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MARKET ANALYSIS IN THE ROMANIAN AGRICULTURAL SECTOR: STATISTICS EXPLAINED

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Abstract:

This study gives an insight into the agriculture sector in Romania, over the last 10 years (2011-2020). The analysis draws on secondary data recorded in different databases and reports. An aggregate assessment of main agricultural macroeconomic indicators has been carried out at a wider scale. The country-specific analysis aims at identifying and evaluating main insights impacting the supply and demand side of agricultural or agriculture-related products and services and serves as a basis in quantifying the need for different interventions and mechanisms to support the agricultural sector. The target group consisted of agricultural holdings dealing with the primary production of agricultural products listed in Annex I of the Treaty on the Functioning of the European Union.

Key words: *market analysis, agricultural sector, statistics, Romania*

1. Introduction

According to the United Nations (2021), 67% of the population in low-income countries and 60% of people in lower-middle-income countries live in rural areas. Furthermore, approximately 80% of those living below the poverty line are located in rural areas. In the European Union (EU), one-fifth of population (20.8%) live in predominantly rural areas (Eurostat 2021). Most of rural peoples' lives depend on the agricultural sector. The state of the growth of agriculture can reduce poverty more rapidly than other sectors (De La O Campos et al., 2018). Agriculture and rural development should be given priority and proper support in the overall development strategy, since rapid agricultural growth has a direct contribution to the overall economic growth, through its favourable impact on total factor productivity (Hwa, 1988). Many governments have set programs to accelerate agricultural growth at the core of their policies and strategies. These initiatives are related to irrigation, water use and land tenure, the use of improved seeds and modern inputs, farmers' access to financial resources and input subsidies, implementation of minimum guaranteed prices, import tariffs and export incentives, and the development of agricultural marketing systems (Mollett, 1988; Jones, 1995; Campenhout, 2017). Despite the fact that

numerous supportive programs have been implemented, they have failed to achieve the desired results, and the agricultural performance in developing countries remained at a low level (Jenicek and Grofova, 2014). As a result, agricultural income is still much below the income in other sectors of the economy (Otsuka, 2019).

Romania remains one of the EU's poorest countries, with a Gross Domestic Product (GDP) per capita of 72% of the EU's average and with 35.8% of the population at risk of poverty or social exclusion (Eurostat 2021, Source datasets: ilc_peps01n). Agriculture has long been an important sector of Romania's economy. The farming structures manage an utilised agricultural area of 12,502,535 hectares (more than one third of the country's land). Arable land accounts for nearly two-thirds (62.4%) of the utilised agricultural area, while permanent grassland and meadow account for more than one-third (34.0%). Permanent crops such as orchards and vineyards account for a 2.4% share, with the remaining 1.2 % mainly attributed to kitchen gardens (Statistical Yearbook of Romania, 2019). After the communism takeover, Romania's economy went through a restructuring process which included enforced collectivization of agriculture. Since 1989, the collective farms have been broken up into small individual subsistence agricultural holdings, with a lot of problems caused by uncertainty of ownership. Nowadays, agriculture is still experiencing a downward trend, as the endemic lack of capital investment, missing modern infrastructure and essential technologies and lack of market information. Romania's agricultural problems are identified in other countries as well. Governments in various developing countries have introduced policies and programs to boost agricultural performance, but most of these initiatives have failed due to the fact that local agricultural markets are frequently monopolised in the hands of small groups of stakeholders who hide information in the market despite having significant market power (Nugroho, 2021). Within this context, the regular assessment of the performance of the agricultural sector not only influences the future of the farming business but also plays an important role in reducing rural poverty.

2. Research Methodology

In the current study, an aggregate assessment of main macroeconomic indicators per Romanian agricultural sector has been carried out at a wider scale. The country-specific analysis aims at identifying and evaluating main insights impacting the supply and demand side of agricultural or agriculture-related products and services and serves as a basis in quantifying the need for different interventions and mechanisms to support the agricultural sector. The target group consisted of the enterprises involved in the primary production of agricultural products listed in Annex I of the Treaty on the Functioning of the European Union.

The study builds on secondary sources of information, including inter alia data from Eurostat collections of agricultural statistics for the last 10 years (2011-2020), evidence of existing studies, publications, specific reports and analyses, working documents produced by European Commission, fi-compass studies. Eurostat Economic accounts for agriculture provided data that gave an insight into: the agricultural market size; the economic viability of agriculture; the income received by farmers; the structure

and composition of agricultural production and intermediate consumption; relationships between prices and quantities of both inputs and outputs and the structure of the trade on agricultural products.

The results of this study do not provide any kind of explanations regarding the impact of the ongoing COVID-19 health crisis or the effect of any government support scheme. This would need to be subject to further analyses by interested stakeholders: practitioners, administrations or researchers.

3. Research Results

Romania is one of the countries with the most pronounced agrarian profile in the European Union (EU). In 2020, Romania had a population of 19,328,838 persons, with 53.1% living in predominantly rural regions (10,255,681 inhabitants). Rural regions cover around 161,667 km² (67.8%) of Romanian territory (European Commission, 2021).

3.1 Market size for commercially oriented agricultural activities

There are 3,422,026 agricultural holdings in Romania, the largest number in EU and 33.3% of all agricultural holdings in EU27 (Eurostat 2021, Farm Structure Survey 2016). Romanian farms are highly polarised and can be divided into four types (Figure 1):

- **subsistence/ semi-subsistence farms** (91.8% of total agricultural holdings, #3,140,768 farms), very small holdings that cultivate less than 5 ha of land (average 1.14 ha/farm) and the agricultural production is usually used for own consumption; they manage 28.70% of the utilised agricultural area.
- **small sized farms** (#244,412 farms), that cultivate between 5-20 ha of land (average 8.06 ha/farm); they include also the larger semi-subsistence farms that cultivate usually smaller plots of land and sell more than 50% of their agricultural production; small farms count for 7.1% of total agricultural holdings and manage 15.76% of the utilised agricultural area;
- **medium sized farms** (#24,536 farms), that cultivate between 20-100 ha of land (average 39.5 ha/farm); they count for 0.7% of total agricultural holdings and manage 7.76% of the utilised agricultural area;
- **large sized farms** (0.4%, #12,310 farms), that cultivate more than 100 ha (average 485.25 ha/farm) and have a clear competitive potential; they account for 0.4% of total agricultural holdings, but manage 47.78% of the utilised agricultural area.

An analysis by economic size shows that among the 3,422,026 farms, the average standard output (SO) is EUR 3,538 / farm (much lower than the average at EU level - EUR 34,784). According to Eurostat, SO is the average monetary value of the agricultural output at farm-gate price, in EUR per hectare or per head of livestock. Breakdown of Romanian farms by economic size (Figure 1), reflects that there were 3,071,070 farms that had a SO that was less than EUR 4,000, while a further 375,280 farms had a SO within the range of EUR 4,000 - EUR 8,000. Together these micro farms accounted for 95% of all Romanian farms. This once again reflects the high number of subsistence and semi-subsistence

agricultural households in Romania. By contrast, there were only 3,570 farms with a SO of at least EUR 250,000; these large farms accounted for 0.1 % of the total number of farms (Eurostat 2021, Farm Structure Survey 2016).

Figure 1: Distribution of Romanian farms by physical size (ha) and economic size (SO)

Source: Eurostat 2021, Farm Structure Survey 2016

The average farm size is considerably smaller than the EU average (3.7 ha in Romania compared to an EU27 average of 15.20 ha). The agricultural land is fragmented into millions of plots which do not allow intensive agriculture. The subsistence and semi-subsistence farms are poorly technically equipped and lack market orientation or involvement in associative structures (groups of producers, agricultural cooperatives), which could assist them to better integrate in markets.

More important than the remarks stated above, for a clear picture of the agricultural sector in Romania, the breakdown of Romanian farms on their legal status reflects that out of the 3,422,026 agricultural holdings in Romania:

- 99.24% of Romanian farms (#3,395,925) do not have a legal personality, operating as:
 - ⇒ **individual agricultural producers** (#3,379,883 farms), cultivating on average 1.88 ha of land, mostly own land and seldom selling their agricultural outputs at the gate-farm or in local markets, based on a producer certificate issued by the town hall, with no obligations to have any financial records;
 - ⇒ **authorised natural persons, individual companies and family companies** (#16,042 farms), cultivating on average 36.63 ha of land, mostly own land, and keeping financial records based on the simplified accounting system;

Out of the total of 3,395,925 farms without legal personality, 79,390 agricultural holdings have no utilised agricultural area and no livestock and 2,816,152 farms have less than 5 ha and more than 50% of their agricultural production is used for own consumption (subsistence farms). **In conclusion, only 500,343 farms without legal personality can be considered commercially viable.**

- 0.76% of Romanian farms (#26,101) are agricultural holdings with a legal personality, operating as:

⇒ **private entities** (#14,505): commercial private companies, agricultural associations and agricultural cooperatives, cultivating between 93.19 ha and 351.87 ha of land (mostly rented), preparing and submitting annual financial statements regarding their activity. Out of the 14,505 private registered farms in Romania, 390 agricultural holdings have no utilised agricultural area and no livestock.

⇒ **public entities** (#11,596): autonomous administrations, state owned companies, research institutes, schools, town halls, foundations, churches, etc.

Out of the total of 26,101 farms with a legal personality, only 14,115 farms can be considered commercially viable private farms.

As a conclusion, the potential market size in terms of commercially oriented agricultural activities consists of 514,498 viable farms (**500,343 farms without legal personality + 14,115 farms registered as private companies**).

- **482,055 small farms:** 240,678 semi-subsistence farms (<5 ha) and 241,377 small sized holdings (5-20 ha).
- **23,292 medium sized farms**, that cultivate between (20-100 ha).
- **9,151 large sized farms** that cultivate more than (>100 ha).

Small and very small farms are often operated by individuals with low educational attainment, while large and very large farms are more likely to be managed by individuals who have professional training and higher levels of educational attainment. Educational attainment and professional training are associated with the introduction of new and modern farming practises and higher agricultural productivity (World Bank, 2018).

The ageing population in Romanian agriculture increases the risk not to renew the future workforce and has a low degree of openness to innovation and requalification. The average age of farmers is very much at the older end of the age spectrum: in 2016, almost half (44.3%) of Romanian farm managers were aged over 65, while only 7.6% were below 40 years old (fi-compass, 2020).

3.2. Performance of the agricultural sector

In 2020, the contribution of agriculture, forestry and fishing sector to the country's Gross Value Added (GVA) was 4.2% - more than two times higher compared to the EU27 average (1.9%). The agricultural sector contributed EUR 6436.52 million towards the Romanian's overall GDP in 2020.

Agricultural industry output

The value of Romania's agricultural output in 2020 was EUR 13086.91 million; this includes the value of crops, of animals, of agricultural services, as well as some goods and services that were not strictly agricultural but which could not be separately measured. A relatively stagnant agricultural output over 2011-2020 (with the year 2012 affected by the financial and economic crises and 2020 affected by the Covid-19 pandemic, which reduced the demand for agricultural products and raw materials) is due to an increase in the volume of output, rather than an increase in prices. In 2020, the volume of the agricultural output

was 2.35% higher than 2010 levels (with the peak in 2018 - 25.75% higher than in 2010) while prices were 16.43% lower than the level in 2010 (Figure 2).

Figure 2: Evolution of agricultural industry output value, output volume and price index, 2011-2020

Source: Eurostat (Online Table: aact_eaa04; aact_eaa05), Economic accounts for agriculture (production value at basic prices, mil. EUR; index 2010=100)

A percent of 64.9 of the agricultural output value in 2020 came from crop production (EUR 8489.88 million) led by cereals (mainly grain maize and wheat), vegetables and horticultural plants and fruits. Animals and animal products accounted for 24.1% of total agricultural output (EUR 3148.37 million), with milk and pigs accounting for the greatest share of the output value. Agricultural services (EUR 295.25 million) and inseparable non-agricultural activities (EUR 1153.41 million) contributed 11.1% (Figure 3).

Intermediate consumption

The term “intermediate consumption”, in an accounting context, refers to the inputs (goods and services) purchased by the farmer to be used to produce the agricultural output: seeds, fertilisers, animal feeding stuffs and fuel for their tractors as well as veterinary services, among other things (Eurostat 2021). The distribution of the intermediate consumption over 2011-2020 reflects the alignment with the distribution of agricultural industry output value. The relative stagnant evolution is due to an increase in the volume of inputs consumed, rather than an increase in prices. In 2020, the volume of the intermediate consumption was 6.45% higher than 2010 levels (with the peak in 2018 - 29.43% higher than in 2010) while prices were only 28.27% lower than the level in 2010 (Figure 4). The evolution in the price of inputs has been quite similar to that of outputs

Figure 3: Output of the agricultural industry in Romania (% share of total output), 2020

Source: Eurostat (Online Table: aact_eaa04), Economic accounts for agriculture (production value at real prices, mil. EUR)

Figure 4: Evolution of agricultural intermediate consumption value, volume and price index, 2011-2020

Source: Eurostat (Online Table: aact_eaa04; aact_eaa05), Economic accounts for agriculture (production value at basic prices, mil. EUR; index 2010=100)

Intermediate consumption costs for the Romanian agricultural sector reached a total of EUR 6650.39 million in 2020 (Figure 5). Costs associated with animal breeding accounted for approaching one third of total intermediate consumption costs –

feedstuffings, 31.5 % and veterinary services, a further 2.6 %. Costs associated with crop farming are: seeds and plants (8.7% of total costs), plant protection products, herbicides, insecticides and pesticides (3.0 %) and fertilisers and soil improvers (5.8 %). Other costs are common to all types of farm, independent of whether specialist or mixed-type: energy (19.4%), maintenance of materials (7.6%), maintenance of buildings (1.2%), agricultural services (4.4%) and other services (15.8%).

Figure 5: Intermediate consumption of the agricultural industry in Romania (% share of total output), 2020

Source: Eurostat (Online Table: aact_eaa04), Economic accounts for agriculture (Production value at basic prices, mil. EUR)

Gross value added and subsidies. Revenue-cost structure

Gross value added at basic prices of the Romanian agricultural industry has proved quite a linear evolution over 2011-2022, with a value of EUR 6436.52 million in 2020, while overall subsidies have increased over the analysed period, amounting to EUR 1886.18 million in 2020. The type of subsidies provided to Romania's agricultural industry has changed over time as a result of successive reforms of the CAP, 'decoupling' subsidies from particular crops and moving towards a system of single farm payments (Figure 6).

In 2016 (last available data), the sector hired 1,640,120 AWUs – 18.5% of the country's working population (more than five times higher than the EU27 average, 4.0%). When divided by the number of full-time annual work units (AWU), GVA can serve as an indicator for labour productivity. Still, the labour productivity is low compared with the EU. In 2016, on average for the EU28, the GVA/AWU was EUR 22,937, while in Romania it was EUR 4,359. At the same time, Romania was in the last position regarding the GVA per hectare: around EUR 553 in 2016, compared with the Western Europe countries where the GVA/ha exceeded EUR 1,000/ha. (Eurostat 2021, Farm Structure Survey, 2016).

Figure 6: Evolution of Gross Value Added and Subsidies on production, 2011-2020

Source: Eurostat (Online Table: aact_eaa04), Economic accounts for agriculture (Production value at basic prices, mil. EUR)

Over the last decade (2011-2020), there have been significant changes in the revenue structure of the agricultural sector: the importance of other subsidies has increased, while revenue from crop and animal output has decreased. The cost for inputs has decreased while fixed capital consumption and labour costs have increased (Figure 7).

Figure 7: Agricultural revenue-cost structure, 2011 vs 2020

Source: Eurostat (Online Table: aact_eaa04), Economic accounts for agriculture (Production value at basic prices, mil. EUR)

Prices of agricultural outputs and agricultural inputs

Evolution of prices for main agricultural outputs and inputs reveals periods of instability, with positive and negative fluctuations (Table 1 & Table 2). Selling prices of Romania's two main crops, maize and wheat registered wide fluctuations.

Table 1: Price indices of agricultural outputs (2015 = 100, real index). Percentage change on previous period.

Agricultural output	2015	2016	2017	2018	2019	2020
Cereals	100	-3.2	-1.07	0.04	-0.3	8.55
wheat and spelt	100	-13.77	1.95	1.89	2.96	6.38
grain maize	100	4.3	-3.24	-0.74	-3.22	11.31
Vegetable & horticultural prod.	100	6.74	4.34	17.81	8.06	3.66
Fruits	100	6.09	14.93	-9.92	11.5	10.84
Forage plants	100	12.28	-16.53	-2.16	9.14	1.29
Industrial crops	100	4.61	-8.15	-7.47	-3.27	9.38
Potatoes	100	15.12	-5.86	6.78	47.67	-12.99
Wine	100	5.9	5.03	10.47	28.78	4.92
Other crop products	100	3.59	4.91	-5.45	30.28	-6.67
Pigs	100	2.36	15.82	-9.17	9.62	4.48
Poultry	100	-2.68	-11.21	3.55	-1.28	5.04
Cattle	100	-2.66	3.92	9.74	-1.68	6.25
Milk	100	-0.29	5.77	0.84	3.28	4.8
Eggs	100	-1.18	16.23	-0.74	-1.58	-0.42
Other animal products	100	4.62	2.93	-1.57	-3.91	1.08

Source: Eurostat, Price indices of agricultural products, output (2015=100) - annual data (Table online: apri_pi15_outa)

Table 2: Price index of agricultural inputs (2015 = 100, real index). Percentage change on previous period.

Agricultural input	2015	2016	2017	2018	2019	2020
Seeds and planting stock	100	-1.05	-0.46	38.3	-8.46	9.43
Energy and lubricants	100	-5.32	-2.87	10.84	-1.93	-16.15
Fertilisers and soil improvers	100	-4.57	56.02	-36.22	11.26	-12.49
Plant protection products	100	24.59	-5.82	3.2	-12.47	7.3
Veterinary expenses	100	-9.8	-13.13	12.75	-8.59	5.67
Feedingstuffs	100	-10.74	7.92	7.71	-5.8	6.69
Maintenance of materials	100	-1.55	0.98	-0.63	-0.17	0
Maintenance of buildings	100	-1.21	6.03	-0.52	6.49	-2.14
Other goods and services	100	-2.07	-3.16	-2.19	-0.3	-0.68

Source: Eurostat, Price indices of the means of agricultural production, input (2015=100) - annual data (Table online: apri_pi15_ina)

High volatility of prices both for the products sold by farmers and the inputs bought by the farmers, combined with their weak negotiating position with both suppliers and

clients, makes their income more variable. The farmers are not yet organised in most of the sub-sectors. Farmers' associations and cooperatives are usually playing a marginal role. As a result, the farmers' bargaining power is weak. Besides the negative impacts on reducing producers' income, price volatility disrupts agricultural markets and investments and increases the share of food expenditure over total consumption of food insecurity (Balie and Morales-Opazo, 2017). Price volatility also has an impact on the use of labour. When agricultural product prices are low, children and adolescents are employed to replace adults on the farm (Beck, Singhal and Tarp, 2018).

Investments in the agricultural sector

The development of the Gross Fixed Capital Formation (GFCF) in the last 10 years points to a slightly decreasing tendency for an investment-active agriculture sector in Romania between 2011-2018 with a slightly increasing tendency in the last two years (2018-2020). The GFCF in Romanian agriculture for the year 2020 amounts to EUR 1082.2 million, which in relation to the total GVA (EUR 6436.52 million), implies that 17% of GVA was used for capital investments in physical assets. Of the GFCF, the bulk of the investments (>90%) were carried out on indirect agriculture assets (e.g. machinery, transport equipment and buildings) in comparison to direct agricultural assets, such as plantations and animals (Figure 8). The decrease in investments in Romanian agriculture must be attributed, in part, to the economic and financial crisis in 2012 and 2018.

Figure 8: Development of Gross Fixed Capital Formation by agricultural and non-agricultural assets 2011-2020.

Source: Eurostat (Online Table: aact_eaa04), Economic accounts for agriculture (Production value at basic prices, mil. EUR)

Income of the agricultural sector

Over the last 5 years, agricultural income has been below the average income levels of other sectors of the economy (Figure 9).

Figure 9: Evolution of agricultural income compared to wages and salaries in other sectors of the economy, 2011-2020

Source: Eurostat, online data code LC_LCI_R2_A; Economic accounts for agriculture (Index of real income of factors in agriculture per annual working unit, 2016=100)

Trade in Agricultural Products

Over the last 10 years, with the exception of two years (2013 and 2014), Romanian both agricultural exports and imports increased, with imports being higher than exports. The agricultural trade deficit has gradually widened since 2015 (Figure 10), mainly due to the fact that Romania imports higher value-added processed products such as meats, protein meats, dairy, fruits and sugar, while it exports lower-value added raw products, such as wheat, corn, sunflower seeds.

In 2020, Romania exports of agricultural products reached EUR 6989,58 million while imports amounted to EUR 8929.26 million. Agricultural products can be subdivided into three main groups: animal products, crops products and foodstuffs (Figure 11). In 2020, in exports, the largest group was crops (51%) followed by foodstuffs 37%) and animal products (12%). In imports, the largest group was foodstuffs (43%) followed by crops 35%) and animal products (22%).

Figure 10: Evolution of agricultural trade, 2011-2020 (in million EUR).

Source: Eurostat (Comext data code: DS-645593)

Figure 11: Romania's trade of agricultural products, by category, 2020 (in million EUR).

Source: Eurostat (Comext data code: DS-645593)

The animal products category consists of five chapters (Figure 12). In 2020, in exports of animal products, the largest chapter was 'live animals' (EUR 405.21 million) while in imports, the largest chapter was 'meat and edible meat offal' (EUR 910.32 million) and 'dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included' (EUR 640.52 million).

There are ten chapters in the crops products category. In exports of vegetable products, the largest chapter was 'cereals' (EUR 2166.23 million), followed by 'oil seeds and oleaginous fruits; miscell. grains, seeds and fruit; industrial or medicinal plants; straw

and fodder' (EUR 955.57 million). In imports of crops, the largest chapter was 'edible fruit and nuts; peels of citrus fruits or melons' (EUR 704.58 million) and 'cereals' (EUR 703.03 million).

Foodstuffs consist of various types of processed foods. The largest chapter in export of foodstuffs was 'tobacco and manufactured tobacco substitutes' (EUR 1376.41 million). In imports of foodstuffs, the largest chapter was 'residues and waste from the food industries; prepared animal fodder' (EUR 575.77 million) and 'preparations of cereals, flour, starch or milk; pastrycooks' products' (EUR 566.74 million).

Figure 12: Romania exports and imports of agricultural products, by product category, 2020 (in million EUR).

Source: Eurostat (Comext data code: DS-645593)

4. Conclusions

Romania is still predominantly a rural country, with the agricultural sector being of economic importance for Romania (4.2% contribution to the country's total GVA) and a major source of employment (about 20% of the working population), income and economic activity in rural areas. The sector is characterised by low productivity. 99.24% of Romanian farms do not have a legal status, operating mainly as individual agricultural producers.

Romania's agriculture is characterised by a high number of very small non-commercial farms, with a very small economic size. Out of the total 3,422,026 farms in Romania, there are only 514,498 viable commercial farms: 93.7% of them are small farms (less than 20 ha), 4.6% medium farms (20-100 ha) and 1.7% large farms (>100 ha). Farmland is highly fragmented (average 3.65 ha/farm). The ageing population in Romania's agriculture increases the risk not to renew the future workforce and has a low degree of openness to innovation and requalification. Romanian agricultural output has been stagnating over the last 10 years, reaching EUR 13086.91 million in 2020. In fact, agricultural production has been growing steadily since 2016, while prices for agricultural outputs have registered a decreasing tendency. A high percentage (64.9) of the agricultural industry output value comes from crop production (mainly wheat, grain maize, vegetables and horticultural products). Animals and animal products count for 24.1% of total agricultural production, with milk and pigs accounting for the greatest share of output value. While Romanian agricultural production has been growing steadily since 2011, prices for agricultural output have decreased. High volatility of prices from one year to the other, both for products sold and inputs bought by farmers, combined with their weak negotiating power, marked the farmers' income more variable. Over the last decade, agriculture income has been below the average income levels of other sectors of the economy. The sector shows a low propensity to invest, as evidenced by the low level of farmers' investments into tangible assets (17% of GVA is used for capital investments in physical assets in the agricultural sector). Investments are mostly made in buildings and new machines and other equipment. 1 In 2020, Romania had an agriculture trade deficit of EUR 1939.68 million. Low productivity and low value-added are the main drivers of Romania's widening agricultural trade deficit.

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