

The reality of food security in Algeria



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Abstract

The issue of food security in Algeria is considered a major challenge facing the country amidst continuous economic and environmental changes. It is a vital and sensitive issue related to providing sufficient and healthy food for all of the country's population. Food security in Algeria faces several challenges including desertification, water scarcity, climate change, and heavy reliance on food imports. Algeria is moving towards enhancing self-sufficiency by supporting local agriculture and developing agricultural technologies to increase production. However, there is still an urgent need for effective measures including improving water resource management, enhancing climate change adaptation, and improving food supply chains to address current and future challenges in food security. The study focuses on analyzing the reality of food security in Algeria with a focus on identifying and understanding the factors affecting the state's ability to ensure the provision of sufficient, safe, and nutritious food for all its citizens.

Keywords

Food Security ;
Desertification ;
Water Scarcity ;
Climate Change ;
Food Imports ;
Algeria.

الكلمات المفتاحية

الأمن الغذائي ؛
التصحّر ؛
الندرة المياه ؛
التغير مناخي ؛
الواردات غذائية ؛
الجزائر.

واقع الأمن الغذائي في الجزائر

ملخص

مسألة الأمن الغذائي في الجزائر تُعتبر تحديًا رئيسيًا يواجه البلاد وسط التغيرات الاقتصادية والبيئية المستمرة. حيث تعتبر قضية حيوية وحساسة تتعلق بتوفير غذاء كاف وصحي لكل سكان البلاد. ويواجه الأمن الغذائي في الجزائر العديد من التحديات بما في ذلك التصحر وندرة المياه وتغير المناخ والاعتماد الكبير على واردات الغذاء. وفي ذلك تتجه الجزائر نحو تعزيز الاكتفاء الذاتي من خلال دعم الزراعة المحلية وتطوير التقنيات الزراعية لزيادة الإنتاج. ومع ذلك، هناك حاجة ملحة لاتخاذ تدابير فعالة بما في ذلك تحسين إدارة الموارد المائية وتعزيز التكيف مع تغير المناخ وتحسين سلاسل التوريد الغذائي لمعالجة التحديات الحالية والمستقبلية في مجال الأمن الغذائي. تركز الدراسة على تحليل واقع الأمن الغذائي في الجزائر مع التركيز على تحديد وفهم العوامل التي تؤثر على قدرة الدولة على ضمان توفير غذاء كاف وآمن ومغذي لجميع مواطنيها.

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I- Introduction :

In Algeria, food security is considered a major challenge facing the country amidst continuous economic and environmental changes. This issue is of significant concern to the government, non-governmental organizations, and citizens alike, as it directly impacts the health and well-being of the population. Food security, defined as the availability and access to food, faces several challenges in Algeria, including desertification, water scarcity, climate change, and heavy reliance on food imports. These factors have a significant impact on food security, necessitating multi-faceted strategies to address this complex issue.

Algeria is moving towards enhancing self-sufficiency by supporting local agriculture and developing agricultural technologies to increase production. It also aims to diversify food sources and reduce dependence on imports by encouraging local agricultural and livestock production. However, there remains an urgent need for effective measures including improving water resource management, enhancing adaptation to climate change, and improving food supply chains to address current and future challenges in food security.

I.1. Research problem:

Algeria is considered one of the countries facing significant challenges in the field of food security due to rapid climate changes affecting food production, alongside heavy reliance on food imports and fluctuations in global market prices. Drought, water scarcity, desertification, and limited agricultural land are all factors adding complexity to the food situation in Algeria. Additionally, agricultural and economic policies, as well as logistical infrastructure, impact Algeria's ability to ensure food security for its population.

I. 2. Methodology:

The methodology outlined for the study on the reality of food security in Algeria includes:

- Comprehensive analysis using various sources and methods.
- Gathering data on food production, import dependency, and the impact of environmental changes.
- Evaluating governmental and non-governmental responses to food security challenges.
- Utilizing both quantitative data and qualitative assessments to understand the depth of food security issues.

I. 3. Objectives of the study:

The objectives of the study include:

- To assess the current state of food security in Algeria.
- To identify the main factors contributing to food insecurity.
- To evaluate the effectiveness of existing policies and strategies aimed at improving food security.
- To suggest improvements for future policies to enhance food security and self-sufficiency in Algeria.

I. 4. Scope Of The Study:

The scope of the study focuses on analyzing the reality of food security in Algeria, with an emphasis on identifying and understanding the factors influencing the state's ability to ensure sustainable provision of sufficient, safe, and nutritious food for all its citizens. This includes researching the challenges facing Algeria in this context, such as climate change, population growth, and agricultural policies, in addition to evaluating the efforts made to address these challenges.

I. 5. The importance of the study:

It is essential to emphasize the importance of this study, as food security is not merely a matter of survival but a vital indicator of the stability and progress of nations. Food security is intricately linked to public health, economic growth, and social stability, making it a multi-dimensional issue that requires a comprehensive and systematic approach.

II - Basic Concepts of Food Security:

II– 1. Définitions of Food Security:

There are approximately two hundred (200) different definitions of food security, (Smith, Pointing, & Maxwell, 1993) reflecting the complexity and diversity in understanding this important concept. This concept has evolved over time due to changes in economic, social, and environmental contexts. Initially, issues of food security were first discussed during the Universal Declaration of Human Rights in 1948, which recognized the right to food as a fundamental element of decent living standards. (United Nations, 10 December 1948) Interest in global and local food security increased rapidly, especially after the World Food Conference in (United Nations, 10 December 1948). Food security was initially defined as the continuous availability of sufficient global food supplies of basic foods to sustain steady food consumption expansion and to offset production and price fluctuations. This definition conceptually emphasized the need for increased production, as protein-energy deficiency was believed to affect over 25% of the global population in 1970. (Berry, Dernini, Burlingame, Meybeck, & Conforti, 2015) In 1983, the definition was expanded to include access, ensuring that individuals have physical and economic access to food they need at all times. (FAO, 1983) In the mid-1990s, food security was defined as a state achieved when all people, at all times, have physical, economic, and social access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life. (World Food Summit, 13-17 November 1996) The terms "nutrition security" and "food and nutrition security" also emerged, considering food security as part of "food security and nutrition."

The Food and Agriculture Organization (FAO) provided an enhanced definition of food security in 2001, stating that it exists when all individuals have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life at all times. With regard to social emphasis, it was acknowledged that addressing poverty is necessary but not alone sufficient to achieve this goal (FAO, Food Insecurity: when people live with hunger and fear starvation, 2001) It was acknowledged that addressing poverty is crucial but insufficient on its own to achieve this objective. Then, at the 2009 World Summit on Food Security, the final official revision added the fourth dimension of stability to the concept of food security. More recently, there have been suggestions to include sustainability as a fifth dimension to encompass the long-term time dimension. (From Peng, 2019)

Through this evolution, the concept began to encompass additional factors such as food stability and environmental sustainability, reflecting the growing concern over the impacts of economic, political, and environmental policies and practices on food availability and access.

II– 2. The difference between Food Security and Food Insecurity:

When discussing food security, we inevitably delve into the realm of food insecurity. Food insecurity represents a stark contrast to the ideal of food security, highlighting the significant challenges and disparities that exist in access to adequate and nutritious food. It encompasses a spectrum of issues, ranging from outright hunger and malnutrition to more subtle forms of deprivation, where individuals or communities struggle to consistently obtain the food they need for a healthy and active life.

Food insecurity refers to the inability to predict where and when one will have access to food in the future. It is defined as: (Turner, 2020) the inability to consistently access an adequate supply of nutritious food. Food insecurity, defined as inadequate access to food due to financial constraints. (Men & Tarasuk, 2021) It also occurs when individuals do not have enough food, whether due to physical, social, or economic factors. (Clay, 2002) The USDA defines food insecurity as the absence of reliable and fair access to nutritious, safe, and reasonably priced foods that support optimal health and well-being. Insufficient access to nutritious food leads to enduring and immediate health and nutritional challenges and adversely impacts one's overall quality of life. (U.S. Department of Agriculture USDA, 2023) Food insecurity impacts individuals and households when there's uncertainty regarding future food access and availability, insufficient quantity and variety of foods (quality) essential for a healthy lifestyle, or when acquiring food necessitates resorting to

unethical or illegal methods. This portrayal integrates the notion of "feelings of deprivation" individuals experience alongside their perceptions of food insecurity, which can trigger response behaviors that perpetuate or exacerbate existing poverty or transfer it to future generations. Some of these practices carry significant nutritional risks, compromising both health and productivity, particularly for the most vulnerable household members-pregnant and lactating mothers and young children-who have heightened nutritional requirements. (Leroy, Ruel, Harris, & Ballard, 2015)

In general, there are several terms associated with food insecurity such as hunger, undernourishment (food insufficiency), and malnutrition. The term hunger encompasses a spectrum ranging from short-term physical discomfort.

Table (01): Terms Related to Food Insecurity

<i>Terms</i>	<i>Definitions</i>
<i>Food Security</i>	Food security exists when everyone has consistent physical and economic access to enough safe and nutritious food to fulfill their dietary requirements and preferences, enabling them to lead an active and healthy life.
<i>Nutrition Security</i>	Sufficient nutritional status encompassing protein, energy, micronutrients, and minerals for every member of the household.
<i>Food Insecurity</i>	Whenever access to nutritionally adequate and safe foods is restricted or uncertain, or when acquiring acceptable foods in socially acceptable manners becomes challenging.
<i>Hunger</i>	Hunger is the discomfort or pain experienced due to insufficient food. It may occur as a potential consequence of food insecurity, though it is not always inevitable.
<i>Under-nourishment Malnutrition</i>	"Inadequate intake of food to meet energy requirements" arises from deficiencies, excesses, or imbalances in the consumption of macro and/or micronutrients.

Source: (S, MS, & AS, 2010)

II– 3. The Dimensions of Food Security:

The Four Dimensions of Food Security are the four components that constitute food security. All four of these characteristics are equally valuable as analytical tools for food security and can be easily derived from the definition provided by the World Food Summit (WFS).

II– 3. 1. Food availability:

Availability is a crucial aspect of food security, as it entails ensuring a sufficient supply of food for a given population. However, it's important to note that mere availability alone isn't enough to guarantee people's access to food. (FAO, 2013)

II– 3. 2. Access to food:

Access to food relies on two main factors: economic and physical accessibility. Economic access is influenced by factors such as disposable income, food prices, and the availability of social support systems. Physical access, on the other hand, depends on the quality and availability of infrastructure like transportation networks, storage facilities, and market systems. Income generated from agricultural, forestry, fishing, and aquaculture activities significantly impacts food security. Enhancements in economic access are often indicated by decreases in poverty rates. (FAO, 2008)

II– 3. 3. Food utilization:

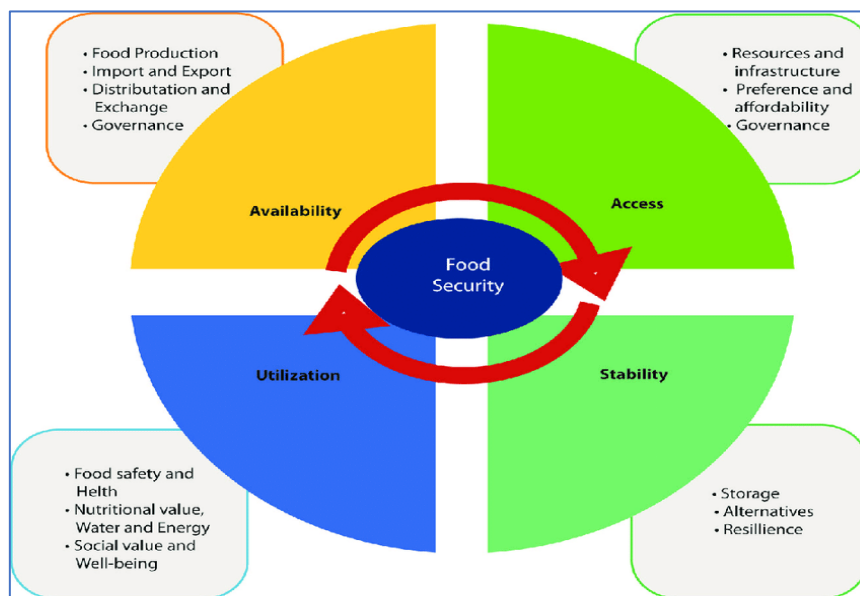
Utilization refers to how effectively the body processes and absorbs nutrients from food. Adequate intake of energy and nutrients is influenced by factors such as proper care, diverse diet, food preparation methods, and fair distribution within households. When coupled with efficient biological utilization of nutrients, these factors collectively impact an individual's nutritional well-being. (FAO, 2013) Research has demonstrated that the body's ability to effectively utilize nutrients from food is closely linked to an individual's health status, which itself depends on crucial non-food factors. It has been established that achieving optimal biological utilization requires access to adequate healthcare and

childcare, clean water and sanitation facilities, as well as comprehensive understanding of nutritional and physiological needs, coupled with their appropriate implementation. (Gibson, 2012)

II– 3. 4. Stability of the other three dimensions over time:

Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status. (FAO, 2008)

Figure (01): Essentials in food availability, access, stability, and utilization to ensure the food security.



Source: (Dayananda, 2022)

Recent advancements underscore the criticality of sustainability, representing the extended temporal dimension -the fifth dimension- of food security. Sustainability encompasses metrics spanning supra-national/regional scales, including ecology, biodiversity, and climate change, alongside socio-cultural and economic considerations. (Peng & Berry, 2019) These factors will shape the food security landscape for future generations.

III- Current Situation of Food Security in Algeria:

Algeria faces significant challenges in the field of food security. Despite possessing vast agricultural resources and animal wealth, the country heavily relies on imports to meet its food needs. Algeria is one of the largest importers of grains in the world, importing a significant portion of wheat, barley, and corn. This high dependency on food imports exposes the country to numerous risks and challenges that threaten its food security and increase its vulnerability. Achieving sustainability in local production and enhancing the competitiveness of the Algerian agricultural sector are essential steps towards achieving food security.

III– 1. Food production in Algeria:

Algeria, located south of the Mediterranean Sea and in northwest Africa, is the largest country in Africa and in the Middle East and North Africa region, as well as the Euro-Mediterranean area, with an area of approximately 2,381,741 square kilometers. The cultivated area in Algeria has seen significant growth, rising from 55,224.1 square kilometers in 2018 to 85,095.7 square kilometers in 2021. As for the per capita share of cultivated land, it increased from 0.130 hectares in 2018 to 0.193 hectares in 2021. Additionally, the arable land is estimated at about 41,316.07 thousand hectares, while the area allocated for irrigated perennial crops is estimated at approximately 978.97 thousand hectares. (Arab Organization for Agricultural Development, 2022) Algeria is a country with immense agricultural potential, boasting vast expanses of arable land and a diverse climate conducive to cultivating a wide range of crops.

III– 1. 1. Agricultural production and animal wealth:

Agricultural production and animal wealth are considered among the most important components for achieving food security in Algeria. Agricultural production includes cereal crops such as wheat, barley, and maize, as well as vegetables and fruits. The cultivation of strategic grains and food grains is considered a priority for the country. Additionally, Algeria possesses animal wealth, including livestock, poultry, and fish farming.

Table (02): The development of agricultural production and animal wealth in Algeria over the period 2018-2021 (*PRODUCTION: 1000 M.T.*)

<i>Item</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>
<i>Cereals</i>	6065.94	5633.45	4392.30	2783.40
<i>Wheat</i>	3981.22	3876.88	3106.00	2168.39
<i>Barley</i>	1957.33	1647.75	1213.14	555.36
<i>Maize</i>	9.13	7.3	3.481	18.881
<i>Rice</i>	0.24	0.23	0.30	0.31
<i>other cereals</i>	118.02	101.31	69.39	40.46
<i>Potatoes</i>	4653.32	5020.25	4659.48	4360.88
<i>Pulses</i>	146.30	146.56	115.05	98.44
<i>Vegetables</i>	9409.39	8619.98	10287.21	10106.68
<i>Fruits</i>	14634.71	4911.351	4540.818	4540.818
<i>green fodders</i>	4889.95	3462.95	2088.30	3480.40
<i>Red Meat Production</i>	507.67	509.82	529.00	514.45
<i>Poultry Production</i>	540.00	299.43	292.63	266.64
<i>Milk Production</i>	3280.00	3189.24	3354.70	3263.60
<i>Eggs Production</i>	314.04	341.56	308.46	305.24
<i>Fish Production</i>	120.35	105.13	86.90	83.98

Source: (Arab Organization for Agricultural Development, 2022) & (Arab Organization for Agricultural, 2021)

Through analyzing the table on the development of agricultural production in Algeria from 2018 to 2021, we can observe the trends in the production of various agricultural items during these years :

- a) **Grains:** The drastic fall in barley production (by almost 72% from 2018 to 2021) is one of the most significant changes. This could impact feed supplies for livestock and might have broader economic effects.
- b) **Pulses and other crops:** Pulses also show a consistent decline, which might affect dietary diversity and nutrition in local diets.
- c) **Livestock and Dairy Products:**
 - **Red Meat and Poultry Production:** There's a slight increase in red meat production, but poultry production decreases, which could influence protein availability in local markets.
 - **Milk and Egg Production:** Milk production shows resilience with a slight decrease, while egg production decreases steadily, suggesting different scales of vulnerability in livestock sectors.
- d) **Fish Production:** There is a continuous decrease in fish production, which could reflect overfishing issues or ecological changes affecting fisheries.

The decrease in major crops and protein sources (such as poultry) may pose challenges to food security, necessitating reliance on imports to meet local needs.

It should be noted that the current food production in the country does not meet the sufficient dietary needs of the growing and diverse population. As a result of this reality, the agricultural sector faces major and diverse challenges due to rapid climate changes, scarcity of water resources, and fragility of agricultural infrastructure. It is important to recognize that most agricultural production in Algeria is concentrated in specific sectors such as cereals, vegetables, and fruits, and is not evenly distributed across various rural areas. Consequently, the country remains heavily reliant on food imports to meet its diverse and increasing needs.

III– 2. The food consumption in Algeria:

Food consumption in Algeria is experiencing steady growth. With an increasing population and improved living standards, the demand for food and beverages is rising. Red meat, poultry, and dairy are among the essential food products that Algerians are increasingly consuming. This rise in consumption necessitates additional resources to meet the growing nutritional needs. Consequently, Algeria heavily relies on food imports to satisfy its dietary requirements. The country has a robust market for imported agricultural products, including grains, vegetable oils, red meat, and dairy. The dependence on food imports stems from the weakness of Algeria's agricultural infrastructure and challenges in local production. Nonetheless, the Algerian government aims to bolster domestic production and enhance the agricultural sector to reduce dependency on imports and achieve food security. And the following table illustrates the evolution of Total, Agricultural and Food Imports & exportsM

Table (03): Total, Agricultural and Food Imports & exports in Algeria over the period 2018-2021 (*Quantity: 1000 M.T.*)

Item	2018		2019		2020		2021	
	imports	exports	imports	exports	imports	exports	imports	exports
Total Agricultural & Food Imports (Million U.S. Dollars)	46333.1	41797.3	41934.1	41797.3	34665.4	35823.5	37215.4	22483.1
Cereals & Flour & Wheat	23721.93	13.61	25127.12	38.18	19047.19	56.93	21297.86	62.96
Barley	356.37	00.00	696.14	00.00	876.89	00.00	730.19	00.00
Maize	9156.99	00.00	8445.57	0.03	4633.81	0.01	3783.77	0.01
Rice	189.14	0.03	128.73	0.30	129.19	0.56	135.66	00.00
other cereals	41.68	11.17	28.58	37.41	60.12	17.29	45.47	17.80
Potatoes	110.44	0.82	90.46	4.55	62.15	2.15	64.40	0.43
Sugars	2179.84	471.17	1704.03	564.66	1777.71	1350.72	2398.96	550.67
Pulses	242.85	0.01	210.56	0.01	191.55	0.06	233.77	0.05
Vegetable Oils & Animal Fats	1045.42	14.21	985.72	1.94	999.97	1.66	1015.67	19.15
Vegetables	32.08	3.78	42.00	6.37	29.65	42.95	32.50	3.97
Fruits	82.81	92.21	241.64	120.79	315.61	69.58	224.61	161.58
Live cattle (1000 Head)	47.61	0.03	41.83	00.00	362.42	00.00	74.74	00.00
Red Meat	51.74	00.00	56.94	0.03	33.77	0.06	7.62	00.00
Live Poultry & Chicks	0.48	00.00	0.3	00.00	0.44	00.00	0.31	00.00
Total Milk	757.98	1.72	644.09	5.24	1271.85	3.55	597.32	1.12
Eggs	0.28	0.07	0.29	0.11	0.56	1.119	0.54	00.00
Fish	19.09	4.06	15.17	3.90	14.33	4.61	14.75	2.82
Coffee. Tea. & Cocoa	133.71	2.60	174.95	3.04	154.10	0.61	205.63	00.00
Total Spices	8.70	0.01	12.47	0.03	13.50	0.06	11.44	0.08
Miscellaneous Edible Preparations	215.42	31.69	153.82	35.74	142.08	17.70	143.77	96.71
Animal Fodder	1601.93	11.43	1490.95	2.70	793.62	3.48	654.00	00.00

Source: (Arab Organization for Agricultural Development, 2022) & (Arab Organization for Agricultural, 2021)

Through the analysis of the table, we find that:

a) Overall Trends in Agricultural and Food Imports vs. Exports:

- Imports consistently exceeded exports throughout the period, indicating a reliance on imported food to meet domestic demand. The total imports in 2021 were 37215.4 million USD compared to exports of 22483.1 million USD.
- There was a notable decrease in exports in 2021 compared to previous years, while imports showed a recovery from a dip in 2020.

b) Major Imported and Exported Goods:

- **Cereals & Wheat:** The largest category of imports, with a significant amount of wheat imported each year. Export figures for these are minimal, suggesting high domestic consumption.
- **Sugars and Vegetable Oils:** High volumes of these commodities are imported, with significant amounts of sugars also being exported, possibly reflecting processing and re-export activities.
- **Fruits and Vegetables:** Modest amounts are both imported and exported, suggesting some level of self-sufficiency and/or trade balance in these products.

c) Indicators of Food Security:

- **Diversity of Imports:** Algeria imports a wide range of food products, from basic staples like cereals to more specialized products like animal fats, indicating a dependency on global markets for food variety.
- **Self-Sufficiency:** The minimal export figures across most food categories, especially staple foods, imply that most of the agricultural production is consumed domestically, which could be vulnerable if import conditions change.
- **Fluctuations in Import and Export Volumes:** The fluctuation in the volume of imports and exports over the years, especially the drop in exports in 2021, might reflect external market conditions or internal production issues affecting food security.

d) Economic and Policy Considerations:

- **Economic Dependency:** The reliance on imports for basic food needs points to economic vulnerability. A sudden increase in global food prices or supply chain disruptions could pose risks to Algeria's food security.
- **Policy Implications:** There may be a need for policies aimed at increasing domestic production, reducing food waste, improving food processing industries, and enhancing the efficiency of the agricultural sector.

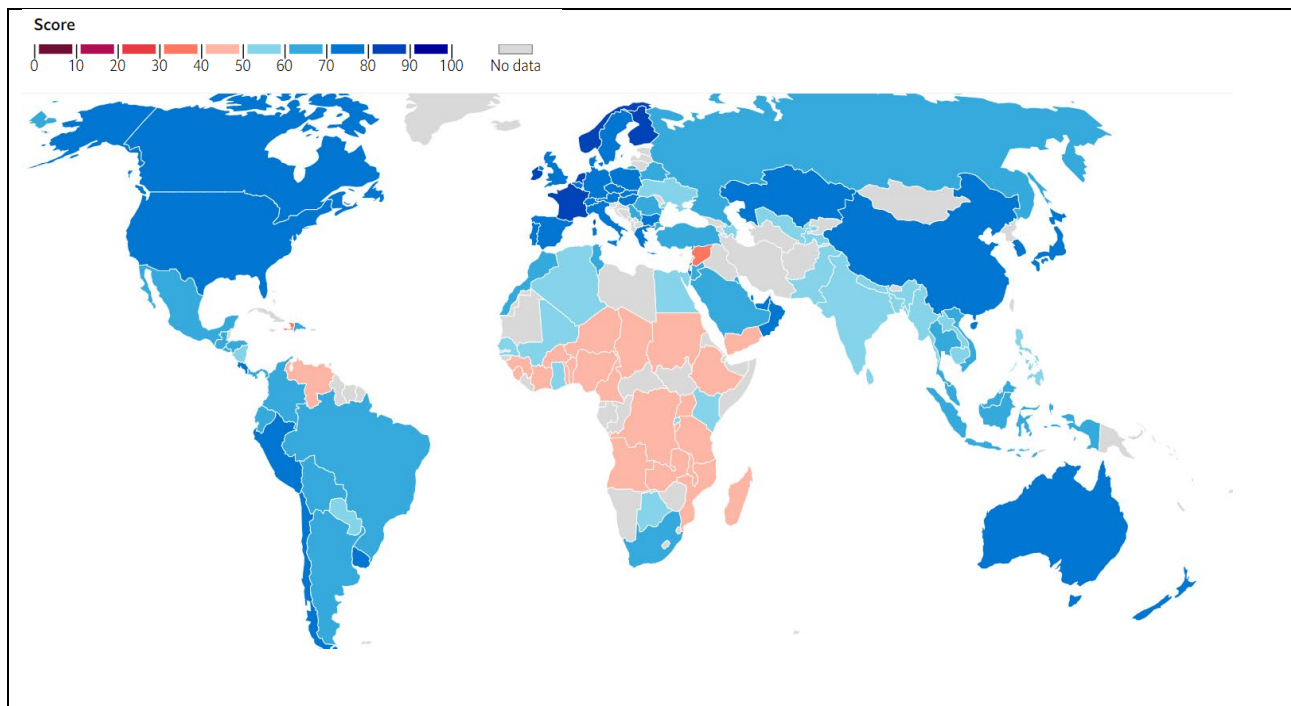
Overall, while Algeria has managed to meet its immediate food needs through imports, the low levels of exports and high import dependency suggest areas of vulnerability in its food security strategy. Efforts to increase local production and reduce dependency on imports could enhance long-term food security.

IV- Food Security in Algeria in Light of the Global Food Security Index:

The Global Food Security Index (GFSI), created by Economist Impact and backed by Corteva Agriscience, assesses food accessibility, availability, quality and safety, as well as sustainability and adaptability in 113 nations. This index is a comprehensive quantitative and qualitative evaluation tool, comprising 68 distinct indicators that gauge the factors influencing food security in both developing and developed nations.

IV– 1. Global Food Security Index:

The results of the 2022 GFSI indicate that the global food system is vulnerable, facing significant strain, and experiencing some of its worst outcomes in history. Food prices and hunger have reached unprecedented levels, and the affordability of food is declining as shocks such as the COVID-19 pandemic, armed conflicts, and climate change worsen systemic stresses. As threats to food security become increasingly commonplace, these stressors and shocks may intensify. To address these challenges and achieve the dual goals of sustainability and resilience, stakeholders across all sectors of the complex and interconnected food system must collaborate.

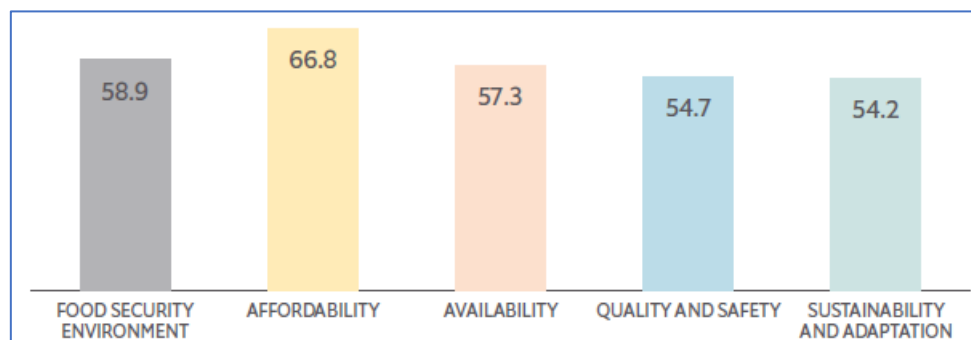
Figure (02): Global Overview 2022

Source: (Economist Impact, 2022)

Reports from the United Nations indicate that approximately 29.6% of the world's population, equivalent to 2.4 billion people, were unable to access food continuously, according to the prevalence of moderate or severe food insecurity in 2022. (League Of Arab States & Arab Organization for Agricultural Development, 2022)

IV– 2. Food security in Algeria as assessed by the Global Food Security Index:

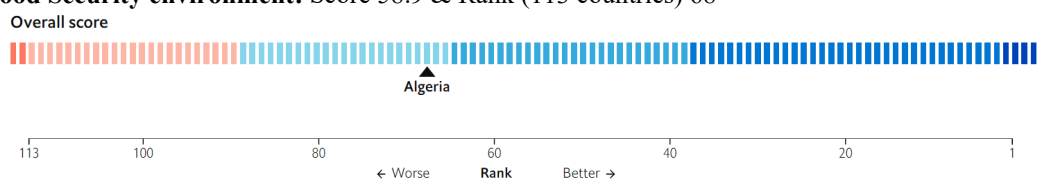
Algeria ranks joint 68th out 113 countries in the index and 12th out of 15 MENA countries, with an overall food security environment score of 58.9. It scores best in the Affordability (66.8) pillar and its weakest pillar is Sustainability and Adaptation (54.2), for which it closely follows its performance in Quality and Safety (54.7).

Figure (03): Globale Food Security Index 2022 Score for Algeria

Source: (Global Food Security index, 2022)

The previous figure will be clarified and analyzed as follows :

- ✓ **Food Security environment:** Score 58.9 & Rank (113 countries) 68th



- ✓ **Affordability** : Score 66.8 & Rank (113 countries) 64th- Measures the ability of consumers to purchase food, their vulnerability to price shocks and the presence of programmes and policies to support consumers when shocks occur.

Affordability



- ✓ **Availability**: Score 54.2 & Rank (113 countries) 56th- Measures agricultural production and on-farm capabilities, the risk of supply disruption, national capacity to disseminate food and research efforts to expand agricultural output.

Availability



- ✓ **Quality and Safety**: Score 54.7 & Rank (113 countries) 82th- Measures the variety and nutritional quality of average diets, as well as the safety of food.

Quality and Safety



- ✓ **Sustainability and Adaptation**: Score 54.7 & Rank (113 countries) 82th- Assesses a country's exposure to the impacts of climate change; its susceptibility to natural resource risks; and how the country is adapting to these risks.

Sustainability and Adaptation



IV– 3. Algeria's Food Security Environment 2012-2022 “Snapshot”:

Despite a decrease in affordability, Algeria has made overall improvements in its food security situation over the past 11 years. These improvements stem from advancements across all pillars. The chart below illustrates Algeria's performance in 2022 (latest available data). Scores are normalized on a scale of 0-100, where 100 represents the best conditions.

(Δ = change in score, 2022 compared with 2012. $\uparrow$ = Score improved $\downarrow$ = Score deteriorated - = no change in score)

Figure (04) : Algeria's performance in the Food Security Index for the year 2022.

FOOD SECURITY ENVIRONMENT					Score	Δ	
					58.9	↑ +8.4	
		Score	Δ			Score	Δ
1	AFFORDABILITY	66.8	↓ -9.0	2	AVAILABILITY	57.3	↑ +25.7
1.1	Change in average food costs	48.5	↓ -30.5	2.1	Access to agricultural inputs	49.0	↑ +1.9
1.2	Proportion of population under global poverty line	96.2	↔	2.2	Agricultural research & development	43.1	↑ +16.3
1.3	Inequality-adjusted income index	63.1	↓ -0.3	2.3	Farm infrastructure	54.1	↑ +36.6
1.4	Agricultural trade	50.0	↓ -8.7	2.4	Volatility of agricultural production	78.2	↑ +61.2
1.5	Food safety net programmes	79.3	↔	2.5	Food loss	58.2	↓ -4.0
				2.6	Supply chain infrastructure	34.4	↑ +9.2
				2.7	Sufficiency of supply	100.0	↑ +59.6
				2.8	Political and social barriers to access	42.1	↓ -6.2
				2.9	Food security and access policy commitments	52.5	↑ +52.5
				3	QUALITY AND SAFETY	54.7	↑ +3.3
				3.1	Dietary diversity	49.1	↑ +3.2
				3.2	Nutritional standards	0.0	↓ -29.8
				3.3	Micronutrient availability	64.7	↑ +18.5
				3.4	Protein quality	67.3	↑ +3.2
				3.5	Food safety	92.4	↑ +21.9
				4	SUSTAINABILITY AND ADAPTATION	54.2	↑ +17.2
				4.1	Exposure	76.2	↔
				4.2	Water	33.7	↔
				4.3	Land	64.7	↓ -0.2
				4.4	Oceans, rivers and lakes	26.6	↓ -20.7
				4.5	Political commitment to adaptation	28.5	↑ +25.9
				4.6	Disaster risk management	100.0	↑ +100.0

Very good
(80–100)

Good
(70–79.9)

Moderate
(55–69.9)

Weak
(40–54.9)

Very weak
(0–39.9)

Source: Global Food Security Index 2022.

■ Very good (80–100)
 ■ Good (70–79.9)
 ■ Moderate (55–69.9)
 ■ Weak (40–54.9)
 ■ Very weak (0–39.9)

Source: Global Food Security Index 2022.

Source: (Global Food Security index, 2022)

Through the previous figure, Algeria's performance in the Food Security Index for the year 2022 can be analyzed, relying on available data.

a) Overview

The chart provides scores for Algeria across various components of food security, normalized on a scale from 0 to 100, where 100 represents optimal conditions. It compares the scores from 2012 and 2022.

b) Detailed Analysis

- **Overall Score:** Algeria's overall food security score has improved over the past decade.
- **Availability:** There was an increase in the score for availability of food, indicating better conditions for food production and distribution.
- **Access:** Access to food also showed improvement, suggesting that economic and physical access to food has been enhanced.
- **Utilization:** Utilization, which involves food preparation and consumption adequacy, saw an improvement.
- **Stability:** The stability of food availability and access, despite potential disruptions like economic fluctuations or weather events, has improved.

c) Trends and Insights

- **Positive Developments:** The chart shows that there has been a broad improvement across all pillars of food security in Algeria. This is a positive sign, indicating that efforts to enhance food security have been broadly effective.
- **Areas for Improvement:** While there are improvements, the degree of change in each area could provide insights into where focused efforts may still be needed, especially if some areas have seen only marginal improvements.

Algeria excels in disaster risk management, food supply sufficiency, and food safety, achieving perfect scores of 100 in these areas. However, there's room for improvement in nutritional standards and supply-chain infrastructure, where rankings are lower due to deficiencies in dietary guidelines and infrastructure inadequacies, respectively. Algeria also shows weak political commitment to adaptation, particularly in environmental-economic accounting and early-warning measures. Strengthening these areas could enhance food availability and overall food security in Algeria.

V- The challenges facing food security in Algeria:

Algeria faces food security challenges due to climate change affecting agricultural production, with temperature shifts and rainfall deficits hindering crop and livestock farming. Water scarcity exacerbates these issues, limiting agricultural expansion. Population growth increases food demand, adding strain. Inadequate agricultural infrastructure complicates food security efforts.

V– 1. Climate Change and Its Impact on Agricultural Production:

Algeria is increasingly facing extreme climatic events, gradually exacerbating its impact. In addition, recurrent periods of drought, which have become longer, have led to the worsening of desertification. Approximately only 13% of the land possesses a Mediterranean climate, while the rest is dominated by a semi-arid to desert climate. Moreover, arable land accounts for less than 3% of Algeria's total area and is mostly confined to the northern part of the country. Despite significant progress, agricultural opportunities in the desert region are limited due to the scarcity and salinity of arable land, which are often confined to oasis areas. (Ministry of Environment and Renewable Energies, October 2023) As a result, rural inhabitants—mainly farmers and livestock breeders—are forced to migrate to major cities. This situation directly contributes to soil degradation and water scarcity in those areas. Recent climate change analyses have shown that its effects are now palpable in the Mediterranean region, leading to an increasing recurrence of unusual and extreme weather phenomena. Global efforts to mitigate climate change will only partially reduce its impact. The average annual temperature rise in the Mediterranean region is approximately 1.5 degrees Celsius above pre-industrial levels (1880-1899). Current climate change rates indicate that the impact of global warming on temperatures in the Arab Maghreb region, specifically Algeria, exceeds the global average. While global temperature rise in the twentieth century was 0.74 degrees Celsius, it ranged from 1.5 to 2 degrees Celsius in the Arab Maghreb region, depending on the area—more than double the global average increase. (Bensmaine, 2022)

Additionally, there is a concerning increase in exposure to natural disasters in Algeria, such as severe floods and persistent drought waves. These floods have intensified since the beginning of the new millennium, starting with the flood of Hay Bab El Oued in Algiers in November 2001. During the period from 2010 to 2018, notable floods include those in El Bayadh in 2010, El Tarf in 2012, Oum El Bouaghi in 2013, El Oued in 2013, and Tiaret in 2018. (Ministry of Environment and Renewable Energies, October 2023) This exacerbates the difficulty of producing and providing food, thus reducing local contributions to agricultural production. This climate change-induced problem poses a significant threat to future food security in Algeria, necessitating urgent and effective measures to address it and ensure the sustainability of the country's agricultural sector.

Therefore, Algeria faces significant challenges due to climate change and its substantial impact on agricultural production. The country deals with a noticeable increase in levels of greenhouse gas emissions and temperature fluctuations, complicating agricultural operations in Algeria. Its negative impact is evident on the diverse agricultural crops the country relies on. Hence, there is an urgent need to explore innovative and effective ways to increase food production in Algeria to meet the growing demand for food resources.

V– 2. Water Resources Scarcity and Its Impact on Agriculture:

The agricultural productivity, both for crops and livestock, is directly and indirectly affected by climate change, due to the combined impact of greater temperature fluctuations and rainfall variability on agricultural yields (disruption in phenological cycles) and the effects of destructive extreme weather events. It should be noted that the agricultural sector consumes more than 60% of the water resources used. Expanding irrigated lands to over 1,560,000 hectares by 2030 is assumed. Water availability per capita has decreased from 1,500 cubic meters in 1962 to about 450 cubic meters at present. Over the past 25 years, Algeria has experienced periods of severe and continuous drought, characterized by a rainfall deficit estimated at 30% over the entire territory. Consequently, there is a gradual deterioration of land due to the exacerbation of natural factors by human activity and the increasing phenomenon of desertification. Thus, more than 27 million hectares covering twelve provinces of the plains region are classified as extremely sensitive areas to desertification, and every year, several thousand hectares of arable land become desertified. (Ministry of Environment and Renewable Energies, October 2023) As for rainfall, its annual quantity ranges between 400 and 1200 millimeters. Irregular and often heavy rainfall leads to soil erosion and sedimentation in dam reservoirs. There is a noticeable variation in rainfall levels between northern and inland regions, for example, rainfall at the peak of the Djurdjura mountain range (northeast) reaches up to 1800 millimeters annually. In the south, less than 10 kilometers away, the Saharan valley barely receives 400 millimeters. There is also another variation between eastern and western regions, where rainfall in the east exceeds that in the west. (Bensmaine, 2022) Algeria faces a significant challenge given its annual water consumption of about 5 billion cubic meters, while future needs are estimated at around 12.9 billion cubic meters by 2030. In response to this challenge, Algeria has launched a comprehensive national program including water desalination, dam construction, water transfer projects, and well drilling. By the end of 2021, Algeria had launched 14 water desalination plants, which currently contribute 17% of total water supply, with a production capacity exceeding 2.1 million cubic meters of fresh water per day. This program aims to alleviate water pressure, preserve essential groundwater resources in the long term, and meet the increasing demand for fresh water for irrigation purposes. Algeria plans for desalinated water to contribute 22% of its needs by 2022, rising to 42% by 2024, and reaching 60% by 2030, according to the Water Strategy for the years 2021-2030. Although climate change predictions remain uncertain, a sharp decline in plant production due to reduced yields and cultivated areas should be expected. For example, estimates from some sources indicate that these losses will range from 15% to 25% of volume, amounting to a loss between 3.2 and 5.4 billion US dollars (based on current prices). Consequently, crop and root tuber production, including potatoes and legumes, and livestock products will experience significant decreases in yields, affecting employment and income in the agricultural sector. (Ministry of Environment and Renewable Energies, October 2023)

Therefore, the agricultural sector in Algeria faces a major challenge due to water resource scarcity and its impact on agriculture. Agriculture heavily relies on water for crop irrigation and livestock farming. However, Algeria suffers from water resource shortages due to insufficient rainfall, groundwater depletion, and deteriorating water quality. This negatively impacts the ability to increase agricultural production and secure food for the population. Addressing this issue requires adopting strategies to conserve agricultural water use and improve the agricultural irrigation system to achieve agricultural sustainability in the face of water scarcity.

V– 3. Population Growth and Increased Demand for Food:

Algeria is experiencing a continuous increase in population; where the population rose to 44.178 million persons in 2022 from 42.6 million persons in 2018, an increase of about 3.70 %, while the rural population decreased from 11.498 million persons in 2018 to 11.317 million persons in 2022, a decrease of 1.57 %. Additionally, the agricultural workforce is low, representing 21.61 % of the total workforce in 2022. (Arab Organization for Agricultural Development, 2022) which is somewhat low As for the average per capita GDP of the agricultural sector, it is estimated at 457.29\$ for 2022, which is somewhat low. (League Of Arab States & Arab Organization for Agricultural Development, The Annual Report on Food Security Conditions in 2022., 2022) This increases the demand for food and poses a significant challenge to achieving food security. With the increasing population, there is a growing demand for food and animal products. Sufficient quantities of food must be provided to meet these growing needs. However, achieving this is challenging within the current agricultural capacities. Agricultural production must be increased, and the ability to meet the population's food needs in the long term must be improved. Despite the size of the challenge, Algeria had made some progress in reducing food insecurity before the outbreak of the pandemic. According to the three-year average estimated by the Food and Agriculture Organization of the United Nations (FAO), the percentage of the population suffering from moderate to severe

food insecurity decreased to 17.6% for the period from 2018 to 2020, compared to 22.9% for the period from 2014 to 2016. However, before the COVID-19 pandemic, it was estimated that 24 million Algerians spent more than 60% of their income to meet their food needs alone. (Tanchum, November 9, 2021) Despite its hydrocarbon wealth, Algeria's continued policy of supporting food imports in the face of global food price increases and the shortage of local production due to drought has become a heavy burden on the public financial system.

VI- Conclusion:

Through studying the reality of food security in Algeria, it becomes clear that the country faces complex challenges in securing its food needs. Despite national efforts to enhance self-sufficiency and support local agriculture, Algeria still heavily relies on imports to meet its food requirements, exposing it to numerous risks related to stability and fluctuations in global markets. The following conclusions have been reached:

- ✓ Climate change and water resource scarcity hinder agricultural production, negatively impacting the ability for sustainable farming and food production.
 - ✓ Algeria is among the world's largest grain importers, and this dependence makes it vulnerable to fluctuations in global market prices and economic disruptions.
 - ✓ There are movements towards enhancing self-sufficiency through supporting local agriculture and diversifying food sources, along with improving water resource management and adapting to climate change.
 - ✓ There is a pressing need for effective policies to improve agricultural infrastructure, achieve sustainability in food production, reduce food waste, and enhance food processing industries.
 - ✓ Food security is not just a matter of food availability but directly affects social and economic stability. Food insecurity can lead to social problems such as poverty, hunger, and inequality, negatively impacting economic growth and sustainable development in the country.
- **Recommendations:**
- ✓ Enhance investments in agricultural technology to increase productivity and sustainability.
 - ✓ Develop national policies to encourage local production and reduce reliance on imports.
 - ✓ Focus on education and awareness about the importance of food security and sustainable agricultural practices among farmers.

To effectively address food security challenges, Algeria needs to implement a comprehensive approach that integrates agricultural, water, economic, and environmental policies. This includes improving land use laws, developing agricultural infrastructure, and establishing programs to support farmers in improving food production and reducing dependence on imports.

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