

## DYNAMICS OF VEGETABLE AGRICULTURAL PRODUCTION IN VRANCEA COUNTY, ROMANIA

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### Abstract

*This paper aims to present an updated evolution of vegetable agricultural production in Vrancea county, during the period 2017-2021, with focus on the county's contributions in total at the country level, using the National Institute of Statistics (NIS) as principal data source. In order to meet the objectives, the methodology of research was based on indicators frequently used in papers about vegetable agricultural production, represented as values and/or percentage units. In 2021, Vrancea county detained 108 civil employment population (with 17% less than in 2017), through 22 employers in agriculture (52% less than in 2017). Among the main findings from the analyse are the following: the areas cultivated with corn grains, oat, sunflower, vegetables (all), dried onion, tomatoes, total fruits trees, plum, apples, pears, cherries and burgundy decreased among the county between 2017 and 2021 period and the areas cultivated with wheat, barley and vineyards in bearing increased. About the production, at the county level, the production of wheat, oat, barley, total fruit trees, plum, apple, pears, cherries, burgundy and grapes increased and the productions like: corn grains, sunflowers, vegetables (all), dried onion, tomatoes, decreased in the analysed period (2017-2021). From the conclusions of this paper, we found out that besides the good image in terms of wine fields, is observed that total fruit production increased by 50%, which can mean a new growth area of the county, regarding of vegetable agricultural production.*

**Key words:** agriculture, area cultivated, vegetable production, Vrancea county

### INTRODUCTION

Vegetables sector in Romania's agriculture is of high importance for assuring a large variety of products for human diet and for processing industry [2, 10].

Vrancea county is one of the most important regions in terms vegetable production and especially of wine.

Vrancea, the Country of Vineyards and Wines, is located outside the Curvature Carpathians, at the intersection of the three historical regions: Moldova, Tara Romaneasca and Transylvania. Its surface is 4,863 sqkm [3] and in 2022 the county had a resident population of 334,056 people, from which 33% living in urban area, and 67% in rural area. [5] In 2014, 53% from the total surface of Vrancea county it was occupied with agricultural land, from which: 40% it was occupied with forests and other forest vegetation, 31% with arable land, 9% with pastures and 21% it was used for other types of lands [5].

In the context in which, Vrancea county is composed of 148,729 ha arable land (in 2014) [5], it is important to know the dynamics and the distribution of the surfaces cultivated with main cultures.



Map 1. Map of Vrancea County  
Source: [3].

Through this purpose, the following pages of this research aims to present an updated evolution of vegetable agricultural production in Vrancea County, during the period 2017-2021, with focus on the county's contributions in total at the country level, using the National Institute of Statistics (NIS) as principal data source.

## MATERIALS AND METHODS

In order to analyze the evolution of vegetable agricultural production in Vrancea, a lot of indicators from the National Institute of Statistics (NIS) were presented in this research papers, after a large documentation about the subject. To meet the objectives of the study was processed and analyzed a series of statistical data available nationally for the period 2017-2021. The methodology was based on indicators frequently used in papers about vegetable agricultural production, represented as values (area cultivated or the obtained production) and/or percentage units (the contribution of Vrancea county in the total level of area cultivated/production). All of the analyzed indicators were compared with the total at the country level, for a better understanding of county contribution.

In this research it was used a series of indicators (secondary data) like: total civil employments in agriculture, surface cultivated with the main cereals, vegetables, fruits and vineyards and the production made on these surfaces.

## RESULTS AND DISCUSSIONS

In Vrancea county climate is suitable for field crops, and especially for vineyard cultivation and wine production [9] (17% of Romania's vineyards in 2021) [5] and wine production (19% of Romania's grapes production in 2021). Vrancea County being the largest wine-growing county in the country, is an exporter to Europe, America and Japan [1]. It is important to have an overview of Vrancea county's indicators because in this county stands out some factors that discourage the development of agriculture like: work force

less qualified or high fragmentation of farms [7].

The following tables, graphics and calculations will help to understand the exactly potential of county in terms of vegetable agricultural production, compared with the total at the country level.

Table 1 presents the evolution of civil employment population in agriculture per county and per country between 2017 and 2021. Vrancea county detain approx. 1.5% civil employment population from the total at the country level, and approx. 2.6% from the total civil population employment in agriculture (2021 data reference). From 2017 to 2021 employed population in agriculture in Vrancea decreased by 52% and by 51% at the country level.

Table 1. Overview of civil employment population

Indicator/Year	2017	2018	2019	2020	2021	2021/ 2017
	thousand persons					Percent
Civil employed population - RO	8,367	8,408	4,893	8,441	7,601	91%
Civil employed population in agriculture - RO	1,742	1,760	1,747	1,681	847	49%
Civil employed population - VN	130	130	131	131	108	83%
Civil employed population in agriculture - VN	45	46	46	44	22	48%

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS. [5]

\*RO=Romania; \*VN=Vrancea

From 2017 to 2021 the surface cultivated with corn grains increased by 6% at country level and decreased by 47% in Vrancea. The surface with wheat increased by 6% in Romania and with 11% in Vrancea (Table 2).

Table 2. Area cultivated with main cereals (ha)

Indicator /Year	2017	2018	2019	2020	2021
Corn grains					
Romania	2,402,082	2,439,842	2,678,504	2,537,104	2,549,281
Vrancea	54,522	54,561	54,707	55,533	28,878
Wheat					
Romania	2,052,917	2,116,154	2,168,370	2,155,254	2,175,077
Vrancea	23,776	23,690	24,614	24,848	26,392
Oat					
Romania	165,757	161,484	161,188	101,340	87,018
Vrancea	4,648	4,637	4,625	4,620	4,643
Barley					
Romania	268,826	250,797	285,065	292,079	333,007
Vrancea	1,463	1,280	1,845	1,590	2,816

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

Area cultivated with oat decreased by 48% in 2017-2021 in Romania, and remained the same (approx. 4,645 ha) in Vrancea. The area cultivated with barley present an increase from 2017 to 2021 on both indicators: in Romania increased by 24% and in Vrancea by 92% (Table 2).

In 2021, the area cultivated with main cereals in Vrancea, represented a small area of the entire cultivated area at the national level, as follows:

- Corn grains: 1.1% of the total area per country;
- Wheat: 1.2% of the total area per country;
- Oat: 5.3% of the total area per country;
- Barley: 0.8% of the total area per country.

From the data source it turns out that in 2021 the area cultivated with oat in Vrancea was on the 4th place nationally, after Suceava, Satu Mare and Mures counties.

From 2017 to 2021 the production of corn grains increased by 3% at country level and decreased by 48% in Vrancea. The production of wheat increased by 4% in Romania and with 9% in Vrancea. The production of oat decreased by 49% in 2017-2021 in Romania, and increased by 4% in Vrancea. The production of barley presents an increase from 2017 to 2021 on both indicators: in Romania increased by 25% and in Vrancea by 210% (Table 3).

Table 3. The production of main cereals (tons)

Indicator /Year	2017	2018	2019	2020	2021
Corn grains					
Romania	14,326,097	18,663,939	17,432,223	10,096,689	14,820,693
Vrancea	317,381	381,769	268,803	81,659	165,954
Wheat					
Romania	10,034,955	10,143,671	10,297,107	6,392,369	1,043,3751
Vrancea	106,350	106,837	103,193	31,425	116,395
Oat					
Romania	407,795	383,722	361,573	196,659	209,845
Vrancea	9,647	9,521	9,026	4,308	10,048
Barley					
Romania	1,271,734	1,276,620	1,340,389	847,241	1,593,802
Vrancea	4,197	4,218	8,213	2,192	12,995

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In 2021, the production of main cereals in Vrancea, represented a small production of

the entire production area at the national level, as follows:

- Corn grains: 1.1% of the total production per country;
- Wheat: 1.1% of the total production per country;
- Oat: 4.8% of the total production per country;
- Barley: 0.8% of the total production per country.

Between 2017-2021, at country level the area cultivated with sunflower increased by 13% and the areas cultivated with vegetables (all), dried onion and tomatoes decreased by 12%, 3% respectively 13%. At the county level, the areas cultivated with the 4 cultures decreased by 14% for sunflower, 8% for vegetables (all), 2% for dried onion and with 22% for tomatoes in the analyzed period (Table 4).

Table 4. Area cultivated with main cultures excepting the cereals (ha)

Indicator /Year	2017	2018	2019	2020	2021
Sunflower					
Romania	998,415	1,006,994	1,282,697	1,142,841	1,123,960
Vrancea	6,940	7,236	7,805	6,841	5,998
Vegetables (all)					
Romania	224,571	226,328	227,720	200,501	19,7677
Vrancea	4,747	4,769	4,768	4,566	4,344
Dried onion					
Romania	30,025	30,269	30,346	29,201	29,251
Vrancea	891	880	888	874	873
Tomatoes					
Romania	40,041	40,741	40,845	34,115	34,747
Vrancea	1,020	1,009	1,014	991	791

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In 2021, the area cultivated with main cultures excepting the cereals in Vrancea, represented the following percentages from the total country area:

- Sunflower: 0.5% of the total area per country;
- Vegetables (all): 2.2% of the total area per country;
- Dried onion: 3.0% of the total area per country;
- Tomatoes: 2.3% of the total area per country.

From the data source it turns out that in 2021 the area cultivated with dried onion in Vrancea was on the 11th place nationally,

with 873 ha cultivated, and represented 2.98% from Romania’s production of dried onion.

In the analyzed period (2017-2021), at country level the production of sunflower and all vegetables decreased by 2% respectively 4%; the production of dried onion and tomatoes increased by 1% respectively 11%. Referring to county production, the production of all 4 cultures decreased by 12% for sunflower, 7% for vegetables (all), 13% for dried onion and with 9% in the analyzes period (Table 5).

Table 5. Production of main cultures, excepting the cereals (tons)

Indicator /Year	2017	2018	2019	2020	2021
Sunflower					
Romania	2,912,743	3,062,690	3,569,150	2,122,865	2,843,531
Vrancea	17,119	15,891	19,780	7,255	15,139
Vegetables (all)					
Romania	3,638,447	3,797,436	3,529,648	3,483,035	3,495,105
Vrancea	61,711	62,813	60,750	71,887	57,115
Dried onion					
Romania	352,165	350,159	340,635	372,953	357,213
Vrancea	9,822	9,237	9,294	10,888	8,574
Tomatoes					
Romania	679,807	742,899	689,401	745,682	753,377
Vrancea	14,504	14,470	14,153	19,004	13,226

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In 2021, the production of main cultures, excepting the cereals in Vrancea, represented the following percentages from the total country production:

- Sunflower: 0.5% of the total production per country;
- Vegetables (all): 1.6% of the total production per country;
- Dried onion: 2.4% of the total area production country;
- Tomatoes: 1.8% of the total area production country.

**Fruits sector**

Between 2017-2021, at country level the number of fruit trees decreased by 1% for plum and apples, increased by 6% in case of pears and remain the same for the total fruit trees, cherries and burgundy. In Vrancea, the number of total fruit trees decrease with 11%, remain at the same for plum trees, and for apple, pears, cherries and burgundy also the number of trees decreased by a percent of 26%, 49% respectively 2% (Table 6).

In 2021, the area covered by fruit trees had the following shares in the total cultivated area in Vrancea County:

- Total fruit trees: 2.9% of the total number of fruit trees per country;
- Plum trees: 3.5% of the total number of fruit trees per country;
- Apple trees: 2.7% of the total number of fruit trees per country;
- Pears trees: 1.2% of the total number of fruit trees per country;
- Cherry and burgundy trees: 3.1% of the total number of fruit trees per country.

Table 6. The number of fruit trees

Indicator /Year	2017	2018	2019	2020	2021
Total fruit trees					
Romania	75,279,182	78,929,084	73,866,869	73,586,476	74,914,434
Vrancea	2,482,202	2,208,529	2,208,455	2,197,646	2,204,143
Plum					
Romania	34,591,325	34,534,473	34,459,654	34,214,693	34,195,891
Vrancea	1,187,970	1,190,848	1,187,970	1,182,478	1,182,969
Apple					
Romania	25,304,145	28,689,430	23,655,918	24,014,734	24,950,006
Vrancea	898,980	664,988	664,241	663,507	669,637
Pears					
Romania	3,153,616	3,192,913	3,147,062	3,313,645	3,331,620
Vrancea	78,808	40,329	40,311	40,298	40,226
Cherries and burgundy					
Romania	5,346,627	5,323,535	5,333,720	5,404,675	5,354,406
Vrancea	172,065	170,042	171,193	168,417	168,559

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

Although are observed decreases, or only small increases for the indicator “The number of fruit trees” (Table 6), for “Fruit production by tree species (tones)” indicator (Table 7) can be noted some big increases in the production of fruits per Romania and Vrancea (from 2017 to 2021), as follow:

*The increases per country:*

- Total fruit trees increased by 61%;
- Plum trees increased by 84%;
- Apple trees increased by 73%;
- Pears trees increased by 8%;
- Cherries and burgundy trees increased by 34%;

*The increases per county:*

- Total fruit trees increased by 50%;
- Plum trees increased by 105%;
- Apple trees increased by 9%;

-Cherries and burgundy trees increased by 5%.

In order to have a clearer view of the previous increased it is important to notice Vrancea's production contribution in the total tons of fruits from the whole country:

-Total fruits: 2.8% of Romania's total fruit production;

-Plums: 3.7% of Romania's total fruit production;

-Apples: 1.8% of Romania's total fruit production;

-Pears: 1.3% of Romania's total fruit production;

-Cherries and burgundy: 3.5% of Romania's total fruit production.

Table 7. Fruit production by tree species (tones)

Indicator /Year	2017	2018	2019	2020	2021
Total fruit trees					
Romania	1,058,494	1,813,420	1,487,450	1,590,795	1,704,550
Vrancea	32,417	54,602	48,898	45,872	48,480
Plum					
Romania	444,922	842,132	704,817	769,874	819,358
Vrancea	14,688	33,940	29,764	27,974	30,074
Apple					
Romania	348,656	643,856	501,515	546,118	602,630
Vrancea	10,160	12,026	11,492	10,808	11,111
Pears					
Romania	48,878	60,440	49,268	49,657	52,592
Vrancea	940	781	719	680	679
Cherries and burgundy					
Romania	58,474	90,837	77,168	74,737	78,590
Vrancea	2,621	3,421	2,856	2,654	2,748

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In terms of fruits contribution at the total level of country production, plum production put up a percent of 3.7% and it is known that important plum areas are located in the counties like: Arges, Valcea, Buzau, Prahova, Dambovita, Caras Severin, Gorj, Mehedinti, Olt and Vrancea [12].

**Grapes sector**

Vrancea has three important vineyards, respectively Panciu, Cotești and Odobești [9]. Grapes field is a very important in Vrancea's economy and through the two indicators like "Area of the vineyards in bearing (ha)" (Figures 1 and 2) and "Total production of grapes" (Figures 4 and 5) the dynamic of this field will be analyzed.

Vrancea County is the leader of wine production because of the high natural potential. Regarding, the soil, the county detains the following zone characteristics: the plain area, the sub-Carpathian hills area and the mountain area [8]. Also, the wine contributes at touristic part of the county. The existing wine route in the county of Vrancea includes seven wineries and wine cellars located in the most important vineyards in the county: Cotești, Odobești and Panciu [6]. The interest of local authorities to develop local wine tourism is shown by the projects such as Vrancea –The Land of Vine and Wine, Wine Road or Vineyards Road [4].

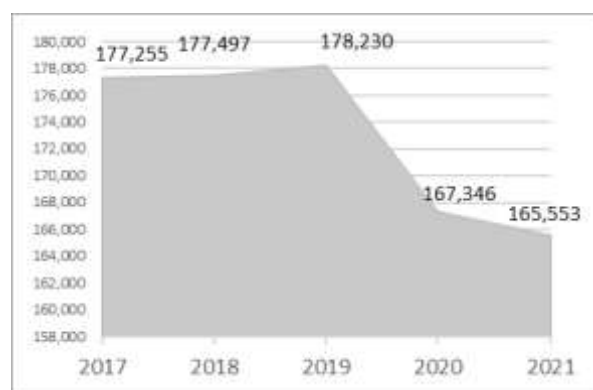


Fig. 1. Area of the vineyards in bearing in Romania (ha)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

According to Figure 1, the area of vineyards in bearing in Romania decreased by 7% between 2017 and 2021. The total area of vineyards in bearing it was 177 thousand ha in 2017 and by 12 thousand ha less in 2021.

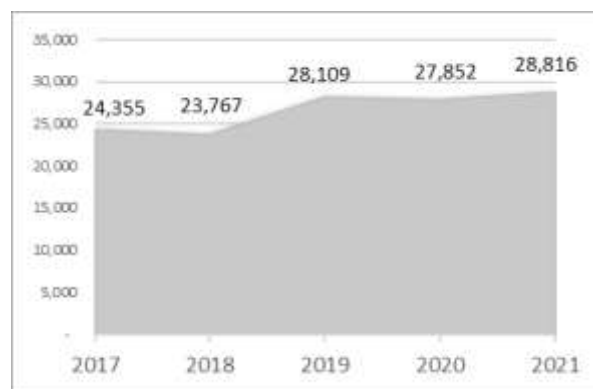


Fig. 2. Area of the vineyards in bearing in Vrancea county (ha)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In Vrancea the area of vineyards in bearing in 2021 was by 18% higher than in 2017. In 2017 the area of vineyards in bearing was 24 thousand ha, and in 2021 by almost 5 thousand ha more (Figure 2).

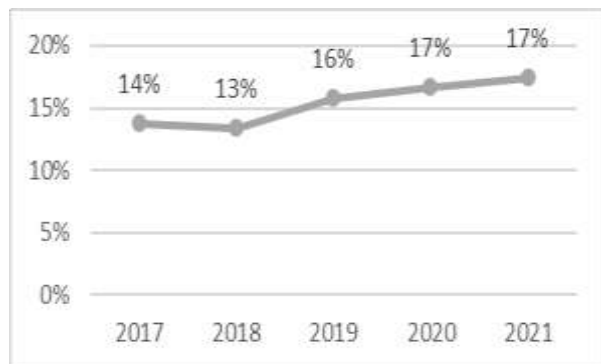


Fig. 3. The percent from Romania's vineyards in bearing detained by Vrancea (%)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

The area of vineyards in bearing from Vrancea increased their contribution on the total level of vineyards in bearing per country, according to Figure 3. In the last 2 years analyzed the percent of contribution was 17%.

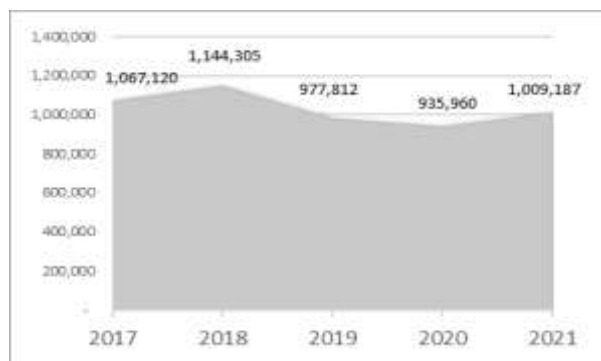


Fig. 4. Total production of grapes in Romania (tons)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

In Romania, total production of grapes in 2017 was 1,067,120 tons and in 2021 it was by 5.5% (57,933 tons) smaller (Figure 4).

According to Figure 5, the production of grapes in Vrancea increased by 10% (17,609 tons) between 2017 and 2021.

Grape production detained by Vrancea increased their contribution on the total level of vineyards in bearing per country, as shown in Figure 6. In the last year analyzed (2021) the percent of contribution was 19%.

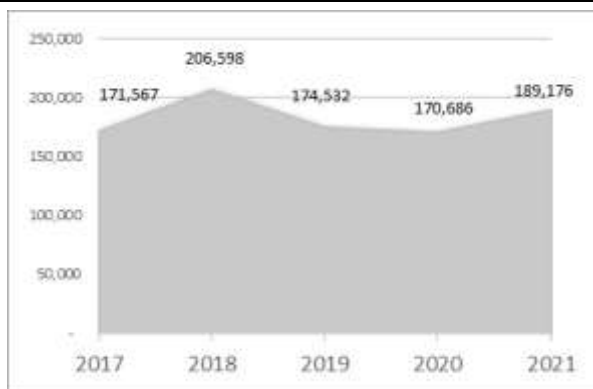


Fig. 5. Total production of grapes in Vrancea (tons)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

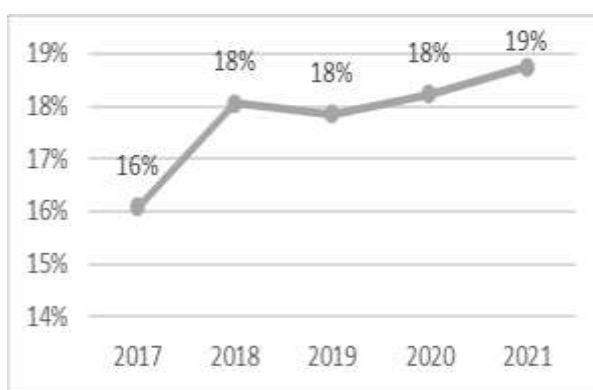


Fig. 6. The percent from Romania's grape production detained by Vrancea (%)

Source: Own calculation on the basis of data from Tempo online data base 2017-2021, NIS, [5].

Prahova County has the most certified wines, 24 in number, followed by Vrancea County with 11 certified wines highlighting specific areas with a tradition in vine cultivation [11].

## CONCLUSIONS

Following the analysis of vegetable agricultural production in Vrancea, with focus on the county's contributions in total at the country level, resulted a lot of interesting and accurate aspects.

Starting with the information that 53% from the total surface of Vrancea county it was occupied with agricultural land, from which: 40% it was occupied with forests and other forest vegetation, 31% with arable land, 9% with pastures and 21% it was used for other types of lands, it was interesting to see what crops are covered these lands.

Corn grains (28,878 ha in 2021) and wheat (26,392 ha in 2021) are the main cereals

cultivated in Vrancea, with productions of 165,954 tons, respectively 116,395 tons in 2021.

The areas cultivated decreased by 14% for sunflower, 8% for vegetables (all), 2% for dried onion and with 22% for tomatoes in the analyzed period (2017-2021) and the production of all 4 cultures decreased by 12% for sunflower, 7% for vegetables (all), 13% for dried onion and with 9% in the analyzes period.

In Vrancea, the number of total fruit trees decrease with 11%, remain at the same for plum trees, and for apple, pears, cherries and burgundy also the number of trees decreased by a percent of 26%, 49% respectively 2%.

The indicator "fruit production by tree species" allowed us to see big increases in production, in Vrancea, as follow: total fruit trees increased by 50%; plum trees increased by 105%; apple trees increased by 9%; cherries and burgundy trees increased by 5%.

The total area of vineyards in bearing it was 177 thousand ha in 2017 and with 12 thousand ha less in 2021.

In 2017 the area of vineyards in bearing was 24 thousand ha, and in 2021 with almost 5 thousand ha more.

The total production of grapes in 2017 was 1,067,120 tons and in 2021 it was with 5.5% (57,933 tons) less.

The production of grapes in Vrancea increased by 10% (17,609 tons) between 2017 and 2021.

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