



## Rapeseed Cultivation in Romania – General Aspects

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Geographical Information Systems (GIS);  
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Study area



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**Abstract:** *Geographic Information Systems are used in traditional agriculture and precision agriculture worldwide, being high-precision tools with which real-time information can be obtained.*

*Rapeseed cultivation technology can be improved with the help of geographic information systems. These tools given by G.I.S. allow the collection, analysis and monitoring of spatial data to improve the management decisions of agricultural land cultivated with rapeseed. Rapeseed is a newly cultivated plant in Europe since the beginning of the last century for its qualities. The agriculture areas are correlated with: climate, relief, geological substrate of the land, soil, culture technology.*

*The purpose of the article is to present statistical data of rapeseed cultivation and to correlate them with the analyzed spatial tools used today in increasing the agricultural area and the production obtained.*

### 1. INTRODUCTION

Rapeseed is along with sunflower one of the most cultivated plants in the category of oilseeds. Rapeseed cultivation is considered to be strategic, the oil obtained from rapeseed reduces cholesterol, prevents strokes, it is also used in industry as a biofuel. Beekeepers use rapeseed crops as honey plants and bees produce 60-90 kg of honey per hectare

### 2. SHORT HISTORY

In the pre-Christian period, rapeseed was discovered in India (2000-1500 BC), Japan and China. It was introduced in the Korean peninsula 2000 years ago. Indian and European species have been separated since the beginning of their development and in this context, their evolution has been different. The cultivation of rapeseed in large areas began in Europe in the thirteenth century. It can be said that rapeseed cultivation took place much earlier in India and China.

By the beginning of the 19th century, the rapeseed had spread to the East and the Scandinavian countries as well as to Russia and Poland. from a botanical point of view. Rapeseed is an oily plant with yellow flowers with four petals, having an average height and a fibrous root system with deep roots.

Rapeseed is grown mainly for seeds that produce 40% of oil. Since 1991, the European Union has started cultivating varieties that have a low content of eurycic acid. The nature of the crop ensures a good soil cover, reducing soil erosion, especially in winter.

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The huge amount of biomass produced by the crop allows the suppression of weeds on the soil where it is planted. World's largest rapeseed producers are Canada, China, India, France and Australia. Canada produces 2 million tons of rapeseed.

The environmental conditions necessary for a good rapeseed production: rapeseed behaves well on well-drained soils, with an alkaline pH between 5-9. The total area has increased steadily in the last period. fertilizer requirements depend on soil potential, soil type and amount of precipitation.

Worldwide in 2019, the total area cultivated with rapeseed was 35 million ha. Five large producers were covering an area of 29.8 million ha with rapeseed, representing 85% of all areas sown globally:

1. Canada: 8.4 million ha,
2. India: 7.3 million ha,
3. China: 6.6 million ha,
4. EU: 5.6 million ha,
5. Australia: 1.9 million ha followed by Chile (4.1 t/ha), Turkey (3.5 t / ha) and from the European Union Switzerland (3.1 t / ha) ranked first, followed by the rest of the EU countries with an average yield of 3.0 t / ha (<https://latifundist.com/en/rating/top-10-proizvoditelej-rapsa-v-2019-godu>).

It was found that in recent years rapeseed production has increased by 7.3 million tons (12%) to 68.2 million tons. Canada has held the lead in production for the past two years, growing by 28% of world production. The EU produces just under (25%), followed by China (19%). Ukraine occupies the 5th position with 3.3 million tons. Russia (+ 215%) and the USA (+ 133%) register a considerable increase in production over ten years.

Main producing countries in 2019 (mln t):

1. Canada: 19.0,
2. China: 13.1,
3. India: 7.7,
4. France: 3.6,
5. Ukraine: 3.3.

The amount of rapeseed oil in the last ten years has increased by 23% to 27.4 million tons, which represents 40% of total crop production. The European Union and China in 2019/20 dominated the production of rapeseed oil with 9.5 million tons and 6.1 million tons of production, respectively (<http://www.fao.org/faostat/en/#data/QC>).

### **3. MATERIALS AND METHODS**

#### Rapeseeds in Romania

In Romania, rapeseed was cultivated in larger areas before the First World War and between the two world wars. Thus, in 1913, it occupied 8038.000 ha, and in 1930 approx. 7732000 ha.

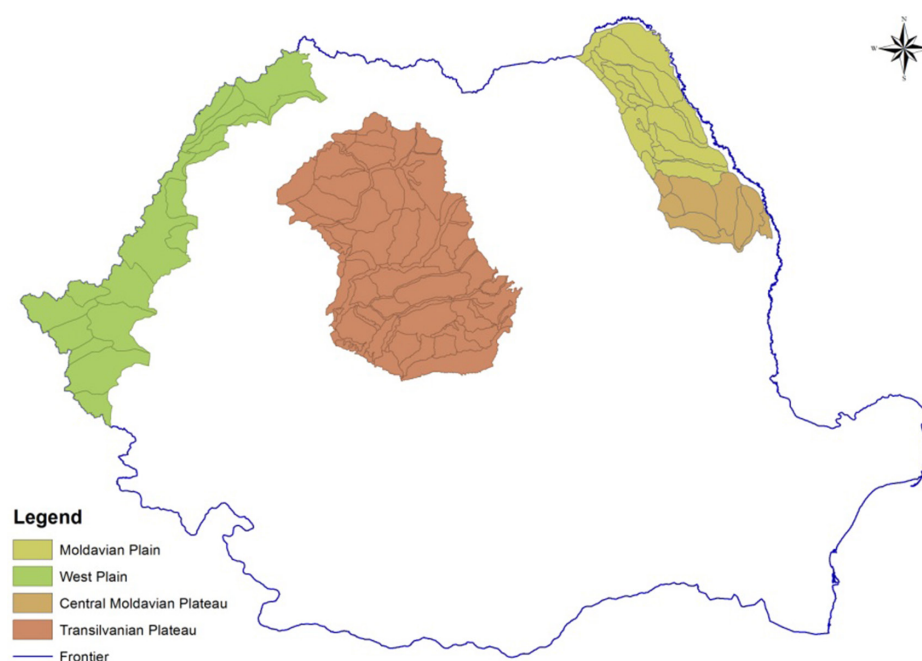
After 1948, the surfaces varied from one year to another, passing a little over 20 thousand ha only in the years 1953, 1955, 1956. In 1935 the statistical yearbook of Romania mentions 5.9 thousand ha (<https://ibis.geog.ubc.ca/courses/klink/class02/apirzade/solar.htm>).

Favourable areas for rapeseed cultivation. In figure 1 is presented the map with the most favourable areas for rapeseed cultivation. This map is created with the help of the program ArcMap 10.5. Vector data were downloaded as well as the relief units from [www://geo-spatial.org](http://www.geo-spatial.org), <https://land.copernicus.eu/pan-european/corine-land-cover/clc-2000>, <http://www.opengis.org>, <https://ibis.geog.ubc.ca/courses/klink/class02/apirzade/solar.htm>.

Rapeseed is cultivated and meets best conditions for development in the following relief units: the Moldavian Plain, the Transylvanian Plateau, the Western Hills, the Plains of Banat and Crisana, the forest-steppe regions in the south of the country, the south of Dobrogea, the southern half of the Siret meadow. In these areas, the best results are obtained on alluvial soils, reavenous and where the snow is not scattered.

Rapeseed grows well in areas where annual rainfall between 450-650 mm falls with a maximum in July-August, with an average annual temperature of 7-10 °C, with winters without high frosts and with a sufficiently thick layer of snow.

As for the soils, they must be deep, medium, rich in humus and limestone, with a pH of 6-7 and high-water retention capacity. The best yields are obtained on alluvial and reavenous soils, then in the chernozem soils and reddish-brown soils.



**Figure 1** Favorability of rapeseeds

In the autumn of 2019, 400,000 ha were cultivated with rapeseeds with extremely dry planting conditions due to the drought of 2018. Of the total cultivated area, about 340,000 ha will remain with rapeseed, the other 60,000 ha will have spring crops. Thus the 340,000 ha of rapeseed in the agricultural year 2020/21 marked an increase of 50.000 ha compared to the agricultural year 2019/20. However, both years do not exceed the area cultivated in 2018/19.

Drought conditions in winter and spring and harmful frosts in mid-March will reduce by 7% the area and production compared to last year. Despite the smaller cultivated area, the total rapeseed production is forecast at 750,000 tons, with an increase of 9.3% compared to last year's harvest.

In the agricultural year 2019/20 the harvested area with rapeseed was 61 percent smaller due to droughts, similar to 2018/19. The obtained production was 686,000 tons. Exports fell by 70 percent over the first seven months of 2019/20 due to low stocks (National Institute of Statistics - INS).

**Table 1.** Romania rapeseeds exports

Romania	2016/17	2017/18	2018/19	2019/20	2020/21
Marketing year begin	July 2016	July 2017	July 2018	July 2019	July 2020
MY Imports MT	29	77	65	81	60
MY Exports MT	1.426	1.565	1.282	402	405

Source: 2016 - 2019 - Romanian Statistical Yearbook

**Table 2.** Area (in Ha) cultivated with the rapeseed, by macroregions, development regions and counties

Macroregions, development regions and counties	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
CENTER region	3597	4441	1888	5299	8323	7210	9813	9564	11162	9198
NORD-EST region	26390	36146	11017	24224	39824	20616	30118	44142	50950	35526
VEST region	18504	25613	3187	16786	25473	25487	37911	54395	61355	43554
CENTRU region	3581	4367	1885	5212	8273	7159	9682	9441	11134	9198
NORD-EST region	25981	35581	10889	24101	39464	20497	29604	43838	50434	35190
VEST region	18504	25283	3186	16778	24267	25193	36890	53831	61127	43504
CENTRU region	475	1150	173	1604	2198	2094	3030	3268	3413	3435
NORD-EST region	7094	5949	2264	4311	6643	6771	8033	13440	15222	15129
VEST region	1923	2331	721	6257	7105	6983	11965	11960	11860	12232

Source: Romania's Statistical Yearbook, 2010 - 2019

Rapeseed is an annual herbaceous plant, cultivated especially for its oil-rich seeds. Today, worldwide, rapeseed ranks 5th in the oil production ranking and rapeseed oil is used in industry and food.

Recent years have shown a special interest in the use of this plant in the manufacture of biodiesel. A fuel used for cars instead of diesel with a cheaper price and less polluting.

#### 4. RAPESEED IN THE LAST FIVE YEARS IN ROMANIA

In the last five years, Romania has had an average rapeseed production of 2.64 t / ha (below the European level). A decrease of about 2.3% is now estimated, according to a study by INGBank. Also, the forecasts for this year are up to 2.57 t / ha.

In 2019, total rapeseed production was 1.61 million tons, down almost 60% from the previous season (<https://latifundist.com/en/rating/top-10-proizvoditelej-rapsa-v-2019-godu>).

More significant rapeseed productions were obtained by the counties: Călărași (11.9%), Arad (8.8%), Teleorman (7.2%), Giurgiu (7.2%), Constanța (6.6%) (<https://www.revista-ferma.ro/articole/agronomie/rapita-2020-la-primul-bilant-cat-va-fi-maximul-la-hectar>).

Average production by main crops. Counties that have obtained higher average productions than the average production per country for main crops: Hunedoara (+ 42.5%), Cluj (+ 33.0%), Brașov (+ 27.1%), Arad (+ 26.9%), Mureș (+ 21.3%);

## 5. CONCLUSION

- The area cultivated with rapeseed ranked Romania, in 2019, on the sixth place among the European Union, and its share in the total area cultivated with rapeseed of the European Union decreased by 2.7 percentage points, compared to the previous year
- Rapeseed production ranked Romania in the top seven states of the European Union. In 2019, the largest rapeseed producer in the European Union was France. Together with Germany, the second-largest producer, they accounted for 37.3% of the total Community production (<https://www.wall-street.ro/articol/Agricultura/270267/romania-ramane-si-in-2020-cel-mai-mare-producator-de-floarea-soarelui-din-ue.html#gref>).
- The biodiesel industry is constantly evolving and has experienced a boom with the need to develop eco-friendly energy sources that do not affect the environment. That is why it has come to process almost half of the total amount of rapeseed oil produced in Europe. Biodiesel from rapeseed is a cheaper fuel than diesel. Being biodegradable, it helps to limit air pollution.
- Rapeseed oil is also used in other industries, such as textiles, leather, plastics, paints, varnishes, inks, detergents, in the printing industry, it is used in lighting, as a lubricant, as oil for painting, for candles, as hydraulic fluid, as an adjuvant for pesticides, as well as in the manufacture of anti-dust agents.
- Rapeseed straw can be used to make chipboard. Rapeseed contains 42-48% oil, which is used in human nutrition, in the preparation of certain types of margarine, as well as in industry.
- An excellent source of animal protein is even the remnants of rapeseed that result from pressing the seeds. But the plant can also be used as green fodder. From 100 kilograms of rapeseed, up to 30-35 kilograms of oil, and 50-55 kilograms of grits can be obtained.

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