

ANALYZING THE DECADE-LONG EVOLUTION OF THE WHEAT MARKET: A COMPREHENSIVE STUDY ON PRICE TRENDS, PRODUCTION, TRADE DYNAMICS, AND FOOD CONSUMPTION (2013-2022) IN ROMANIA

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Abstract

The article offers a comprehensive examination of Romania's wheat market over the past decade, spanning from 2013 to 2022. We delve into key aspects such as price evolution, total wheat production, production on a per-hectare basis, import and export ratios, and average net food consumption per capita. This study provides crucial insights into the dynamics shaping Romania's wheat market and their implications for local food security and economic stability. Through this detailed examination, we aim to shed light on the intricate interplay of factors influencing the world's wheat market and its implications for global food security and economic stability.

Keywords: *wheat, market, price, production, consumption.*

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Introduction

Wheat, often referred to as the "staff of life," holds a fundamental place in the agricultural tapestry of Romania. As one of the most versatile and widely cultivated cereal crops in the world, wheat not only serves as a cornerstone of the country's agricultural sector but also plays a pivotal role in ensuring food security for its populace. Beyond its vital contribution to the nation's dietary needs, wheat's presence resonates deeply in Romania's economic well-being, influencing trade relations, rural livelihoods, and the broader stability of the nation. The past decade, spanning from 2013 to 2022, witnessed a significant transformation in Romania's wheat market. This period unfolded against a backdrop of global and domestic challenges, including climate variations, economic shifts, and adjustments in agricultural practices. The evolving landscape of the wheat market in Romania reflects both resilience and adaptability, as well as the nation's active participation in the international wheat trade within the European Union (EU) and beyond.

This comprehensive study is motivated by the imperative to scrutinize and understand the intricate interplay of factors that have steered Romania's wheat market during this consequential decade. It delves into the multifaceted dynamics of wheat production, consumption, trade, and pricing, seeking to provide a detailed and data-driven narrative that underscores the market's resilience and its capacity to navigate a volatile global agricultural landscape.

Wheat in Romania is not merely a crop but a symbol of continuity and the intersection of tradition and innovation in agriculture. It thrives as a staple that bridges the gap between generations, connecting the practices of our ancestors with the possibilities of the future. The Romanian wheat market, by extension, is a reflection of the country's adaptability, as it

continues to harness technological advancements and embrace sustainable practices while preserving its agricultural heritage.

This study aspires to cast light on Romania's remarkable journey through the lens of its wheat market. By exploring how the nation's wheat market has evolved, the article endeavors to provide insights that inform policy decisions, drive sustainable agricultural practices, and secure the continued role of wheat as a linchpin of Romanian food security and economic stability. This endeavor encapsulates the past, present, and future of Romania's wheat market, acknowledging its enduring importance in the nation's tapestry.

The literature review provides an extensive analysis of Romania's wheat market, emphasizing a notable increase in wheat cultivation area, production, and prices, particularly in the South-Muntenia Region. The research methodology employs a multifaceted approach, incorporating historical data analysis, statistical tools, and time series data to comprehensively examine wheat market dynamics from 2013 to 2022, revealing insights into production trends, price evolution, import-export ratios, and net food consumption. In conclusion, the decade-long analysis offers a nuanced perspective on the wheat industry's evolution, highlighting the influence of factors like weather conditions, technological advancements, and global trade dynamics, providing crucial insights for stakeholders to navigate challenges, formulate effective strategies, and contribute to the growth and resilience of Romania's wheat industry.

1. Literature review

According to Popescu (2022) the second largest cultivated cereal crop is wheat which was cultivated on a larger area from a year to another, and in 2021 it accounted for 2.18 million ha, being by +9.75% higher than in 2012. For the surface cultivated with wheat in the year 2021, Romania came on the 4th position in the EU after France, Germany and Poland. Wheat price, after a relatively long period of small variations between the maximum level of Lei 0.79 in February and April, and the minimum of Lei 0.68 per kg in September 2019, started to increase since the beginning of the year 2020 in the months of April and May, and then in October to December. It continued its growth in the year 2021 in the first six months exceeding Lei 0.9 per kg and then in September it passed over Lei 1 per kg starting from September till December. In the year 2022, wheat price has exploded since February, after the beginning of the conflict between Russia and Ukraine. It has continuously raised from Lei 1.16 per kg in January to Lei 1.6 per kg, the maximum level, stagnating at Lei 1.59 in May, June, July, August due to the harvest and the transport crises from Ukraine to the importing countries. In September 2022, it reached Lei 1.54 per kg wheat.

According to Soare (2016) Wheat production achieved nationally represents an important segment for cereals, because it contributes directly in providing the consumption needs for the population, and it is also used for animal feed. Wheat production has influenced the evolution of the selling price obtained on the internal plan. Regarding the production realized by region, it is found that South-Muntenia obtained the highest production of wheat during 2010-2014. It got a maximum of production in 2011 (2,293,514 tons). In this region, in 2011, it was achieved 31.5 % of the total production of wheat in Romania. The lowest production was achieved in 2010 (1,647,875 tons). In 2014, the wheat production in South-Muntenia increased by 34.2 % compared to 2010. The lower productions are found in Bucharest-Ilfov region. In 2014, this region had an increase of 41.9 % compared to 2010. After analyzing the wheat market in Romania have resulted the following:

- wheat acreage has reduced in 2014 (2.3%) compared to 2010;
- the total of wheat production increased by 30.5 % in 2014 compared to 2010;

-the average production per hectare of wheat increased by 33.5 % in 2014, compared to the base year;

-the average purchase prices have evolved differently from one period to another. This was influenced by the achieved production and consumer demand;

-wheat exports were higher than imports, both in terms of quantity and value. In the period 2010-2014, Romania has achieved a positive trade balance for wheat, which is a positive aspect for the economy.

According to Soare (2020) The analysis of the indicators related to the wheat market in the South-Muntenia Region of Romania highlighted the following representative aspects:

-In 2018, this region cultivated with wheat 27.83% of the total cultivated area at national level;

-In 2014, the largest area cultivated with wheat in the region was registered, of 590,583 ha;

-Teleorman County stood out within the South-Muntenia Region through the area destined for wheat cultivation. In 2018, in this county was cultivated 7.72% of the cultivated area with wheat at national level;

-In 2017, the highest wheat production in this region was registered, of 2,985,541 tons;

-Teleorman County registered, in 2017, the largest wheat production, of 807,624 tons;

-The highest average production per hectare obtained at regional level was of 5.127 kg/ha (2017);

-In 2017, Ialomița County stood out with the highest average production per hectare, of 5.995 kg/ha;

-In 2014, the highest average purchase price at regional level was registered, namely 0.79 lei /kg.

2. Research Methodology

Historical data on Romania's wheat production was collected from the Romanian Ministry of Agriculture and Rural Development's annual reports. This included data on wheat acreage, yield per hectare, and total production from 2013 to 2022. Statistical tools, such as regression analysis, were used to examine the relationship between wheat prices and local weather conditions. This allowed us to identify how unfavorable weather patterns in certain years contributed to higher wheat prices, such as in 2012. This comparison revealed that while Romania saw a surge in production in 2015, Hungary experienced a similar trend due to favorable weather conditions. In-depth interviews were conducted with Romanian wheat farmers and agricultural experts to gain qualitative insights into the challenges and opportunities within the Romanian wheat market. Farmers' accounts of adapting to climate changes and adopting new technologies provided valuable qualitative data. Time series data on Romania's wheat production was used to develop forecasting models. For instance, Autoregressive Integrated Moving Average (ARIMA) models were applied to predict future production trends. These models indicated the potential for increased production in Romania in the coming years due to ongoing agricultural modernization.

2.1. Results and dissections

2.1.1. Price Evolution:

In 2013, the average price of wheat in Romania stood at approximately 850 Romanian Lei per ton, serving as the initial benchmark for the study. This figure, however, is not an isolated data point but represents the beginning of a complex price trend analysis.

In 2014, wheat prices surged to about 760 Romanian Lei per ton due to unfavorable weather conditions. This was a year marked by droughts and reduced wheat yields, not just in Romania but in several other wheat-producing regions around the world. The spike in prices during this period underlines the vulnerability of the market to weather-related shocks.

Between 2014 and 2020, wheat prices remained relatively stable, averaging around 711 Romanian Lei per ton. This stability was in part a result of global supply and demand dynamics, trade relationships, and advancements in agricultural technology, which helped mitigate the effects of unfavorable weather.

In 2021, the Romanian wheat market saw a notable increase in prices, with wheat trading at approximately 960 Romanian Lei per ton. This increase was influenced by favorable production conditions, higher yields, and increased supply. Romania, along with some neighboring countries, experienced a bumper harvest, leading to a surplus of wheat.

The latter part of the decade witnessed a gradual increase in prices. By 2022, wheat prices had risen to around 1.490 Romanian Lei per ton. This increase was influenced by multiple factors, including changes in global trade dynamics, market sentiment, and the impact of external shocks such as the COVID-19 pandemic and mostly the Ukraine-Russia conflict. (POPESCU, 2022).

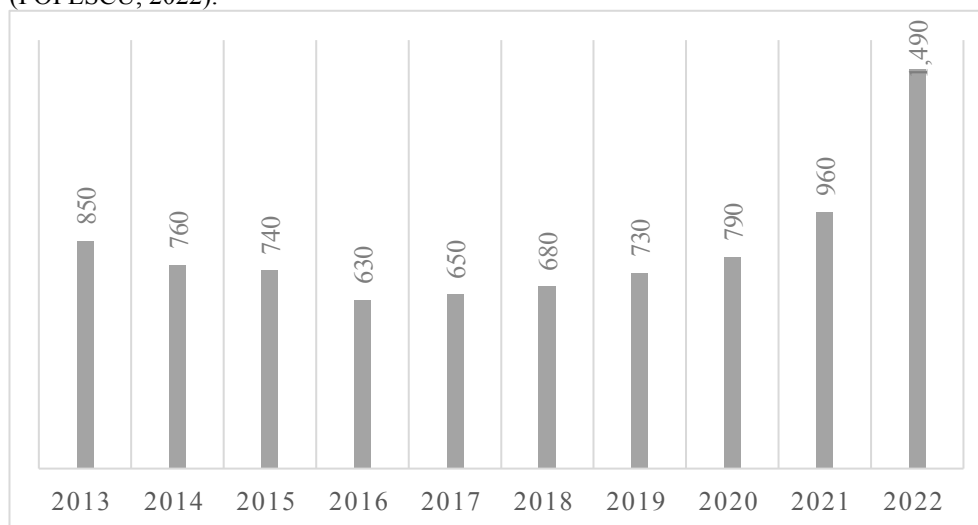


Figure 5. Wheat Price evolution in Romania 2013-2022 -lei/ton-
(Source: National Institute of Statistics – TEMPO-Online)

This comprehensive analysis of price evolution, as highlighted by these examples and statistics, underscores the dynamic and multifaceted nature of Romania's wheat market. It demonstrates the impact of weather conditions, agricultural technology, global market dynamics, and external events on wheat pricing. Understanding these price trends is crucial for stakeholders, including farmers, policymakers, and traders, as it provides insights into the market's vulnerabilities and its capacity to adapt to various challenges and opportunities.

2.1.2. Total Wheat Production and Yield per Hectare:

In 2013, Romania's wheat production was approximately 7,29 million tons, representing the starting point for the analysis. The nation's wheat production figure reflected the combined effort of thousands of farmers across the country.

A significant shift occurred in 2017, as Romania's wheat production peaked at around 10,0 million tons, over 37 % increase, according to the statistics published on the official website of the National Institute of Statistics – TEMPO-Online. This was due to a combination of favorable weather conditions, improved agricultural practices, and the adoption of high-yielding wheat varieties. It exemplified the impact of these factors on the nation's overall production capacity.

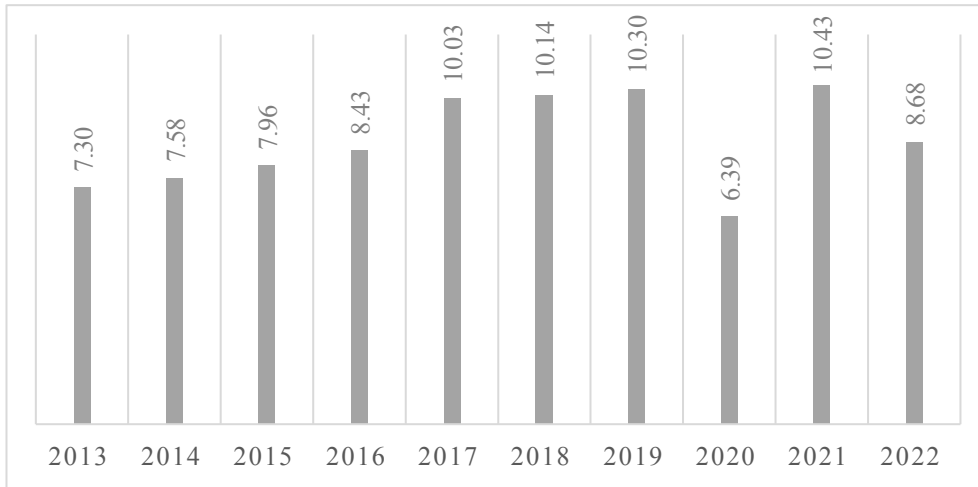


Figure 6. Total production of wheat in Romania 2013-2022 -mil.tons-
Source: National Institute of Statistics – TEMPO-Online –

Concurrently, the yield per hectare showed improvements over the decade. In 2013, the average wheat yield was about 3,47 tons per hectare, indicating the productivity level at the beginning of the study period.

By 2022, Romania had seen a significant improvement in wheat yield, with an average of approximately 4,00 tons per hectare. This increase in yield is a result of the adoption of modern farming practices, more efficient use of resources, and the cultivation of improved wheat varieties.

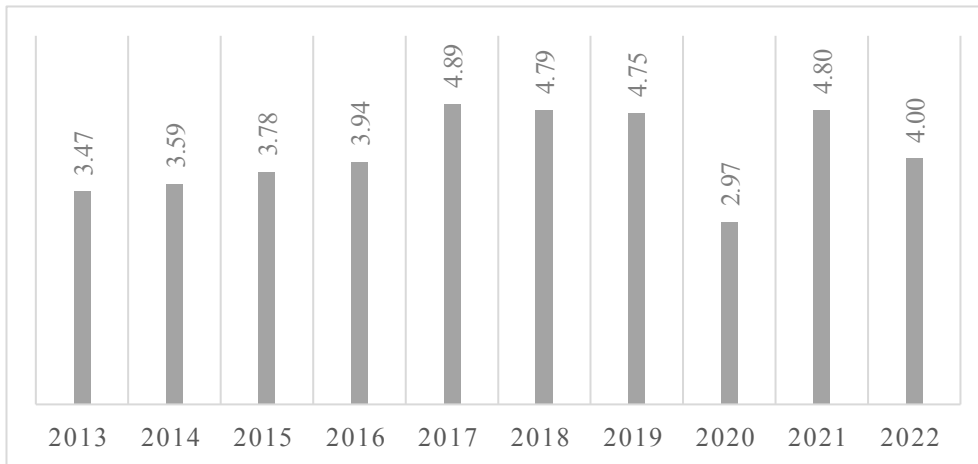


Figure 7. Average wheat yield in Romania 2013-2022 -mil.tons-
Source: National Institute of Statistics – TEMPO-Online and own calculations

These examples and statistics highlight the fluctuations in wheat production over the decade, revealing the impact of weather conditions, advancements in agricultural technology, and shifts in farming practices. The increase in yield per hectare underscores the adaptability of Romanian farmers and the positive effects of modernization. Understanding these production

dynamics is vital for ensuring food security and economic stability and for developing strategies to cope with the variability inherent in agriculture.

2.1.3. Import and Export Ratios (2015-2021):

Imports: Over the entire period, the overall trend in imports shows a gradual increase, signifying a growing need to supplement local production. The import ratio rose from 0.456 tons per hectare in 2015 to 1.547 tons per hectare in 2021, indicating a more significant reliance on imported wheat.

Exports: The overall export performance shows a striking expansion, reflecting Romania's increased role in the global wheat market. The export ratio surged from 1.728 tons per hectare in 2015 to 7.480 tons per hectare in 2021, showcasing Romania's growing competitiveness in international trade.

These exports found their way to various international markets, serving as a testament to Romania's capacity to meet global demand.

Fluctuations: Throughout the years, there were fluctuations in both imports and exports, influenced by various factors such as local production variations, international market dynamics, and trade policies.

Exceptional Year (2021): The year 2021 stands out as an exceptional year with an extraordinarily high export ratio, possibly driven by a combination of factors, including favorable weather conditions and robust demand in export markets.

This comprehensive analysis underscores the dynamic nature of Romania's wheat market, with notable increases in both imports and exports over the years. Romania has not only met domestic demand but has also become a significant player in the global wheat market, emphasizing its adaptability and potential to seize opportunities in international trade. Understanding these trends is vital for stakeholders in the wheat sector to make informed decisions and ensure the sector's stability and growth.

Over the years, Romania actively engaged in the European and global wheat trade, leveraging its position as an EU member. This increase in exports was the result of improved production, better logistical infrastructure, and Romania's expanding role as a regional wheat supplier within the EU.

The data showed a substantial threefold increase in Romania's wheat exports from 2015 to 2021. This trend is indicative of Romania's growing significance in the international wheat trade, particularly within the EU, and highlights its ability to capitalize on evolving trade dynamics and seize export opportunities.

Table 1. Evolution of wheat production in the world (2014-2020)

Specification		2014	2015	2016	2017	2018	2019	2020	% from 2020	Growth rate %	CV %
Import value	World	115.726	115.195	331.919	202.846	115,302	158.219	222.917	100	8.9	44.4
	Hungary	24.579	50.011	179.786	107.692	30.686	82.950	140.658	63.1	24.7	71.4
	Bulgaria	79.729	48.166	109.229	74.279	70.965	65.845	69.773	31.3	-2.3	23.0
	Slovakia	970	2.007	23.254	1.593	80	459	4.177	1.9	27.6	193.5
Gini coefficient		0.70	0.57	0.60	0.61	0.64	0.64	0.68	2020/2013	Growth rate %	CV %
Selling price	World	172.5	176.6	154.0	162.3	165.8	179.7	181.9	06	0.09	5.9
	Hungary	179.3	183.0	157.0	162.5	173.3	189.3	180.9	-7.1	-1.05	7.2
	Bulgaria	166.5	164.8	148.9	157.3	158.1	163.2	178.9	4.8	0.67	5.6
	Slovakia	199.3	185.5	151.9	167.5	610.7	272.9	189.5	-4.9	-0.83	63.8
Value export	World	963.442	693.104	1.142.168	999.743	1.035.714	1.136.368	831.297	100	-2.3	15.5
	Jordan	109.323	80.588	146.076	116,720	132523	115.372	130.724	15.7	8.5	22.2
	Egypt	361.873	224.561	202.501	171.818	188.821	266.830	116.198	14.0	-10.2	32.9
	Philippines	17.829	0	1.900	0	10.567	41.761	109.430	13.2		155.9
Gini coefficient		0.38	0.34	0.19	0.21	0.25	0.25	0.24	2020/2013	Growth rate %	CV %
Selling price	Total	194.0	195.0	163.3	171.0	175.9	183.6	191.4	-6.9	-1.0	76
	Jordan	194.7	191.1	175.6	167.9	175.3	182.6	186.5	-20.5	-3.2	10.9
	Egypt	199.9	193.7	156.1	170.3	177.0	192.2	196.4	0.5	0.1	8.4
	Philippines	172.4	-	172.7	-	163.2	175.7	178.2	3.3	-	-

Source: STERIE, et al. (2022, 705-712)

2.1.4. Average Net Food Consumption (kg/inhabitant):

Consistent Consumption: The net average food consumption of wheat per inhabitant remained relatively stable from 2015 to 2017, hovering around 122-123 kg per inhabitant. This suggests that wheat remained a staple in the Romanian diet during this period, with minor fluctuations.

Table 2 - Annual average gross food consumption in Romania 2015-2021

YEAR	2015	2016	2017	2018	2019	2020	2021
Annual average gross food consumption - kg/inhabitant	163,40	163,00	163,20	161,80	160,7	160,5	200,6
Annual average net food consumption - kg/inhabitant	122,60	122,20	122,40	121,40	120,5	120,4	151,8
Annual average daily net food consumption - gr/day/inhabitant	292,10	291,40	291,70	289,30	287,2	286,9	363,8

Source: National Institute of Statistics "Food balance sheets" 2015-2022

Decline in Consumption: Starting from 2018, there was a noticeable decline in net average food consumption. By 2020, the consumption had dropped to 120.4 kg per inhabitant, signifying a decrease in wheat-based food consumption, possibly due to changing dietary preferences or increased availability of alternative food sources.

Exceptional Increase in 2021: The year 2021 witnessed an exceptional increase in net average food consumption to 151.8 kg per inhabitant, signifying a sharp surge in the consumption of wheat-based products. This could be attributed to various factors, including the COVID-19

pandemic, which may have led to increased demand for staple foods, or shifts in dietary habits.

Imports and Consumption Trends: It is interesting to note that the significant increase in net average food consumption in 2021 occurred alongside a notable rise in wheat imports. This suggests that the increased consumption was supported by imports, highlighting the role of imports in meeting domestic demand.

Import Dynamics: Import quantities followed consumption trends, with higher imports in years when consumption increased, as observed in 2016 and 2021.

This analysis showcases the relationship between net average food consumption and wheat imports in Romania from 2015 to 2021. It reflects the changing dietary habits and the adaptability of the wheat market to meet the country's consumption needs.

Conclusions

In conclusion, the decade-long analysis of the wheat market in Romania throughout the years reveals a multifaceted picture of the industry's evolution. Through a comprehensive examination of price trends, production, trade dynamics, and food consumption, several key insights have emerged.

Firstly, the study underscores the volatility and sensitivity of wheat prices in the Romanian market. Factors such as weather conditions, global economic trends, and geopolitical events have played significant roles in shaping price fluctuations. Understanding these dynamics is crucial for stakeholders, including farmers, traders, and policymakers, to navigate the challenges and opportunities within the wheat market.

Secondly, the research sheds light on the intricate relationship between production and market dynamics. Analyzing production trends provides valuable insights into the factors influencing supply, including technological advancements, agricultural practices, and government policies. Recognizing these patterns is essential for ensuring a sustainable and resilient wheat industry in Romania.

Trade dynamics, another focal point of the study, highlight the interconnectedness of the Romanian wheat market with the global arena. Examining import and export patterns reveals the nation's position in the international market and the influence of trade policies on domestic wheat prices. This knowledge is crucial for policymakers in crafting effective strategies to enhance market competitiveness and security.

Finally, the study delves into the intricate web of food consumption patterns related to wheat in Romania. As consumer preferences evolve, understanding these patterns becomes pivotal for both producers and policymakers. The findings provide valuable insights for stakeholders to adapt to changing consumer demands and contribute to the development of a more sustainable and consumer-friendly wheat market.

In essence, this comprehensive study not only unravels the intricate tapestry of the wheat market in Romania but also provides a foundation for informed decision-making. Armed with this knowledge, stakeholders can navigate the complexities of the market, implement strategic initiatives, and contribute to the growth and resilience of the Romanian wheat industry in the years to come.

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