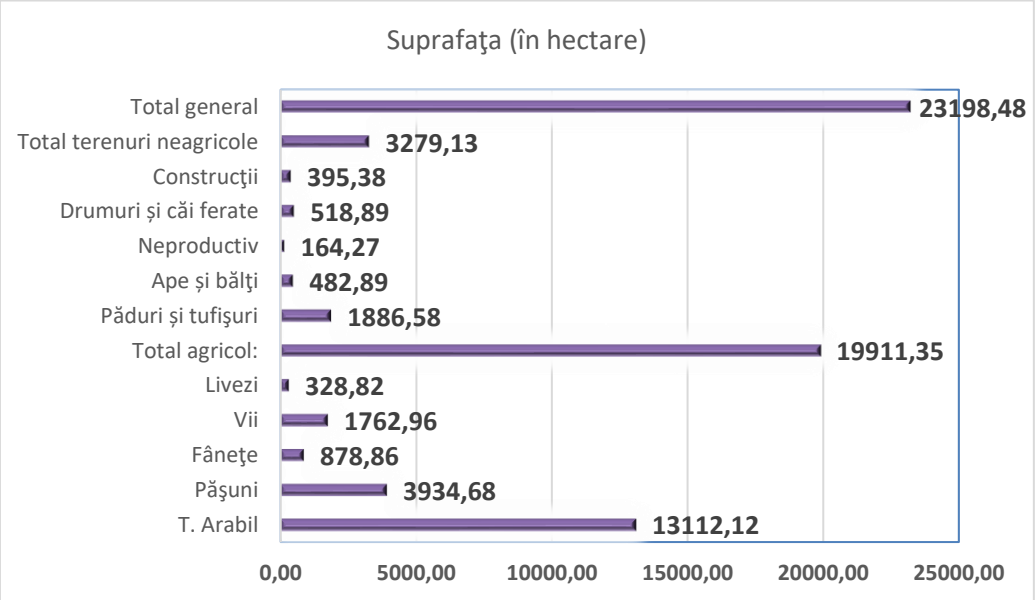

Figure 1. Situation regarding the land fund of Recaş locality (2023)

Table 2.sage of the agricultural land fund at the level of Recaș and its constituent villages

Locality	Total area (ha)	Arable land area	Pasture area	Meadow area	Vineyard area	Orchard area
Recaş	3.326	2.802	354	17	113	40
Izvin	1.976	1.372	363	6	231	-
Bazoş	1.870	1.792	544	-	-	-
Petrovaselo	1.616	1.214	270	82	70	-
Herneacova	1.449	885	263	152	132	75
Stanciova	2.370	1.588	622	132	122	71

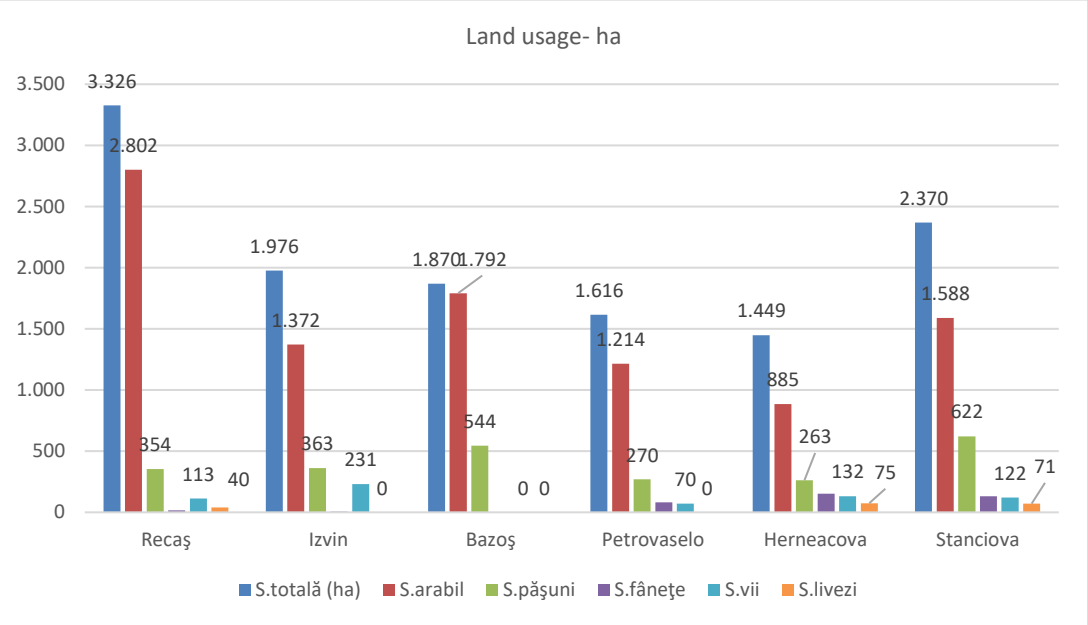

Fig 2. Categories of agricultural land use in Recaș compared with its constituent villages

As for the situation at S.C. Recatim S.A., out of the total area of 4,164 ha, 1,348 ha is arable land and 868 ha are vineyards (21.2% of the agricultural area), while pastures and meadows together occupy approximately 1,948 ha.
Regarding the classification of these lands into favorability/quality classes for arable land (Fig. 3.3), the situation is as follows:

- Class II: 2,953 ha, representing 14.8%
- Class III: 8,785 ha, representing 44.2%
- Class IV: 5,865 ha, approximately 29.4%
- Class V: 2,313 ha, representing 11.6% of the total area studied

The distribution of soils in the studied area is varied; consequently, their production capacity differs from one type to another, due to the presence of certain limiting factors affecting productivity and fertility. Among these factors, the most important are:

- **Soil reaction (pH):** lower values occur on approximately 21% of the surface, while higher values are present on only 2%
- **Humus content:** generally low, affecting about 30 ha
- **Slope:** limits the use of soils on approximately 31.7% of the territory, with degrees of limitation ranging from deficient (about 23% of the land), partially restrictive (5%), to restrictive (3.7%)
- **Excess moisture:** varies depending on the water source; groundwater has a lower impact than precipitation, which is more pronounced on certain flat areas where shallow clay-rich layers cause puddles, affecting about 22% of the territory
- **Total porosity:** in soils with a Bt horizon, low values are observed over approximately 32% of the territory

Land exploitation in the studied area is as follows: six agricultural associations with legal status collectively manage over 46% of the locality's land. The remaining areas are cultivated by small, usually family-type associations or private owners (without legal status). Thus, the entire land area is worked in a mixed system (private or associative), with agricultural operations carried out using a complex array of

tractors and machinery, as shown in Table 3 and Figure 3.

Table no. 3. Technological - agricultural park in Recaș, in 2023

Machines	No.
Combine	
Straw	35
Corn	17
Feed	4
Tractors	
<45	44
46-55	12
56-65	89
>65 Hp	9
Trailers	80
Straw sowers	38
Roasters	50
Tractor ploughs	113
Combiners	25
MA and MIG	31
MET	47
Mechanical Traction Harrows	111
Cultivators	58
Rollers	5
Balers	18
Dusty Spray	26
Tillers	9
Brushcutters	12
Tinker	15
Vindrovere	11
Animal ploughs	9
Beet dislocators	5
Hydraulic loaders	5
Irrigated motor pumps	4
Freight transport	
<1.5t	18
>1.5 t	12
Carts and carts	124

Source (Recas-Timiş City Hall)

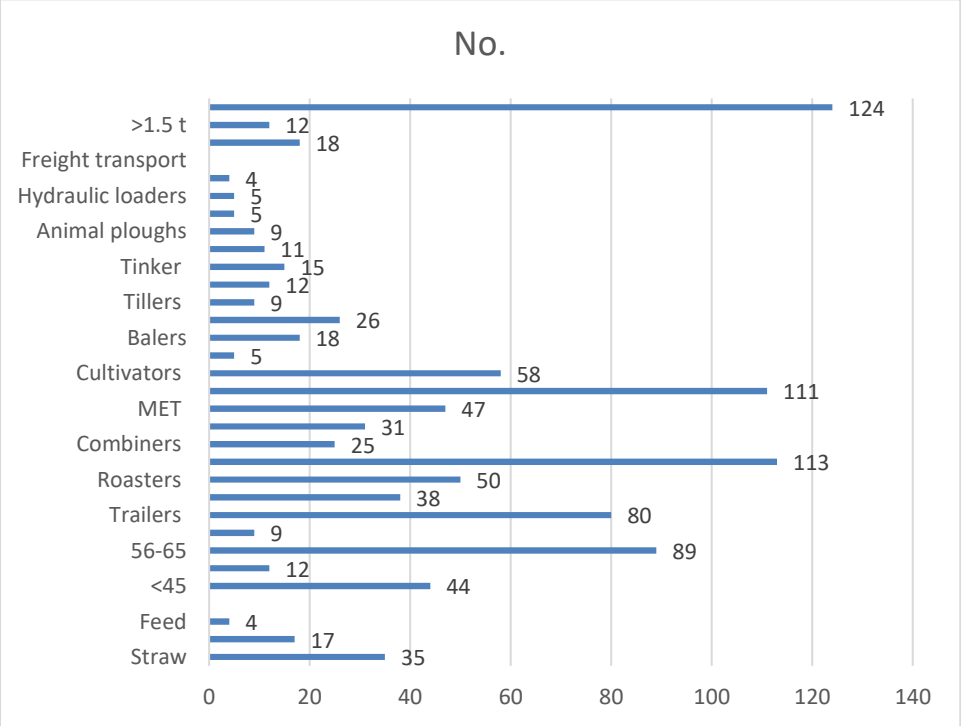

Figure 3.Technologycal park

In the following table for the year 2023, common winter wheat shows the highest yields among cereal crops for grains, while sorghum for grains has the lowest production,

with 152 tons. Within the grain cereal range, the common winter wheat crop ranks first in terms of harvested area, whereas the sorghum crop for grains, with 110 hectares harvested, ranks last.

The oilseed crops are represented by sunflower, with 1,160 hectares harvested, and rapeseed, with 610 hectares harvested.

Summer and autumn potatoes in 2023 were harvested from the same area, 5 hectares each. The cultivated areas for the main crops have fluctuated over time due to market prices. Although the soils in the area have medium to good natural fertility, the yields obtained from these crops were modest due to climatic conditions, with rainfall during the growing season being low and unevenly distributed.

Corn is the most widely cultivated species, along with wheat, barley, sunflower, fodder plants, and a number of vegetables.

The Recaș area is also recognized for its vineyards, with the Recatim company being the most famous and highly regarded, due to the quality of its wines, which have received international awards. This commercial company manages over 868 hectares, of which 813 hectares are fruit vineyards, representing approximately 17.5% of the vineyard area in Timiș County.

At Recatim, grape varieties are grown for both table and wine purposes: 190 hectares are planted with table grapes, and 623 hectares with wine grapes. The winery has a storage capacity of around 800 wine wagons.

Vines are also cultivated in the localities of Izvin, Petrovaselo, and Herneacova, but the yields are modest due to diseases and pests.

Most of the agricultural products obtained in the area are collected by “Comcereal,” located in the city of Recaș. This facility has a minimum storage capacity of 12,000 tons and a maximum capacity of 15,000 tons, employing 15 permanent staff, along with 6–8 seasonal workers.

Table 4.Grain harvested areas in 2024

Crops	Harvested areas -Hectares-
Grain cereals - total	4250
Common Autumn Wheat	1800
Autumn triticale	400
Autumn barley	300
Spring barley	300
Autumn oats	300
Spring oats	320
Corn for grains	960
Grain sorghum	110
Sunflower	1160
Rape	610
Summer potatoes	5
Autumn potatoes	5

Animal Husbandry

As for this sector, at the level of Recaș, the situation has been steadily declining. On 04.01.1971, the livestock included 7,661 cattle, 9,586 pigs, 11,078 sheep, 431 goats, 1,354 horses, 38,200 birds, and 881 bee families. After 1989, with the dissolution of the former CAPs, the number of livestock herds was drastically reduced, due both to the unclear status of land ownership and the lack of guaranteed product marketing.

Currently, there is a milk processing factory in the area. Although relatively small, this factory pasteurizes and packages part of the milk collected from local producers and also produces a range of dairy products. There is also a joint-stock company, Recosemtract, which has a sausage processing capacity of over 14 tons.

The locality of Izvin, which belongs to Recaș, is known in the area for its Stud Farm (Herghelia Izvin), a subsidiary of

R.A. – Thoroughbred Horses of Romania. Its exclusive profile is as a stud farm and stallion repository.
According to the records of the City Hall, there are six agricultural companies that work the land under an associative system. The remaining agricultural land is cultivated privately by various entrepreneurs or by individual owners, depending on their level of mechanization.

CONCLUSIONS

Recaș has a dominant agricultural use (85.1% of 23,198.48 ha), with a major share of arable land (56%) and significant viticultural potential (7.5%), confirming the local competitive advantage in the wine sector.
The distribution of quality classes for arable land (II–V) indicates a high share of Classes III (44.2%) and IV (29.4%), suggesting medium to good productive potential, but sensitive to management.
The regional limiting factors – soil acidity (~21% of the surface), slope (~31.7%), excess moisture (~22%), and low porosity in soils with Bt horizons (~32%) – require adapted technological measures: amendment and pH management, conservative practices on slopes, drainage and simplification of machinery traffic on wet soils, and avoidance of compaction.
The flooring and heterogeneity of technical equipment at the level of small farms can affect adherence to optimal working windows and production stability; the literature recommends efficient aggregate selection and mechanization optimization (Duma Copcea et al., 2022; 2024).
The integration of weed management (IWM) and sustainable farming practices – including consistent crop rotations, minimum tillage where feasible, and climate-sensitive agrotechnics – is aligned with European evidence and can improve the performance of local systems (Hatcher & Melander, 2003; Riemens et al., 2022; Koning et al., 2019; O'Mara, 2012). Urlica et al. (2019) and Groszler, Ökros, & Dragoescu (2017) also noted the importance of developing sustainable practices.
Ultimately, strengthening recovery chains (cereals, viticulture) and investing in storage, consulting, and continuous training infrastructure remain priorities for increasing resilience and added value in the territory (Dumitru et al., 2019; European Commission, 2025).

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