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The Ukraine Crisis and Food Security in Algeria: The Geopolitics of Supply Chains and Resilience Strategies

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Abstract:

This article examines the impact of recent global crises on food supply chains in Algeria, focusing on the period 2022–2025, marked by the war in Ukraine. By disrupting international flows of cereals and fertilizers, this crisis has revealed the structural vulnerability of Algeria, which is heavily dependent on imports for its food security. Using a multidisciplinary approach combining economic, political and logistical analyses, the research assesses the effectiveness of the risk management mechanisms adopted by public authorities and private actors.

The methodology includes qualitative data collection and food security indicators. The results show that the Ukrainian crisis has exacerbated pre-existing vulnerabilities, notably supplier concentration, lengthened supply lead times, and price volatility. Risk management has relied on adaptation strategies such as diversifying import sources, building up safety stocks and strengthening internal logistics capacity.

However, institutional coordination remains inadequate, limiting the overall resilience of the food system. This article also offers targeted recommendations to improve supply chain governance, notably through closer integration between agricultural and trade policies, the development of local supply chains, and increased use of strategic monitoring to anticipate disruptions.

By comparing global challenges with the Algerian context, this analysis makes a significant contribution to the literature on food security in the context of international crises, whilst offering concrete avenues for proactive risk management in an unstable environment.

Keywords: Food supply chains; Risk management; 2022–2025 Ukrainian crisis; Food security in Algeria; Structural vulnerability; Systemic resilience; Agri-food governance.

Analysis Plan:

Part 1: Algeria's Achilles' heel - An import-based food security model (pre-2022)
Part 2: The shockwave (2022) - The Ukrainian crisis and its immediate repercussions
Part 3: Crisis management - Emergency measures and short-term resilience strategies (2022-2023)
Part 4**:** The paradigm shift (2023–2025) - Towards a doctrine of food sovereignty.

Introduction:

Food security, defined by the Food and Agriculture Organization of the United Nations (FAO) as a situation where "all human beings have, at all times, physical, social and economic access to sufficient, safe and nutritious food to meet their energy needs and dietary preferences for an active and healthy life" (FAO, 2020, p. 4), forms the bedrock of social stability and the sovereignty of any nation. For Algeria, a semi-arid country heavily dependent on imports for its strategic foodstuffs, this issue has always been at the heart of the state's concerns. However, the Ukrainian crisis, which erupted in February 2022, acted as a shock of unprecedented severity, casting the country's structural vulnerabilities in a harsh and unforgiving light (Torero, 2022, pp. 100–101).

This conflict, pitting two of the world's largest breadbaskets against one another, instantly paralyzed global supply chains, triggered a historic surge in agricultural commodity prices and jeopardized supplies to many net-importing countries, including Algeria. This event is not merely a temporary crisis; it heralds a new era of geopolitical turbulence in which food has become a lever of power.

This analysis aims to examine in depth how the Ukrainian crisis has put Algeria's food security model to the test between 2022 and 2025. We will first examine the landscape of Algeria's structural vulnerabilities prior to the crisis, characterized by a heavy reliance on imports. Next, we will analyse the immediate shockwaves of the conflict on supply chains and prices (Laabas et al., 2023, p. 880). Thirdly, we will dissect the crisis management strategies and emergency measures adopted by the Algerian authorities to cushion the blow. Finally, we will examine the long-term strategic adjustments and the emerging doctrine of "food sovereignty", assessing its ambitions, challenges and prospects for the period up to 2025 and beyond (FAO, 2022, p. 3).

The principal contribution of this article lies in connecting food security studies with geopolitical analyses of strategic dependence and resilience. It demonstrates that food vulnerability cannot be understood solely through agricultural indicators but must also be examined through international power relations and global supply-chain dynamics. Nevertheless, the study presents certain limitations. It relies primarily on qualitative evidence and publicly available institutional data. Future research could strengthen the findings through quantitative modelling, comparative regional analysis and field-based investigations involving key actors in agricultural governance and food logistics.

Theoretical Contribution and Study Limitations:

H1: The Ukrainian crisis exposed pre-existing structural vulnerabilities rather than creating new forms of dependency.
H2: Algeria's short-term resilience was primarily enabled by hydrocarbon revenues rather than by structural improvements in food governance.
H3: Supplier diversification and strategic stock-building reduced immediate risks but did not eliminate long-term dependence.
H4: The transition toward food sovereignty is constrained by environmental, logistical and governance limitations that may hinder its full implementation.

Research Hypotheses:

The analytical framework combines three complementary perspectives. First, resilience theory is mobilized to evaluate the capacity of institutions and supply chains to absorb and adapt to shocks. Second, the concept of weaponized interdependence developed by Farrell and Newman is used to explain how global networks can become sources of strategic vulnerability. Third, critical geopolitics is employed to interpret food systems as arenas of power, sovereignty and geopolitical competition. Together, these perspectives permit a multidimensional reading of Algeria's food-security challenges, moving beyond purely economic explanations toward a broader understanding of geopolitical dependence and strategic adaptation.

Analysis Approach and Theoretical Framework:

The research relies on qualitative analysis supported by documentary and statistical evidence. Data were collected from Algerian institutional reports, international organizations and specialized academic literature. The methodological approach is inspired by process tracing, making it possible to reconstruct the causal chain linking the outbreak of the Ukrainian conflict, disruptions in agricultural markets and their domestic consequences. The analysis focuses on the interaction between geopolitical dynamics, economic constraints and policy responses. Although the study does not seek universal generalization, it aims to generate analytically transferable findings capable of informing broader debates on food security under conditions of geopolitical uncertainty.

Methodology:

Algeria constitutes a particularly relevant case study because it combines high food-import dependency with significant hydrocarbon revenues capable of temporarily mitigating external shocks. This duality creates a revealing analytical setting for examining the limits of rent-financed food security. The Ukrainian crisis represents a critical case because it simultaneously affected cereals, fertilizers, logistics and global commodity markets. Moreover, the Algerian experience provides broader lessons for North African and Global South countries facing similar structural vulnerabilities. The case therefore possesses both empirical significance and comparative value within contemporary food geopolitics.

Case Study Selection:

This article is guided by the following research question: To what extent did the Ukrainian crisis reveal the structural vulnerabilities of Algeria's food security model, and how effective were the resilience strategies adopted between 2022 and 2025? The study pursues four objectives: identifying structural vulnerabilities, analyzing geopolitical transmission mechanisms, evaluating public crisis-management measures, and assessing the prospects of the emerging food sovereignty doctrine. Methodologically, the article adopts a qualitative case-study design combining geopolitical analysis, policy analysis and supply-chain assessment. Rather than treating the crisis as an isolated event, the study interprets it as a systemic stress test exposing deeper structural dependencies. This perspective enables a critical assessment of the relationship between external dependence, state capacity and strategic resilience.

Part 1: Algeria's Achilles' Heel – An Import-Based Food Security Model (Pre-2022)

To understand the scale of the 2022 shock, it is essential to paint a picture of Algeria's food situation on the eve of the conflict. The Algerian model was based on a paradox: a quest for internal social stability financed by hydrocarbon revenues, at the cost of massive external dependence for its food supply.

1.1. A Staggering Dependence on Cereals

Wheat lies at the heart of the Algerian social contract. Bread and semolina, products made from soft and durum wheat, are staple foods whose prices are heavily subsidized by the state to ensure they are accessible to all sections of the population. This policy comes at a cost: structural dependence on global markets (OAIC, 2022, p. 34).

- **Soft wheat:** Algeria imports an average of 7 to 8 million tons of soft wheat per year, making it one of the world's five largest importers. Domestic production, which is highly volatile due to climatic uncertainties, covers only a tiny fraction of the needs of the industrial milling sector. Historically, France was the main supplier, but during the 2010s, the Black Sea region (Ukraine and Russia) gained significant market share thanks to more competitive prices and a quality that met the specifications of the Algerian Interprofessional Cereals Office (OAIC), the state buyer.
- **Durum wheat:** Although Algeria is a long-standing producer of durum wheat, domestic production remains insufficient to meet the full requirements of the pasta and semolina industry. The country therefore imports between 1 and 2 million tones per year, mainly from Canada and Mexico.

This dependence is not only quantitative; it is also qualitative and logistical. Through international tenders, the OAIC seeks specific specifications (protein content, specific gravity) that only certain major exporting countries can consistently guarantee.

1.2. Milk Powder: The Other Pillar of Dependency

The second strategic product illustrating this vulnerability is milk powder. Packaged milk, sold at a subsidized price of 25 dinars per liter, is another key element of the state's social policy. However, this milk is predominantly reconstituted from imported milk powder. Algeria ranks among the world's top three importers of milk powder, with annual expenditure regularly exceeding one billion dollars. The main suppliers are France, New Zealand, Poland and Argentina. Any price fluctuation on the global milk powder market has a direct and massive impact on the state budget (ONIL, 2022, p. 8).

1.3. Other Dependencies: Oils, Sugar and Pulses

Beyond cereals and milk, dependence extends to other essential products. Almost all the edible oils consumed in Algeria are produced from imported raw soya or sunflower seeds. Similarly, sugar is mainly imported in its raw form to be refined locally. Dried pulses (lentils, chickpeas), although part of the traditional diet, are also imported in large quantities, mainly from Canada and Mexico (Groupe Sucre Algérie, 2022, p. 28). The National Interprofessional Office for Oils also documents the near-total dependence on imported crude oils (ONIH, 2022, p. 15).

1.4. The Structural Causes of This Vulnerability

This situation is not the result of chance but of a post-independence development model (MADR, 2020, p. 33):

- **Oil revenues:** Revenues from hydrocarbons have made it possible to finance these imports on a massive scale, creating an 'easy way out' that has discouraged sustainable investment and far-reaching reform of the agricultural sector. Subsidies for finished products have made local agriculture less competitive.
- **National agricultural challenges:** The Algerian agricultural sector faces major constraints:
  - **Climatic:** Over 80% of the territory is arid or Saharan. The northern plains, the country's historic breadbasket, suffer from recurrent droughts and increasingly erratic rainfall.

- **Structural:** Land fragmentation, difficulties in accessing agricultural land, an ageing farming population, and a lack of modernization and mechanization are holding back yield growth.
- **Water-related:** Water management is the number one challenge. The overexploitation of groundwater and the low efficiency of irrigation systems limit production potential.

In short, on the eve of 2022, Algeria had built its food security on fragile foundations: long supply chains, total exposure to the volatility of global markets, and an insufficient domestic production base. The system held up as long as maritime flows remained smooth and prices, though fluctuating, stayed within a range manageable by the state budget. The Ukrainian crisis was to shatter this precarious balance.

Table 1: Algeria's Main Food Dependencies Prior to the Ukrainian Crisis

Strategic product	Level of dependency	Main suppliers
Soft wheat	7–8 million tons imported per year	France / Russia / Ukraine
Durum wheat	1–2 million tons imported per year	Canada / Mexico
Milk powder	> USD 1 billion per year	France / New Zealand
Vegetable oils	Almost entirely imported	Black Sea / Latin America

Source: OAIC, ONIL, FAO, 2021–2022 reports.

This table illustrates Algeria's high structural dependence on international markets for its strategic food products.

Part 2: The Shockwave (2022) – The Ukrainian Crisis and Its Immediate Repercussions

On 24 February 2022, the outbreak of the Russian invasion of Ukraine sent shockwaves through global commodity markets. For Algeria, the impact was immediate, brutal and multifaceted.

2.1. The Disruption of Black Sea Supply Chains

The Black Sea, the outlet for nearly 30% of global wheat trade, became a war zone.

- **Paralysis of Ukrainian ports:** The ports of Odessa, Chornomorsk and Pivdennyi, through which almost all of Ukraine's agricultural exports passed, were blocked or mined. Ukraine, a rising supplier to Algeria, was instantly removed from the list of potential suppliers.
- **Setbacks for Russian exports:** Although Russian food products were not directly targeted by the first waves of Western sanctions, trade was severely hampered. Financial sanctions complicated banking transactions (letters of credit), insurance premiums for ships operating in the region skyrocketed, and many international shipping companies refused to call at Russian ports for fear of the risks involved.

For the OAIC, this meant the sudden loss of two major sources of supply, renowned for their competitiveness. Alternatives had to be found urgently, triggering a global race to secure available volumes elsewhere (OAIC, 2023a, p. 19).

2.2. The Surge in Global Prices

The paralysis of the Black Sea, coupled with a wave of panic and heavy speculation on the futures markets (such as the Chicago Board of Trade), triggered a historic surge in prices (IGC, 2022, p. 8):

- **Wheat:** The price of soft wheat reached unprecedented highs, exceeding €400 per tonne on the European market (Euronext), more than double its pre-crisis level (Euronext, 2022).
- **Vegetable oils:** As the Black Sea region is also the world's leading exporter of sunflower oil, prices of all vegetable oils (sunflower, soya, palm) soared dramatically due to the substitution effect.
- **Fertilizers:** As Russia is a major producer of fertilizers (particularly potash and nitrogen-based), disruptions to its exports and rising gas prices caused agricultural input costs to skyrocket worldwide. This rise had a twofold effect: it increased production costs for Algerian farmers and contributed to the general rise in global food prices.

Table 2: Changes in Global Prices During the Ukraine Crisis

Commodity	2021	2022	Change
Soft wheat	≈ €200/ton	> €400/ton	+100%
Sunflower oil	Index 100	Index 180	+80%
Nitrogen fertilizers	Index 100	Index 210	+110%

Source: International Grains Council (2022); Euronext (2022); FAO Food Price Index (2022).

The surge in global agricultural commodity prices illustrates the systemic nature of the food crisis triggered by the war in Ukraine.

2.3. The Impact on Algeria: A Perfect Storm

For Algeria, the consequences were felt on several levels.

- **Pressure on the state budget:** The OAIC had to issue tenders in a market in turmoil. Contracts signed in the spring and summer of 2022 were concluded at exorbitant prices. The cost of importing cereals and milk powder skyrocketed, leaving a gaping hole in the budget allocated to subsidies. Paradoxically, the crisis also sent hydrocarbon prices soaring, providing Algeria with unexpected revenue which, initially, enabled it to absorb this colossal budgetary shock without jeopardizing the subsidy system (Bank of Algeria, 2023, p. 41).
- **The race to diversify suppliers:** Algeria urgently turned to its other suppliers. France, by necessity, once again became the preferred partner for soft wheat. Purchases were also made in Germany, Poland, the Baltic states and even Argentina and Brazil, despite higher freight costs and longer transport times.
- **Inflation and social tensions:** Although the prices of subsidized bread, semolina and milk remained stable, inflation spread to all other food products (Laabas et al., 2023, p. 884). The government, aware of the risk of social tensions, had to redouble its vigilance.

The Ukrainian crisis thus acted as an extreme stress test, revealing that Algeria's food security hung by a thread: the availability of foreign exchange from hydrocarbons to pay for an import bill that had spiraled out of control.

2.4. The War in Ukraine and the Geopolitical Reconfiguration of Global Food Markets

The Ukrainian crisis is not merely a temporary disruption of global agricultural markets; it represents a structural transformation of contemporary food geopolitics. The conflict has highlighted the strategic role of cereal supply chains in international power relations. In this context, foodstuffs are no longer merely a matter of market logic but have also become instruments of geopolitical pressure, diplomatic negotiation and national security.

This situation is part of a broader dynamic that Henry Farrell and Abraham Newman describe as **"weaponized interdependence"**, that is, the strategic use of global interdependencies as a lever of power (Farrell & Newman, 2019). In the case of food, global logistics infrastructure — ports, maritime corridors, financial systems and futures markets — is becoming an arena for geopolitical competition. Countries heavily dependent on food imports, such as Algeria, find themselves particularly vulnerable to supply disruptions, financial sanctions and speculative fluctuations.

The crisis has also accelerated the fragmentation of global agricultural markets. Several exporting countries introduced temporary export restrictions to protect their domestic markets. This trend towards food protectionism has intensified international competition for access to available stocks. In this context, North African countries appear to be particularly vulnerable. Egypt, the world's leading wheat importer, Tunisia, which is facing a severe financial crisis, and Morocco, affected by repeated droughts, have all experienced significant inflationary pressures. Algeria has certainly benefited from rising energy revenues, but remains structurally vulnerable to any sustained disruption in global markets.

More broadly, this crisis highlights the return of the geopolitics of strategic resources to international relations. Cereals, just like energy or critical minerals, are now increasingly being integrated into states' power strategies. Food security is thus becoming a central component of national security and political stability, particularly in rentier states heavily dependent on external markets.

Part 3: Crisis Management – Emergency Measures and Short-Term Resilience Strategies (2022–2023)

Faced with this existential threat to its stability, the Algerian state deployed a multi-pronged crisis management strategy, combining emergency measures to secure immediate supplies with actions to control the domestic market.

3.1. Securing Supplies and Managing Strategic Stocks

The top priority was to avoid any stock shortages of essential goods.

- **OAIC diplomacy and activism:** The OAIC stepped up its calls for tenders, agreeing to pay a premium to secure the necessary volumes. Diplomatic contacts at the highest level were activated to secure commitments from supplier countries, notably France.
- **Building strategic stocks:** Aware of the extreme volatility of the markets, the government accelerated its policy of building up safety stocks. The aim was to have several months' worth of consumption in reserve to cope with a sudden disruption to supplies or to wait for prices to stabilize before launching new tenders.
- **The Black Sea Grain Deal:** The agreement negotiated by the UN and Turkey in July 2022, allowing for the partial resumption of Ukrainian exports, provided a much-needed respite for global markets. Although Algeria did not immediately resume its massive purchases from Ukraine, the resulting relative easing of global prices eased the pressure on its finances (MADR, 2022, p. 15).

3.2. Control of the Domestic Market and the Fight Against Speculation

At the same time, the government took firm action to prevent chaos on the domestic market (JORA, 2022, p. 5):

- **Export ban:** As early as March 2022, a radical decision was taken: a ban on the export of all consumer goods imported by Algeria, notably sugar, oil, semolina, pasta and wheat products.

This measure was intended to protect national stocks and prevent subsidized products from being re-exported for profit to neighboring countries where prices had skyrocketed.

- **Combating speculation and illegal stockpiling:** The government launched a massive campaign against speculators. A new law, criminalizing speculation on basic commodities with very heavy prison sentences, was enacted. Security and trade control services carried out thousands of raids, seizing tones of goods stored illegally.
- **Communication and maintaining confidence:** The Ministries of Trade and Agriculture issued numerous statements to assure the public that stocks were sufficient and that there was no risk of shortages. This communication was designed to prevent panic buying.

Thanks to oil revenues and these decisive measures, Algeria managed to weather the peak of the crisis in 2022 without any major supply disruptions for essential goods and without social unrest. However, this crisis management, whilst successful in the short term, came at an exorbitant budgetary cost and highlighted the unsustainability of the existing model.

3.3. The Structural Limitations of Algeria's Crisis Management

Despite the relative effectiveness of the emergency measures implemented between 2022 and 2023, several structural limitations remain. Algerian crisis management remained largely dependent on windfall revenues from hydrocarbons generated by rising global energy prices. This situation highlights the persistence of a food security model financed by rent rather than by a profound transformation of the national productive apparatus.

Furthermore, institutional coordination between the various actors involved in food governance remains inadequate. Agricultural, trade, logistics and water policies often remain fragmented, limiting the emergence of an integrated food resilience strategy. The absence of an advanced national system for strategic foresight and geopolitical monitoring of global agricultural markets also reduces the capacity for early response to future crises.

Added to this are the logistical limitations of the national storage and transport system. Grain storage capacity remains insufficient in certain regions, whilst rail and port infrastructure requires significant investment. Finally, technological dependence on imported agricultural inputs — fertilizers, seeds, irrigation equipment — continues to constitute a structural vulnerability that could be exacerbated by international geopolitical tensions.

Part 4: The Paradigm Shift (2023–2025) – Towards a Doctrine of Food Sovereignty

The Ukrainian crisis has been the catalyst for a profound strategic re-evaluation. The political discourse has shifted from the concept of "food security" (guaranteeing access to food, regardless of its origin) to the more ambitious and demanding concept of "food sovereignty" (controlling one's own production and reducing external dependence). The period 2023–2025 is thus marked by the launch of structural initiatives aimed at putting this new doctrine into practice.

4.1. The Imperative of Cereal Production: The Challenge for the South

Reducing the cost of wheat imports has become the number one objective. Faced with the limitations of the northern lands (drought, saturation), all eyes have turned to the potential of the Sahara (OAIC, 2024, p. 42):

- **Large-scale Saharan agriculture:** The government launched a vast programme to allocate agricultural concessions in the Far South (Adrar, Timimoun, Illizi, Djanet) to major national and foreign investors. The idea is to develop intensive, irrigated cereal farming, mainly using center-pivot systems, across thousands of hectares.

- **The colossal challenges:** This gamble on the South is not without major risks: the water issue (dependence on fossil aquifers), logistics (more than 1,000 km from major consumption centers), and energy costs (pumping water from deep underground is very energy-intensive).

The stated objective is to achieve significant production by 2025 in order to drastically reduce soft wheat imports and achieve self-sufficiency in durum wheat.

4.2. Modernization of Agriculture in the North and Diversification

In parallel with the southern front, efforts are being made to improve productivity in traditional regions (INRAA, 2023, p. 18):

- **Improving yields:** The focus is on the widespread use of certified high-yield seeds, improved farming techniques, the promotion of precision farming, and better technical support for farmers from institutes such as the INRAA.
- **The dairy sector:** To reduce dependence on milk powder, a new strategy is being implemented to encourage the production of raw milk (ONIL, 2023, p. 25). This involves subsidies for the import of dairy cows with high genetic potential and the reorganization of the collection system.
- **Oilseed sectors:** Modest but strategic programmers are being launched to revive sunflower cultivation and introduce rapeseed cultivation, with a view to eventually reducing total dependence on imports of crude oils (MADR, 2023, p. 38).

4.3. Strengthening the Resilience of Supply Chains

The lesson from the Ukrainian crisis has been learnt: dependence on a single geographical region is an unacceptable risk (OAIC, 2023b, p. 14):

- **Strategic diversification of suppliers:** The OAIC has been instructed to diversify its sources beyond France and the Black Sea. Relations are being strengthened with Canada, Argentina, Brazil and other European countries. The aim is to build stable partnerships and spread geographical risk.
- **Investment in storage capacity:** A national program to build new grain silos, both in ports and in production regions (particularly in the south), has been accelerated.
- **Development of a national fleet:** Dependence on foreign shipping companies has been identified as a vulnerability. Projects are under consideration to strengthen the capacity of the National Shipping Company (CNAN) to transport a portion of the country's strategic imports (CNAN, 2024, p. 32).

4.4. The Geopolitical and Environmental Limits of the Saharan Model

The development of Saharan agriculture is one of the key pillars of Algeria's new doctrine of food sovereignty. However, this strategy raises significant geopolitical and environmental questions. The intensive exploitation of the fossil aquifers of the Saharan system could, in the long term, lead to major water imbalances, given that these resources are characterized by a very low capacity for natural renewal.

The ecological sustainability of this model will therefore depend on the state's ability to enforce rigorous mechanisms for water management, withdrawal controls and technological modernization. The use of smart irrigation techniques, precision farming and renewable energy appears essential in order to limit energy and environmental costs.

Furthermore, the effects of climate change constitute an aggravating factor. Rising temperatures, the gradual desertification of agricultural land in the north and the increasing irregularity of rainfall risk permanently undermining national productive capacities. In this context,

absolute food sovereignty appears difficult to achieve. The central strategic challenge for Algeria lies more in building systemic resilience capable of reducing critical vulnerabilities whilst maintaining the ability to adapt to international shocks.

4.5. Outlook and Food Security Scenarios for 2035

The future development of Algeria's food security will depend on the country's ability to transform its economic and agricultural model in a sustainable manner. Three main scenarios can be envisaged by 2035.

The first scenario corresponds to a path of controlled resilience. Under this scenario, investments in Saharan agriculture, logistics infrastructure and storage capacity would enable a gradual reduction in cereal dependency. Diversification of suppliers and the modernization of agricultural supply chains would help to strengthen the stability of the national food system.

The second scenario is one of persistent vulnerability. Despite the reforms undertaken, water constraints, governance challenges and technological dependence would continue to limit the structural transformation of the agricultural sector. Algeria would remain highly exposed to fluctuations in global markets and international geopolitical tensions.

Finally, a third scenario envisages the emergence of a major systemic shock linked to a combination of several factors: worsening climate change, sustained disruptions to international shipping routes, a structural rise in energy costs and an increase in geopolitical conflicts. Such a scenario could profoundly destabilize global food balances and call into question the supply capacities of net importing countries.

From this perspective, food security can no longer be viewed exclusively as an agricultural or trade issue. It is becoming a multidimensional challenge involving national security, resource geopolitics, logistical resilience, the energy transition and strategic governance.

Ultimately, the Algerian experience confirms that food security can no longer be treated as a sectoral issue limited to agricultural production. It has become a strategic domain situated at the intersection of geopolitics, economics, environmental sustainability and national security. The lessons derived from the Ukrainian crisis suggest that resilience will depend not only on increasing domestic production but also on improving governance, strengthening regional cooperation and developing adaptive capacities capable of responding to an increasingly volatile international environment.

Furthermore, food security is becoming increasingly intertwined with broader questions of energy transition, climate adaptation and sustainable development. Algeria’s investments in renewable energy, especially solar energy in Saharan regions, could support the expansion of agricultural production while reducing the environmental costs associated with intensive irrigation. The articulation between food policy, energy policy and climate policy therefore constitutes a crucial component of long-term resilience.

The African Continental Free Trade Area (AfCFTA) creates additional prospects for strengthening agricultural exchanges across the continent. In the medium term, deeper integration with African markets could contribute to the diversification of suppliers and reduce excessive dependence on a limited number of external partners. Such diversification is particularly important in a context characterized by increasing geopolitical fragmentation and uncertainty surrounding global trade routes (African Union, 2023).

4.6. Regional Cooperation and the Geopolitics of Food Resilience

Although food sovereignty is increasingly presented as a national objective, food resilience also possesses an important regional dimension. Algeria's geographical position within North Africa and the Mediterranean space provides opportunities for cooperation that could reduce vulnerability to future disruptions. Regional coordination in areas such as strategic grain reserves, agricultural research and logistics infrastructure could generate significant economies of scale and improve collective resilience.

In addition, digital technologies offer new opportunities for strengthening food governance. Satellite observation, geographic information systems and artificial intelligence-based forecasting tools can support agricultural planning and optimize the allocation of scarce resources. The integration of these technologies into public decision-making would enhance the state's capacity to monitor agricultural production, evaluate drought risks and manage strategic reserves more efficiently (FAO, 2023).

A comprehensive early-warning architecture could integrate meteorological information, commodity-market monitoring, maritime logistics data and geopolitical risk assessments. Such a system would facilitate more accurate forecasting of supply disruptions and allow public authorities to adjust procurement strategies proactively rather than reactively. The establishment of specialized interministerial units bringing together experts from agriculture, trade, transport, water management and foreign affairs could significantly improve crisis anticipation and coordination.

4.7. Food Governance, Strategic Foresight and Early-Warning Mechanisms

The Ukrainian crisis demonstrated that food security depends not only on production capacity but also on the quality of governance and anticipatory decision-making. Contemporary food systems operate within highly interconnected global networks where geopolitical tensions, climatic disruptions and financial volatility can rapidly generate cascading effects. Consequently, Algeria's food-security strategy would benefit from the institutionalization of strategic foresight mechanisms capable of identifying emerging risks before they materialize. International experience shows that countries combining food reserves with advanced monitoring systems are generally better positioned to absorb external shocks (World Bank, 2023).

Conclusion:

The period 2022–2025 will go down in Algeria's history as a decisive turning point for its food security. The Ukrainian crisis, through its brutality, has served as a merciless revelation of the fundamental flaws in a model based on rent-seeking and imports. It has forced the country to emerge from a certain strategic lethargy and embrace a new, ambitious doctrine of food sovereignty.

The short-term response, though costly, proved effective in maintaining social peace and ensuring the availability of essential goods. It demonstrated the Algerian state's capacity for mobilization in times of crisis, greatly aided by favorable oil prices.

However, the real challenge lies in the success of the structural reforms that have been initiated. The venture into Saharan agriculture, whilst promising, is fraught with ecological and logistical pitfalls that will require rigorous planning and colossal investment. The modernization of agriculture in the north, the reform of the dairy sector and the strengthening of logistical capacities are all complex undertakings whose results will only become apparent in the medium to long term.

By 2025, Algeria will not yet be fully self-sufficient in food. Dependence on soft wheat imports, although potentially reduced, will persist. The transition of the dairy sector will take years.

Nevertheless, the trajectory will have been fundamentally altered. The crisis will have embedded in the collective and political consciousness the idea that food security is not a given, but an ongoing struggle.

The success of this transition will depend on Algeria's ability to stay the course with these reforms beyond the immediate crisis. It will require political steadfastness, the allocation of the necessary financial resources even in the event of a decline in oil revenues, and above all, the ability to make difficult choices, particularly regarding the sustainable management of water resources. The Ukrainian crisis has served as a stark warning; the way in which Algeria responds to it in the long term will define not only its food security, but also the resilience and stability of its society for decades to come (Laabas et al., 2023, p. 892).

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