

Research
Article

Arab Food Security in the Era of Geopolitical Transformations: Structural Challenges and a Strategic Vision in Light of the Algerian Experience

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Doi Serial

<https://doi.org/10.56334/sci/8.9.43>

Keywords

Food security; Food sovereignty; Algeria; Geopolitical crises; Smart agriculture

Abstract

This study addresses the issue of food security in Arab countries from a strategic perspective, with a particular focus on the Algerian experience in light of increasing global challenges. It seeks to analyze the concept of food security in its multiple dimensions (availability, access, stability, and utilization) and to link it to geopolitical shifts, especially following the COVID-19 pandemic and the Russia-Ukraine war. The study reveals that many Arab countries remain captive to food dependency and that food has become a tool of pressure and political leverage in international relations. In this context, Algeria emerges as a promising model, undertaking efforts to reclaim desert lands, expand seawater desalination plants, and adopt smart agriculture, aiming to gradually achieve food sovereignty. The research also includes a comparative analysis of Arab experiences in Egypt, Saudi Arabia, and Jordan, highlighting strengths and weaknesses and shaping an integrative vision. The study concludes with a set of recommendations, most notably: the need to build a strategic Arab partnership in the food sector, establish an Arab food bank, and develop a production system based on technology, knowledge, and equitable water management.

Citation. Tebra, M., & Elagag, M. (2025). Arab Food Security in the Era of Geopolitical Transformations: Structural Challenges and a Strategic Vision in Light of the Algerian Experience. *Science, Education and Innovations in the Context of Modern Problems*, 8(9), 472–488. <https://doi.org/10.56352/sci/8.9.43>

Issue: <https://imcra-az.org/archive/383-science-education-and-innovations-in-the-context-of-modern-problems-issue-9-vol-8-2025.html>

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Received: 05.02.2025

Accepted: 20.05.2025

Published: 17.07.2025 (available online)

Introduction

Since the dawn of human existence on Earth, food has been man's primary concern and his means of survival. His very existence and stability have been tied to it; for its sake, he migrated, waged wars, and built civilizations. The earliest settled societies emerged along riverbanks such as the Tigris and Euphrates, the Nile, and the Indus because water and food formed the foundation of human life. Food has never been merely a commodity; it has always been a lever for stability or a gateway to chaos, a tool for life or a means of death.

Throughout history, numerous major wars have been driven by the desire to control fertile lands, monopolize food trade routes, or subjugate populations through starvation. The "Bread Revolution" in France and the "Flour Protests"

in some modern countries are stark reminders that when hunger knocks on people's doors, it can shake the thrones of rulers.

In contemporary times, despite remarkable advances in agricultural technology and food production, the tragedy of hunger continues to afflict humanity. According to reports by the Food and Agriculture Organization (FAO), an estimated 735 million people experienced hunger in 2023. Ironically, this occurs in a world that produces enough food for everyone, but poor distribution, conflicts, and economic domination have rendered food a hostage in the hands of the powerful.

In the Arab world, food security remains one of the most pressing strategic challenges, due to weak domestic production, an almost total dependence on imports, and the scarcity of natural resources—especially water along with fragile agricultural infrastructure in some countries. Conflicts, climate change, and geopolitical transformations further exacerbate the fragility of this system, making food not merely a developmental issue but a matter of national security.

The major crises of recent years, most notably the COVID-19 pandemic and the Russia-Ukraine war, have exposed the vulnerability of Arab food systems. Food prices soared by over 30% in some countries, and millions of citizens found themselves facing hunger—not only because of a lack of food, but due to the inability to access it.

Moreover, food has entered a new phase of politicization, as some global powers have begun using it as a geopolitical weapon to impose conditions and influence national policies. Consequently, the concept of food security has shifted from “food sufficiency” to “decision-making sovereignty,” and the notion of “food sovereignty” has emerged as a strategic demand to protect nations from international blackmail.

In this context, the Algerian experience stands out as a model that is beginning to chart its path toward food independence, through large-scale agricultural reclamation projects in the south, the use of technology in desert farming, and the expansion of irrigated areas—marking a serious attempt to break free from dependency.

Hence, the importance of this study lies in its effort to deconstruct the dimensions of food security in the Arab world, analyze its causes and ramifications, and explore the opportunities available to overcome it with a particular focus on the Algerian case, in light of accelerating global transformations and the increasing use of food as a tool of power and control in the contemporary international order.

Problem Statement

In a world driven by interests and constantly reshaped by geopolitical shifts, food is no longer merely an agricultural product or a consumable commodity—it has become a tool of conflict, a mechanism of pressure, and a new entry point for understanding power dynamics. Famine is no longer solely the result of drought or war, but increasingly the consequence of political decisions, disruptions in global supply chains, or speculation in international commodity markets for wheat, rice, and oils.

The discourse around “food security” has shifted from the margins of developmental reports to the core of strategic discussions, as nations have come to realize that their sovereignty remains incomplete as long as their dining tables depend on ships arriving from across the seas.

Within this turbulent context, Arab countries—led by Algeria—stand at a critical crossroads: either continue down the path of food dependency, with all its economic and security risks, or rise to the challenge of establishing genuine food sovereignty rooted in strategic investment, intelligent planning, and the capacity to confront climatic and geoeconomic challenges.

Main Research Question:

How can Arab countries, in light of major global transformations and multiple crises (health, climate, geopolitical), establish sustainable food security that guarantees their sovereignty and the well-being of their populations—focusing on the Algerian experience as an emerging model striving for food independence and the development of self-sufficiency?

Sub-questions:

Understanding this issue requires deconstructing the central problem into a series of essential questions that allow for an analysis of its multiple dimensions, assessment of the depth of the challenges, and anticipation of possible pathways toward food independence.

The current state of food security in the Arab world did not emerge in a vacuum it has been shaped by a complex interplay of internal and external factors, both structural and circumstantial. On one side, there is water scarcity and the threat of climate change; on the other, dependence on global markets. Then come major crises from the pandemic to wars—that have exposed the fragility of national food production systems.

To grasp the full picture with precision and objectivity, several sub-questions will guide the course of this research and illuminate its various facets:

1. What are the key structural and circumstantial challenges hindering the achievement of food security in Arab countries?
2. How have major global crises—such as the COVID-19 pandemic and the war in Ukraine—revealed the vulnerability of food systems in the Arab world?
3. To what extent are Algeria's efforts effective in its pursuit of food sovereignty, and what are its main strengths and weaknesses?
4. What strategic approaches can enable Arab countries to build an independent, resilient, and equitable food system amid current geopolitical and environmental transformations?

Hypotheses

Researching the issue of food security in Arab countries cannot be effective without adopting a set of preliminary hypotheses that serve as initial explanatory answers from which this study departs, pending confirmation or refutation through in-depth analysis.

These hypotheses have been formulated based on real-world data and international statistics, as well as indicators related to the performance of Arab countries—chiefly Algeria—in addressing food crises and their capacity to transition from a logic of dependency to one of sovereignty.

Accordingly, this research is based on the following hypotheses:

- **First Hypothesis:**

Arab countries suffer from a structural imbalance in their food systems due to weak domestic production, high dependency on imports, and insufficient investment in available agricultural and water resources.

- **Second Hypothesis:**

Recent international crises foremost among them the COVID-19 pandemic and the war in Ukraine have exacerbated the Arab food security crisis and revealed the urgent need for a fundamental review of agricultural and trade policies.

- **Third Hypothesis:**

The Algerian experience represents an emerging model in the path toward food sovereignty, thanks to its policies supporting domestic production, reclaiming desert lands, and utilizing agricultural technology despite real challenges that must be addressed.

Research Objectives

As this study addresses the issue of food security in Arab countries amid successive global crises, it seeks to provide an analytical reading of the Arab food reality and to examine the dynamics of challenge and response, with a particular focus on the Algerian experience as an advanced model in the pursuit of food sovereignty.

Accordingly, the following objectives have been identified:

- To analyze the current state of food security in Arab countries and diagnose the main structural and emergent challenges hindering the achievement of food self-sufficiency.
- To understand the impact of major international crises such as the COVID-19 pandemic and the Russia-Ukraine war—on food production and consumption systems in the Arab world.
- To highlight the geopolitical and economic dimensions of food security, and how food has become a tool of pressure and alignment in modern international relations.
- To assess the efforts undertaken by Algeria to achieve food security and to review national initiatives aimed at building an independent and sustainable food system.
- To propose a comprehensive strategic vision for enhancing Arab food security, drawing from the Algerian experience, while taking into account environmental, economic, and political variables.

Significance of the Study

The significance of this research stems from the nature of the topic it addresses and the geopolitical and economic context in which it is situated. Food security is no longer a developmental option that can be postponed; it has become a vital condition for the survival and stability of states in a world marked by escalating crises, volatile markets, and the instrumentalization of vital resources—particularly food as tools for pressure, negotiation, and coercion.

The importance of this study lies in its endeavor not merely to describe the food crisis in the Arab world, but to frame it within a strategic analytical perspective that considers its environmental, economic, and sovereignty-related dimensions and links it to the global transformations compelling states to rethink their relationship with food in terms of production, distribution, and management.

The value of this research is further enhanced by its focus on the Algerian experience as an evolving model working seriously to overcome food dependency through the reclamation of millions of hectares, the use of modern agricultural technologies, and the achievement of a gradual breakthrough in national production despite a harsh natural environment and complex challenges.

This study contributes to enriching the scientific discourse on a strategic issue that affects Arab national security. It offers a scientific framework for understanding the sources of weakness and outlining the path toward food self-sufficiency and sovereignty, based on the Algerian experience as a potentially scalable model for the Arab region.

Research Methodology

This study adopts a descriptive-analytical approach based on the inductive method to trace the evolution of the concept of food security and to analyze the contexts that have influenced it—particularly in the Arab world following successive crises such as the COVID-19 pandemic and the Russia-Ukraine war. The research aimed to examine up-to-date data through reports issued by international organizations (FAO, WFP, World Bank, ESI, among others), in addition to official data published by ministries and national institutions, particularly in Algeria.

A comparative method was also employed to analyze the differences in food performance among various Arab countries, with a focus on the disparity in responses between Gulf states, North African countries, and conflict-affected states. The analytical method was used to understand the relationship between food security and sovereign strategies, as well as the geopolitical dimension that has become increasingly evident in how major powers handle food-related issues.

A partial field-based approach was also included, through the analysis of national programs announced in Algeria and the examination of their implementation indicators, to determine whether they genuinely reflect progress toward building actual food sovereignty or remain in an experimental phase.

Structure of the Study

The research is divided into four main sections, aiming to cover the conceptual, analytical, comparative, and strategic dimensions of the topic:

- **Section One:** Concepts of Food Security and Its Recent Developments
- **Section Two:** The Impact of International Crises on Food Security in the Arab World
- **Section Three:** The Algerian Experience in Building Food Security
- **Section Four:** Toward a Strategic Vision for Arab Food Security

Previous Studies

Previous studies serve as an essential scholarly foundation for any serious academic research. They provide the necessary knowledge base for understanding the research problem and allow the researcher to build their own perspective based on prior scholarly contributions. In the field of food security which has witnessed significant development in recent decades Arab researchers have shown increasing interest, particularly in light of successive crises that have exposed the fragility of food systems.

Below is an analysis of the two most relevant studies to this research topic, with a focus on their strengths and limitations, and their relevance to the Algerian experience, which is examined in depth in this study.

❖ First Previous Study:

In their study titled “The Reality of Food Security in Arab Countries,” published in 2023 in the Journal of Organizational Economics and Sustainable Development at the University of Jijel, researchers Ahlam Laabni and Cherif Amara addressed the issue of food security in the Arab world from a comparative analytical perspective. They focused on the weak domestic food production capacity and chronic dependence on imports amid a volatile economic and climatic environment.

The study was guided by a central question regarding the ability of Arab countries to achieve food security in light of structural and circumstantial challenges. It relied on a descriptive-analytical method and data from international organizations such as FAO and AOAD.

The researchers concluded that most Arab countries despite their natural and human resources suffer from structural dysfunction in their food systems, driven by weak agricultural investment, fragmented national policies, lack of regional integration, and escalating climate change impacts. The study highlighted how crises such as the COVID-19 pandemic and the war in Ukraine exposed the vulnerability of excessive reliance on external markets, which poses a direct threat to Arab food security.

It concluded that the Arab world cannot achieve food security without redefining the regional agricultural model, adopting an integrative vision, and effectively investing in infrastructure and local production. The study recommended establishing a joint Arab framework for food governance, modernizing agricultural systems, and linking food security to water security.

Despite the study’s comprehensive approach, it remained within a general framework and did not delve into national case studies or highlight promising experiences such as the Algerian one. This is where the present research distinguishes itself, by offering a detailed analysis of the Algerian case, with a focus on the influence of new geopolitical dynamics on food decision-making and sovereignty.

❖ Second Previous Study:

The study titled “Food Security in Algeria in Light of Key Indicators (2020–2023): Realities and Challenges” by researcher Raziqa Yatou, published in 2024 in the Journal of Global Politics at the University of Algiers 3, presented a precise empirical model examining the development of food security in Algeria during a critical period marked by global uncertainty and disruption.

The researcher employed a quantitative-analytical method and assessed Algeria's performance using indicators such as the Global Food Security Index (GFSI), the food gap, and local production rates.

The study found that Algeria made notable progress in certain agricultural indicators, such as vegetable and dairy production, due to expanded cultivated areas and land reclamation. However, it still suffers from a clear food gap in strategic commodities, especially cereals and oils. The study also showed that international fluctuations affected Algeria's rankings in global indices, indicating that current efforts need to be strengthened and scaled up.

The researcher concluded that Algeria possesses significant potential to achieve national food security but still requires a more integrated policy that connects production, consumption, and agricultural technology, while smartly investing in desert resources.

The study recommended rationalizing imports, supporting local investors, and expanding smart desert agriculture.

The value of this study lies in its data accuracy and focus on recent indicators. However, it did not incorporate the geopolitical dimension or global environmental challenges elements that the present research addresses by analyzing food security within broader political and strategic contexts, while offering a forward-looking perspective on Algeria's role as an emerging food actor.

SECTION ONE: FUNDAMENTAL CONCEPTS OF FOOD SECURITY AND ITS EVOLUTION IN THE ARAB AND INTERNATIONAL CONTEXT

Since the dawn of history, food has been intrinsically linked to the concept of survival. Early human societies emerged where water and fertile land were available, and alliances and wars were shaped around the control of food resources. However, with the advancement of civilizations, food has ceased to be merely a biological necessity and has become a fundamental component in systems of power, sovereignty, and development. To control food is, in essence, to control the fate of nations.

Consequently, food security is no longer solely an agricultural or economic concept; it has evolved into a strategic instrument for shaping the future of states especially in the twenty-first century, where the world has become so interconnected that a breakdown in food security in one country poses a threat to regional and even global stability.

1. Defining Food Security: A Multidimensional Perspective

In its classical definition, the Food and Agriculture Organization (FAO) states that food security exists when: "All people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life."

While this definition is comprehensive, it remains static unless analyzed through its four fundamental dimensions, which form the pillars of a true understanding of the concept:

First: Availability

This refers to the capacity to produce or provide food on a consistent basis, whether through domestic agriculture or organized imports. The key question here is: does the country possess sufficient land, water, and technical knowledge to produce what it needs? And if it relies on imports, does it have the sustained capacity to purchase food? This dimension directly links food to economic and political capability.

Second: Access

This is a more complex dimension, as it involves not just the presence of food but citizens' ability to obtain it. This brings into play concepts such as social justice, purchasing power, pricing policies, and government subsidies. A country may produce sufficient food, but if vulnerable populations cannot afford it, food security remains at risk.

Third: Stability

Food security is not measured at a single point in time it must be sustainable. This means that food availability must remain consistent and stable over time, unaffected by economic crises, climate change, or armed conflicts.

Fourth: Utilization

This dimension relates to how food is used in a way that promotes health and nutritional balance. It includes nutrition education, access to clean drinking water, hygiene, and healthcare. Although often overlooked, this dimension is vital in combating malnutrition and "silent hunger."

Together, these dimensions reveal that food security is not merely a matter of production; it is a complex issue that requires an integrated vision combining economics, politics, technology, and public health.

2. From Food Security to Food Sovereignty: A Conceptual Shift

In recent decades, the notion of "food security" has proven insufficient, giving rise to a deeper and more autonomous concept: "food sovereignty." This political-economic term emerged in the 1990s, particularly through global peasant movements, and is defined as:

"The right of peoples to define their own agricultural and food policies, and to produce food according to their local needs, without being subjected to the logic of the global market."

This conceptual shift reflects a growing awareness that food is no longer a neutral commodity, but rather a tool of pressure and bargaining in the hands of major powers and multinational corporations. In this context, sovereignty over food decision-making has become a prerequisite for full national sovereignty

3. The Concept's Evolution in the Arab Context: From Description to Sovereign Awareness

In the Arab world, discourse on food security remained, for a long time, confined to development reports and agricultural programs. However, recent crises from the COVID-19 pandemic to the Russia-Ukraine war have exposed the fragility of Arab food systems and deepened the awareness that food is not merely an economic challenge, but a strategic threat.

It has become evident that many Arab countries, despite their capabilities, manage their food systems with an emergency import mindset rather than through sovereign planning. The absence of complementary policies from water security to agricultural research has left them vulnerable to the volatility of global markets.

In contrast, ambitious Arab initiatives have begun to emerge particularly in Algeria and Saudi Arabia seeking to break the cycle of dependency through desert land reclamation, investment in agricultural technology, and the establishment of strategic grain reserves. These initiatives warrant in-depth analysis not only in terms of outcomes but also through the lens of a shifting philosophy in food governance, from dependency to autonomous production.

Food security is a process shaped by the interaction of multiple components: production, distribution, access, utilization, and stability. Achieving it goes beyond expanding agriculture; it requires freeing food-related decisions from dependency and aligning them with a comprehensive national vision. While international frameworks have defined the general outlines, the Arab especially Algerian context calls for the formulation of its own concepts rooted in its specific challenges, resources, and political identity.

SECTION TWO: THE IMPACT OF INTERNATIONAL CRISES ON FOOD SECURITY IN THE ARAB WORLD

In recent years, the world has experienced a series of successive crises that have posed severe tests to food security systems especially in developing countries. In the Arab context, the challenges were not limited to structural

imbalances that had accumulated over decades of weak agricultural investment, but were compounded by external shocks that disrupted supply chains, destabilized markets, and drove prices to unprecedented levels.

The COVID-19 pandemic, the Russia-Ukraine war, and the repercussions of climate change were not mere transient events; they marked critical turning points that exposed the fragility of Arab food systems and redefined food security as a matter of sovereignty and geopolitics not just development.

The COVID-19 Pandemic: Exposing Food Systems

At the beginning of 2020, the pandemic caused widespread disruptions in global supply chains due to border closures, halted maritime transport, and the suspension of agricultural labor movement in several regions. This had an immediate impact on Arab countries, many of which rely heavily on imported food.

According to a joint report by the FAO and the World Food Programme (WFP) in 2021, the number of people facing acute food insecurity in the Arab region rose to over 53 million, an increase of nearly 20% compared to 2019. Prices of staple goods surged by more than 30% in some countries, such as Lebanon, Yemen, and Sudan, forcing millions of households to reduce their meals or resort to low-quality food alternatives.

More alarming than the statistics is the fact that the pandemic revealed that many Arab countries lack sufficient strategic food reserves and do not possess robust logistical systems capable of absorbing such shocks thus turning a health crisis into a food, social, and political crisis.

The Russia-Ukraine War: Food Security at the Mercy of Conflict

The outbreak of war in Ukraine in 2022 had an immediate and profound impact on global food security particularly in the Arab world. This is due to the fact that both Russia and Ukraine are among the world's top exporters of wheat and vegetable oils. According to data from the World Trade Organization, nearly 50% of wheat imports in the Middle East and North Africa originated from these two countries.

The suspension of exports, closure of Black Sea ports, and rising costs of shipping and insurance all contributed to sharp increases in the prices of wheat and oils. This directly undermined the purchasing power of Arab citizens, especially in vulnerable countries such as Lebanon, Tunisia, Yemen, and Egypt.

In its 2023 report, the FAO stated that global food prices rose by 14.3% in just one year, prompting many countries to reassess their food and financial priorities.

Climate Change: The Silent Enemy of Food Security

Beyond visible crises, climate change represents a silent yet persistent and deepening threat to Arab food security.

The Arab region is among the most vulnerable to drought, desertification, and declining rainfall. According to the World Bank's 2022 report, 75% of agricultural land in the Arab world is at risk of losing its fertility in the coming decades if current water and agricultural policies continue.

Moreover, a temperature increase of just 2°C in some areas could lead to a reduction in grain production by up to 20%, which would widen the food gap, increase pressure on imports, and further diminish the prospects of achieving food self-sufficiency.

Food Security: Hostage to the Global Market

What the three major crises the pandemic, the war, and climate change have revealed is that Arab countries have lost control over their food supply because they have yet to establish independent food systems. Instead, their food systems have remained governed by the logic of the global market, placing them in an extremely fragile position in the face of any international disruption.

With the absence of strategic reserves, near-total reliance on imports, and a lack of diversification in supply sources, many Arab countries have become vulnerable to indirect starvation. This points us to a critical and alarming concept:

Food is no longer a right it has become a tool of international negotiation.

A Critical Comparison: From Disarray to the Will to Change

Nevertheless, these crises despite their severity have awakened political awareness in some Arab states, such as Algeria and Saudi Arabia, of the importance of regaining control over food-related decision-making. These countries have begun to move toward:

- Strengthening domestic production
- Reclaiming marginal lands
- Investing in smart agriculture
- Building large-scale reserves of wheat, oils, and sugar

However, progress remains relative and requires a comprehensive strategic vision, not ad hoc or reactive decisions. Food policy must not be managed through crisis response, but rather through proactive sovereignty.

Successive international crises have made it clear that Arab food security cannot be built on a fragile and volatile external market. Countries that have failed to develop self-sufficiency in food production have become exposed to non-traditional threats. Therefore, the current challenge lies not only in increasing production, but in building an independent, resilient, and equitable Arab food system one that can withstand shocks and prevent food from becoming a means of subjugating nations.

SECTION THREE: THE ALGERIAN EXPERIENCE IN BUILDING FOOD SECURITY FROM DEPENDENCY TO POTENTIAL SOVEREIGNTY

Food security in Algeria has not merely been a developmental slogan; in recent decades, it has taken on an explicitly strategic dimension especially after successive global crises exposed the fragility of the international system and turned food into a commodity subject to political bargaining. Algeria, once among the world's largest importers of grain, came to realize that survival depends on owning food decision-making and that any delay in doing so could turn bread from a guaranteed right into a tool of coercion.

For decades, the country managed its food file under the pressure of imports and oil prices. But it has since begun to reshape its vision, moving toward a new agricultural model aimed at reducing dependency, boosting domestic production, and enhancing adaptability. This shift has become the foundation of Algeria's path toward possible food sovereignty.

Algeria's food crisis was not primarily a matter of resource scarcity but of governance. A country that spans more than 2.3 million square kilometers and possesses vast agricultural land in both the north and south cannot remain at the mercy of foreign markets. In recent years, the state has begun investing in its desert areas, which had long been neglected. Remarkable changes have been observed in provinces such as El Oued, Ghardaïa, and Laghouat, where model farms have emerged that harness technology and reimagine the desert not as a climatic burden, but as a potential source of food.

These projects were far from symbolic; they produced tangible results. Cultivated land in the south increased dramatically, and for the first time, Algeria began exporting potatoes and tomatoes. It also covered over 90% of its domestic needs for milk and poultry. This marks the beginning of a fundamental transformation: from a country that only consumes, to one that produces—and breathes its independence through agriculture.

Figures Reflect the Shift... But They Are Not Enough

While numbers are not everything, they remain a crucial indicator of the general trend. According to official data, Algeria's annual potato production exceeded 4.6 million tons, milk production rose to 3.2 billion liters, and grain output reached approximately 4.1 million tons in 2022—despite climate volatility.

However, the numbers do not obscure the main challenge: near-total dependency on soft wheat, the most widely consumed food staple in Algeria. The country still imports about 60% to 70% of its needs, a ratio that leaves Algerian food sovereignty exposed to global price fluctuations and geopolitical shocks. In other words, what has been achieved is significant—but not sufficient unless further steps are taken toward achieving strategic self-sufficiency.

Agricultural Technology: From Seed to System

Today, Algeria is betting on agricultural technology not merely as a means to improve production, but as a lever for achieving food sovereignty. In recent years, the country has begun adopting drip irrigation systems, smart farming techniques, and solar energy to operate groundwater wells. Artificial intelligence is even being used to identify the most suitable crops for each type of soil and to link weather data with agricultural planning.

These developments reflect a new awareness: agriculture is no longer a traditional sector but a domain of innovation, investment, and sovereignty. The Algerian farm is no longer just a site of manual labor, but an experimental space for creating smart and modern production models.

Real Challenges Requiring the Courage to Acknowledge

Despite this progress, the Algerian experience still faces three core challenges:

- **The grain gap remains significant:** Heavy reliance on European and Russian wheat persists, even though efforts to diversify import sources have begun.
- **Water resource management:** Especially in the south, where the rapid depletion of groundwater threatens the long-term sustainability of agricultural projects.
- **Marketing and storage chains:** Much of the domestic production is lost due to weak transport and refrigeration infrastructure, and the absence of organized regional markets.

The trajectory is promising, but success depends on the courage to evaluate, acknowledge weaknesses, and overcome them through a well-defined strategic vision.

Food Sovereignty in Algeria: A Dream Becoming a Project

What distinguishes Algeria today is not only the expansion of production or land reclamation, but a political shift in how food is perceived: From a subsidized consumer good to a sovereign file subject to planning, financing, and oversight at the highest levels. The government has announced clear objectives to achieve self-sufficiency in durum wheat, reduce imports of soft wheat, and boost youth investment in desert agriculture.

This shift from reactive management to proactive strategy, from day-to-day administration to long-term vision is what makes the Algerian experience a worthy Arab model for study, inspiration, and expansion.

Algeria's experience in food security may not be perfect, but it possesses all the elements of a genuine national project: political will, land, resources, and openness to technology. It is the story of a gradual transition from dependency to sovereignty, from consumption to production, from the global market to the local field.

If this project succeeds in overcoming major challenges, Algeria will not only achieve self-sufficiency it will prove that food can be a symbol of sovereignty, not a tool of pressure and dependence.

SECTION FOUR: TOWARD A STRATEGIC ARAB VISION FOR FOOD SECURITY – FROM FRAGILITY TO SHARED SOVEREIGNTY

In recent years, it has become clear that the Arab world despite its natural wealth and unique geographical position remains deeply entrenched in a state of acute food dependency. Indicators show that over 60% of the region's food is imported, placing entire populations at the mercy of international market disruptions, geopolitical fluctuations, and the decisions of global producers.

What complicates the picture is not only water scarcity or demographic pressure, but the lack of a collective will to build a unified Arab food project one that moves beyond each country acting alone, toward shared sovereignty, regional integration, and strategic not competitive investment in Arab resources.

From Crisis to Opportunity: When Hunger Becomes a Driver of Sovereignty

Within every crisis lies opportunity. After the COVID-19 pandemic and the Russia-Ukraine war, Arab food security has ceased to be merely an economic issue and has become an existential matter of sovereignty. This delayed awareness must now be translated into bold not superficial policies. While Algeria has taken serious steps toward food sovereignty, the time has come to formulate an Arab food project based on:

- **Agricultural specialization among countries:** It makes little sense for each country to produce everything. Roles should be divided based on climate, water resources, and soil quality.
- **Establishment of regional food banks:** These would store strategic reserves of grains, oils, and sugar.
- **Creation of a pan-Arab agricultural research complex:** Focused on smart agriculture, seed enhancement technologies, and drought-resistance techniques.

Toward a New Concept: Smart Food Sovereignty

What is required today is to move beyond the traditional discourse of "food security" toward what may be called "smart food sovereignty"—that is, building an Arab food system that is:

- Productive and sustainable
- Rooted in technology and knowledge, not just land and labor
- Free from import dependency and global market dictates

Achieving this also demands a transformation in mindsets: food sovereignty cannot be built amid administrative corruption, marginalization of the agricultural sector, or distorted subsidy policies. Food is no longer merely a social service it has become a political, societal, and strategic asset.

What Can Be Learned from the Algerian Experience?

The Algerian experience shows that even in a harsh climate, and despite a historical dependency on certain products, a country can change course if it possesses the will, planning, and capacity for serious investment. Algeria has succeeded in:

- Reclaiming desert land and transforming it into an agricultural reservoir
- Introducing modern technologies into traditional farming practices
- Increasing levels of self-sufficiency in certain sectors
- Diversifying food trade partners to avoid geopolitical blackmail

This positions Algeria not only on the path to sovereignty, but also as a potential driver of a regional Arab food project, if its experience is strategically directed toward export and integration with neighboring countries.

Outlines of the Proposed Future Vision

Based on the preceding analysis, the proposed strategic pillars for building a coherent and resilient Arab food security framework can be summarized as follows:

- **Developing desert agriculture** and reducing reliance on climate-vulnerable crops
- **Harmonizing customs and agricultural policies** within a unified Arab integration space
- **Strengthening agricultural scientific research** and leveraging artificial intelligence and data technologies in food planning
- **Establishing joint agricultural investment funds** among Arab countries
- **Engaging the private sector and civil society** to ensure equitable access to food

Arab countries can no longer afford to postpone the food sovereignty battle, nor to manage it through improvisation or dependency. Food is now the key to sovereignty, the weapon of the future, and a measure of the dignity of the Arab individual. Algeria, through what it has achieved in just a few years, sends a clear message:

When will is transformed into a project, and the farm becomes a national priority, bread becomes a sovereign asset not a point of vulnerability.

1. Saudi Arabia: From Desert to Smart Production

Saudi Arabia, with nearly 90% of its territory classified as desert, has achieved a radical transformation in its agricultural sector under its national Vision 2030. The country has reached 129% self-sufficiency in milk production and 117% in table egg production, while date production stands at 124% of local demand, allowing for significant exports (arabnews.com). Over five years, the sector's production value surpassed \$16 billion, with projections reaching \$17.7 billion by 2029.

The state has invested more than \$24 billion in water and agriculture sectors, guided by a technological agenda that includes precision irrigation, protected agriculture, and artificial intelligence. This experience demonstrates how a resource-rich economy with strategic planning can transform barren desert into a promising agricultural space while ensuring food security.

2. Egypt: Seeking Wheat Alternatives and Reducing the Import Bill

Egypt, the world's largest wheat importer, spends approximately \$2.1 billion annually to secure 8.25 million tons of wheat needed to feed 70 million citizens, while domestic production covers only 3.5 million tons (theguardian.com, reuters.com).

In response, the government has launched a strategy to substitute 20% of domestic wheat with corn or sorghum flour in bread production by April 2025, potentially saving 1 million tons of wheat per year. Egypt has also secured \$700 million in loans from Islamic banks to support strategic commodities. The "Future of Egypt" authority was established to facilitate wheat purchases from Russia, under a 1.27 million ton contract through June 2025.

Meanwhile, the ambitious \$5 billion desert reclamation project named "Future of Egypt" has been largely stalled due to groundwater depletion (theguardian.com). This example highlights Egypt's push toward food independence, though water scarcity remains the major obstacle.

3. Jordan: Managing Water Scarcity through Agricultural Innovation

Jordan faces extreme water scarcity, with per capita water availability ranging between 61–95 m³ per year, among the lowest levels globally (jordan.un.org). Nevertheless, agricultural exports rose by 38% between 2018 and 2022, reaching approximately 898 million Jordanian dinars in 2022 a 441% increase compared to 2018 (fao.org).

Guided by a national roadmap (2021–2030), Jordan launched an integrated food information system to monitor stocks, supply chains, and enable early crisis forecasting. Moreover, over 1,500 farmers adopted smart irrigation

technologies (e.g., hydroponics), reducing water usage by up to 80% in some projects. Large-scale desalination projects have also been initiated to meet agricultural and urban demands.

Jordan's experience affirms that water scarcity does not preclude the construction of a data- and technology-driven food model.

Study Findings

1. Arab Food Security Remains Fragile... Despite Disparate Ambitions

The study revealed that most Arab countries, despite their natural and human resources, still rely heavily on global markets to meet their food needs particularly for essential commodities such as wheat, oils, and sugar.

The recent crises most notably the COVID-19 pandemic and the Russia-Ukraine war have demonstrated that the Arab world lacks a self-sufficient and independent food system, and that national policies often treat food as an economic commodity rather than a strategic instrument of sovereignty.

2. The Algerian Experience Represents a Rising Model Toward Food Sovereignty

The study showed that Algeria has taken significant steps to strengthen its food security through desert land reclamation programs, the development of smart agriculture, and the integration of food security with water security notably via seawater desalination initiatives.

Encouraging results have been recorded in areas such as potatoes, dairy, and poultry, but the country still suffers from acute dependency on soft wheat and vegetable oils, placing its food project in a promising yet still transitional phase.

3. No Food Security Without Water Security... No Sovereignty Without Technology

The study affirmed that food security cannot be separated from water challenges, especially in arid countries such as Algeria, Jordan, and Saudi Arabia.

Managing water resources through desalination, smart irrigation, and water recycling is a fundamental condition for achieving any form of food sovereignty.

Moreover, the adoption of modern agricultural technologies such as protected agriculture, remote sensing, and artificial intelligence is crucial for enhancing production efficiency and sustainability.

4. Successful Arab Models Exist... But No Collective Vision

A comparative analysis of Arab experiences revealed that each country is pursuing its own food strategy independently, based on its specific priorities and conditions.

However, the absence of a unified Arab vision and regional coordination turns these efforts into isolated initiatives, vulnerable to collapse in the face of future crises.

While Saudi Arabia has excelled in desert farming, Jordan has made strides in managing water scarcity, and Egypt has launched large-scale projects despite its challenges, a significant gap remains between these individual achievements and the collective ambition to build a shared Arab food security system.

5. The Concept of "Food Sovereignty" Must Replace "Food Self-Sufficiency"

The study emphasized that food self-sufficiency is no longer a sufficient objective in a volatile and monopolized world.

There is now an urgent need to shift toward the philosophy of food sovereignty, which entails controlling food-related decision-making and managing production, distribution, and marketing from a political rather than purely commercial perspective.

This shift requires a reassessment of agricultural policies and the recognition of food as an integral component of national sovereignty, not merely a secondary economic sector.

Comparison of National Experiences: Algeria, Saudi Arabia, Egypt, and Jordan in the Context of Food and Water Security

Comparative Summary:

If Algeria presents a strong model that combines land reclamation, integration of food and water through seawater desalination, and the use of agricultural technology, then Saudi Arabia exemplifies leadership in desert agricultural technology. Egypt, meanwhile, remains a large-scale example of market vulnerability, and Jordan stands out as a model of efficiency amid resource scarcity.

Extracted Vision:

Toward an Arab food sovereignty strategy based on the integration of water, technology, financing, and shared strategic vision with the possibility of extending the Algerian experience to the Eastern Mediterranean as a comprehensive agricultural union.

Analytical Chapter: Why Did Self-Sufficiency Projects Fail in the Arab World?

Over the decades particularly in the 1960s and 1970s several Arab countries attempted to build self-sufficiency projects. However, most of these efforts ended in disappointing results. The reasons lie in a set of structural, historical, and institutional factors that limited the effectiveness of these initiatives:

1. Unbalanced Financial Dependency (Rentier Economies)

Many Arab states, such as Algeria, were tied for years to oil rent economies, weakening the incentive for agricultural reform. When a state relies on a single source of revenue, it reduces the drive to develop productive food systems. As a result, agricultural projects were often treated as consumer subsidies rather than fundamental economic ventures.

2. Water Scarcity and Overexploitation

The region suffers from chronic water scarcity, with renewable sources representing only 1.3% of the world's total and per capita water availability well below the recommended minimum of 1,000 m³/year (emirates247.com). Additionally, past Arab agriculture heavily relied on groundwater overextraction, leading to rapid depletion of reserves and a decline in agricultural output, which was not compensated by effective alternative strategies.

3. Agricultural Land Loss and Rural Marginalization

Urban sprawl and rural migration led to the underutilization of arable land, with less than one-third of cultivable land being effectively used. This, combined with weak storage and logistics infrastructure, resulted in significant crop losses including approximately 3.3 million tons of wheat wasted annually due to poor transport and storage conditions (jordantimes.com).

4. Lack of Advanced Research and Improved Seeds

Delayed investment in research and development has cost the region opportunities in modern agriculture. While expectations existed for developing drought- and salinity-resistant seeds, reliance on foreign companies and insufficient local funding prevented any significant breakthroughs.

5. Disconnection Between State and Farmer, Symbolic Support Without Real Production

Agricultural production was often dictated by state subsidy policies, but lacked genuine training or private investment incentives. Licenses for production were granted without alignment to land realities, rendering agriculture formal rather than productive.

The failure of self-sufficiency projects in the Arab world is not merely the result of technical shortcomings, but rather the outcome of a structural economic model focused on rent, mismanaged scarce water resources, neglect of agricultural research, and a fragmented policy framework. The absence of institutional prerequisites necessary for genuine food advancement links the lack of self-sufficiency to a deficit in governance, integration, and innovation.

CONCLUSION

This research has demonstrated that food security is no longer a developmental option that can be postponed; it has become a matter of full sovereignty intertwined with economic policy, geopolitical balance, and the fundamental right to survival. In an era where food has become a soft weapon used in modern conflicts, Arab countries, including Algeria, must strategically reshape their relationship with land, water, and technology moving beyond patchwork solutions toward comprehensive sovereign construction.

The Algerian experience, despite its challenges, has shown the capacity to emerge from the depths of the desert. It is betting on reclaiming arid lands, desalinating seawater, and employing artificial intelligence in agriculture to gradually build a national model toward food independence. At the same time, Algeria recognizes that achieving sufficiency is not merely a question of quantity, but requires the establishment of an effective institutional system, a firm political will, and a community-based culture of production.

Conversely, the comparative analysis of Arab experiences reveals that efforts remain fragmented, and the absence of regional coordination continues to deepen the Arab food gap. The challenge today is not merely to increase production but to establish a comprehensive Arab food bloc based on specialization, water cooperation, unified supply chains, and institutionalized agricultural research.

Accordingly, the future of Arab food security will not be built in global markets, but will be born from the Arab land itself when the farmer becomes a sovereign actor, the farm a smart facility, and food a matter of national decision-making. In this way, food self-sufficiency becomes not just an economic goal, but a symbol of dignity, sovereignty, and sustainable development.

Recommendations

Based on the study's findings and the analysis of the preceding sections, we propose a set of practical recommendations that could contribute to strengthening food security both in Algeria and across the Arab world:

❖ First: At the National Level (Algeria)

- Expand the seawater desalination program to include new coastal agricultural areas, and connect agricultural irrigation networks to desalination plants, particularly in regions suffering from severe water stress.
- Revise the soft wheat import policy through a gradual plan to cultivate it domestically using drought-resistant modified seeds, alongside technical and financial support for farmers.
- Encourage investment in smart agriculture by promoting startups in agricultural data analytics, sensor and precision irrigation technologies, and offering tax incentives to digital farmers.
- Restructure storage and marketing chains by building strategic reserves for grains and essential vegetables, linked to digital platforms to distribute production locally and transparently.
- Integrate food-related dimensions into educational and media policies to spread food security awareness as a national concept that concerns not only the state but also citizens and society.

❖ Second: At the Arab Level

- Launch a joint Arab food strategy that includes a functional division of agricultural roles among countries based on their comparative advantages (e.g., dates in the Gulf, wheat in the Maghreb, fruits and vegetables in the Nile Valley).
- Establish a unified Arab food bank to manage strategic reserves of grains, oils, and sugar, and ensure a minimum level of food solidarity during crises.
- Activate joint Arab agricultural research through digital platforms, regional institutes, seed and climate data exchange, and encourage research on climate resilience.
- Create an Arab fund to finance emerging agricultural projects, funded by oil-surplus countries, targeting marginalized rural areas and sustainable initiatives.
- Build unified Arab food diplomacy to secure a stronger negotiating position in global markets and protect Arab interests from price volatility and monopolistic practices.

Final Recommendation:

Food security cannot be achieved through technical plans alone. It requires serious political will, deep societal engagement, and smart partnerships between the state and its citizens, and among Arab states themselves. If Algeria succeeds in turning its challenges into opportunities, its experience can evolve into an inspiring Arab-African model charting a path toward sovereignty, far from market subjugation and food blackmail.

Acknowledgment

The authors would like to express their sincere gratitude to the academic staff and research departments of Mustapha Stambouli University of Mascara and Belhadj Bouchaib University of Ain Temouchent for their support and insights throughout the development of this research.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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