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Food Security, a Geostrategic issue for Algeria

Belgaid Lynda

University of Mouloud Mammeri, Tizi-Ouzou, Algeria

Email: lynda.belgaid@ummtto.dz

<https://orcid.org/0009-0006-3721-6827>

Ouchalal Houria

University of Mouloud Mammeri, Tizi-Ouzou, Algeria

Email: ouchalal_houria@yahoo.fr

<https://orcid.org/0009-0002-7479-9903>

Abstract---The food insecurity that threatens Algeria, combined with a dependence on oil and gas revenue, accentuates the country's vulnerability. Food is a sector whose dynamism is closely linked to the geopolitical position of a country on the world stage, thus offering it the capacity, or not, to satisfy the needs of its citizens without having to resort to abroad to preserve its sovereignty. Consequently, the problem this article analyzes is the following: to what degree is Algeria dependent on the outside to supply its population with food products and how does this influence its geostrategic position? Therefore, the objective is to analyze the extent of food dependence and insecurity in Algeria due to its importance in global geopolitics.

Keywords---Food security, self-sufficiency, vulnerability, sovereignty, Agriculture.

(JEL) Classification: P00, Q18

1. Introduction

Algeria, far from being immune to a possible food crisis, has embarked on large-scale agricultural policies, particularly from the 2000s. However, and despite all the efforts that have been made and the measures put in place to extract the country from this food insecurity, Algeria remains dependent on food imports with a trade balance for food products in deficit of more than 7.6 billion dinars in 2019 (General_Directorate_of_Customs, Statistique du commerce extérieur de l'Algérie. Rapport anuel, 2019). As pointed out by (Chabane, 2014), the cause may not be limited to the failure of the policies that are put in place, but resulting from natural vulnerabilities (climate hazards, water, rainfall, quality and availability of soil, etc) as well as the transformation of the mode of consumption, the evolution

of demography which generates a regular and lasting impoverishment of the national market by foodstuffs. This is something which places Algeria in the situation of a weak international partner and possessing reduced potential in terms of negotiation.

1.1. Research Problematic:

In this context, we will look in this article at the extent of food insecurity in Algeria and its impact on the geopolitical situation of the country. The problem addressed is the following: to what degree is Algeria dependent on the outside to supply its population with food products and how does this influence its geostrategic position?

To do this methodologically, we opted for descriptive data analysis (which is an essential tool for understanding economic phenomena, evaluating performance, making informed decisions, and effectively communicating results). We collected data from national and international authorities, then synthesized and visualized them by creating graphs in order to be able to understand the state of affairs, detect inherent trends and interpret the evolution of macroeconomic aggregates relating to our subject of study.

1.2. Research Aims:

Therefore, the objective is to analyze the extent of food dependence and insecurity in Algeria due to its importance in global geopolitics. Thus, we will first return to the importance of national sovereignty, then analyze the degree of Algeria's food dependence on the rest of the world in order to be able to appreciate the stakes of this situation on the chessboard internationally and to issue recommendations.

2. The importance of Sovereignty in Algeria

Algeria is a country which is, historically and intrinsically, committed to safeguarding its sovereignty. (Belkaid, 2009) even goes so far as to describe this desire of Algerian leaders to preserve the sovereignty of the country and the tireless political discourse which reiterates this concept as soon as an internal or external crisis comes as a "sovereignist obsession". The origin of this obsession goes back to the war of liberation, the Algerians have nourished it throughout these years, notably through socialism after independence and even until today, where there are actions of state capitalism to preserve national autonomy in decisions.

Algerian History clearly demonstrates the special place that the government gives to its autonomy and independence. Several economic-political actions have been interpreted as a desire to preserve national sovereignty (BELGAID, 2024). We noted the following:

- Active participation in the non-aligned movement;
- The nationalization policies of the 1960s and 1970s;
- The policy of prudent management of state reserves;
- The policy of early payment of the external debt;
- The policy of strengthening the military, security apparatus; and many others.

Hence, sovereignty in Algeria is a fundamental pillar of national stability and economic development. For the Algerians, it represents not only political autonomy and independent management of national affairs, but also the preservation of the country's cultural and historical identity. It helps protect natural and economic resources against excessive foreign exploitation, thus promoting sustainable and equitable management of national wealth. By ensuring autonomous and informed decision-making, sovereignty plays a crucial role in building a strong and resilient Algerian nation that is capable of facing internal and external challenges while aspiring to a prosperous future for its citizens.

3. The Vulnerabilities of the Algerian Economy

3.1. Natural Vulnerabilities

The natural vulnerabilities, from which Algeria suffers, come from the nature of the semi-desert territory. The land, which is suitable for agriculture, only represents 40 million hectares and only 8.2 million hectares represent useful land on a total of 2,381,741 km² of surface area (Mouhoubi, 2008), accentuated by a lack investment in this sector. While there was a time when cereals, for example, were 1st place in exports (19th century), we currently find them in 2nd place but in agri-food imports (Mouhoubi, 2008). Then, the immensity of the territory involving infrastructure coverage costs (roads, railways, airports, water, electricity and gas networks) and expenses for securing borders with seven border countries (Tunisia, Libya, Niger, Mali, Mauritania, Western Sahara and Morocco) whose stability is often uncertain.

Finally, the fact a relatively moderate drop in rainfall would have a very significant effect on surface runoff and, therefore, on the filling conditions of hydraulic structures: 15% drop in rainfall would result in a drop of 40% surface flows (Assaba, 2013). According to the report of the Ministry of the Environment and Renewable Energy (2023), there are three bioclimatic parts in Algeria, namely:

- The subhumid part (the coast and the Tellien Atlas), where we find mild temperatures and rainy winters. As for summer, it is a hot and dry season. Precipitation decreases from East to West (from 1000 mm to 400 mm) and North to South (from 1000 mm to less than 130 mm).
- The semi-arid to arid part (the High Plains and the Saharan Atlas), where precipitation is low and irregular, namely 200 to 400 mm per year with cold winters and hot summers.
- The desert part in the Sahara, one of the hottest in the world where rains are rare, irregular, less 150 mm per year (Ministry_of_the_Environment_&_Renewable_Energies, 2023).

Hence, Algeria is poorly endowed with water resources, compounded by the fact these are poorly mobilized (Agharmiou & Hammoutene, 2021). The trend in the government's overall strategy has changed in recent years, particularly with the launch of the construction of several water works (dams and seawater desalination stations) that are still not in service.

This is, probably, not going to be enough and Algeria must take inspiration from countries such as Senegal, Mali, Ghana, Ethiopia, Kenya and Zambia which use

smart agriculture as the best way to prepare for climatic hazards. The concept of smart agriculture was introduced by the FAO (Food and Agriculture Organization) in 2010. It aims to modify traditional agricultural practices by adopting methods that are adapted to climatic variations. FAO defines smart agriculture as an approach guiding the actions needed to transform agricultural systems into effectively support development and ensure food security in a changing climate. (The_Global_Green_Growth_Institute, 2021).

3.2. Institutional Vulnerabilities

Political governance in Algeria is characterized by institutional and political instability, the weakness of the political and union landscape, a lack of institutions, an inadequacy of existing ones for the regulation of a market economy, bureaucratic cumbersomeness, tax evasion, an informal market and an economic environment that is unfavorable for investment and business (Assaba, 2013).

Algeria suffers from other vulnerabilities, notably the ineffectiveness of scientific and technological research policy. (Mouhoubi, 2008) points out that it is the absence of a stable and long-term national economic project which also explains the absence of a global strategy in terms of scientific and technological research. Indeed, since the establishment of the Ministry of Higher Education and Scientific Research in 1970, this body has experienced instability, particularly given its place in the economic sphere and the limited resources allocated to it (Agharmiou & Hammoutene, 2021).

3.3. Dependence on the Hydrocarbon Sector

The major characteristic of the Algerian economy is its dependence on hydrocarbons. Indeed, in the structure of exports, gas and oil constitute 92.80% of total exports in 2019 (General Directorate of Customs, 2019). The trend is improving, since in 2022, oil and gas represented 89.8% of total exports. This share includes 41% natural gas, 30.3% crude oil, and 15.4% fuels. The country's total exports reached \$68.4 billion in 2022, mainly due to the increase in hydrocarbon prices. Products not related to hydrocarbons represented only 10.2% of total exports (General_Directorate_of_the_French_Treasury, 2023)

This dependence has negative repercussions on employment, the balance of payments and the trade balance. Thus, Algeria is one of the countries most impacted by a downward trend in energy prices as evidenced by the shock of 1986 where the situation led to a cessation of payments as well as a political and social crisis. This vulnerability is accentuated by the weak diversification of the Algerian economy, in particular a poor contribution of the agricultural sector to GDP.

Another observation is the fact that Algeria's main commercial supplier is the European Union, while exports (gas and oil) are invoiced in dollars. The evolution of the dollar and euro prices has negative repercussions on the national economy on several levels.

Indeed, the depreciation of the billing currency (dollar) compared to the euro will have a double negative impact: first on foreign trade and, therefore, on income from exports. Then, on foreign exchange reserves of which the dollar constitutes the main currency, a depreciation of the dollar against the euro is synonymous with a net loss for Algeria. The dollar is regularly depreciating against the euro, something which goes against Algeria's interests as explained previously and as has been the trend since 2008 (see figure 1 below)

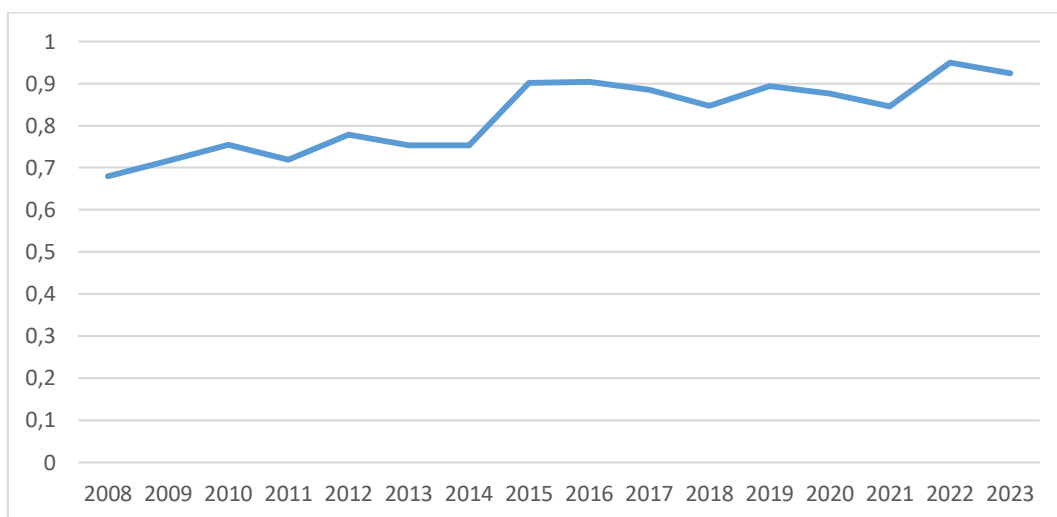


Fig. (1). Official exchange rate (local currency units (euro) per US \$, average for the period)

Source: World Bank data

3.4. The Agri-food Industries, a Sluggish Sector

The agro-food industries play a vital role in the country's food system. However, they only participate in improving food security and do not contribute to the development of the agricultural sector. They are not yet part of a sustainable development strategy (General_Directorate_of_Customs, Statistiques du commerce extérieur de l'Algérie., 2019).

As indicated in Table 1 below, in the structure of imports, the group of "agricultural capital goods" occupies the last rank in the structure of imports with a very low share of around 1.09% and worth 437 million USD. It recorded a decrease of 18.96% during the year 2019 (General Customs Directorate). The downward trend is clearly visible in 2020 and 2021 with respectively 198 and 247 million dollars.

Table (1) : Imports of agricultural equipment (in millions of US dollars)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Valu	219	321	364	310	477	629	638	479	585	537	437	198	247

Source: Bank of Algeria, "Annual report, Economic and monetary evolution in Algeria", Algiers, 2013, 2017, 2022. In: (Bank of Algeria, 2022).

4. Quantification of Food Insecurity in Algeria

Due to its importance, agriculture has always featured in successive national strategies. Indeed, from 1962 to 1966, it figured in the colonial heritage that the State wanted to preserve alongside oil. Then, from 1967 to 1979, agriculture was still present but overtaken by the first development plans for heavy industries. From 1979 to 1989, strategic choices were oriented to equipment, giving a significant part to agriculture (Agharmiou & Hammoutene, 2021)

All this was in vain since the country was faced with a multiple national crisis (economic, social and security) from the 1990s. However, from the beginning of the 2000s and in view of a very favorable international economic situation, Algeria experienced a decade of financial euphoria which led to the relaunch of development plans, notably a tireless desire to escape dependence on the hydrocarbon, industrialization and a race towards food self-sufficiency.

One of the major indicators for quantifying food insecurity is the change in volume of agricultural production. As highlighted in graph 2, in Algeria, the agricultural sector recorded a negative growth rate in volume of 1.3% in 2021 compared to 2020. This decline concerns market gardening, cereal, plant and animal production. This situation is partly due to unfavorable climatic conditions as well as the increase in prices of agricultural inputs and import constraints (General_Directorate_of_Customs, Statistique du commerce extérieur de l'Algérie. Rapport annuel, 2019).

Thus, we have recorded a sharp drop in cereal production going from 43.9 million quintals in 2020 to 27.6 million quintals in 2021 (-37%). In detail, this drop is as follows: durum wheat (-29%), soft wheat (-37%), oats (-42%) and barley (-54%). As a result of forest fires, olive production fell by 34%, market garden production fell by 3% and increased by 2.73% in 2020 to stand at 146.09 million quintals in 2021 compared to 150.70 million quintals in 2020 (Bank of Algeria, 2022). A few exceptions should be mentioned, notably those of red meats, industrial tomatoes, dates and viticulture that experienced positive growth rates, respectively of 2%, 20%, 3% and 14% (Bank_of_Algeria, 2022)

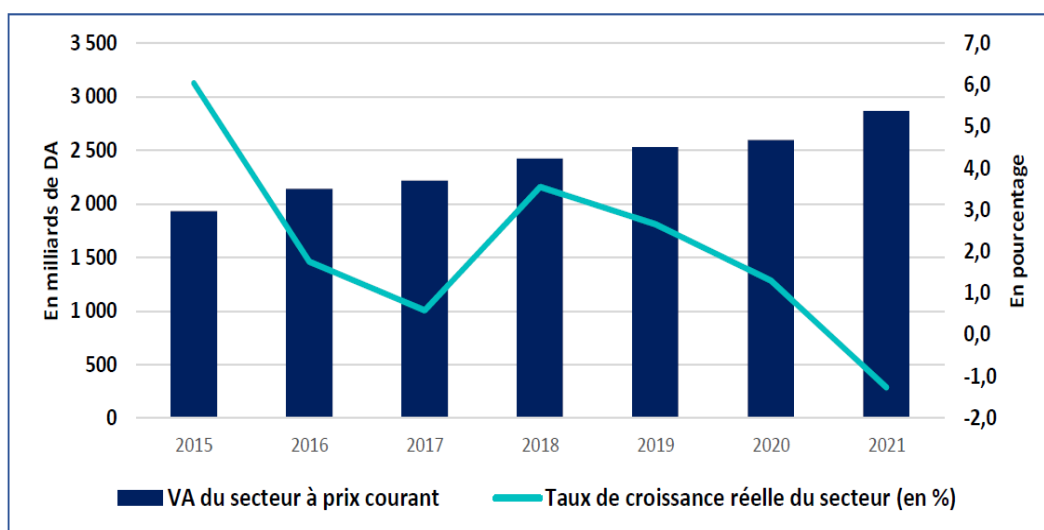


Fig. (2): Growth of the Agricultural Sector in Algeria (2015-2021)

Source: Bank of Algeria “Annual report 2021, Economic and monetary evolution in Algeria”, Algiers, June 2022, p 24. In: (Bank of Algeria, 2022)

Furthermore, the food bill, which is still in deficit, places the country in a dangerous dependence on imports. Indeed, the chronic deficit that the country is experiencing in its food bill is of great magnitude as shown in Table 2. In 2021, the deficit is widening further and stands at more than 8,301 million US dollars. We clearly see, in Table 2 and Figure 3, the importance of the country’s food deficit from 2009 to 2021 with no notable improvement over the period. On the contrary, the trend is towards worsening.

Table (2): Evolution of the Food Balance Deficit in Algeria (in Millions of US Dollars)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Food Import	5512	5696	9261	8483	9013	10550	8946	7855	8 069	8 199	7 694	7 723	8 877
Food Export	113	315	355	315	404	323	238	326	350	373	408	437	576
Balance of Food Bill	-5399	-5696	-8906	-8483	-8609	-10227	-8708	-7529	-7719	-7826	-7286	-7286	-8301

Source: Bank of Algeria, “Annual report, Economic and monetary evolution in Algeria”, Algiers, 2013, 2017, 2022. In: (Bank of Algeria, 2022)

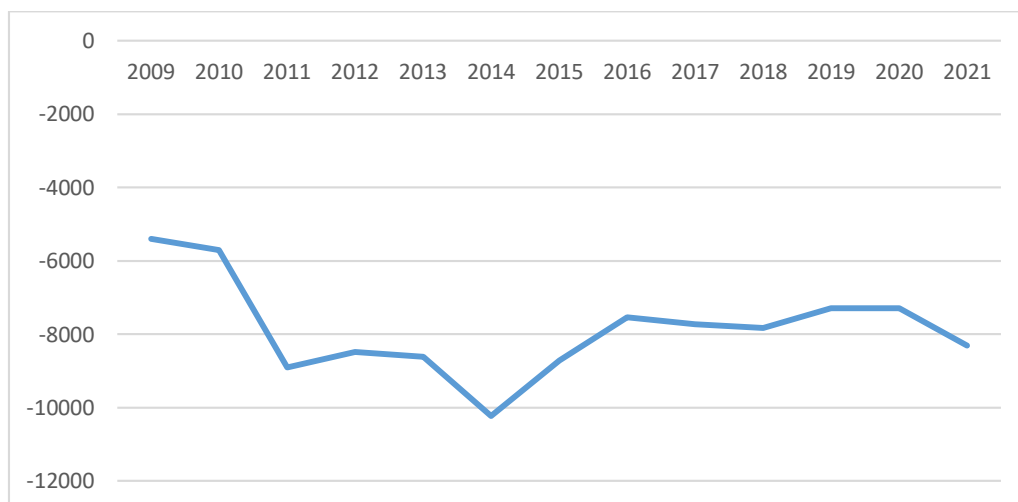


Fig. (3): Blance of the Algerian Food Bill (in Millions of US Dollars) 2009-2021
Source: Adapted from: Bank of Algeria, “Annual report, Economic and monetary evolution in Algeria”, Algiers, 2013, 2017, 2022 in: (<https://www.bank-of-algeria.dz/>)

Therefore, we can conclude, from the previous analysis, that Algeria is a country with an average level of food security due to the structural weakness of the agricultural sector, the lack of agricultural investment and research in this area, weak governance which leads to decision-making and strategic inefficiency (Rahmani, 2020).

To support this conclusion, Table 2, plotting the FAO Index, indicates that Algeria is far from the top of the ranking in terms of food security. It even moved to 68th place in 2022. Nonetheless, Algeria is not in a very bad position since in terms of undernourished population, its situation is improving over the entire period considered, from 2001 to 2017 (see Fig. 4).

Table (3): Algeria’s Global Food Security Index (2014-2022)

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Ranking	70	68	66	68	69	70	58	54	68
GFSI	47,5	50,9	54,3	51,5	52,1	59,8	61,8	63,9	58,9

Source: Global Food Security Index, an annual measure of the state of global food security, a report from The Economist Intelligence Unit, 2014-2022.

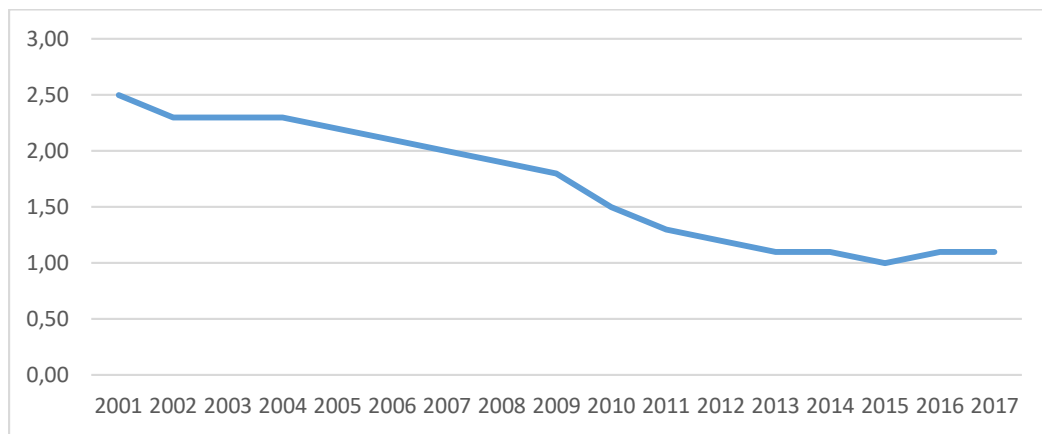


Fig. (4): Total undernourished population in Algeria (2001-2017)
Source: FAO Data (<https://www.fao.org/faostat/fr/#data/>)

5. Food Self-sufficiency, a Geostrategic Issue

A State is sovereign if it is not subject without its consent to any authority or body which imposes a constraint on it. The term independence, generally used as a synonym, reflects this negative nuance (Charpentier, 2014). In the economic field, this notion appears as an essential reference for States which try, often in vain, to assert their independence in the face of the influence of the global economy and natural, as well as external shocks such as climatic hazards and the evolution of food product prices on world markets (Bal, 2012).

Thus, food insecurity constitutes a factor of vulnerability, in the sense that it exposes the country to the need for regular external supplies, to the risk of shortage and market fluctuations, and also to the risk of difficulty in accessing food rations basis for populations (Ezzraimi, 2013).

Hence, the development and modernization of Algerian agriculture is a national priority. Food security constitutes an important issue for the stability and independence of the country. Boosting agriculture is a guarantee for Algeria to have a safer and more autonomous future. As a result, (Omari, 2012) provide some guidelines that would make it possible to revitalize agriculture, in particular to stabilize the institutional environment, overcome land ambiguities as well as natural obstacles. Besides, promote local products to improve competitiveness and make good use of partnerships like the Euro-Mediterranean one.

6. Analysis of Results and Recommendations

The indicators relating to the degree of food security in Algeria show that the latter's position is not comfortable and the country is in a situation of vulnerability to external and environmental shocks. In addition, we have identified a certain number of weaknesses, notably institutional, environmental, climatic and economic. These indicators are alarming for some, like the extent of the external deficit in the food balance which places Algeria in great food dependence on the rest of the world. Therefore, its geostrategic position is

desteriorated. The growth rate of the declining agri-food industries sector is also not very comforting and predicts a sluggish sector in the coming years given its low supply of equipment.

Algeria's Global Food Security Index, calculated by the FAO (Food and Agriculture Organization), indicates that Algeria experiences a certain stability in its ranking. Even better, the share of the undernourished population is considerably reduced, which proves that the agricultural sector manages to feed the local population by directing production to the local market and not to export. The food subsidy policies that the Algerian state maintains also have a lot to do with it. Thus, and given the importance of the subject, it is important to make some recommendations based on the results of our analysis.

- It is more than urgent to extract the country from its almost chronic dependence on the hydrocarbon sector and to direct its forces to agriculture and the agri-food industry. This involves agricultural equipment and imports of which local production is almost 00%.
- Encourage research in agriculture in order to think intelligently and scientifically about methods and solutions to the climatic hazards that weigh on the sector.
- Modernize methods of exploiting water resources and agricultural cultivation techniques to increase agricultural yields and reduce the effects of problems due to rainfall in the country.

As part of innovation and the encouragement of research in agriculture, it is interesting to embark on intelligent agriculture which offers various advantages. The latter, also known as precision or digital agriculture, represents the integration of information and communications technologies (ICT) into agricultural systems (Torquibian, 2017). Among the advantages that can be gained from this innovative method of agricultural production:

- It increases productivity by improving yields through management of crops and inputs.
- It helps reduce costs through more efficient use of resources, reducing expenditure on water, fertilizers and pesticides.
- It minimizes the environmental impact by reducing the use of chemicals and better management of natural resources.
- It allows for better resilience through the ability to adapt to climate change and cope with environmental hazards.
- It contributes to food security by increasing production and reducing post-harvest losses.

7. Conclusion

We wanted to draw attention to the urgency of making food security a strategic priority by demonstrating that food sovereignty is a necessary condition for the stability, autonomy and sovereignty of any country. Indeed, as underlined by (Azoulay, 1993), improving food security is considered as a central element around which various strategies are structured.

Algeria, as explained before, is in no way immune to a food crisis given the serious deficit in its external food and agricultural balances. But, paradoxically,

all analysts agree that Algeria has the potential to be self-satisfied in terms of food, as evidenced by the constantly decreasing share of the undernourished population.

We agree with the conclusions of (Chabane, 2014) to say that the causes of this situation are numerous and diverse from the point of view of their origins. Indeed, the causes range from the colonial legacy which disrupted the rural structure and the creation of a dualism of today's agricultural sectors (traditional and modern). Other causes, as we have seen, are environmental and climatic. Also called into question the perpetual reforms and persistent rearrangements, the modes of organization and status of the land, the mode of exploitation and the considerable distortion in the allocation of resources.

It is, therefore, essential that decision-makers design a policy based on scientific aspects and real findings. A policy which must be subject to technical justification based on an in-depth study of the agricultural sector. Because in Algeria, according to (Ouchalal & Ferfera, 2020), scientific research remains mainly theoretical and struggles to directly benefit the productive environment (industrial, agricultural, etc). This situation often hinders the necessary collaboration between scientific research and the productive sector which is essential to stimulate technological innovation and promote economic growth.

However, the field of analysis of food security is in no way restricted to the availability of foodstuffs aspect, it rather extends to specialized subjects such as the quality of food that is available. Indeed, according to (Lebreche, 2013), the decline in the purchasing power of the citizen and the possible disengagement of the State from food support directs household consumption towards products with low market value and, consequently, an imbalance in the food ration. It reduces access to an appropriate, healthy and balanced diet.

We agree with (Bouchentouf & Benabdeli, 2021) and indicate that the most important solution to reduce food dependence is the effective mobilization of skills with a good mastery of the agricultural field in order to reduce the degradation of resources and public funds in strategic plans that fail. Indeed, after finalizing this research and after much reading on the subject, we consider it interesting to look into the subject of intelligent agriculture, a concept which makes perfect sense in Algeria given the serious climate hazards conditions facing the country. Also smart agriculture, called precision agriculture, refers to the use of advanced technologies to improve the efficiency and sustainability of agricultural practices. According to (Bouzelha, 2020), the latter can be a long-term solution addressing both the problems of reduced productivity, adaptation to climate change and increased greenhouse gas emissions.

Thus, we have tried to provide an overview of the geostrategic challenges of Algeria's food security, while highlighting the importance of integrated strategies and innovative policies to improve resilience and access to healthy food. Indeed, food security in Algeria requires an integrated approach that combines effective government policies, investments in agricultural infrastructure, the adoption of modern technologies, and sustainable management of natural resources. By strengthening local agricultural production, reducing dependence on imports, and

improving resilience to climate change, Algeria can progress towards more robust and sustainable food security.

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