

**Building Resilient Food Systems in Algeria:
Climate Adaptation, Import Dependence, and Economic Diversification****SELT Mohammed Mostefa**Laboratory of « MQEMADD », University of Djelfa,
(Algérie), m.seltold@univ-djelfa.dz**Received:** 23/10/2025**Accepted:** 21/11/2025**Published:** 25/11/2025**Abstract:**

This paper examines Algeria's food security through the four classical pillars—availability, access, utilization, and stability—within the context of climate variability, chronic water scarcity, and exposure to global market shocks. Using a risk-systems approach, we synthesize evidence from FAO GIEWS country briefs (2024–2025), USDA Foreign Agricultural Service (FAS) reports, IPCC AR6 climate projections for the Mediterranean, and official Algerian sources (ONS, OAIC, Algerian Energy Company). Domestic cereal production remains structurally low (≈ 4.1 Mt in 2024), leaving Algeria reliant on wheat imports (≈ 8 Mt in MY 2024/25 and over 9 Mt projected for MY 2025/26). Water availability has dropped to an estimated 260–300 m³ per person per year—well below the absolute scarcity threshold—necessitating rapid desalination expansion (≈ 3.7 Mm³/day by end-2024, ≈ 5.6 Mm³/day by 2030). The analysis highlights sectoral interventions for cereals, dairy, dates, and olives, and provides a forward-looking operational roadmap (2025–2030) emphasizing water-demand management, agro-climatic zoning, import risk hedging, and value-chain upgrading. Our findings call for governance reforms, data transparency, and integrated resource planning to strengthen long-term resilience and reduce Algeria's dependence on volatile global markets.

Keywords: Food security, cereal production, wheat imports, water scarcity, agro-climatic zoning, climate change adaptation, food price inflation, governance

JEL Classification : Q18 ; Q25 ; Q54 ; Q17 ; Q13

1. Introduction

Algeria's food security continues to face recurrent stress episodes caused by the interplay of climate variability, global commodity price shocks, and domestic logistical constraints. The country's dietary energy supply remains dominated by cereals—primarily bread wheat—accounting for about 61 % of per-capita calorie intake.¹

The population reached an estimated 45.5 million inhabitants in 2024, with an urbanization rate of 73.3 %.² This demographic pressure increases strain on food supply chains and public budgets. Government policy has historically focused on price stabilization, relying on strategic wheat reserves, milk-powder subsidies, and targeted transfers to maintain affordability.³

Public investment in irrigation infrastructure expanded total irrigated land to approximately 1.39 million ha in 2023, compared with 1.28 million ha in 2018.⁴ At the same time, Algeria accelerated the rollout of desalination capacity, projected to reach 3.7 million m³/day by end-2024 and 5.6 million m³/day by 2030, covering nearly 42 % of national drinking-water needs.⁵

Despite these investments, rainfall remains low and erratic, averaging 200–250 mm/year across much of the High Plateaus.⁶ Per-capita renewable water availability has fallen below 300 m³/year, among the lowest in North Africa.⁷ Cereal yields remain modest, averaging 1.7–2.0 t/ha over the past decade—below those of neighboring Morocco (2.5 t/ha) and Tunisia (2.3 t/ha).

The country's structural reliance on imports persists: wheat import requirements for marketing year 2024/25 are projected at 14 million tonnes, while domestic cereal output reached only 4.1 million tonnes in 2024.⁸ This dependence exposes Algeria to Black Sea supply risks, freight-cost volatility, and climatic shocks affecting both production and prices.

In this context, the present study aims to propose an integrated resilience strategy combining a risk-systems approach with quantitative evidence and policy analysis. Specifically, it seeks to (a) map key vulnerabilities across the four pillars of food security—availability, access, utilization, and stability—(b) assess recent trends in production, imports, water availability, and prices, and (c) outline a 2025–2030 operational roadmap balancing agricultural intensification, water-governance reform, trade-risk management, and value-chain

¹ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome: Food and Agriculture Organization of the United Nations

² World Bank. (2024). *World Development Indicators: Population and Urbanization (Algeria 2024)*. Washington, DC: World Bank

³ USDA Foreign Agricultural Service (FAS). (2023). *Grain and Feed Annual – Algeria 2023*. Washington, DC: U.S. Department of Agriculture

⁴ FAO AQUASTAT. (2024). *Algeria – Country Water Profile*. Rome: Food and Agriculture Organization of the United Nations.

⁵ Algérie Presse Service (APS). (2024, May 15). *Programme national de dessalement : 5,6 millions m³/jour d'ici 2030*. Algiers: APS

⁶ Intergovernmental Panel on Climate Change (IPCC). (2022). *Sixth Assessment Report: Impacts, Adaptation and Vulnerability*. Cambridge University Press.

⁷ FAO AQUASTAT. (2022). *Water Resources by Country – North Africa Region*. Rome: FAO.

⁸ USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Annual – Algeria 2025*. Washington, DC: U.S. Department of Agriculture.

upgrading.

2. Conceptual Background and Literature

We adopt a risk-systems perspective that integrates political economy, resource economics within the water–energy–food (WEF) nexus, climate impact science, and international market intelligence. This framework acknowledges that supply-side constraints (ecoclimatic limits, water scarcity), demand-side pressures (population growth, dietary patterns), and external shocks (price spikes, logistics disruptions) interact non-linearly to shape food security outcomes in Algeria⁹.

Political economy of food systems. Governance arrangements and state interventions—such as strategic grain reserves, subsidies, and public imports—play a central role in determining food availability and access. In highly import-dependent countries like Algeria, state trading agencies and subsidy regimes influence both exposure to international volatility and incentives for upgrading domestic value chains (FAO, 2024)¹⁰. Recent research highlights how trade dependencies and policy legacies in the Mediterranean and North Africa amplify vulnerability to external shocks¹¹.

WEF nexus and resource economics. Algeria's structural food insecurity is aggravated by severe water stress. Per capita renewable water availability has fallen below 300 m³/year, among the lowest levels in North Africa (absolute scarcity threshold < 500 m³/year)¹². FAO AQUASTAT and World Bank data emphasize the urgency of improving allocation efficiency, promoting conjunctive use of surface and groundwater, and developing non-conventional resources such as desalination and wastewater reuse¹³. Such measures align with MENA-wide policy guidance advocating demand management, precision irrigation, and leakage reduction¹⁴.

Climate impacts. Evidence from the IPCC Sixth Assessment Report (AR6) shows that mean annual precipitation in North Africa is projected to decline significantly at global warming levels ≥ 2 °C, with the sharpest reductions expected in the northwestern Mediterranean¹⁵. Droughts are likely to intensify, evapotranspiration rates to rise, and rainfed cereal yields to decline without adaptive measures (e.g., drought-tolerant varieties, soil-moisture conservation practices)¹⁶.

Market intelligence and trade exposure. FAO GIEWS and USDA FAS consistently report that Algeria's cereal output remains structurally below domestic needs, necessitating large import volumes every year¹⁷. These reports also document the diversification of suppliers—

⁹ World Bank. (2024). *Food Security in MENA: A Systems Perspective*. Washington, DC

¹⁰ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome: Food and Agriculture Organization of the United Nations

¹¹ Béné, C. (2021). *Resilience of local food systems and policy trade-offs in the Mediterranean region*. *Food Policy*, 103, 102-109

¹² FAO AQUASTAT. (2022). *Water Resources by Country – North Africa Region*. Rome

¹³ World Bank. (2024). *Beyond Scarcity: Water Security in the Middle East and North Africa*. Washington, DC

¹⁴ OECD & FAO. (2022). *Agricultural Policies in the Middle East and North Africa: Monitoring and Evaluation 2022*. Paris

¹⁵ IPCC. (2022). *Sixth Assessment Report: Impacts, Adaptation and Vulnerability*. Cambridge University Press

¹⁶ Ceglar, A. (2021). *Climate-induced yield variability and adaptation in Mediterranean cereal systems*. *Agricultural and Forest Meteorology*, 308–309

¹⁷ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome

particularly toward the Black Sea region—and evolving logistics risks¹⁸. Such intelligence is essential for calibrating cereal balances and for designing import-risk management strategies (e.g., supplier mix, freight contracts).

Mediterranean value-chain context. Algeria’s opportunities for diversification—especially in olives, dates, and dairy—are shaped by regional market dynamics. The international olive oil market has experienced historic price volatility due to drought-induced production shortfalls in Spain and Italy, while the dairy sector in North Africa continues to depend heavily on imported milk powder¹⁹. Expanding cold chains, upgrading certification systems, and encouraging productivity-linked subsidies are key to reducing vulnerability and enhancing competitiveness²⁰.

3. Recent Trends and Structural Vulnerabilities

Algeria’s food system remains characterized by a structural dependence on imports despite notable domestic production gains. Cereals continue to dominate the dietary energy supply, with the 2024 harvest estimated at 4.1 million tonnes after a mixed season.²¹ Nevertheless, cereal import requirements for marketing year 2024/25 are projected at around 14 million tonnes, largely to meet bread-wheat consumption and animal-feed demand.²²

Table 1. Agro-Ecological Zoning and Policy Priorities for Agricultural Resilience in Algeria

Agro-ecological zone / Region	Key features	Policy priorities
Tell (North)	Rainfed cereals; variable rainfall; urban demand centers	Seed systems; storage; leakage control; peri-urban horticulture
High Plateaus	Cereal-sheep systems; frost risk; groundwater stress pockets	Deficit irrigation; rangeland restoration; forage systems
Sahara (South)	Dates; greenhouse horticulture; high evapotranspiration	Drip irrigation; salinity management; cold chain; renewable energy

Source: Adapted from FAO (2023), , OSS (2023)

The state grains office (Office Algérien Interprofessionnel des Céréales – OAIC) remains the sole wheat importer, although since 2020 Algeria has diversified its sourcing: Russia has overtaken France as the leading supplier, while France’s share has dropped to historical lows.²³ A June 2025 update by the USDA Foreign Agricultural Service revised wheat-import

¹⁸ USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Annual – Algeria 2025*. Washington, DC

¹⁹ International Olive Council (IOC). (2024). *World Olive Oil and Table Olive Market Report*. Madrid

²⁰ USDA Foreign Agricultural Service (FAS). (2023). *Dairy and Products Annual – Algeria*. Washington, DC

²¹ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome: Food and Agriculture Organization of the United Nations

²² USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Annual – Algeria 2025*. Washington, DC: U.S. Department of Agriculture

²³ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome: FAO

expectations down to about 8 million tonnes due to slower shipping, though projections for MY 2025/26 remain high at 9.2 million tonnes.²⁴ This trend has prompted authorities to expand national storage capacity and strengthen strategic reserves to buffer logistics shocks.²⁵

In the dairy sector, consumer prices remain regulated while subsidies exceed 18 billion Algerian dinars annually, distributed among breeders, milk collectors, and processors.²⁶ Despite these efforts, domestic milk output still covers less than half of national demand, maintaining a dependence on imported milk powder to fill supply gaps.²⁷

Dates and olives represent key diversification opportunities. Algeria is the world's third-largest date producer, with output rising from 1.25 million tonnes in 2022 to 1.32 million tonnes in 2023.²⁸ Olive-oil production, though expanding, remains constrained by climate-related yield variability, as noted by the International Olive Council in 2024.²⁹

Table 2. Key Indicators

Indicator	Value / Period	Source (APA short)
Total cereal production	≈4.1 Mt (2024)	FAO GIEWS (2025)
Cereal import requirements	≈14 Mt (MY 2024/25)	FAO GIEWS (2025)
Wheat imports	≈8 Mt (MY 2024/25, revised); ≥9 Mt (MY 2025/26)	USDA FAS (2025a; 2025b)
Date production	≈1.25 Mt (2022); ≈1.32 Mt (2023 est.)	FAOSTAT; Statista comp.
Milk production subsidies	>18 bn DZD/year (ongoing)	USDA FAS (2023; 2024)
Desalination capacity	≈3.7 Mm ³ /day by end-2024; ≈5.6 Mm ³ /day by 2030	Reuters (2024); AEC/APS (2025)
FAO Food Price Index	130.1 (July 2025)	FAO (2025, Aug)
Food prices (Algiers)	YoY declines mid-2025	ONS (2025)

Sources: FAO GIEWS (2025); USDA FAS (2025a; 2025b);

Water scarcity remains the country's most critical constraint. Renewable freshwater availability averages only 260–300 m³ per capita per year, well below the 1 000 m³ threshold of water stress.³⁰ To mitigate the deficit, the government is scaling up seawater-

²⁴ USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Update – Algeria (June 2025)*. Washington, DC: U.S. Department of Agriculture

²⁵ Reuters. (2024, May 14). *Algeria expands grain storage capacity to bolster reserves*. Reuters News Service.

²⁶ USDA Foreign Agricultural Service (FAS). (2023). *Dairy and Products Annual – Algeria*. Washington, DC: U.S. Department of Agriculture.

²⁷ FAO. (2023). *Dairy Sector Review: Market Trends and Policy Insights*. Rome: FAO

²⁸ FAOSTAT. (2024). *Crops and Livestock Products – Algeria*. Rome: Food and Agriculture Organization.

²⁹ International Olive Council (IOC). (2024). *World Olive Oil and Table Olive Market Report*. Madrid: IOC.

³⁰ FAO AQUASTAT. (2022). *Algeria Country Water Profile*. Rome: FAO

desalination capacity—targeting 3.7 million m³/day by end-2024 and 5.6 million m³/day by 2030—while promoting wastewater reuse and more efficient irrigation.³¹

At the macroeconomic level, Algeria experienced domestic disinflation in 2024–2025, even as the FAO Food Price Index reached 130.1 points in July 2025, its highest level since early 2023.³² Retail food prices in Algiers declined markedly by mid-2025, supported by large import arrivals and sustained government price-stabilization measures.³³

4. Sectoral Resilience Strategies

Case 1 – Cereals (Wheat and Barley)

Cereal production in Algeria—particularly bread wheat, the staple of the national diet—remains heavily dependent on rainfall, exposing yields to pronounced interannual variability. Average wheat yields have fluctuated between 1.6 and 2.0 t/ha over the past decade, compared with 2.4 t/ha in Morocco and 2.3 t/ha in Tunisia³⁴. Building resilience requires a multi-pronged strategy that combines genetic improvement, water-efficient farming, and market modernization.

Tableau 3. Cereal Production, Imports, and Supplier Shares (2023–2025)

Year / MY	Total Cereal Production (Mt)	Total Cereal Imports (Mt)	Wheat Imports (Mt)	Russia Share (%)	France Share (%)	Other Origins (%)
2023/24	3.8	13.6	8.3	48	36	16
2024/25 (est.)	4.1	14.0	8.0	52	32	16
2025/26 (proj.)	n.a.	≥ 14.5	9.2	55	30	15

Sources: FAO GIEWS (2025); USDA FAS (2025a; 2025b);

The development and dissemination of drought- and heat-tolerant wheat varieties, supported by certified seed systems and local adaptation trials, are key to reducing yield gaps³⁵. Targeted deficit irrigation and soil-moisture conservation practices—such as minimum tillage and mulching—can improve water-use efficiency in semi-arid cereal zones³⁶.

³¹ Algérie Presse Service (APS). (2024, May 15). *Programme national de dessalement : 5,6 millions m³/jour d’ici 2030*. Algiers: APS.

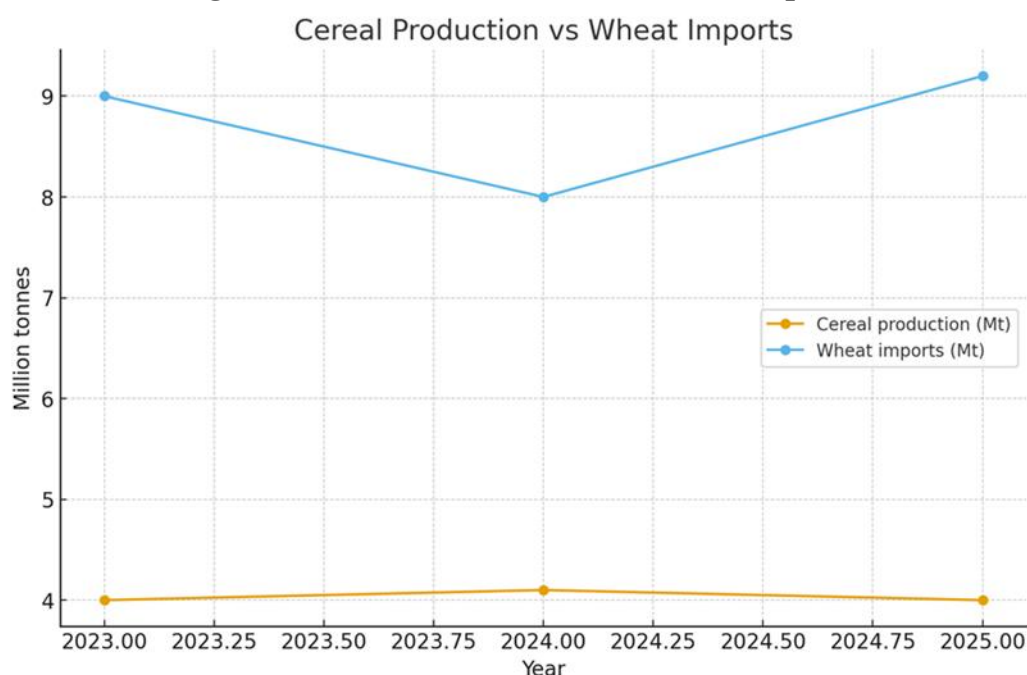
³² FAO. (2025). *FAO Food Price Index – Monthly Update, July 2025*. Rome: FAO.

³³ World Bank. (2025). *Food Security Update: North Africa and Middle East*. Washington, DC: World Bank.

³⁴ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome: Food and Agriculture Organization of the United Nations

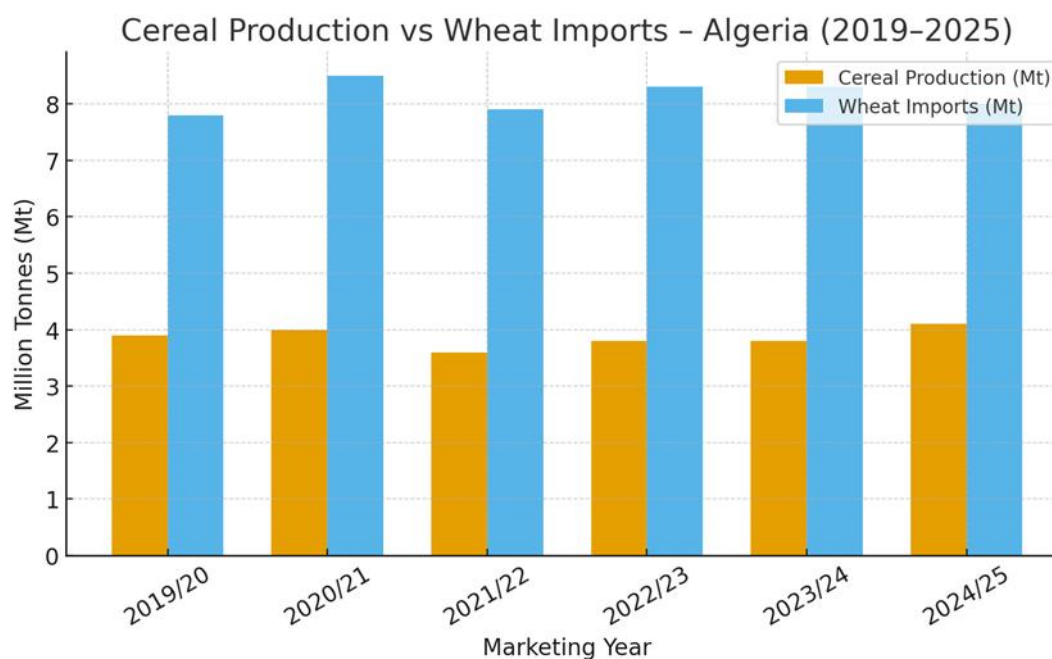
³⁵ INRA France & ICARDA. (2023). *Improving Cereal Genetic Resilience in North Africa*. Rabat

³⁶ FAO AQUASTAT. (2024). *Algeria – Country Water Profile*. Rome

Figure 1. Cereal Production vs Wheat Imports

Sources: FAO GIEWS (2025); USDA FAS (2025a; 2025b);

Given Algeria's continued dependence on imported wheat, diversification of suppliers beyond traditional European origins and the use of price-risk management tools (e.g., futures contracts) would enhance national supply security³⁷. Furthermore, modernizing storage facilities and adopting hermetic technologies could reduce post-harvest losses, estimated at 5–8 % of total volume, while strengthening strategic-reserve management³⁸.

Figure 2: Cereal production vs Wheat imports – Algeria (2019-2025)

³⁷ World Bank. (2024). *Food System Transformation and Agribusiness Competitiveness in North Africa*. Washington, DC

³⁸ USDA Foreign Agricultural Service (FAS). (2023). *Grain and Feed Annual – Algeria 2023*. Washington, DC

Source: Based on FAOSTAT. (2024)

Case 2 – Dairy Sector

The Algerian dairy sector remains constrained by regulated milk prices that ensure affordability but limit investment incentives. Annual subsidies exceeding 18 billion DZD are distributed among producers and processors³⁹. Structural reform should progressively shift from a volume-based subsidy regime toward productivity-linked incentives that reward improvements in herd genetics, feed efficiency, and milk quality⁴⁰.

Improving the organization of milk collection networks and formalizing cooperatives would help enforce hygiene standards, transparency in payments, and traceability⁴¹. Experiences from Morocco’s “Plan Laitier” confirm that strengthened farm-gate governance and cold-chain infrastructure can significantly raise yields and quality⁴².

Case 3 – Dates and Oliviculture

With annual production exceeding 1.3 million tonnes, Algeria is the third-largest date producer worldwide⁴³. Differentiating premium Deglet Nour varieties—representing over half of national output—through geographical indication (IGP Deglet Nour de Tolga) and export branding is vital for value addition⁴⁴. Studies show that traceability and quality labeling can raise export unit values by up to 20 % in Mediterranean fruit markets⁴⁵.

In parallel, the olive-oil industry is expanding, but yields remain highly vulnerable to heatwaves and droughts⁴⁶. Key levers include deficit irrigation, mulching, and energy-efficient milling technologies to reduce costs and carbon footprint⁴⁷. Strengthening traceability and certification systems would allow producers to access premium European and Gulf markets⁴⁸.

Case 4 – Water and Resource Management

Agriculture consumes roughly 60–65 % of total water withdrawals in Algeria⁴⁹. Future resilience depends on increasing efficiency and diversifying supply sources. Strategic measures include scaling up wastewater reuse for horticulture and forage crops, enhancing distribution-network efficiency through leak detection, and enforcing basin-level groundwater governance to limit over-extraction⁵⁰. Expanding drip-irrigation coverage with

³⁹ USDA Foreign Agricultural Service (FAS). (2023). *Dairy and Products Annual – Algeria*. Washington, DC

⁴⁰ FAO. (2023). *Dairy Sector Review: Market Trends and Policy Insights*. Rome

⁴¹ FAO. (2023). *Building Inclusive Dairy Value Chains in North Africa*. Rome

⁴² World Bank. (2023). *Morocco: Support to the Dairy Value Chain Modernization Program*. Washington, DC

⁴³ FAOSTAT. (2024). *Crops and Livestock Products – Algeria*. Rome

⁴⁴ EU–FAO. (2022). *Strengthening Geographical Indications in North Africa: Case Studies of Tunisia and Algeria*. Rome–Brussels

⁴⁵ Benmehaia, A. (2020). *Market Incentives for Date Quality Upgrading in Algeria*. *New Medit*, 19(3), 35–46

⁴⁶ International Olive Council (IOC). (2024). *World Olive Oil and Table Olive Market Report*. Madrid

⁴⁷ FAO. (2023). *Climate-Smart Olive Production in the Mediterranean Region*. Rome

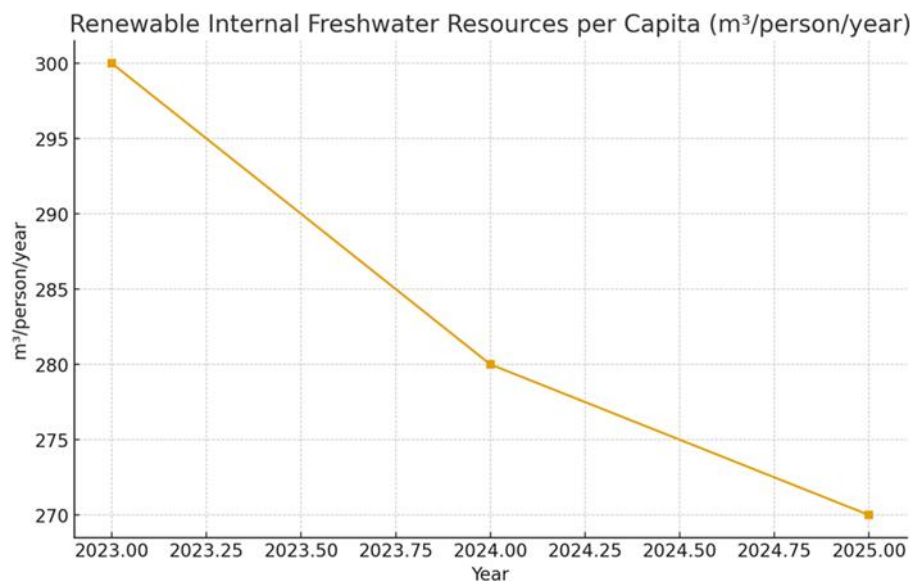
⁴⁸ World Bank. (2024). *Agro-Food Value Chain Upgrading and Export Competitiveness in North Africa*. Washington, DC

⁴⁹ FAO AQUASTAT. (2022). *Water Resources by Country – North Africa Region*. Rome

⁵⁰ World Bank. (2024). *Beyond Scarcity: Water Security in the Middle East and North Africa*. Washington, DC

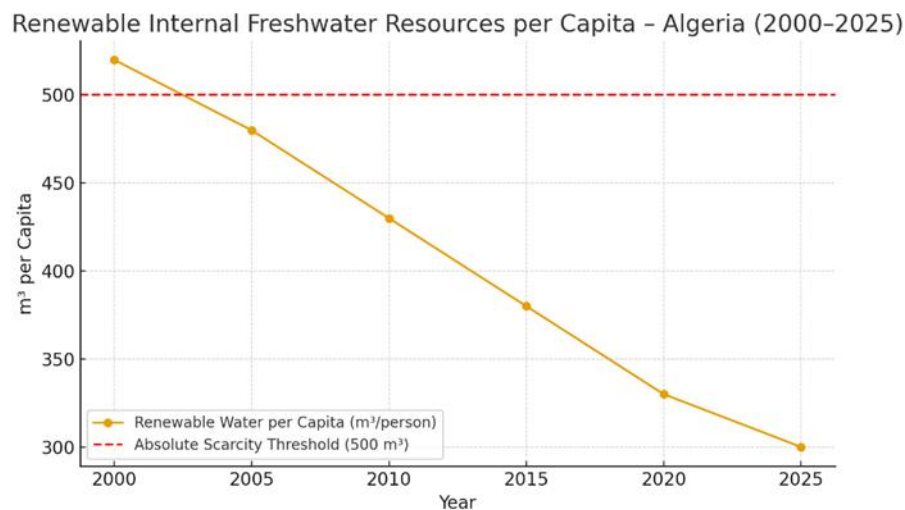
performance-based subsidies would further reduce non-productive losses⁵¹.

Figure 3. Renewable Internal Freshwater Resources per Capita



Source: FAO AQUASTAT. (2022). *Algeria Country Water Profile*

Figure 4: Renewable Internal Freshwater Resources per Capita-Algeria (2000-2025)



Source: Based on FAO AQUASTAT. (2022).

5. Territorial Governance and Regional Integration

Algeria's food-system resilience is strongly conditioned by its territorial heterogeneity. The country spans three main agro-ecological zones—the Tell in the north, the High Plateaus, and the Sahara—each characterized by distinct climatic constraints, production systems, and

⁵¹ Algérie Presse Service (APS). (2024, May 15). *Programme national de dessalement : 5,6 millions m³/jour d'ici 2030*. Algiers: APS

investment needs⁵². Effective policy design thus requires differentiated territorial strategies that exploit local comparative advantages while ensuring equitable resource distribution and environmental sustainability.

In the Tell region, where rainfall is higher and urban markets are dense, priority should be given to rainfed-cereal intensification, peri-urban horticulture, and storage infrastructure modernization⁵³. In the High Plateaus, mixed cereal–sheep systems dominate under fragile ecological balance; here, rangeland restoration, forage-crop integration, and controlled deficit irrigation represent critical levers for productivity and sustainability⁵⁴. Meanwhile, the Sahara offers strong potential for greenhouse horticulture and date-palm expansion, supported by drip irrigation and renewable-energy desalination units⁵⁵.

Shared resources such as the North-Western Sahara Aquifer System (NWSAS)—extending across Algeria, Tunisia, and Libya—illustrate the interdependence of water governance across borders⁵⁶. Over-extraction threatens long-term availability and underscores the need for basin-level management, cross-regional coordination, and participatory approaches integrating local users, pastoral communities, and basin authorities⁵⁷. The OSS (Observatoire du Sahara et du Sahel) and FAO have documented the importance of joint hydro-monitoring systems to prevent irreversible depletion of deep aquifers⁵⁸.

At a broader scale, territorial planning and decentralization are instrumental to enhancing adaptive capacity. Regional agricultural chambers, local cooperatives, and water users' associations can play a pivotal role in implementing bottom-up governance aligned with national food-security strategies⁵⁹. Such coordination also supports the decarbonization of agricultural value chains and the integration of renewable-energy solutions into irrigation systems—particularly in southern and steppe provinces⁶⁰.

6. Market Governance and Risk Management

At the market level, Algeria's state grains office (Office Algérien Interprofessionnel des Céréales – OAIC) remains central to bulk wheat purchasing and import coordination. This model has historically secured favorable procurement terms through public tenders and centralized logistics. However, greater transparency, diversification of suppliers, and risk-management tools are required to mitigate exposure to geopolitical shocks, freight disruptions, and sanitary-standard changes—such as the 2023 revision of bug-damage tolerances that opened new access to Black Sea wheat⁶¹.

⁵² FAO. (2023). *Near East and North Africa Regional Overview of Food Security and Nutrition 2023*. Rome

⁵³ World Bank. (2024). *Agricultural Productivity and Market Access in North Africa*. Washington, DC:

⁵⁴ CRSTRA & FAO. (2023). *Pastoral Systems and Feed Resource Management in the Algerian High Plateaus*. Biskra

⁵⁵ FAO. (2024). *GIEWS Country Brief: Algeria*. Rome

⁵⁶ Observatoire du Sahara et du Sahel (OSS). (2023). *Groundwater Management in the North-Western Sahara Aquifer System (NWSAS)*. Tunis

⁵⁷ World Bank. (2024). *Beyond Scarcity: Water Security in the Middle East and North Africa*. Washington, DC

⁵⁸ FAO & OSS. (2023). *Shared Aquifer Management in North Africa: Policy and Governance Perspectives*. Rome–Tunis

⁵⁹ OECD. (2022). *Decentralisation and Rural Development in the MENA Region*. Paris

⁶⁰ IRENA. (2023). *Renewable Energy Solutions for Agri-Food Systems in North Africa*. Abu Dhabi

⁶¹ USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Annual – Algeria 2025*. Washington, DC

Developing a forward-looking import-management system entails the use of futures and options contracts, freight insurance, and strategic diversification across supplier regions⁶². International experience from Egypt and Turkey demonstrates that these instruments reduce price volatility and budgetary exposure when global markets tighten⁶³.

Strengthening domestic grain storage capacity also represents a key resilience pillar. Expanding silo networks and adopting digital inventory systems would enhance traceability and improve rotation of public stocks⁶⁴. According to FAO and the World Bank, modern grain-management systems can reduce quantitative losses by 5–8 %, a non-trivial saving at current import volumes⁶⁵.

In parallel, market information systems play an essential role in stabilizing expectations. Establishing an independent market-monitoring authority—linked to the FAO AMIS (Agricultural Market Information System)—would strengthen transparency on domestic prices, import flows, and stock levels⁶⁶. Integrating weather data, port logistics, and retail-price monitoring within a unified digital dashboard would improve Algeria's ability to anticipate shocks and coordinate policy responses⁶⁷.

Finally, food-security governance should expand beyond commodity markets to include social protection linkages. Indexing cash-transfer programs to food-price movements protects vulnerable households during inflation spikes, as demonstrated by adaptive social-protection frameworks in Jordan and Morocco⁶⁸. This combination of market intelligence, strategic storage, and targeted transfers forms a robust policy mix for stabilizing both supply and access dimensions of food security⁶⁹.

7. Social Protection and Inclusive Food-Security Policies

The social dimension of food security in Algeria has long been anchored in price stabilization and universal subsidies. While these measures have cushioned consumers from inflation, they are fiscally costly and often regressive, favoring higher-income households that consume more subsidized goods⁷⁰. A gradual transition toward targeted and adaptive social protection systems can preserve social stability while improving efficiency and inclusiveness⁷¹.

Indexing Social Transfers to Food Prices

Indexing cash transfers—or the benefit levels of existing social-assistance programs—to food-price movements helps preserve the purchasing power of vulnerable households during

⁶² FAO. (2024). *GIEWS Country Brief: Algeria*. Rome

⁶³ World Bank. (2023). *Managing Commodity Price Volatility in MENA: Lessons from Egypt and Turkey*. Washington, DC

⁶⁴ Reuters. (2024, May 14). *Algeria expands grain storage capacity to bolster reserves*

⁶⁵ FAO & World Bank. (2023). *Reducing Post-Harvest Losses in Grain Supply Chains*. Rome–Washington, DC.

⁶⁶ FAO. (2024). *Agricultural Market Information System (AMIS) – Global Food Market Monitoring*. Rome

⁶⁷ OECD. (2023). *Digital Agriculture and Data Governance in the MENA Region*. Paris

⁶⁸ IMF. (2023). *Targeted Social Assistance and Food Price Inflation in the Middle East and North Africa*. Washington, DC

⁶⁹ World Food Programme (WFP). (2023). *Adaptive Social Protection in North Africa: Building Shock-Responsive Safety Nets*. Cairo

⁷⁰ World Bank. (2023). *Food Security Update: North Africa and Middle East*. Washington, DC

⁷¹ OECD. (2022). *Social Protection Systems and Fiscal Reform in MENA*. Paris

rapid price increases⁷². Evidence from adaptive social-protection frameworks in Jordan, Morocco, and Egypt shows that price-indexed transfers improve the timeliness and predictability of government responses to inflation shocks while limiting the erosion of real transfer values⁷³. According to the IMF (2023), targeted and indexed cash transfers are more cost-effective and equitable than generalized subsidies, particularly during global food-price spikes⁷⁴.

In the Algerian context, introducing automatic adjustment triggers based on food inflation indicators—such as the FAO Food Price Index or the ONS domestic food basket index—would help maintain household resilience without exacerbating fiscal pressure⁷⁵.

School Feeding and Local Procurement

Expanding school-feeding programs with strong local-procurement linkages offers a double dividend: improved child nutrition and market opportunities for smallholders⁷⁶. The FAO and World Food Programme (WFP) emphasize that home-grown school-feeding (HGSF) models—combining locally sourced food, nutritionally balanced menus, and inclusive public procurement rules—generate positive multiplier effects on local economies⁷⁷.

In Algeria, strengthening the integration of agricultural cooperatives and local SMEs into school-feeding supply chains could revitalize rural economies, particularly in high-poverty provinces⁷⁸. Regional experience demonstrates that localized procurement can create sustainable demand for fruits, vegetables, dairy, and cereals while enhancing value-chain organization and quality standards⁷⁹.

8. Data Governance and Institutional Capacity

Building a resilient food system also requires a robust data and institutional architecture to support evidence-based policymaking. Algeria's current food-security monitoring framework remains fragmented, with limited interoperability among data sources—such as agricultural statistics, trade records, and meteorological databases⁸⁰. Strengthening data governance would allow more accurate forecasts, better coordination between ministries, and improved response capacity to climatic and market shocks⁸¹.

The creation of a National Agricultural and Food Information System (NAFIS), integrating datasets from the Office National des Statistiques (ONS), the Ministry of Agriculture, and

⁷² World Food Programme (WFP). (2023). *Adaptive Social Protection in North Africa: Building Shock-Responsive Safety Nets*. Cairo

⁷³ IMF. (2023). *Targeted Social Assistance and Food Price Inflation in the Middle East and North Africa*. Washington, DC

⁷⁴ IMF. (2023). *MENA Regional Economic Outlook: Fiscal Space and Social Protection*. Washington, DC

⁷⁵ FAO. (2025). *FAO Food Price Index – Monthly Update, July 2025*. Rome

⁷⁶ FAO. (2019). *School Food and Nutrition Framework*. Rome: Food and Agriculture Organization of the United Nations

⁷⁷ World Food Programme (WFP). (2023). *Home-Grown School Feeding: A Framework to Link Agriculture and Nutrition*. Rome

⁷⁸ FAO. (2024). *Smallholder Market Access and Public Procurement in North Africa*. Rome

⁷⁹ World Bank. (2024). *Strengthening Local Value Chains through School Feeding in MENA*. Washington, D

⁸⁰ World Bank. (2024). *Food Security and Data Systems in the Middle East and North Africa*. Washington, DC

⁸¹ FAO. (2023). *Integrated Food Security Phase Classification (IPC) and Data Governance Frameworks*. Rome

hydrological services, could serve as a unified reference for real-time monitoring⁸². The FAO's Agricultural Market Information System (AMIS) and World Bank's Global Food and Nutrition Security Dashboard demonstrate the benefits of interlinked data ecosystems for decision-making under uncertainty⁸³.

Digitalization and open-data policies are equally critical. Opening access to agricultural and hydrological data—while ensuring data quality and privacy—can encourage academic research, strengthen accountability, and support innovation in agri-tech and logistics⁸⁴. OECD research indicates that transparency in agricultural data governance enhances investment confidence and facilitates the diffusion of precision-agriculture tools⁸⁵. Institutional capacity building must complement these digital reforms. This includes upgrading statistical training, harmonizing data collection methodologies, and fostering inter-ministerial coordination between agriculture, trade, and environment departments⁸⁶. Collaboration with regional and international partners (FAO, UNDP, AfDB) can accelerate technology transfer, improve risk modeling, and reinforce Algeria's integration into global monitoring platforms⁸⁷.

9 – Conclusion and Policy Roadmap (2025–2030)

Algeria's food security stands at a pivotal juncture shaped by the converging pressures of climate change, water scarcity, and global market volatility. These challenges simultaneously constrain domestic production, raise exposure to external shocks, and weaken the purchasing power of households⁸⁸. Meeting these challenges demands a systemic transformation of the national food system—one that integrates supply, demand, governance, and knowledge dimensions into a coherent resilience framework⁸⁹.

Strategic Pillar 1: Water and Resource Efficiency

By 2030, Algeria aims to achieve a total desalination capacity of 5.6 million m³/day, representing nearly half of national drinking-water demand⁹⁰. Complementary measures—such as expanding wastewater reuse, enforcing basin-level groundwater limits, and promoting drip irrigation—are essential to ensure water sustainability in the agricultural sector⁹¹. Institutional coordination between the Ministry of Water Resources, Agriculture, and Energy will be key to operationalizing these reforms⁹².

Strategic Pillar 2: Agricultural Productivity and Trade Security

Raising cereal yields through improved seed systems, deficit irrigation, and soil-

⁸² ONS. (2024). *Rapport annuel sur les statistiques agricoles et alimentaires 2024*. Alger

⁸³ FAO. (2024). *Agricultural Market Information System (AMIS): Enhancing Global Food Market Transparency*. Rome

⁸⁴ World Bank. (2023). *Open Data for Food and Agriculture: Opportunities and Challenges*. Washington, DC

⁸⁵ ECD. (2023). *Digital Agriculture and Data Governance in the MENA Region*. Paris

⁸⁶ UNDP. (2024). *Institutional Capacity and Governance in the Agricultural Sector of North Africa*. New York

⁸⁷ African Development Bank (AfDB). (2024). *Digital Transformation for Sustainable Agriculture in Africa*. Abidjan

⁸⁸ FAO. (2024). *Near East and North Africa Regional Overview of Food Security and Nutrition 2024*. Rome

⁸⁹ World Bank. (2024). *Transforming Food Systems in the Middle East and North Africa: Pathways to Resilience*. Washington, DC

⁹⁰ Algérie Presse Service (APS). (2024, May 15). *Programme national de dessalement : 5,6 millions m³/jour d'ici 2030*. Algiers: APS

⁹¹ FAO AQUASTAT. (2024). *Algeria – Country Water Profile*. Rome

⁹² World Bank. (2024). *Beyond Scarcity: Water Security in the Middle East and North Africa*. Washington, DC

regeneration practices could substantially reduce import dependency⁹³. Simultaneously, adopting risk-hedging instruments (e.g., futures contracts) and diversifying wheat suppliers will enhance import security⁹⁴. Investment in storage modernization and grain logistics digitalization can further reduce losses and strengthen national reserves⁹⁵.

Strategic Pillar 3: Value-Chain Upgrading and Inclusion

Modernizing dairy, date, and olive value chains offers major potential for economic diversification and rural income growth⁹⁶. Expanding cold-chain networks, developing geographical indications (GI), and strengthening export certification would enhance Algeria's competitiveness in regional and global markets.⁹⁷ Inclusive mechanisms—particularly for smallholders and cooperatives—should remain central to these strategies⁹⁸.

Strategic Pillar 4: Governance, Data, and Institutions

Institutional resilience will depend on strengthening data governance, integrating agricultural, water, and market information systems, and building inter-ministerial coordination⁹⁹. Establishing a national food-security observatory, connected to international systems such as FAO's AMIS and the World Bank's Food Security Dashboard, would facilitate real-time policy response and transparency¹⁰⁰.

In sum, Algeria's pathway to food-system resilience requires balancing short-term stabilization (through subsidies, import diversification, and emergency reserves) with long-term transformation (via investment in productivity, water management, and institutional modernization)¹⁰¹. A coherent 2025–2030 roadmap, grounded in credible data and integrated governance, can transform recurrent vulnerability into structural resilience—ensuring food availability, affordability, and sustainability for future generations¹⁰².

⁹³ INRA France & ICARDA. (2023). *Improving Cereal Genetic Resilience in North Africa*. Rabat

⁹⁴ USDA Foreign Agricultural Service (FAS). (2025). *Grain and Feed Annual – Algeria 2025*. Washington, DC

⁹⁵ FAO & World Bank. (2023). *Reducing Post-Harvest Losses in Grain Supply Chains*. Rome–Washington, DC

⁹⁶ FAOSTAT. (2024). *Crops and Livestock Products – Algeria*. Rome

⁹⁷ International Olive Council (IOC). (2024). *World Olive Oil and Table Olive Market Report*. Madrid

⁹⁸ World Bank. (2024). *Agro-Food Value Chain Upgrading and Export Competitiveness in North Africa*. Washington, DC

⁹⁹ ONS. (2024). *Rapport annuel sur les statistiques agricoles et alimentaires 2024*. Alger

¹⁰⁰ FAO. (2024). *Agricultural Market Information System (AMIS): Enhancing Global Food Market Transparency*. Rome

¹⁰¹ IMF. (2023). *MENA Regional Economic Outlook: Fiscal Space and Social Protection*. Washington, DC

¹⁰² World Bank. (2025). *Food Security Update: North Africa and Middle East*. Washington, DC

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