

IS WHEAT SELF-SUFFICIENCY IN ALGERIA, A MYTH?

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Abstract: *Algeria is one of the largest wheat importers in the world. Despite the importance of this staple food for the population, the country remains heavily dependent on imports due to its inability to produce enough wheat to meet its own needs. With a focus on food sovereignty, this paper aims to explore the feasibility of achieving wheat self-sufficiency in Algeria. A historical review of the trends in wheat production, import, and consumption from 2001 to 2018 was conducted to understand the dynamics of the wheat market in Algeria. The review reveals that despite government efforts to increase wheat production, it has remained sluggish, while consumption has continued to grow rapidly. The widening gap between these two magnitudes is a reflection of the country's inability to achieve self-sufficiency in wheat. The wheat self-sufficiency rate is calculated as the ratio of wheat production to consumption, and the findings of this study indicate that this rate is unlikely to reach the value of 1, which means that self-sufficiency in wheat remains an elusive goal for Algeria. The slow growth of wheat production and the rapid increase in consumption highlight the need for a more comprehensive approach to addressing the wheat self-sufficiency challenge in Algeria, which would involve improving agricultural policies and practices, increasing investment in the sector, and promoting technological advancements. In conclusion, this paper highlights the critical need for Algeria to prioritize the development of its agricultural sector, specifically its wheat production, to achieve food sovereignty and reduce its dependence on imports. The study provides valuable insights into the challenges and limitations of achieving wheat self-sufficiency in Algeria and offers recommendations for future action to address these challenges.*

Keywords: Cereal policy, Food sovereignty, Self-sufficiency, Wheat production, Wheat consumption.

JEL Classification: O13, Q13, Q16, Q18.

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1. Introduction

In Algeria, the problem of non-coverage of the national wheat market persists. Indeed, every year, the Algerian State, notably the OAIC, the regulator of the wheat market in Algeria, justifies its imports which are frequent as well as excessive. We can note for example that during the 2018/2019 campaign, Algeria imported 7.5 Mt of wheat (Wisotzki, 2020) to cover 90% of common wheat needs and nearly 40% of durum wheat (OAIC, 2020) against nearly 6.2 Mt previously, letting us note a significant increase of 21%.

However, the Algerian government is seeking to rationalize its purchases, to limit its bill. Nevertheless, wheat is the basis of the diet of Algerian consumers. But the country does not produce enough of it, in particular, due to unfavorable climatic conditions, and the national sector is struggling to meet the growing needs of its population. Indeed, wheat consumption in the country exceeds 10.5 Mt, for a production that fluctuates on average between 2 and 3 Mt (Wisotzki, 2020).

This leads us to wonder if one day Algeria will finally be able to achieve self-sufficiency in wheat. «Food self-sufficiency reflects the desire of States to better control the evolution of a food system that marks a trend of change fast and uncontrolled» (Labonne, 1985).

In this paper, we will try to follow the evolution of Algeria's self-sufficiency in wheat to try to identify the factors that can determine it to propose strategies to help improve it.

2. Literature Review

a) Algeria's wheat self-sufficiency:

The self-sufficiency rate (SSR) reflects the importance of production, compared to domestic consumption. SSR is defined as follows (Poitevin et Bezzaz, 2020):

$$SSR = \frac{Production}{Production+Imports-exports} \quad (1)$$

In the context of food security, the SSR is often used to show how self-sufficient a country is with its productive resources: the higher the SSR, the closer the country is to self-sufficiency. The SSR is the appropriate instrument for assessing the availability of products considered separately.

On the other hand, the import dependency rate (IDR) is defined as the share of imports in the availability of the product and formulated as follows:

$$IDR = \frac{Imports}{Production+Imports-exports} \quad (2)$$

By comparing the two equations (1) and (2), we can deduce that in general, SSR and IDR are not complementary to 100. However, an extract from the table of the evolution of these two entities over a period from 2012 to 2018 reveals the opposite (cf Table 1).

Table 1. An extract of the evolution of self-sufficiency rate and import dependency rate

Year	Self Sufficiency rate (%)	Import Dependency Rate (%)
2012	35,00	65,00
2013	34,00	66,00
2014	25,00	75,00
2015	24,00	76,00
2016	23,00	77,00
2017	24,00	76,00
2018	41,00	59,00

Source: MADR, 2020.

This table leads us to the following conclusions:

- Algeria's wheat exports are insignificant or non-existent;
- Algeria's wheat Import dependency rate is bigger and bigger than the self-sufficiency rate;

– We can adapt equations (1) and (2) to neglect wheat exports in Algeria which we will develop later.

By examining the two equations expressing the self-sufficiency and dependency rates, we see that they require knowledge of two important components in the wheat sector, which are production and imports. So, to try to follow and predict the evolution of the two rates, we should study the two cited variables which are upstream of the sector.

b) Evolution of wheat production in Algeria:

Throughout history, Algeria has always produced wheat, but before French colonization, the production of soft wheat was very slow and was limited to the oases and this can be explained by the mode of consumption of Algerians at that time. and which was based much more on durum wheat essentially. at that time, the production was enough to feed the whole population.

Nowadays, the mode of consumption of wheat by Algerians has changed, in favor of common wheat. In addition, production is no longer sufficient to cover the needs of the population since the second half of the previous century already.

To study the evolution of wheat production in Algeria, we suggest the analysis of the series offering the observed data of this variable over time. Let's note that this series will go through two eras of cereal policies adopted by the Algerian state that is:

- The 2000 to 2009 plan, revolves around encouraging and supporting agricultural holdings, through voluntary membership of farmers for the development of products adapted to the characteristics and specificities of agro-ecological zones, with the aim of optimal intensification of crops and agro-industrial integration by sector of activity, including wheat;
- Since 2009, the program implemented as part of the agricultural renewal policy providing farmers with both technical and economic, to modernize the productive apparatus. (Djermoun, 2018).

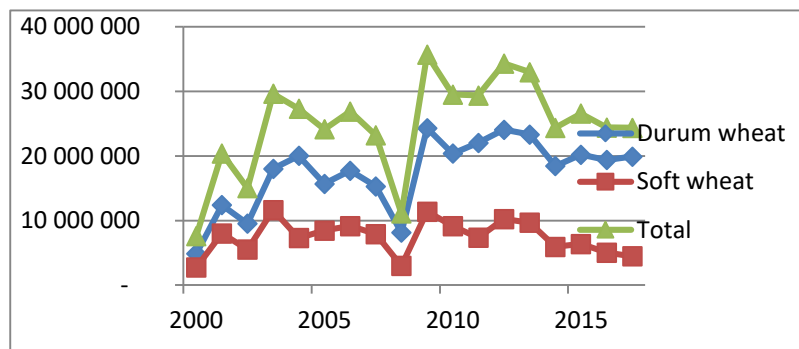


Figure 1. Evolution of wheat production in Algeria (in quintals)

Source: OAIC, 2020.

By studying the evolution of both durum and soft wheat productions, we note that these show no trend and we can easily see that there are two obvious levels of wheat production:

- The first one in the period between 2000 and 2009 characterized by a total production average of about 22 million q;
- The second one in the period between 2010 and 2017 typified by a total production average of about 28 million q.

However, we cannot say that the two levels are so different. Indeed, the Student's test of comparison of two means reveals a non-significant difference between the two periods at the 5% error threshold; which leads us to conclude that statistically, over the entire period of study, there has not been a clear evolution of wheat production in Algeria; which permits us to say that their evolution rate is close to zero...

To try to explain the situation of Algeria's wheat dependency, we have to study the evolution of imports. This will be developed in the next section.

c) *Evolution of Algeria's wheat imports:*

We have to note Algeria that Algeria uses imports to absorb wheat needs not covered by production. We got the evolution of wheat imports for the period between 2007 and 2018 and summarized the statistics in the following figure.

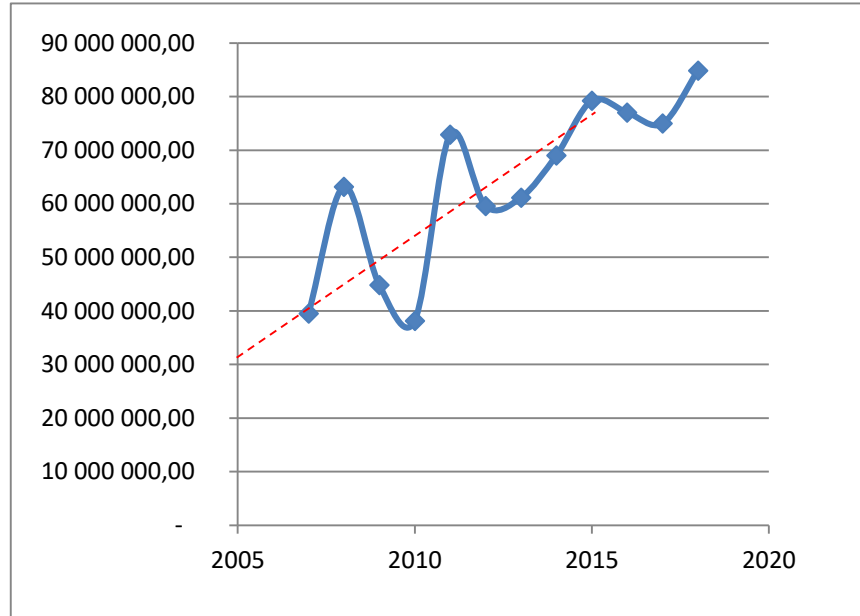


Figure 2. Evolution of Algeria's wheat imports (in quintals)

Source: OAIC, 2020.

Figure 2 above clearly shows an upward trend of increasingly large imports. We saw in the previous section that wheat production had insignificant trend evolution. We saw in the previous section that wheat production had an insignificant trend evolution and was almost stagnant. The sum of these two entities could well be an estimate of wheat consumption in Algeria. This leads us to think that consumption is at the origin of Algeria's dependence on the increasingly remarkable international wheat market.

Let us remind you that in what preceded, we suggested adapting the formulas of coverage rates and dependence on imports to the case of Algeria because we are witnessing a situation of absence of exports; which leads to eliminating this component in the formulas and simply replacing the denominator (which is now the sum of production and imports) with consumption. As a result, equations (1) and (2) introduced above will become:

$$SSR = \frac{Production}{Consumption} \tag{1}$$

$$IDR = \frac{Imports}{Consumption} \tag{2}$$

We can note that:

- These two rates are complementary to 1;
- The increase or decrease of either of these two rates does not depend on the numerator;
- The variations in consumption, which is a variable independent of the other two, affect the two rates as well.

Let's then study the evolution of wheat consumption in Algeria.

3. Methodology

Our approach includes two steps. The first relates to the presentation and purification of the database of the evolution of wheat production in Algeria and the evolution of Algeria's wheat imports. In the second step, we admit to estimating consumption by the sum of production and import. In the last part of the article, we calculate the self-sufficiency ratio

a. Presentation of Data on wheat production in Algeria:

The Data on wheat production in Algeria studying the evolution of both durum and soft wheat productions, we note that these show no trend and we can easily see that there are two obvious levels of wheat production: The first one in the period between 2000 and 2009 characterized by a total production average of about 22 million q and the second one in the period between 2010 and 2017 typified by a total production average of about 28 million q.

b. Presentation of Data on Algeria's wheat imports:

Algeria uses imports to absorb wheat needs not covered by production. We got the evolution of wheat imports for the period between 2007 and 2018

c. Presentation of Data on Algeria's wheat consumption:

As explained previously, we admit to estimating consumption by the sum of production and import. However, we will try to study its evolution over time by disregarding all the factors that may influence it. The variations in both durum and soft wheat consumption in Algeria in the period 2001 – 2018.

4. Results

a. Algeria's wheat consumption:

As explained previously, we admit to estimating consumption by the sum of production and import. However, we will try to study its evolution over time by disregarding all the factors that may influence it. Figure 3 below, shows variations in both durum and soft wheat consumption in Algeria in the period 2001 – 2018.

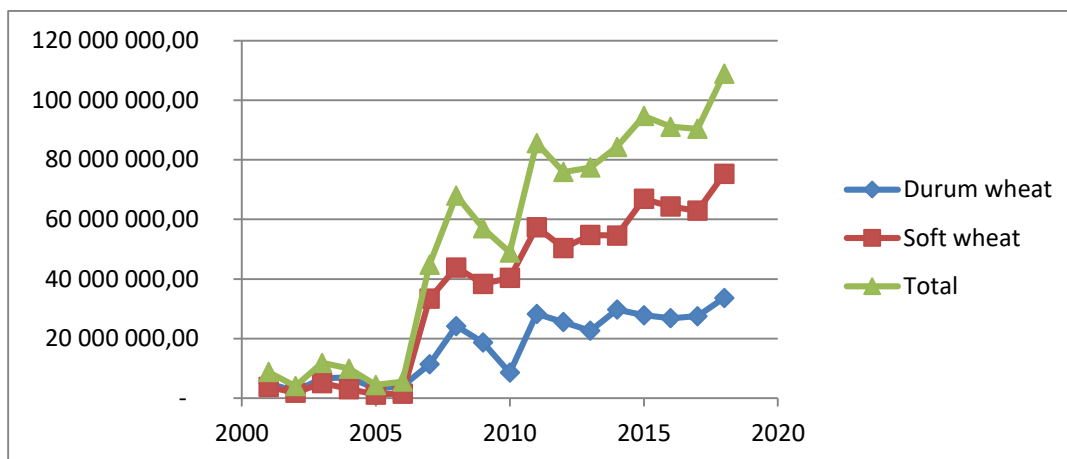


Figure 3. Evolution of Wheat consumption in Algeria (in quintals)

Source: OAIC, 2020.

The three graphs show two distinct periods:

- The first one between 2001 and 2006 characterized by consumption evolution without apparent trend;
- The second one is between 2007 and 2018 when we notice a sudden jump with a very steep slope from 2006 to 2007 and a clear trend, especially for soft wheat.

Also, soft wheat consumption is much greater than that of durum wheat in the second period where we can say that the Algerians have changed their food habits to the detriment of durum wheat and the benefit of soft wheat. But both have an important evolution rate. On the other hand, when comparing the curves of production and consumption, especially for the last period, we note a very big difference and which widens more and more; which causes the coverage rate to move further and further away from the value 1.

b. Wheat self-sufficiency rate in Algeria:

In the previous section, we noticed that wheat self-sufficiency according to production and consumption statistics in Algeria never reaches or approaches 1, worse still, it is falling more and more until it is below 45%; which makes the cereal sector of the country suffering from food insecurity about this commodity. From what has been said, we will try to develop the formula (1) to examine from what moment this entity is seen on the rise. Let's remind the formula (1):

$$SSR = \frac{Production}{Consumption}$$

Let's note: R=SSR; P=Production; C= Consumption.

If we want R to be on the rise, its differential must be positive. So let's express the differential of R.

$$dR = \frac{1}{C} dP - \frac{P}{C^2} dC \tag{3}$$

We previously noted that production was getting quite non-variable values according to its statistical results, so dP is close to zero. Consequently, R increases when C decreases; which is quite impossible (cf. figure3). This means that dR is negative and if we want it to be at least zero, we must have according to equation (3):

$$\frac{dP}{P} = \frac{dC}{C} \tag{4}$$

This equation shows that if we want R to be dR to be strictly positive, we must ensure that the production's evolution rate is greater than of consumption's one. Statistically, we noted the opposite, and this led us to conclude that reaching wheat self-sufficiency in Algeria could be impossible.

4. Conclusions

Like any sovereign country concerned about its food security, Algeria continues to seek the best policy enabling it to cover the wheat needs of its population, in particular by focusing on production. Indeed, trying to increase production is likely to reduce the country's food dependency. 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. This makes the rate of self-sufficiency in wheat lower and lower until it falls below 45%.

Because of this situation, an examination of the formula linking the rate of self-sufficiency to the two most important components of the cereal sector; namely, production and consumption require that the rate of evolution of production be barely equal to that of consumption if one aspires to even a stagnation of the rate of self-sufficiency; which is impossible because consumption is constantly increasing. This brief analysis has led us to deduce that trying to improve the rate of self-sufficiency in wheat in Algeria requires an improvement in production at least equal to the increase in consumption. Therefore, we wonder if achieving wheat self-sufficiency in Algeria is just a simple myth.

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validation: Bahia Bouchafaa; visualization: Hanya Kherchi-Medjden; writing- original draft: Bahia Bouchafaa; writing - review & editing: Hanya Kherchi-Medjden.

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