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Resilience of the Algerian wheat sector

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Abstract:

Algeria has experienced these last three years, two shocks that are COVID-19 Russian-Ukrainian conflict , and this affected wheat availability and accessibility ; which revealed the vulnerability of the wheat sector in Algeria to shocks.
This article aims to clarify the situation of Algerian wheat sector through measurement of its resilience to shocks in order to find solutions in case of fragility. Our study shown that Algerian wheat sector is vulnerable to shocks. Solution is to try to improve production.

Key words: Resilience, Shock, Supply, Value chain, Wheat sector.

JEL Classification Codes: H40, Q18, R00.

1. Introduction:

A Sector «is a system of agents that contribute to producing, transforming, distributing and consuming a product or a type of product» (Duteurtre & al, 2000)[Our translation]. Each agent carries out individual or collective functions. All agents maintain relations with one another agents with system external environment Wheat sector includes grain production, all transformations and consumption. In Algeria, wheat products occupy a strategic place in food system and in national economy. This characteristic is clearly perceived through all supply chain phases (Djermoun, 2009). That is why wheat sector constitutes one of the most important bases of agro-food industry in Algeria.

However, Algerian wheat production cannot cover national wheat demand and this forces Algerian State to resort to imports. The quantities of imported wheat were multiplied by more than 10 between 1961 and 2021 (from 442,000 t to 8 million t) (USDA, 2022), costing the public treasury about 2.25 billion USD; i.e. a quarter of the total food import bill (Assocle, 2022). These imports became excessively expensive over the years, with limited payment means (Ferhat & Chehat; 2020). That is why Algerian State gently abandoned subsidies (JORADP, 2020) and this may affect a large part of population (about 52%) living below or approaching the poverty line (Bouchafaa, 2018). This situation can lead to an imbalance for the Algerian consumer because it will now be difficult for him to access an essential commodity for his daily life. This can harm Algerian food security because, according to Bessaoud (1997), it is linked to a global development dynamic and requires mobilization of all economic sectors and it is also a matter of State comes under public policy (Bessaoud 1997 in Ferhat & Chehat, 2020).

According to Economist Impact, in 2022, Algeria regressed from 54th to 68th rank in only one year with a 58.9 Global Food Security Index GFSI, thus losing 5 points compared to previous year. So, we are witnessing a destabilization of the country's food security, and this could be explained by the fragility of agri-food sectors, particularly wheat sector. Bessaoud in 2023 thinks that this imbalance is due to events the world experienced in recent years; namely the global health crisis of COVID-19 and the

Russian-Ukrainian war (Bessaoud, 2023); which prompted us to study the resilience of Algerian wheat sector facing to changes that world may undergo

This paper aims to study the resilience of the wheat sector by identifying the factors contributing to its constitution as well as the key players in the said sector. The sector approach is a method of technical and economic analysis which aims to shed light on the gray areas on the circuit of a product and allows, among other things, to better understand the strategies of the actors and participates in the fight against poverty and the search for food security (Duteurtre & al., 2000).

2. Algerian wheat sector:

Since the end of the 1980s, the use of the concept of sector regressed (Rastoin & Ghersi, 2010 in Temple & al., 2011). Indeed, sector contemporary analysis is enriched by new such as «global value chain» and «supply chain» to offer an updated vision imposed by the transformations of global agriculture and to make it possible to work for a better openness to the world with its complexity (Temple & al., 2011).

A value chain in agriculture refers to all the actors and activities that move a primary agricultural product from the production stage into fields to its final consumption, a process in which each stage sees value be added to the product. A value chain can be a vertical link or a network between various organizations of independent contractors and may relate to the processing, packaging, storage, transportation and distribution. Terms value chain and supply chai are often used interchangeably. Traditional agricultural value chains are generally governed by spot market transactions numerous small retailers and producers. Modern value chains are characterized by vertical coordination, consolidation of the supply base, agro-food processing and the use of standards throughout the chain. There are two types of value-creating activities:

- main activities (Internal logistics, Production, External logistics, Commercialization, Services)

- support activities. (Supplies, Technological development, Human resources' management)

Main activitices are those that make it possible to create/manufacture and distribute the products or services. Supporting activities are those that allow the other principals to exist (Granger, 2023).

A rough examination of Algerian wheat sector highlights three main components.two of them upstream, represent the main and support activities of the value chain linked to this sector; namely production, and supply (collection and imports) (Granger, 2023) and downstream, consumption (Bencharif and Rastoin, 2007; USDA, 2008; OAIC, 2020); that the activities mentioned above try to cover. Processing and marketing will not be the subject of this study because from 2020, the State has lifted the subsidy for wheat intended for processing except for ordinary bread (JORADP, 2020).

2.1. Wheat production:

Wheat production in Algeria is marked by a strong irregularity, itself conditioned by the vagaries of the weather. Thus, over the last 40 years, there has been a difference of 1 to 5 times between a dry year (9.7 million q in 1994) and a year of abundance (52.5 million q in 2009). However, technical and economic progress has made it possible to significantly increase production. In fact, the ten-year average almost doubled between 1981-1990 (18.2 million q) and 2001-2010 (34.9 million q), with a steady increase thus enabling it to accompany demographic growth (from 19 to 38 million inhabitants between 1980 and 2012) (Rastoin and Benabderrazik, 2014).

According to national statistics, wheat production increased from an average of 3 million tonnes over the 2005-2008 period to just over 4.5 million tonnes over the 2009-2018 period (Bessaoud & al, 2019). However, a study of the evolution of wheat production over a period from 2001 to 2018 reveals a notable stagnation in the face of an increased increase in consumption over the same period (Bouchafaa & al., 2023).

The low cereal production in Algeria is strongly linked to the low potential yields (OAIC, 2018) which have persisted since independence, themselves linked to the conjunction of several factors which are:

- pedoclimatic constraints essentially summed up by rain irregularity of the with unsuitable cultivation practices (Amrani, 2013);
- Technical constraints due either to lack of will, lack of know-how or simply useful means for mastering the technical itinerary (Hamadache, 2013);
- Constraints linked to the agricultural policies adopted by the State and which have contributed to the devaluation of the work of the land and of agricultural investment in the broad sense (Hamadache, 2013)

However, measures were taken by the State by adopting plans encouraging cereal farmers to increase their production. The most recent are:

- the National Agricultural Development Program PNDA (2000-2009);
- Agricultural and Rural Renewal RAR (2010-2014);
- the FELAHA plan (2015-2019).

Through these plans, Algerian State opted for cereal crops intensification by deploying all means.Neverthelrss, results have always been below the objectives set by the Ministry of Agriculture and Rural Development (MADR) (Ferhat & Chehat, 2020).

In addition, cereals collection in Algeria is very fluctuating and low compared to the produced quantities. Examination of collected wheat quantities over a long period clearly shows that they have not significantly increased and that the collection rates remain weak. It represents, for durum wheat on average 46% of the production estimated between 2000 and 2008, with a minimum of 19% (in 2007) and a maximum of 52%. For soft wheat (Merabet, 2011). Overall, the stated objective to collect all production has never been seriously «approached». Indeed, cereal farmers seem largely reluctant to deliver their harvests to the Public Office, preferring to store them to either use them as they please or sell them on the free market at higher prices (Naïli, 2022). It is therefore imperative to study this very important link in Algerian wheat sector.

2.2.Wheat collection:

In Algeria, wheat collection and imports are now and since August 202e1 nsured by the only public operator, the Algerian Interprofessional Cereals Office (OAIC) (Besaoud, 2023) which must fulfill a highly strategic role, because of their efficiency will depend on the constitution of stocks and therefore national food security (Rastoin & Benabderrazik, 2014; Anonymous, 2022).

During the 2020-2021 season, OAIC was only able to recover 15,000 q of barley and, for all other cereals, deliveries to the CCLS did not exceed 13 million q during the same campaign, whereas that the total production was around 27 million q, i.e. less than 50% was delivered to the OAIC (Algeria Eco-a, 2022).

To overcome this problem, the Algerian government, and to control and restore order in the wheat sector, resorts to binding and coercive measures, in a global context where cereals and all agricultural raw materials are at the center of new balance of power resulting from the consequences of the war in Ukraine, through a new provision introduced in the LFC 2022 in article 30 of the said law (Algeria Eco-b, 2022) which states that «Any farmer practicing cereal farming benefiting from the support of the State, both upstream and downstream, and whatever its form or nature, is bound by the obligation to transfer its production of wheat and barley to the Algerian Interprofessional Cereals Office» (JORADP, 2022) [Our translation].

It should also be noted that Algerian State has already taken measures to improve cereals collection. Indeed, a special collection plan has been deployed in addition to an upward revision of cereals purchase price in order to increase the collection rate, thus stopping durum wheat price at 6,000 DZD per q instead of 4500 DZD supporting an increase of 33%, and common wheat price at 5000 DZD instead of 3500 DZD for an increase of more than 42%.

Nevertheless, all these efforts were in vain because collection rates remained low. Crops collection and delivery to OAIC, is considered to be the weak link in wheat supply chain, despite all the measures taken. by the Algerian state. This forces OAIC,

and to cover national demand to resort to imports which reached the quantity of 6.1 tons, only for common wheat in 2021 (Algeria Eco-b, 2022).

2.3.Wheat imports:

In order to meet the country's needs, Algeria adopted since 1970 a food policy consisting of recourse to imports aimed at satisfying the national demand for foodstuffs, particularly cereals (Sadi-Ahmed, 1992). Since 1995, more than 80% of national wheat supplies and derived products came from imports. Imported wheat quantities multiplied by more than 10 between 1961 and 2004 (from 442,000 to 5 million tons) (Bencharif & Rastoin, 2007). Bill for wheat purchases abroad exceeded $2 billion on average (Bessaoud & al, 2019). The sensitivity of the Algerian wheat industry to the external economic environment is therefore very high. (Bencharif & Rastoin, 2007). Indeed, Algerian agriculture, which produces only 2 to 3 Mt of wheat per year, is unable to meet the increasingly growing national demand (Wisotzki, 2020).

Since the mid-2000s, Algeria has been one of the countries whose imports exceed 5 million tonnes/year. In 2017, Algeria's dependency ratio on cereal wheat imports was 78% for soft wheat to nearly 45% for durum wheat (Bessaoud & al, 2019). In the year 2021, according to USDA estimates, Algeria imports nearly 7.5 million tons of (Hales & Torry, 2022), thus displaying its vulnerability to unpredictable crisis situations including that of COVID -19 suffered by the whole world during the period 2019 to 2022. Moreover, following the Russian-Ukrainian war which began on February 24, 2022, and to consolidate the country's security stocks, and with an absolute record never achieved in the past, Algeria bought 600,000 tonnes of French soft wheat at USD 485 per tonne for loading in March-April 2022 (i.e. more than USD 100 compared to February 2022), and two batches of durum wheat in Mexico from a total volume of more than 500,000 tons at a price reaching one at 570 USD per ton, and the other at 590 USD per ton (Bessaoud, 2023).

Algeria is highly dependent on its external payment resources to ensure its food supplies and in particular cereals, they are paid mainly by the currencies of the oil rent which represents 96% of the export receipts. If the decline in these resources were to

continue over the next few years, there would be a great political risk of seeing the country unable to meet its food bill, and in particular cereals (Bessaoud & al, 2019). Indeed, these imports are at the origin of a structural deficit in the agricultural trade balance for the year 2020 (Bessaoud, 2023); which implies a food vulnerability of Algeria very narrowly resilience to the existing risks on the world food markets.

In addition, according to FAO-OECD estimates, the volatility of world agricultural product prices should rather increase or remain at a high level in the future (OECD-FAO, 2018 in Bessaoud, 2023); which leads us to worry about the sustainability of supplies on world markets affected by recurrences of political instability and geopolitical conflicts, even if Algeria has been able to manage its supplies in a situation of financial comfort without guarantee it persists in the medium or long term (Bessaoud, 2023).

It should be noted that consumption is at the origin of Algeria's increasingly remarkable dependence on the international wheat market. This leads us to study the evolution of wheat consumption in Algeria.

2.4.Wheat consumption in Algeria:

Cereal products represent staple foods with a consumption level reaching 205 kg/inhabitant/year (Chehat, 2007.) and wheat is the first in this catogory, exceeding 200 kg per inhabitant and per year (OCD-FAO, 2021).

A study of wheat consumption according to population growth reveals a very strong link with an increased trend for consumption, especially for soft wheat, and predicts a clear drop in the coverage rate for this (Bouchafaa & Kherch-Medjden, 2014). A more recent study carried out over the period 2001-2018 confirms these results and shows that the increase in wheat consumption is essentially controlled by that of durum wheat, thus affirming the reorientation of the dietary habits of Algerians towards soft wheat and this at from 2005, partially abandoning their attachment to durum wheat (Bouchafaa & al., 2023)

According to OECD-FAO in 2022, Algeria will remain a major consumer of wheat, with high levels of consumption exceeding 230 KG/capita (OECD-FAO, 2022). With wheat production showing a notable stagnation in the face of this increased increase in consumption, Algeria is becoming increasingly dependent on the international wheat market since the level of self-sufficiency in wheat (durum and soft) is lower and lower until to drop below 45% (Bouchafaa & al., 2023).

Faced with this situation of Algeria's food vulnerability to the vagaries of international market, themselves resulting from socio-economic and geopolitical crises, the Algerian State must chart its course towards food sovereignty to ensure a solid future based on resilient structures such as the wheat sector, the resilience of a sector being the result of the resilience of all its components

3. Sector resilience:

A system resilience is defined as «its ability to overcome shocks and adversity. In the field of risk and disaster management» (Andrianarisoa & al., 2016) [Our translation] as well as to anticipate, address, adapt or recover (IPCC, 2012). Tendall & al (2015) assume that the resilience of food systems is linked to food security issues by ensuring sufficient, suitable and accessible food supply but also stability (Tendall & al. 2015 in Andrianarisoa & al., 2016).

Pettit & al. (2010) listed fourteen factors contributing to the analysis of the resilience of a sector, among which we will cite the most suitable for the wheat sector in general and that of Algeria in particular. These are flexibility in supply, capacity (availability of capital), efficiency (ability to produce with a minimum of resources), visibility (ability to learn about one's own situation and environment), adaptability, anticipation, recovery, dispersion (diversity of markets or decentralization of capital or decision-making), collaboration, organization (Petti & al. 2010 in Andrianarisoa & al., 2016) without forgetting the ability to learn and the ability to govern (Tendall, 2015 in Andrianarisoa & al., 2016).

However, in order to really appreciate the resilience of a sector, in the face of the appearance of shocks or disturbances of different kinds, it has the capacity to:

- withstand and then absorb the shock;
- to react accordingly with speed and flexibility;
- to recover and adapt thanks to the experience acquired in order to regain one's initial state;
- or arrive at an improved state allowing him to develop his capacities and his resilience sustainably in the face of new shocks. (Tendall et al. 2015 in Andrianarisoa & al., 2016)

Note that by shock we mean any economic, social, political or climatic disturbance that may appear punctually and unpredictably or even regularly, seasonally or even permanently (like price instability, etc.) (Andrianarisoa & al., 2016).

We can adopt the concept of sector resilience to the Algerian wheat sector in order to assess its degree of capacity to absorb or control a shock, whether temporary or permanent. The idea is to assign scores to each of the reactions that the sector may display in the event of a shock (Tendall et al. 2015 in Andrianarisoa & al., 2016).

4. measurement of Algerian wheat sector resilience:

In order to be able to measure the resilience of the wheat sector, we must take into consideration only the components of activities that we have cited in the previous sections. Indeed, dysfunctions are detected only in these parts of the wheat sector in Algeria.

Let's Recall that, according to Tendall et al. (2015), a resilient food system is composed of both reactive actions:

- absorb ;
- react;
- restore ;
- learn
- and preventive actions (robustness) (Tendall et al. 2015 in Andrianarisoa & al., 2016).

By assigning each level of resilience a score on a scale of 0 to 4 in the proposed order of reactions that a sector or one of its components may have, we can have an estimate of the degree of resilience of wheat sector. in Algeria.

According to the study of value chain components carried out previously and the situation of each segment of wheat sector, we will try to assign the corresponding scores.

We have seen previously that the production activity did not show any improvement in relation to climatic and technical constraints and to development policy measures; it is not responsive; it has a score of 0.

For the supply activity, divided into two sub-activities; collection and import, we note that:

• The collection shows a moderate improvement, it is barely responsive, it has a score equal to 1;

• The import ensures its objective despite the disturbances of the international market; it restores but does not learn, it has a score of 2. As a result, the supply component has an average score of 1.5.

Finally, the score for this segment of the sector is 0.75. Since we measure on a scale from 0 to 4, the average is 2. The resilience of this segment of the wheat sector, the most important is very below average. The wheat sector in Algeria is vulnerable!

5. Discussion:

Obtained result reveal a fragility of Algerian wheat sector in its key segment composed of the two vital activities of the sector, namely production and supply with its two components. This result was predictable because during the COVID-19 period, we experienced episodes of shortages of wheat derivatives such as flour, semolina, etc. The sector suffers from capacity. of availability more than payment capacities.

Also, the only reaction that the State has had as a corrective measure is the "partial" lifting of wheat subsidies, in our view negative and not studied because it first affects the modest consumer and this can have repercussions on "product accessibility", one of the four pillars of food security.

Algeria has so far proven its ability to absorb shocks (case of the Russian-Ukrainian war). This is due to its comfortable financial situation, the limits of which we do not know; otherwise, Algeria might have done better to ensure its food sovereignty,

which is currently closely linked to its oil revenues. To believe that Algeria does not learn from its lessons!

As the wheat sector in Algeria is vulnerable, Algerian State must deploy all means to restore production so as not to depend on the international wheat market, which is very sensitive to global economic conditions. A review of the mechanisms to be undertaken to revive this segment of the wheat sector is therefore recommended.

Conclusion:

In this study, we tried to estimate the degree of resilience of the Algerian wheat sector to shocks. A journey of the said sector has highlighted its vital components, namely production and supply to ensure ever-increasing consumption.

Over the past three years, the world has experienced a succession of events that have had an impact on all countries, including Algeria, which was disrupted during the transitional regime of the shocks it suffered. Indeed, we have witnessed episodes of shortages and have suffered price increases for some products derived from durum wheat because the State has deemed it useful to partially lift the subsidy for this essential product.

To cope with these shocks, Algeria has certainly shown its capacity for absorption, even restoration, because currently the product remains available and more or less accessible, but has still not learned from its lessons because the problem of low production persists and supply mechanisms not yet mastered. The Algerian wheat sector is barely resilient.

To overcome this problem, Algeria must seriously reconsider its vision for wheat sector and try to find solutions oriented towards improving production in order to ensure its food security and deliver it from dependence on the international market and make this product available and accessible at any time.

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