Journal of Excellence for Economics and Management Research
ISSN 2572-0171
Vol 10, N°01 : (2026)
P 389-405

مجلة الامتياز لبحوث الاقتصاد والإدارة
ISSN 2572-0171
المجلد 10، العدد: 01 (2026)،
ص 389- 405

Food Security in Algeria under Wheat Import Dependence: The Role of Supplier Diversification, 2010–2026

1st Salah OUYABA [1(*)]

[1]**MCA**, University of Ghardaia, Laboratory of Applied Studies in Financial Sciences and Accounting, Faculty of Economic Sciences, Commerce and Management Sciences, (Algeria)
✉ ouyaba.salah@univ-ghardaia.edu.dz
https://orcid.org/0000-0002-1071-0159

Received: 19/3/2026 **Accepted**: 21/4/2026 **Published**: 5/6/2026

Abstract:
This paper examines whether selective import substitution can strengthen food security in Algeria under persistent dependence on cereal and wheat imports. Using a descriptive-analytical case study approach and secondary data from FAO, USDA, OEC, WITS, official reports, and recent literature for 2010–2026, the study measures import dependence and evaluates the roles of domestic production, strategic stocks, and supplier diversification.
The results show that wheat consumption increased from 8.75 million tons in 2010/11 to 11.95 million tons in 2025/26, while the wheat import dependence ratio remained high, ranging from 63.1% to 80.9%. Although domestic output improved in some seasons, cereal import requirements remained around 14.0–14.6 million tons in the most recent years. The supplier structure became less concentrated, with the share of the top three wheat suppliers falling from 94.0% in 2018 to 60.3% in 2024, while strategic storage capacity expanded. These developments improved supply resilience but did not produce a structural decline in external dependence. The paper concludes that food security in Algeria cannot rely on production expansion alone and that an effective import substitution strategy should combine productivity gains, storage capacity, logistics, and supplier diversification.

Keywords: food security; wheat imports; import substitution; supplier diversification; Algeria.
JEL Classification Codes : Q18; Q17; F13; O24.

* *Corresponding Author.*

Doi: https://doi.org/10.34118/jeemr.v10i1.4603

Journal of Excellence for Economics and Management Research
ISSN 2572-0171
Vol 10, N°01 : (2026)
P 389-405

مجلة الامتياز لبحوث الاقتصاد والإدارة
ISSN 2572-0171
المجلد 10، العدد: 01 (2026)،
ص 389- 405

الأمن الغذائي في الجزائر في ظل الاعتماد على واردات القمح: دور تنويع الموردين، 2010-2026

صالح أويابة [1] (*)

[1] محاضر أ، أستاذ، جامعة غرداية، مخبر الدراسات التطبيقية في العلوم المالية والمحاسبة (الجزائر)
ouyaba.salah@univ-ghardaia.edu.dz
https://orcid.org/0000-0002-1071-0159

تاريخ الاستلام: 2026-03-19 تاريخ القبول: 2026-04-21 تاريخ النشر: 2026-06-05

ملخص:

تبحث هذه الورقة فيما إذا كان الإحلال الانتقائي للواردات قادرا على تعزيز الأمن الغذائي في الجزائر في ظل استمرار الاعتماد المرتفع على واردات الحبوب والقمح. واعتمدت الدراسة مقاربة دراسة حالة وصفية-تحليلية، بالاستناد إلى بيانات ثانوية صادرة عن (FAO)، و(USDA)، و(OEC)، و (WITS)، فضلا عن تقارير رسمية وأدبيات حديثة تغطي الفترة 2010-2026. وفي هذا الإطار، قامت الدراسة بقياس درجة الاعتماد على الواردات وتقييم أدوار الإنتاج المحلي والمخزونات الاستراتيجية وتنويع موردي القمح.

وتظهر النتائج أن استهلاك القمح ارتفع من 8.75 مليون طن في 11/2010 إلى 11.95 مليون طن في 26/2025، في حين ظلت نسبة الاعتماد على واردات القمح مرتفعة، متراوحة بين 63.1% و80.9%. وعلى الرغم من تحسن الإنتاج المحلي في بعض المواسم، بقيت الاحتياجات الاستيرادية من الحبوب في السنوات الأخيرة تدور حول 14.0-14.6 مليون طن. كما أصبح هيكل الموردين أقل تركزا، إذ انخفضت حصة أكبر ثلاثة موردين للقمح من 94.0% في 2018 إلى 60.3% في 2024، بالتزامن مع توسع السعة التخزينية الاستراتيجية. وقد حسنت هذه التطورات مرونة الإمدادات، لكنها لم تفض إلى تراجع هيكلي في الاعتماد الخارجي. وتخلص الورقة إلى أن الأمن الغذائي في الجزائر لا يمكن أن يرتكز على توسيع الإنتاج وحده، وأن استراتيجية فعالة لإحلال الواردات ينبغي أن تجمع بين مكاسب الإنتاجية، والسعة التخزينية، والخدمات اللوجستية، وتنويع الموردين.

الكلمات المفتاحية: الأمن الغذائي؛ واردات القمح؛ إحلال الواردات؛ تنويع الموردين؛ الجزائر

تصنيف JEL : Q18، Q17، F13، O24.

(*) المؤلف المرسل

المعرف الرقمي للمقال (doi): https://doi.org/10.34118/jeemr.v10i1.4603

1. INTRODUCTION1. INTRODUCTION

Food security has become increasingly shaped by geopolitical, climatic, financial, and logistical disruptions rather than by agricultural output alone. According to The State of Food Security and Nutrition in the World 2025, around 673 million people faced hunger in 2024 and nearly 2.3 billion experienced moderate or severe food insecurity. At the same time, FAO projects global cereal trade at 501.7 million tons in 2025/26, (FAO, 2025) confirming the centrality of international trade in food provisioning while also revealing its vulnerability to climate shocks, trade policy restrictions, tensions in the Black Sea and Middle East, and the war against Iran.

Within this context, Algeria represents a particularly important case of structural food dependence. Domestic cereal demand, especially for soft wheat, continues to exceed local productive capacity by a wide margin. FAO estimated Algeria's cereal import requirement at approximately 14 million tons in 2024/25 and projected 14.6 million tons in 2025/26, while cereal production remained close to 4.1 million tons in 2024 and 4.2 million tons in 2025. OEC data further indicate that Algeria imported wheat worth USD 1.76 billion in 2024, making it the world's eighth-largest wheat importer. (FAO, 2026)

The issue is not limited to import volume; it also concerns the structure of associated risks. Algeria's wheat imports surpassed 9.5 million metric tons in 2023/24, were estimated at 8.0 million metric tons in 2024/25 after a mid-year downward revision, and are forecast at 9.2 million metric tons in 2025/26, indicating continued heavy dependence on external supply Russia has emerged as a leading supplier, Ukraine has become an increasingly important source of grain, and France's traditional role has declined sharply in recent marketing years. (USDA, 2025a) (USDA, 2025b) In the first half of marketing year 2024/25, Reuters Refinitiv data cited in a USDA-FAS update indicated that Russia had shipped more than 1.68 million metric tons of wheat to Algeria, while Ukraine's shipments also increased markedly (USDA, 2025c). At the same time, the Algerian government expanded stock capacity through a program to build 30 silos and 350 storage centers and to connect grain silos to the railway network, linking import management to a broader storage strategy (USDA, 2025a).

Trade data for 2018–2024 indicate that Algeria's wheat dependence is structural rather than temporary. Based on annual bilateral wheat trade data compiled from the Observatory of Economic Complexity, Algeria's cumulative wheat import value over the period reached approximately USD 13.44 billion, whereas cumulative exports amounted to only about USD 266.9 thousand, confirming a persistent net-import position. The same trade data also point to a major shift in supplier structure: whereas France had long been Algeria's dominant wheat supplier, more recent imports have become more diversified, with Bulgaria, Canada, France, Ukraine, and Romania appearing as the main suppliers in 2024 (OEC, 2026). Reuters likewise notes that France was for many years Algeria's largest wheat supplier but was overtaken as Algeria increasingly sourced wheat from Black Sea and other competing origins, highlighting that the Algerian issue concerns not only import volume, but also supplier concentration and exposure to disruptions affecting specific supplier regions and trade routes (Trompiz & Hogan, 2024).

International research shows that cereal import dependence is directly linked to sustainability, resilience, and food sovereignty rather than constituting a neutral trade outcome. (Silva et al., 2023) identified realistic pathways to higher relative wheat self-sufficiency in Africa through narrowing yield gaps and smart intensification. (Castro Campos et al., 2020) related cereal dependence in water-scarce countries to the logic of "virtual water." (Lin et al., 2023) and (Kozielec et al., 2024) demonstrated the vulnerability of wheat-importing countries in the Middle East and North Africa to Black Sea shocks. (Kaitibie et al., 2022) and (Mohammed & Almojel, 2025) showed that supplier diversification and substitution elasticities are central to food-security protection.

Recent Algerian studies have analyzed the wheat food gap, the determinants of imports, and the agricultural sector's role in food security. (Ben Sakri, 2024), (Rahal & Belouerghi, 2025), (Mekki, 2025), and (Bougroura & Slimani, 2025) all contributed important insights. However, much of the local literature remains either partially econometric and centered on import determinants or descriptively sectoral. It rarely integrates import substitution, supplier concentration, and strategic storage within one analytical framework using the most recent data for 2023–2026.

This paper addresses that gap by examining whether selective import substitution can improve Algerian food security without assuming the feasibility of absolute self-sufficiency. The central research question is: To what extent can an import-substitution strategy enhance food security in Algeria under continued high dependence on cereal and wheat imports?

The study addresses four sub-questions:

What is the actual or approximate scale of dependence on cereal and wheat imports in Algeria in recent years?

What factors explain the persistence of this dependence despite declared policies aimed at expanding domestic production?

Does supplier diversification and the expansion of strategic storage contribute to greater food-security resilience even before full production-based substitution is achieved?

What are the limits of import substitution in the case of wheat, especially soft wheat used in subsidized bread production?

The study aims to assess the practical feasibility of import substitution as a tool for strengthening food security in Algeria. More specifically, it seeks to measure the degree of import dependence, analyze the roles of domestic production, storage, and supplier diversification, and formulate a selective policy framework for import substitution in the cereal sector.

The paper tests three hypotheses:

H01: Dependence on cereal imports in Algeria remains structural rather than temporary.

H02: Expanding cultivated area or output alone is insufficient to reduce dependence unless accompanied by improved yields, logistics, and storage.

H03: Import substitution has a greater effect on food security when based on selective and gradual substitution rather than the pursuit of absolute self-sufficiency.

The paper contributes to the literature by integrating import dependence, supplier concentration, and strategic storage into a single food-security framework for Algeria using updated evidence for 2010–2026.

2. Materials and methods

2.1 Conceptual and analytical framework

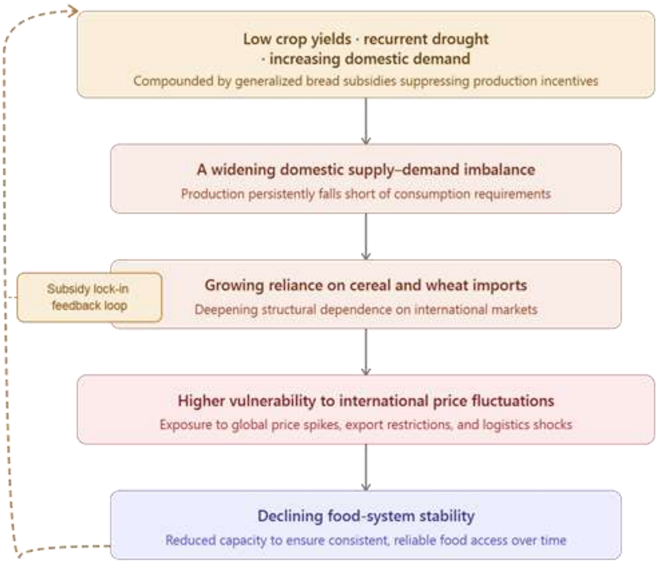
The paper adopts a food-security systems perspective in which food security is understood not only in terms of availability, but also in terms of stability and resilience. In line with FAO, food security refers to a condition in which all people, at all times, have physical, economic, and social access to sufficient, safe, and nutritious food that meets dietary needs and preferences. (World Bank, 2023) Although the broader concept includes utilization and access, the present analysis focuses primarily on availability and stability while recognizing the role of prices and logistics in shaping effective access.

Import substitution is treated here as a selective policy rather than as a doctrine of absolute self-sufficiency. In operational terms, it refers to all measures capable of reducing cereal and wheat import dependence through four interrelated channels: expanding and restructuring domestic cereal production, diversifying import suppliers geographically, developing consumption and technological alternatives that reduce reliance on imported wheat, and building strategic reserves capable of cushioning external shocks.

The study also uses the concept of strategic grain stock to refer to officially or quasi-officially stored reserves capable of absorbing temporary disruptions in international markets or domestic production. This concept is particularly important in Algeria because USDA reports anticipate an increase in official storage capacity from about 5 million tons to 9 million tons after the completion of the silo and storage-center program.

The analytical model assumes that food-security outcomes in cereals and wheat are shaped by the interaction of climatic conditions, water scarcity, agricultural productivity, storage and logistics infrastructure, demand structure and subsidies, and diversification of external suppliers. Low yields, drought, broad bread subsidies, and rising demand widen the supply-demand gap and increase cereal imports, thereby heightening exposure to price and supplier shocks. Conversely, improvements in productivity, storage, transport logistics, and supplier diversification can reduce fragile dependence and enhance resilience even if import volumes remain high.

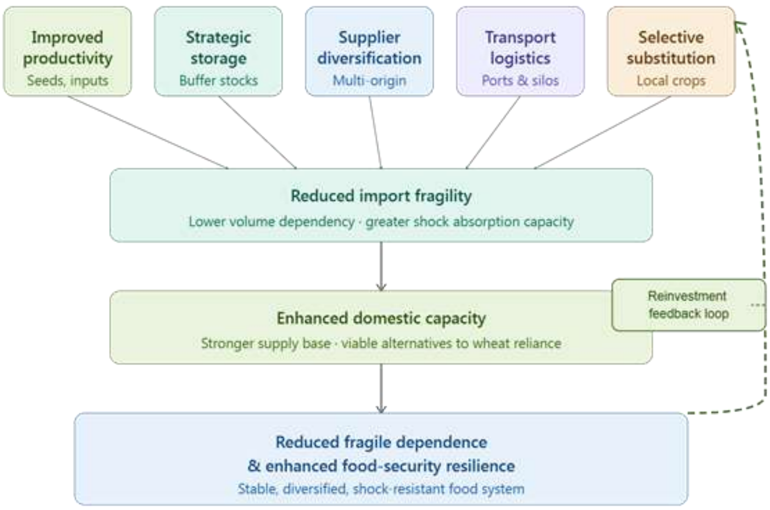
Figure 1. Pathway of Cereal Import Dependence in Algeria



Source: Developed by the author based on the study's analytical framework

However, this pathway can be altered through:

Figure 2. Pathway to Food-Security Resilience



Source: Developed by the author based on the study's analytical framework

2.2 Review of relevant literature

The international literature can be grouped into three broad strands. **The first** concerns pathways to relative self-sufficiency and agricultural substitution. (Erenstein et al., 2022) emphasized wheat's central role in the global food system. (Silva et al.,

2023) showed that narrowing yield gaps through improved varieties and agricultural practices can raise relative self-sufficiency in Africa, while (Barel-Shaked & Buda, 2025) linked resilience not only to domestic production ratios but also to food-basket diversity and market structure.

The second strand concerns trade vulnerability and dependence on external markets. (Castro Campos et al., 2020) found a nonlinear relation between cereal import dependence and water scarcity, suggesting that imports may be rational from a water-efficiency perspective but still risky without institutional resilience. (Deteix et al., 2024), (Somaweera et al., 2024), and (Xu et al., 2026) all showed that reliance on a limited number of commodities, corridors, or suppliers deepens exposure to shocks and may reduce the developmental benefits of food trade.

The third strand concerns war, market shocks, and the Middle East and North Africa. (Battat et al., 2012) showed early on that grain-chain logistics, procurement, and hedging are as important as the import decision itself. (Lin et al., 2023) and (Kozielec et al., 2024) confirmed that the Russian-Ukrainian war magnified regional vulnerability through higher prices and supply disruptions. (Kaitibie et al., 2022) and (Mohammed & Almojel, 2025) emphasized the importance of substitution elasticities among suppliers and commodities in Arab food-security policy.

At the regional and local levels, (Ben Sakri, 2024) found that domestic production, population, world prices, and world wheat stocks are major determinants of Algerian wheat imports. (Rahal & Belouerghi, 2025) highlighted the continued importance of cereal imports despite agriculture's broader role in food security. (Bougroura & Slimani, 2025) and (Mekki, 2025) examined wheat and cereal production as strategic levers of food security, but also underscored the incompleteness of self-sufficiency in wheat, corn, and barley.

A comparison of international and local work reveals three gaps. **First,** international studies interpret import dependence through resilience, vulnerability, and resource trade-offs, whereas much local work remains centered on the food gap or on isolated import determinants. **Second,** self-sufficiency is increasingly treated internationally as a selective and feasibility-dependent objective, an angle not fully incorporated into the Algerian case. **Third,** Algeria's recent developments between 2024 and 2026, especially storage expansion and supplier reconfiguration, have not yet been assessed within a unified framework of import substitution and food security.

2.3 Research design and data

The paper uses a quantitative descriptive-analytical approach within an Algerian case study, supported by interpretive policy analysis. This design is appropriate because the research problem concerns both measurable import dependence and the broader institutional configuration within which imports, storage, suppliers, and agricultural policy interact.

The study population consists of publicly available statistical series and policy documents related to cereals, wheat, and food security in Algeria. The analytical sample includes annual and seasonal data on cereal production, imports, exports, stocks, and storage capacity for 2010–2026 where available; recent wheat supplier data for 2018–2024; recent documents issued by FAO, USDA, and the World Bank for 2024–2026; and recent international and local academic studies directly relevant to the subject.

2.4 Data sources and validity

The analysis relies on document analysis and secondary data analysis. Data were collected from FAO/GIEWS bulletins on Algeria, USDA Foreign Agricultural Service grain and feed reports, OEC and WITS/UN Comtrade trade data, World Bank bulletins on food security and commodities, and recent scientific studies.

Content validity was ensured by selecting indicators widely recognized in the literature, including import requirements, storage capacity, supplier shares, and the cereal import dependence ratio. Construct validity was strengthened by linking these indicators to the proposed model of production, trade, storage, and resilience. Reliability was improved through triangulation among FAO, USDA, and trade-partner data, while acknowledging that some recent USDA values are estimates derived from Algeria's trade-partner data and industry reports because detailed Algerian customs data on wheat are not regularly published.

2.5 Analytical methods

The study uses descriptive statistics, including averages, ratios, shares, and percentage changes. It calculates the approximate cereal import dependence ratio based on the FAO formula:

Dependence ratio = (Net imports / Available domestic supply) × 100

In the approximate application to recent seasons, import and production data were used under the assumption that exports were marginal and had only a weak effect on the overall result. The analysis also includes supplier concentration measures based on the shares of major trade partners, seasonal comparison across the 2023/24, 2024/25, and 2025/26 marketing years, and interpretive analysis of the relationship among production, imports, storage, and food-security resilience.

Table 1. Summary of Major Previous Studies

Author Year	Method	Main Findings Gap	Addressed by This Research
Silva et al. 2023	Comparative analytical	There are realistic pathways for increasing relative wheat self-sufficiency in Africa through narrowing yield gaps	Applies the idea to Algeria with a trade-institutional dimension
Castro Campos et al.	Cross-sectional	Cereal dependence is nonlinearly related to water	Adds the storage and logistics dimension for

2020	econometric	scarcity	Algeria
Lin et al. 2023	Shock modeling	The Black Sea war increases trade risks and wheat prices	Transfers the discussion to the specific effect of the shock on Algeria
Kaitibie et al. 2022	Trade econometric	Supplier diversification and substitution elasticities reduce food-security risks	Test's supplier structure in Algerian imports
Kozielec et al. 2024	Analytical review	MENA is more vulnerable because of imports, climate, and politics	Provides an updated Algerian applied case
Ben Skri 2024	Econometric	The wheat food gap is linked to production, area, and imports	Broadens the analysis to include wheat suppliers and storage
Rahal F. Belouerghi N. 2025	Analytical	Agriculture is important, but dependence on cereals remains high	Provides an updated quantitative measure of dependence intensity

Source: Prepared by the researcher based on the studies cited above.

3. Results and discussion

3.1 Descriptive profile of the analytical sample

The analytical database combines annual and seasonal data. FAO data were used to trace aggregate cereal production and import requirements. USDA estimates were used for wheat imports, consumption, and stocks. OEC and WITS data were used to follow the evolution of supplier structure. This combination is methodologically appropriate because cereal and wheat sectors are often measured by marketing years rather than by calendar years alone.

The available trade data also show that Algeria’s wheat trade balance remained strongly negative throughout the study period. Wheat imports ranged from USD 1.45 billion in 2019 to USD 2.66 billion in 2022, while exports did not exceed USD 108.8 thousand in any year. Algeria was therefore not an exporting actor in the wheat market, but rather a structural net importer dependent on external supply.

3.2 Scale of dependence on cereal imports

The results confirm that Algeria’s cereal import dependence remains very high. Domestic cereal production reached about 3.6 million tons in 2023, 4.1 million tons in 2024, and 4.2 million tons in 2025, while cereal import requirements remained about 14 million tons in 2023/24 and 2024/25 and rose to 14.6 million tons in 2025/26. When the approximate FAO formula is applied, the cereal import dependence ratio appears to be around 79.5% in 2023/24, 77.3% in 2024/25, and 77.7% in 2025/26. These results support **H01**, indicating that dependence is structural rather than temporary.

Table 2. Domestic Cereal Production/Consumption/Stocks and the Wheat Import Dependence Ratio

Year/Marketing year (July/June)	Domestic cereal production (million tons)	Wheat consumption in Algeria (million tons)	Wheat stocks (thousand tons)	Wheat imports dependence ratio (%)
2010/11	–	8.75	2,175	63.1
2011/12	2.80	8.95	1,660	70.3
2012/13	3.40	9.05	3,766	65.8
2013/14	3.30	6.65	3,718	65.6
2014/15	1.90	10.05	3,768	79.4
2015/16	2.70	10.25	4,357	75.2
2016/17	2.00	10.35	4,443	80.9
2017/18	2.40	10.45	4,525	77.4
2018/19	3.94	10.55	6,000*	67.4
2019/20	3.95	10.60	7,335*	67.0
2020/21	3.90	11.05	5,756	65.9
2021/22	2.50	11.10	4,411	76.3
2022/23	2.50	11.15	5,401	70.5
2023/24	2.70	11.55	5,731	77.9
2024/25	4.2	11.75	4,976*	72.8
2025/26	3.00*	11.95	5,221*	75.4

Source: Prepared by the researcher based on:

- FAO/GIEWS, using the FAO formula for the cereal import dependence ratio;

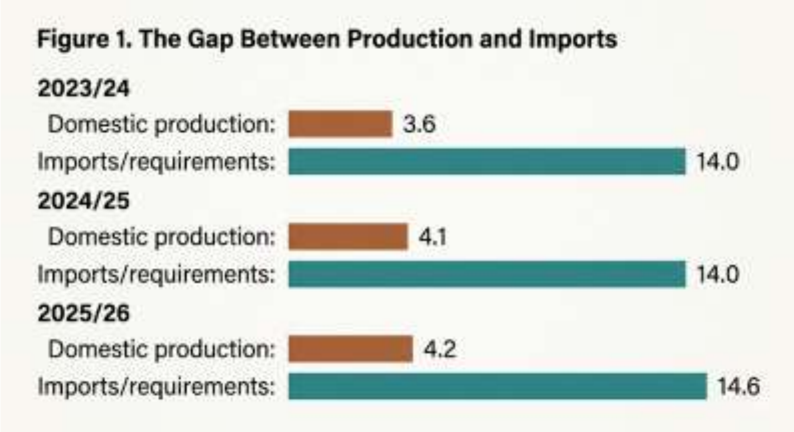
- Algeria-related USDA annual/update reports published in 2004, 2005, 2007, 2011, 2012, 2013, 2014, 2016, 2017, 2018, 2019, 2022, 2023, 2024, and 2025, with priority given to the latest published revision when multiple values exist for the same year.

- * Data are estimates/projections.

Table 2 shows three important patterns. **First,** domestic cereal and wheat production is highly volatile and climate-sensitive. Production fell to around 1.9 million tons in 2014/15, recovered to about 3.9–3.95 million tons in 2018/19–2020/21, declined again to about 2.5 million tons in 2021/22–2022/23, and then improved moderately afterward. **Second,** wheat consumption followed a more stable upward trend, rising from 8.75 million tons in 2010/11 to 11.95 million tons in 2025/26. **Third,** wheat stocks rose over the long term, though not linearly, indicating greater recourse to reserve-building rather than domestic self-sufficiency.

The wheat imports dependence ratio remained high throughout the entire series. It never fell below 63.1% and reached a peak of 80.9%, confirming persistent reliance on external markets even in periods of production recovery. In the most recent years, the ratio was 77.9% in 2023/24, 72.8% in 2024/25, and 75.4% in 2025/26. This supports **H02:** production increases alone have not been sufficient to reduce import dependence because domestic demand is large and rising, especially for soft wheat used in subsidized bread, while stocks are being expanded simultaneously.

Figure 3. The Gap Between Production and Imports



Source: Researcher's representation based on FAO/GIEWS data.

3.3 The position of wheat in Algerian food dependence

Wheat occupies a central place in Algeria's food-security equation. (OEC, 2026) data show that wheat imports reached about USD 1.76 billion in 2024, placing Algeria among the world's largest wheat importers. USDA estimates further indicate that wheat imports exceeded 9.5 million tons in 2023/24 and stabilized near 9.2 million tons in 2024/25 and 2025/26. At the same time, wheat consumption reached 11.75 million tons in 2024/25 and was projected at 11.95 million tons in 2025/26, while wheat stocks were expected to rise further. This indicates that current policy relies less on rapid substitution than on managing high dependence through continued imports and strategic reserves.

Table 3. Official Storage Capacity for Cereals and Wheat Products in Algeria

Year/Period	**Value (thousand tons)**	**Notes**
2012 (existing capacity)	> 5,000	More than 50 million quintals; cereal capacity in general
2013 (declared target)	6,000	Plan to raise national cereal capacity to 6 million tons
2017 (updated plan)	>5,000 then +840 by 2019	Updated plan; cereals in general
2025–2027 (target/planned capacity)	9,000	Adding 30 silos and 350 storage centers
2026-02 (single new project)	+100	Launch of a strategic silo project in El Meniaa with a capacity of 100 thousand tons

Source: Prepared by the researcher based on Algeria-related USDA annual/update reports published in 2012, 2013, 2017, and 2025, with priority given to the latest published revision when multiple values exist for the same year; 2026 data points drawn from official Algerian statements published by Algerian Radio and APS. (aps, 2026)

Although the series on storage capacity is incomplete and partly based on official announcements, it clearly shows a continued policy commitment to expanding reserves. This means that storage is becoming part of the institutional architecture of food security and of import-substitution management, even if it has not yet translated into a structural fall in import volumes.

3.4 Supplier diversification and trade vulnerability

One of the most important changes in Algerian wheat trade during 2018–2024 was the gradual transformation of supplier structure. Wheat supplier data for 2024 show that Algeria no longer depended on a single dominant European source as it did earlier in the period. Bulgaria ranked first at about USD 411 million, followed by Canada at USD 338 million, France at USD 311 million, Ukraine at USD 260 million, and Romania at USD 164 million. Together, these five countries accounted for about 84.3% of the value of Algerian wheat imports in 2024.

Table 4. Algerian Wheat Imports by Trade Partners (2018–2024)

Year	Total imports (USD million)	First supplier	Second supplier	Third supplier	Share of top 3 suppliers %	Number of partners
2018	1778.5	France (1201.2; 67.5%)	Argentina (245.6; 13.8%)	Canada (225.9; 12.7%)	94.0	8
2019	1445.0	France (925.1; 64.0%)	Canada (262.3; 18.2%)	United States (121.0; 8.4%)	90.6	14
2020	1569.8	France (887.8; 56.6%)	Germany (201.6; 12.8%)	Canada (120.4; 7.7%)	77.1	14
2021	2202.4	France (651.2; 29.6%)	Germany (592.0; 26.9%)	Canada (335.4; 15.2%)	71.7	17
2022	2659.5	France (849.1; 31.9%)	Bulgaria (476.4; 17.9%)	Romania (330.9; 12.4%)	62.2	15
2023	2029.5	Canada (506.6; 25.0%)	Bulgaria (491.3; 24.2%)	Romania (324.8; 16.0%)	65.2	15
2024	1756.8	Bulgaria (410.9; 23.4%)	Canada (337.8; 19.2%)	France (310.7; 17.7%)	60.3	11

Source: The Observatory of Economic Complexity (OEC), data 2025.

The data reveal three phases. **The first phase,** from 2018 to 2020, was characterized by strong French dominance and very high concentration among few partners. **The second phase,** in 2021–2022, witnessed broader diversification with the rise of Germany, Bulgaria, and Romania, alongside a sharp increase in the import bill. **The third phase,** in 2023–2024, saw continued diversification with greater prominence of Canada, Bulgaria, Ukraine, and Turkey and a clear decline in France's relative weight.

The share of the top three suppliers fell from 94.0% in 2018 to 60.3% in 2024. This represents a significant reduction in concentration and supports the argument that supplier diversification can improve resilience. However, diversification did not eliminate vulnerability; it redistributed part of that vulnerability toward the Black Sea region and toward maritime transport risks. Supplier diversification is therefore a necessary but insufficient condition for food-security resilience.

Table 5. Algerian Wheat Exports by Trade Partners (2018–2024)

Year	Total exports (USD)	First destination	Second destination	Third destination	Number of partners
2018	36,797	Niger (21,821; 59.3%)	Italy (13,320; 36.2%)	Canada (1,183; 3.2%)	6
2019	904	Canada (904; 100.0%)	–	–	1
2020	6,508	Austria (4,634; 71.2%)	Canada (1,864; 28.6%)	Switzerland (10; 0.2%)	3
2021	48,161	France (34,511; 71.7%)	United States (11,315; 23.5%)	United Kingdom (1,623; 3.4%)	6
2022	108,788	Netherlands (56,022; 51.5%)	France (52,766; 48.5%)	–	2
2023	20,108	France (15,971; 79.4%)	United States (4,070; 20.2%)	Switzerland (67; 0.3%)	3
2024	45,596	Italy (31,656; 69.4%)	France (12,710; 27.9%)	Niger (1,217; 2.7%)	5

Source: The Observatory of Economic Complexity (OEC), data 2025.

Exports remained extremely low and volatile. Across 2018–2024, cumulative wheat imports reached about USD 13.44 billion compared with cumulative exports of only about USD 266.9 thousand. Algeria therefore remained an almost purely net importer of wheat throughout the period.

3.5 Institutional effects of import-substitution alternatives

The evidence suggests that Algeria has begun to build institutional elements of import substitution even though their quantitative impact on import volumes remains limited. In 2024, the government announced the allocation of more than 2 million hectares to wheat and about 1 million hectares to barley. It also launched a program to build 30 silos and 350 storage centers, raise official storage capacity from 5 to 9 million tons, and connect some silos to rail infrastructure. These measures indicate that current import substitution takes the form of strengthening the capacity to manage dependence rather than rapidly eliminating it.

At the same time, official policy has aimed at achieving self-sufficiency in durum wheat and partially increasing barley and corn production. Soft wheat, however, remains especially difficult to substitute because it represents about 75–80% of Algeria's wheat imports and is closely tied to subsidized bread consumption. Durum wheat accounts for about 20–25% of imports and is more likely to present selective substitution opportunities.

3.6 Interpretation and discussion

Overall, the results indicate more institutional improvement than structural transformation. Domestic production improved in some seasons, but not enough to reduce imports to low levels. Storage expansion and supplier diversification improved resilience, yet Algerian cereal food security remains deeply linked to global market conditions. These findings lead to partial acceptance of **H03:** import substitution can strengthen food security, but only when understood as an integrated package of productive, logistical, and trade measures rather than as a purely production-centered project.

The results are consistent with (Silva et al., 2023), who argued that relative self-sufficiency depends on deep productivity gains rather than nominal expansion of area. They also align with (Castro Campos et al., 2020), who showed that water-scarce countries may remain dependent on cereal imports, making selectivity more rational than an indiscriminate rush toward self-sufficiency. Likewise, the findings support (Lin et al., 2023) and (Kozielec et al., 2024), who emphasized the vulnerability of MENA importers to international grain-chain shocks. At the local level, the results are consistent with (Ben Sakri, 2024) and (Rahal & Belouerghi, 2025), who highlighted the persistence of the food gap and the difficulty of rapidly reducing wheat dependence.

The study also differs from part of the local literature in one essential respect: it does not interpret the solution as simply increasing production in isolation from storage, procurement, logistics, and supplier structure. The findings show that food security may improve in the short term through reserve accumulation and supplier diversification even before major productive substitution is achieved. This is close to the argument of (Kaitibie et al., 2022) and (Mohammed & Almojel, 2025), who stressed the importance of managing trade risks rather than imagining that they can be fully eliminated.

From a policy perspective, the evidence suggests that Algeria should prioritize yield improvement over area expansion alone, focus on wheat types with better domestic comparative advantage, accelerate the silo and storage-center program, connect storage to transport infrastructure, diversify suppliers flexibly across regions, and reform demand through more precise bread-support and waste-reduction policies. Expansion of irrigated areas in the south may contribute to substitution, but only if accompanied by strict water governance, modern irrigation technologies, and drought-resistant varieties. Otherwise, horizontal expansion risks becoming environmentally and economically costly.

3.7 Limitations

The findings remain subject to several limitations. Some recent wheat data are USDA estimates based on trade-partner data and industry reports due to limited Algerian official publication. The analysis emphasizes availability and stability more than utilization and nutritional quality. It also addresses import substitution at national and sectoral levels rather than at the level of provinces or detailed value chains. The results should therefore be interpreted as an updated analytical framework rather than a substitute for full econometric modeling using a complete national database.

4. Conclusion

The paper examined whether selective import substitution can strengthen food security in Algeria under continued high dependence on cereal and wheat imports. Using secondary data for 2010–2026, it integrated food security, import dependence, supplier concentration, and strategic storage into a single analytical framework.

The results show that Algeria's cereal and wheat dependence remains structural. Wheat consumption increased from 8.75 million tons in 2010/11 to 11.95 million tons in 2025/26, while the wheat imports dependence ratio remained high, ranging from 63.1% to 80.9%. Domestic production improved in some years, but cereal import requirements remained around 14.0–14.6 million tons in recent seasons. This confirms that production expansion alone is insufficient to transform the structure of dependence.

The study also showed that Algeria's recent policy adjustments have improved resilience more through strategic storage and supplier diversification than through direct reduction of import volumes. The share of the top three wheat suppliers fell from 94.0% in 2018 to 60.3% in 2024, indicating a meaningful decline in concentration. Nevertheless, diversification did not eliminate vulnerability; instead, it redistributed part of it toward other geopolitical and logistical spaces, especially the Black Sea and maritime routes.

The main implication is that food security in Algeria cannot rely on a narrow production-centered strategy or on the pursuit of absolute self-sufficiency. A realistic and effective import-substitution strategy should be selective and gradual. It should combine productivity gains, higher yields, strategic storage, better logistics, demand rationalization, and diversified trade partnerships within one coherent institutional framework.

Future research should extend the analysis through econometric modeling of Algerian wheat-import elasticities with respect to global prices, exchange rates, and stock levels and through regional studies identifying the agricultural basins most capable of supporting successful import substitution.

5. References

Rahal, F., & Belouerghi, N. (2025). The Role Of Agricultural Sector On Achieving Food Security In Algeria During The Period 2005/2022- The Cereal As A Model-. *Journal of Excellence for Economics and Management Research (JEEMR)*, *9*(9), 426-444. Récupéré sur https://asjp.cerist.dz/en/article/269801

aps. (2026, February 21). *Agriculture minister launches 100,000-tonne grain silo project in El Menia*. Consulté le 03 02, 2026, sur https://www.aps.dz/en/economy/agriculture-fisheries/mlwd3twy-agriculture-minister-launches-100-000-tonne-grain-silo-project-in-el-menia?utm_source=chatgpt.com

Barel-Shaked, S., & Buda, E. (2025). Charting resilience: a typology of food self-sufficiency in OECD nations. *Agriculture & Food Security*, *14*(19). https://doi.org/https://doi.org/10.1186/s40066-025-00537-0

Battat, M., Erekat, D., Lampietti, J., De Hartog, A., & Michaels, S. (2012). *The grain chain : food security and managing wheat imports in Arab countries : La filière des céréales : sécurité alimentaire et gestion des importations de blé dans les pays Arabes (French).* Working Paper, DC: World Bank, Washington. Récupéré sur http://documents.worldbank.org/curated/en/185501468050969647

Ben Sakri, A.-M. (2024). دراسة قياسية لمحددات الواردات القمحية في الجزائر خلال الفترة 1990–2022. *Revue Recherches et Etudes en Développement*, *11*(2), 162-178. Récupéré sur https://asjp.cerist.dz/en/article/263963

Bougroura, S., & Slimani, I. (2025). إنتاج القمح في الجزائر كمدخل استراتيجي لتحقيق الأمن الغذائي في ظل الأزمات الاقتصادية والصراعات الدولية. *Journal of Advanced Economic Research*, *10*(1), 262-275. Récupéré sur https://asjp.cerist.dz/en/PresentationRevue/494

Castro Campos, B., Ren, Y., & Loy, J.-P. (2020). Scarce Water Resources and Cereal Import Dependency: The Role of Integrated Water Resources Management. *Water*, *12*(6), 1750.

Deteix, L., Salou, T., & Loiseau, E. (2024). Quantifying food consumption supply risk: An analysis across countries and agricultural products. *Global Food Security*, *41*, 100764. https://doi.org/https://doi.org/10.1016/j.gfs.2024.100764.

Erenstein, O., Jaleta, M., Mottaleb, K., Sonder, K., Donovan, J., & Braun, H.-J. (2022). Global Trends in Wheat Production, Consumption and Trade. Dans M. Reynolds, & H.-J. Braun (Éds.). Wheat Improvement Center. Springer, Cham. https://doi.org/https://doi.org/10.1007/978-3-030-90673-3_4

FAO. (2025, 07 28). *Hunger declines globally, but rises in Africa and western Asia: UN report*. Consulté le 03 02, 2026, sur Food and Agriculture Organization of the United Nations: Hunger declines globally, but rises in Africa and western Asia: UN report

FAO. (2026, 03 06). *World Food Situation*. Consulté le 03 10, 2026, sur Food and Agriculture Organization of the United Nations: https://www.fao.org/worldfoodsituation/csdb/en?utm_source=chatgpt.com

Kaitibie, S., Irungu, P., Ng'ombe, J., & Missiame, A. (2022). Managing Food Imports for Food Security in Qatar. *Economies*, *10*(7), 168. https://doi.org/https://doi.org/10.3390/economies10070168

Kozielec, A., Piecuch, J., Daniek, K., & Luty, L. (2024). Challenges to Food Security in the Middle East and North Africa in the Context of the Russia–Ukraine Conflict. *Agriculture, 14*(1). https://doi.org/https://doi.org/10.3390/agriculture14010155

Lin, F., Li, X., Jia, N., Feng, F., Huang, H., Huang, J., Fan, S., Ciais, P., & Song, X.-P. (2023). The impact of Russia-Ukraine conflict on global food security. *Global Food Security, V.36*, 100661. https://doi.org/https://doi.org/10.1016/j.gfs.2022.100661.

Mekki, A. (2025). مساهمة شعبة الحبوب في دعم الأمن الغذائي بالجزائر (دراسة تحليلية 2019–2022). *Revue d'économie et de statistique appliquée*, *22*(1), 386-406. Récupéré sur https://asjp.cerist.dz/en/article/268952

Mohammed, R., & Almojel, S. (2025). Elasticities of Food Import Demand in Arab Countries: Implications for Food Security and Policy. *Sustainability*, *17*(14), 6271. https://doi.org/https://doi.org/10.3390/su17146271

OEC. (2026). *Algeria (DZA) exports, imports, and trade partners.* Consulté le 03 10, 2026, sur https://oec.world/en/profile/country/dza?utm_source=chatgpt.com

Silva, J. V., Jaleta, M., Tesfaye, K., Abeyo, B., Devkota, M., Frija, A., Habarurema, I., Tembo, B., Bahri, H., Mosad, A., Blasch, G., Sonder, K., Snapp, S., & Baudron, F. (2023). Pathways to wheat self-sufficiency in Africa. *Global Food Security, V.37*, 100684. https://doi.org/https://doi.org/10.1016/j.gfs.2023.100684

Somaweera, P., Kosgoda, D., & Perera, H. (2024). Assessing External Wheat Supply Risk: Perspectives from a Low Middle-Income Country on Wheat Imports. *IFAC-PapersOnLine, 58*(19), 1096-1101. https://doi.org/https://doi.org/10.1016/j.ifacol.2024.09.123.

Trompiz, G., & Hogan, M. (2024, October 10). *Exclusive: Algeria bars France from wheat import tender as relations sour, sources say*. Récupéré sur Reuters: https://www.reuters.com/markets/commodities/algeria-bars-france-wheat-import-tender-relations-sour-sources-say-2024-10-09/

USDA. (2025a). *Grain and feed annual: Algeria.* Consulté le 03 10, 2026, sur https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain+and+Feed+Annual_Algiers_Algeria_AG2025-0002

USDA. (2025b). *Grain and feed update: Algeria.* Consulté le 03 10, 2026, sur https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain+and+Feed+Update_Algiers_Algeria_AG2025-0005

USDA. (2025c). *Grain and feed update: Algeria.* Consulté le 03 10, 2026

World Bank. (2023, 08 25). *What is Food Security?* Consulté le 03 02, 2026, sur The World Bank Group: https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security

Xu, Z., Wu, T., Hu, T., Liu, Y., & Peng, J. (2026). International food trade increased the food security gap between high and low economic development groups. *Geography and Sustainability, 7*(1), 100402. https://doi.org/https://doi.org/10.1016/j.geosus.2025.100402