

The wheat sector in Algeria facing the challenges of food security

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Abstract:

The war in Ukraine has highlighted the critical importance of food security, particularly for countries dependent on imports of strategic commodities such as wheat, which is essential in Algeria. This commodity, a mainstay of Algerian diets, requires massive imports to meet needs. This article analyzes the complex challenges Algeria faces in ensuring its food security, including climatic, structural, and economic obstacles. A long-term strategy focused on modernizing agriculture and reducing dependence on imports is essential to address these challenges. A multifaceted approach and concerted efforts are needed to ensure sustainable food security in the years to come.

Keywords: Algeria, food security, wheat, challenges, production, needs, imports.

Jel Classification Codes: Q10,Q14 ,Q18

1. INTRODUCTION

Wheat has long been the staple food of Algerians, and continues to be so, it is a product that draws its importance from its high degree of satiety and its refreshing taste without tiring, with an average annual consumption of about 230 kg per person (2017, *سالت*) or nearly 2 and a half times the world average, which is 95 kg/person/year (FAO, 2025), which constitutes for the Algerian 25% of his family food budget, and which in turn represents the equivalent of more than 2 billion US dollars of annual state expenditure. Feeding a rapidly growing population is not easy, especially since by 2030, Algeria will have some 60 million souls to feed (the 45 million inhabitants mark has already been exceeded in 2023). Although agriculture and reducing food dependency on the outside world have always officially been among the national priorities, the results have remained below the expected objectives;

The question that arises then is the following: for Algeria, what are the challenges to be met to ensure our food security around this strategic product that is wheat?

2. The concept of food security

We considered it useful to clarify the theoretical aspect relating to the problem addressed.

Algeria, like developing countries, has refocused the concept of food security through institutional and administrative measures aimed at improving people's access to abundant food in quantity and quality (Poitevin & Bezzaz, 2020). Various actions have been undertaken since the concept of food security took precedence over that of food self-sufficiency (MADR, 2022)

Recently, through the roadmap of the Ministry of Agriculture on the sustainable transformation of food systems in Algeria by 2030, refers to the definition of food security initiated by the FAO¹, and that it: "must allow everyone to access sufficient, healthy food that prioritizes the nutritional, organoleptic and cultural quality of products (MADR, 2022). To do this,

this system must be based on sustainable production methods that preserve the natural resources (soil, water, biodiversity and energy) on which our food is based.

3. Aspects of the food system in Algeria

The aspect of the structure of the energy food (Cerdan, 2019) ration in Algeria reflects the socio-economic, demographic and cultural changes that the country has experienced in recent decades. It refers to the distribution of food energy sources in the diet of the population, the latter which continues to increase (see table 1). For our country, carbohydrates occupy a predominant place in the diet of Algerians, whose share in the energy ration is around 55 to 60%. This main source of energy in the Algerian diet comes mainly from cereals and derived products

Since the 2000s until today, Algeria has experienced an accelerated modernization of its diet, influenced by globalization and changes in lifestyles (FAO, 2005)

However, the consumption of refined cereal products (white bread, pasta) remains high, while complex carbohydrates (whole grains, legumes) are less consumed. And this has consequences of strong dependence on imports. Thus, the structure of the energy food ration can be quantified in Table 2.

Table 1. Demographic evolution in Algeria

Year	Population
1966	11 821 679
1977	16 063 821
1987	22 732 880
1998	29 100 867
2008	34 080 030
2016	40 835 601
2022	44 900 000
2023	46116000
2024	46630000

Source: NSO², 2023 and Statista³ 2025

From Table 2, below, it can be concluded that in Algeria, carbohydrates occupy a central place in the food ration (Kamel & Padilla, 2014), and they are mainly influenced by traditional eating habits, local availability and imports; and which come mainly from cereals and derived products. Wheat is the most consumed cereal, mainly in the form of bread (baguette, traditional pancake) and semolina (used for couscous), the annual consumption of bread is estimated at 120-140 kg / person (Harrag & Boulferd, 2019) one of the highest in the world; also couscous, which is a national dish, prepared from wheat semolina, it is a major source of complex carbohydrates, as well as pasta, which are increasingly popular, especially in urban areas.

Table 2. Characteristics of the food ration in Algeria

Daily Caloric Intake	Macronutrient distribution	Dependence on imports
• 1960s-1970s: Daily caloric intake was about 2,000-2,200 kcal/person/day, with a dominance of complex carbohydrates (cereals, legumes). • 2000s: Caloric intake increased to about 3,000 kcal/person/day, often exceeding average energy needs. • Today: Average caloric intake is estimated at 3,100-3,200 kcal/person/day, which is higher than WHO recommendations (2,000-2,500 kcal/day for an adult).	• Carbohydrates: - o Account for about 55-60% of total energy intake. - o Cereal consumption (wheat, barley) is high, averaging 150-180 kg/person/year (mainly in the form of bread and semolina). - o Sugar consumption has increased significantly, reaching about 35 kg/person/year (above the world average of 20-25 kg/person/year). • Lipids: - o Account for about 25-30% of total energy intake. - o Vegetable oil consumption (sunflower, soybean) is high, averaging 15-20	* Algeria imports about 70-75% of its cereal needs (wheat, barley, corn), which influences the structure of the energy ration, and which influences the structure of the carbohydrate ration. • * The annual food bill exceeds 10 billion dollars, with a strong dependence on imports of wheat, milk and sugar.

	- kg/person/year. - o The share of saturated fats (from processed foods and meat) has increased. • Proteins: - o Account for about 10-15% of total energy intake. - o Meat consumption (poultry, mutton, beef) has increased, reaching around 25-30 kg/person/year. - o Dairy consumption is also increasing, with an average of 100-120 litres/person/year.	
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Source: produced by the author from statistics provided by FAO stat 2022

4. Evolution of food security governance

Algeria has made food security a central objective of its agricultural development plans, aiming to establish a sustainable development strategy to achieve it. However, agricultural policies implemented since the 2000s, (Bedrani & Cheriet, 2012) such as the National Agricultural Development Plan (NADP)⁴ and the Agricultural Renewal, have encountered many obstacles: technical, financial, legal and social constraints, as well as a sometimes inconsistent political commitment. For example, despite an official discourse of protecting agricultural land, many cases of diversion of this land from its initial vocation have been recorded. Food security is closely linked to the country's economic situation, in particular to the growth of its GDP⁵ and its distribution. In Algeria, economic growth has been fluctuating, sometimes positive but with major challenges (FMI, 2024) .

Table 3 .The rate of agricultural GDP compared to total GDP in Algeria

Period 2010-2015	10%-12%	In average value(18,2Md USD)
Period 2016-2020	12%-14%	In average value(21,4Md USD)

Source: produced by the author from statistics provided by IMF 2022

The foundation of any policy aimed at adequate food security is the agricultural sector; however, there has been no agricultural census since 2001. According to available information, Algeria has approximately 1 million farms, 50% of which are less than 20 ha, with an average size of 8 ha. Approximately 800,000 farms are privately owned and occupy 69% of the UAA⁶. 100,000 are operated by concession of private domain from the State (30% of the UAA), the rest being State pilot farms or operated by research or development institutes and organizations (MADR, 2003).

Table 4. Distribution of agricultural holdings in Algeria, by surface area

UAA (ha)	Farms		areas	average size (ha⁷)
less than 10 ha	717 155	70%	2 155 703 ha	3,0
10-50 ha	231 110	22,6%	4 471 437	19,3
more than 50 ha	19 599	1,9%	1 921 539	98
subtotal	967 864	94,5%	8 548 679	8,8
above ground	55935	5,5%	-	-
Total	1 023 799	100%	8 548 679	8,3

Source: MARD, 2003- General Census of Agriculture, 2001 Algiers

Algeria has made food security a central objective of its agricultural

development plans, aiming to establish a sustainable development strategy to achieve it. However, agricultural policies implemented since the 2000s, such as the National Agricultural Development Plan (NADP) and the Agricultural Renewal, have encountered many obstacles: technical, financial, legal and social constraints, as well as a sometimes inconsistent political commitment. For example, despite an official discourse of protecting agricultural land, many cases of diversion of this land from its initial vocation have been recorded. Food security is closely linked to the country's economic situation, in particular to the growth of its GDP and its distribution. In Algeria, economic growth has been fluctuating, sometimes positive but with major challenges.

The difficulty of living conditions led the authorities to officially recognize the problems of precariousness, poverty and exclusion, notably at the Conference on Poverty and Exclusion in Algiers in 2000; the concept of food security was then integrated into the objectives of the NADP launched the same year (Gozlan, F, Belkeir, & Yakhlef, 2010).

This plan focused on the development of strategic sectors (cereals, milk, meat, olive growing, etc.) and on water management. Performance contracts by wilaya were established, setting agricultural development objectives for 2014. However, the 2008 reforms, like those that preceded them, did not reduce the country's food dependency (Saidoun, Ait Hammou, & Chehat, 2022). Land instability and the persistence of fallow land (around 3 million hectares) hampered modernization efforts. A new land law in 2010 attempted to address these issues by establishing 40-year concessions for agricultural land. Despite some improvements, Algerian agriculture has not achieved the expected results, particularly for strategic products such as cereals. Reforms have often been hampered by a lack of rigor and insufficient support; population growth has also increased pressure on food resources (Rezki, Cheriet, Khiali, & Makhlouf, 2024).

Faced with these challenges, Algeria has committed to achieving the UN Sustainable Development Goals (SDGs), in particular SDG 2, which aims to eliminate hunger, ensure food security and promote sustainable

agriculture by 2030 (Bessaoud, 2022). This objective is based on five key indicators, including access to nutritious food, the fight against malnutrition, increasing agricultural productivity and preserving ecosystems.

In this context, it should be noted that the bulk of the structural reforms proposed by the roadmap for the sustainable transformation of food systems in Algeria by 2030 aims to successfully carry out this profound transformation and change in food systems, through the establishment of horizontal and vertical food governance, the table... traces the different programs included in the intersectoral action plan for the sustainable transformation of food systems.

Table5. the sustainable transformation plan for food systems2020

Program	Key objectives
National Non-Communicable Disease (NCD) Control Programme	Promoting healthy eating
The national food safety system in Algeria	Food safety and sanitation monitoring
The National Food Safety Plan (PNSSA)	Strengthen policies and the regulatory framework, formalize and strengthen risk assessment, monitoring and alert, and response systems
The Waterborne Disease Control Program (WBD)	preventive and curative checks on the quality of distributed water
The Food Waste Control Program	the fight against waste, limiting losses,
Algerian Diet Promotion Program	Encouraging increased consumption of food legumes (preferably from domestic production) rich in vegetable proteins as well as durum wheat and cereals
The Program for the Substitution of Imported Agricultural Products	the development of the productivity of small and medium-sized farms, while making sparing use of water and solar energy
Program for the development and protection of steppe and pastoral areas	the fight against land degradation, the fight against desertification and the creation of small livestock units.
Implementation of the national strategy for the blue economy (SNEB)	the development of investment in the field of fisheries and aquaculture

Source: produced by the author from Roadmap for the sustainable transformation of food systems in Algeria by 2030

5. Wheat Product: Importance, Area and Production.

Cereal products, mainly wheat, occupy a strategic place in the food system and in the national economy. This characteristic is clearly perceived through all phases of the sector. This speculation is present in all bioclimatic levels, including in the Saharan zones.

Thus, cereals and their derivatives constitute the backbone of the Algerian food system. Indeed, they provide more than 60% of the caloric intake, and 75 to 80% of the protein intake of the national food ration.

During the two periods 2000-2010 and 2010-2020 ,the area cultivated in soft wheat and durum wheat generally fluctuated between 2 and 2.5 million hectares (Boukella, 2021) . The Useful Agricultural Area (UAA) is estimated at approximately 8.5 million hectares. Wheat cultivation (durum wheat and soft wheat) occupies a significant part of this area, generally between 30% and 35% of the UAA, depending on the year and climatic conditions.

During the period 2000-2010, the area sown with cereals in Algeria experienced fluctuations depending on climatic conditions, agricultural policies and available water resources.

Area sown with cereals (2000-2010), with an annual average of 3.5 million hectares. From which we can see annual variations, such as drought years (such as 2000-2002 and 2009) saw a reduction in the area, sometimes below 3 million hectares. But the most favorable years (such as 2005-2008) reached areas close to 4 million hectares. For the distribution of the main cereals, it is as follows:

- a. Durum wheat: 1.75 million hectares, equivalent to 50% of the sown area
- b. Soft wheat: 1 million hectares, which constitutes 28% of the cereal area
- c. Barley: 0.75 million hectares.

Among the factors influencing the area sown were recurrent droughts, since Algeria experienced several drought episodes during this period, which limited the areas sown. In addition, the government implemented subsidies and incentives to encourage cereal production, but the results were mixed due to climatic constraints; it can be added that the availability

of irrigation water played a key role in the areas sown, especially in arid and semi-arid regions.

During the period 2010-2020, the area sown with cereals in Algeria continued to fluctuate according to climatic conditions, reaching an annual average of about 4 million hectares, with fluctuations:

- o Drought years (such as 2016-2017) saw a reduction in area, sometimes below 3.5 million hectares.
- o More favorable years (such as 2018-2019) reached areas close to 4.5 million hectares.

For the last decade, the distribution of the main cereals was as follows:

- a. Durum wheat: 2 million hectares.
- b. Soft wheat: 1.25 million hectares, which constituted a rate of 31%, i.e. an increase in area of approximately 3% compared to the previous decade.
- c. Barley: 1.2 million hectares.

It should be noted that Algeria has experienced episodes of severe drought, particularly in 2016-2017, which limited the areas sown. Although the government has continued to support cereal production through incentives and irrigation programs, the results have been uneven due to climatic hazards.

Regarding cereal production, Algeria has experienced significant fluctuations during the two decades 2000-2010 and 2010-2020, mainly due to recurring droughts. For the period 2000-2010, the average annual production was on average 2 to 3 million tonnes, with annual variations, where drought years (such as 2000-2002 and 2009) saw production drop to 1.5 million tonnes or less.

While the most favourable years (such as 2005-2008) reached productions of 3 to 4 million tonnes. For the main cereals produced:

- a. Durum wheat: 1 to 1.5 million tonnes.
- b. Soft wheat: 0.5 to 1 million tonnes.
- c. Barley: 0.5 to 1 million tonnes.

The government has implemented subsidies for agricultural inputs (seeds, fertilizers) and irrigation programs, but the results have been limited by climatic hazards.

Local production often covered only 30% to 50% of national needs, forcing Algeria to import massively. For the period 2010-2020, annual production reached an average of 3.5 million tons. Hence the main cereals produced are:

- a. Durum wheat: 1.75 million tons.
- b. Soft wheat: 1.25 million tons.
- c. Barley: About 0.85 million tons.

In terms of employment, more than 500,000 permanent and seasonal jobs are provided by the cereal system.

Since total agricultural employment in Algeria is estimated at 2.5 to 3 million people (or 20 to 25% of the total active population), the share of the cereal sector is directly provided by approximately 8 to 12% of agricultural employment.

Pending the national census of agricultural and livestock holdings included in the framework of the implementation of the roadmap for the agricultural sector 2020-2024, the table below best indicates, according to the last agricultural census of 2001, the situation of farmers in Algeria by activity, where large-scale crops occupy the first place with 348,895 farmers for an area of approximately 3 million hectares for cereals; it should be noted that the statistics vary somewhat depending on the sources.

Table 6. Distribution of farmers by agricultural activity

Activity	Effective	%
Large crops	348 895	36,75
Arboriculture	188 144	20,28
Market gardening	82 644	9,02
Large farms	222 771	24,01
Small farms	30 449	3,28
Land development	55 365	5,97
Marginal activities	392	0,04
Unexploited properties	5984	0,65
Total	934 641	100

Source : National Chamber of Agriculture, Algiers Juin 2012

In terms of production, Algeria remains far behind in terms of wheat production if we compare it to the world level. Algeria's ranking comes just after Afghanistan, Ethiopia, Uzbekistan, Brazil, Egypt, Kazakhstan, Iran, the United Kingdom and Turkey. In the top 10, we find Argentina, Ukraine (20.5 million metric tons), Pakistan, Australia (33 million), Canada (35 million), the United States (44 million). Russia is fourth with an estimated production in 2022 of 91 million metric tons, ahead of India, the European Union and China (More than 138 million metric tons).

Table 7. Level of wheat production 2010-2020 (in million tons)

Year	Quantity
2010	4,5
2011	4,7
2012	5,1
2013	4,9
2014	3,7
2015	3,4
2016	3,6
2017	4,2
2018	4,8
2019	4,1
2020	4,5
2021	3,2
2022	3,4
2023	3,5
2024	±3,7

Source: NSO, AICO⁸, National Chamber of Agriculture, and MARD

6 - Issues and challenges of food security in Algeria

The issues and challenges of food security in Algeria are multiple and often complex (2024 (سالت محمد مصطفى،). As a reminder, Algeria has the lowest agri-food import coverage rate in the North African region. Between 2010 and 2015, this rate was around 5%; and between 2016 and 2018 the rate remained low, fluctuating between 5% and 10%, despite the

government's efforts to stimulate local production through various programs, in 2019, agri-food imports reached a peak of nearly \$10 billion, according to data from the Ministry of Agriculture, the bill for wheat imports alone exceeded \$2 billion.

In 2020, the COVID-19 pandemic exacerbated food security challenges, with disruptions to global supply chains. However, the coverage rate remained stable, around 5% to 7%, due to the low export capacity of the national agri-food sector. Thus, a set of factors can be put forward to explain this low coverage, firstly the dependence on cereals, Algeria imports more than 50% of its cereal needs, mainly soft wheat used for bread production. In 2020, cereal imports accounted for around 40% of the total agri-food bill (FAO, 2021). The second factor is limited exports, and the third factor is structural obstacles, since the agricultural sector suffers from structural problems, such as land fragmentation, lack of irrigation and low mechanization, which limit its productivity and export competitiveness.

Table 8. The coverage rate of agri-food imports in Algeria (2010-2020)

Year	Agri-food imports (in billions of USD)	Agri-food exports (in billions of USD)	Coverage rate (%)
2010	6,2	0,3	4,8
2015	8,5	0,4	4,7
2018	9,2	0,5	5,4
2020	9,8	0,6	6,1
2021	8,5-9	0,2-0,3	2,5-3,5
2022	9-9,5	0.3-0.4	3-4
2023	9,5-10	0,4-0,5	4-5
2024	9-9,5 (forecasts)	0,5-0,6(forecasts)	5-6(forecasts)

Source: FAO, MARD, World Bank ⁹

Food security is a major issue for our country, which relies heavily on imports to feed its population. Despite efforts to develop the agricultural sector, the country faces structural, climatic and economic challenges that hamper its food autonomy.

The first of these challenges is the confrontation with several structural obstacles, firstly the fragmentation of land, since the majority of farms are small, which limits their productivity and competitiveness.

Secondly the lack of modernization (سالت محمد مصطفى، 2024), where the use of modern agricultural technologies remains limited, and access to irrigation is insufficient. According to the World Bank, only 10% of agricultural land is irrigated in Algeria (BM, 2024). We also add the dependence on subsidies, although public subsidies support farmers, they are not enough to stimulate sustainable and competitive production.

The second challenge is economic, resulting from the decline in budget revenues and the country's financial resources linked only to gas and oil exports, which depend on many exogenous factors over which the country has no control and only suffers the repercussions. Thus, a fluctuation in world prices, since dependence on imports exposes the country to variations in international food prices, such as wheat and cooking oil. This too can put pressure on public finances, massive imports of food products weigh on the state budget, especially in times of falling oil revenues.

The third challenge is demographic and social, resulting from the significant increase in the population (the population reached 46.63 million inhabitants in 2024; it will reach 50 million in 2030. Two major facts must be highlighted for the future), which increases the demand for food products (durum wheat and soft wheat) and whose local supply remains insufficient. Hence the climatic and environmental challenges. Algeria is facing difficult climatic conditions, characterized by increasing aridity and irregular rainfall. According to the Intergovernmental Panel on Climate Change (IPCC), the North African region, of which Algeria is a part, is one of the most vulnerable to climate change (Bouznit, Elaguab, Selt, Himrane, & Aïssaoui, 2022). Recurrent droughts have a direct impact on agricultural production, particularly on cereal crops such as wheat and barley. Since 2021, drought has led to a significant drop in cereal production (from 4.5 million tons in 2020 to 3.2 million tons in 2021).

Furthermore, desertification and soil degradation threaten agricultural land. According to a study published by the United Nations Development Programme (UNDP), nearly 20% of agricultural land in Algeria is affected by desertification (PNUD, 2019).

7. CONCLUSION

Food security in Algeria remains a complex challenge, requiring concerted efforts to overcome climatic, structural and economic obstacles. Although progress has been made, a long-term strategy, focused on modernizing agriculture and reducing dependence on imports, is essential to ensure the country's food security. Thus, Algeria must adopt a multidimensional approach:

- Investment in sustainable agriculture: Modernization of agricultural practices, promotion of agroecology and efficient use of water resources.
- Diversification of the economy: Reducing dependence on hydrocarbons by supporting other sectors, including agriculture.
- Protection of agricultural land: Implementing strict measures to preserve arable land and combating its misappropriation.
- Strengthening social policies: Improving access to food for vulnerable populations and reducing inequalities.
- International cooperation: Leveraging international partnerships to acquire appropriate technologies and know-how.

In conclusion, food security in Algeria is a complex challenge that requires strong political will, rigorous management of resources and the involvement of all stakeholders, from farmers to policy makers. It is by combining these efforts that Algeria will be able to ensure a sustainable food future for its population.

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