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# National Food Safety in Algeria Is Conditioned by The Diversification of Agricultural Production and The Modernization of Agricultural Practice

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**Abstract**

Food safety in Algeria constitutes a real challenge for the social stability of the country. It is characterized by a great dependence on foreign markets, due to the insufficiency of local production. Several sectors suffer from the inability to meet the growing needs of the population, notably cereals, fodder and milk. In addition, the food security of Algerians is insufficient in terms of nutritional quality. In a context of low productivity agriculture and an economy oriented towards hydrocarbons, the search for productivity gains proves to be an essential path for the food security and social stability of the country.

**Keywords:** *Food Safety, Price Rise, Productivity, Social Stability, Algeria.*

## 1. INTRODUCTION

The Food Safety situation in Algeria is characterized by high dependence on foreign markets, due to insufficient local production. In fact, 70% of dietary energy requirements are imported. This situation is due to many structural and circumstantial obstacles, including the problem of low agricultural productivity, difficult natural conditions: the deficit in water resources and limited arable land, the nature of production systems and the failure of successive development programs since independence. We can also add, the disorganization of production branches and the orientation of national food industries towards foreign markets.

However, the country's public authorities are placing more attention in this sector. During the past decade, Algerian agriculture has witnessed a set of regulatory and legislative measures in order to initiate a development movement capable of ensuring Food Safety for the country. In this context, the National Agricultural Development Plan (PNDA) was initiated in 2010. This was followed in 2009 by the Agricultural and Rural Economy Renewal (ARER) policy aimed at improving the country's Food Safety and revitalizing rural areas.

In light of the weakness of domestic agricultural production, productivity gains appear to be an appropriate approach to achieving Food Safety for the country. Increasing productivity is considered inevitable, especially in areas that are unfavorable for expanding agricultural land, due to climatic, geomorphological, and pastoral or forest constraints. These obstacles are widespread in Algeria and constitute a major obstacle to expanding agricultural lands. In those parts of the country, opportunities to expand agriculture are scarce, while needs for agricultural food are increasing. This situation leads us to think that our Food Safety will depend mainly on the levels that can be achieved in the field of agricultural land productivity.

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This research addresses the Food Safety situation in Algeria from both a quantitative and qualitative standpoint, in light of the crisis of high international food prices and the resulting economic and social risks. It also includes an overview of the efforts made in the pursuit of achieving national Food Safety. After that, the situation of agricultural productivity and intensification in Algeria is analyzed by comparing it to some other countries, explaining the reasons for the current situation. Finally, ways to improve agricultural productivity in Algeria and various aspects related to the importance of productivity in the agricultural field are discussed.

## 2. MATERIALS AND METHODS

The method used is based on the collection of statistical data from international institutions such as the FAO and the national statistics office before proceeding to analyze and interpret the data by making comparisons with neighboring countries on the southern shore and reference countries on the North shore like the European Union. The results will subsequently be illustrated graphically and interpreted to highlight the current situation of food security, the challenges and the constraints. Recommendations will be given at the end of this work in the form of prospects for the future.

### 2.1. The case of Food Safety in Algeria: Quantitative aspects

The report on the state of Food Safety in the world for the year 2020, by the Food and Agriculture Organization indicates that the percentage of people suffering from malnutrition in Algeria, that is, those who live on less than 1830 kilocalories/day, represents less than 5% of the population.

The same source indicates that the per capita share of food energy available for human consumption, estimated during the period 2014-2016, amounts to 3,100 kilocalories/day. This quantity is considered similar to what is available in other countries in the North Africa and Middle East region. As for national statistics, the Algerian Ministry of Agriculture estimates the availability of food during the period 2010-2020, amounting to 3,600 kilocalories/person/day. (FAO, 2021)

However, the rate of self-supply of basic foodstuffs is very low. In fact, Algeria's imports are estimated at 75% of its grain needs and 60% of its milk needs. Algeria also imports 30% of its needs for feed materials (9), in addition to sugar and all consumed food oils. Given these data, a large proportion of lunch supplies is attributed to imports, which represents a definite threat to national Food Safety and the social peace of the country.

Grain production, which is considered a central element in national Food Safety, still depends greatly on the climate, that is, the amount of rain received from the sky, and annual crops are characterized by great variation due to the lack of control over supplementary irrigation systems and techniques, severe drought, and the accumulated delay in... The research concerns technical and agricultural references. For these reasons, the productivity of wheat cultivation in Algeria remains generally low, estimated at less than 13 q/ha on average.

In fact, the global food market appears to have become more vulnerable and vulnerable to periods of extreme price volatility. The reasons for this weakness are the increased likelihood of extreme weather events, increased reliance on international trade to meet food needs, increased demand for food resulting from the energy sector, and instability in financial markets.

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This reality exposes countries, including Algeria, that depend on imports to a state of ongoing crises linked to the escalation of lunch prices, which affects the amounts allocated to the food import bill, the value of which may reach about 20% of the country's total imports. In addition, the upward trend in the value of food imports threatens to undermine the overall balance of the economy, due to the latter's connection to a single source of income characterized by instability and unsustainability, as is the case with dependence on the oil sector. All of these indicators could have serious consequences for social peace in a tense environment in countries not far from Algeria.

### 2.2. The case of Food Safety in Algeria: Qualitative aspects

Aside from the quantitative aspect, the Food Safety situation in Algeria is characterized by some shortcomings in terms of food quality. Problems related to the quality of food in Algeria are multiple, with the problem of malnutrition widespread. Although the dietary diversity index is improving, food quality remains inadequate. Three-quarters of the dietary energy supply (DEA) consists of grains, vegetable oils and sweeteners (edulcorants), energy-rich foods that can be one of the reasons for the emergence of overweight and obesity.

In addition, micronutrient deficiencies and goiter are common due to low levels of salt iodization. Vitamin A deficiency is also widespread among residents of the South. In rural areas, approximately one third of women suffer from anemia caused by iron deficiency.

On the other hand, the nutritional status of children under 5 years of age remains a concern in Algeria. 10% of children suffer from underweight and 20% of them suffer from delayed growth. Malnutrition occurs mainly among residents of rural areas and in the south of the country.

These phenomena particularly affect poor families, where food expenditures constitute a large portion of the family budget, and high prices force them to adopt inappropriate behavior in terms of the quality and health of nutrition.

### 2.3. Algeria's efforts to achieve Food Safety

Given the food insecurity situation, the country's public authorities are currently committed to developing new agricultural and rural development strategies, in order to enhance Food Safety. These strategies aim, on the one hand, to improve the level of local production and to protect and value food products, and on the other hand, they aim to develop technologies adapted to climate change and build harmonious and balanced development of rural areas (17).

Based on multidisciplinary studies and broad consultations, the policy of renewing the agricultural and rural economy in Algeria is considered a strategic and practical response to the issue of national Food Safety.

The adopted development approach aims to create an enabling environment for the intensification and expansion of agricultural potential through the organization of various production divisions, collective risk management and market regulation.

Agricultural economic renewal focuses on increasing local agricultural production, through intensification programs. Priority is given to basic food products: dry grains and legumes, potatoes, milk, red and white meat, olive oil and dates. Incentives are applied for various ways to increase production, including improving productivity, reclaiming new land and reducing fallow areas.

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On the other hand, the Rural Renewal Policy is designed for the sustainable development of the territories, to protect and exploit resources and diversify the economic activities of rural residents, who participate in a direct way in the preparation of the development of neighboring projects (PPDRI).

The third element in the agricultural and rural renewal policy relates to activating technical assistance and strengthening the human capabilities of all actors. Among the basic goals of the rural renewal policy is to control the phenomenon of rural displacement and to stabilize the rural population, most of whom practice long-term and permanent family farming in the countryside to serve their lands and transfer development to them in order to improve their living conditions, break their isolation, and equip all inhabited rural spaces with the necessary facilities.

## 3. RESULTS AND DISCUSSION

### 3.1. Agricultural productivity and intensification in Algeria

Agriculture in Algeria is characterized by mostly non-intensive production systems, with low land productivity. In this context, grain farming is a very clear example. Due to low yields, local production only guarantees about 25% of national needs (MWD, 2010), while this type of agriculture occupies approximately 70% of the agricultural area (SAU).

This is through the grain/fallow agricultural cycle (20). Thus, the prospects for a significant increase in production, in response to increasing demand, are inconceivable outside the scope of intensification and the search for greater land productivity.

Figures 1 to 3 show a comparison between the average yields of some of the main crops in Algeria: wheat, potatoes and dates, with those recorded in other countries during the period 2010-2020. These charts show the low productivity of land in Algeria compared to other countries. This applies to several types of crops, especially to grain cultivation, as the national average yield: 20 q/ha is two times less than the global average: 29 q/ha.

The potato crop is in a different situation. The average yield recorded in Algeria: about 250 q/ha. It is considered similar to what is achieved in neighboring countries, and perhaps even slightly higher than the global average estimated at 190 q/ha. This relatively good performance is due to the intensification efforts that have benefited this crop since the beginning of the 2000 years. In fact, the national average productivity of potato cultivation increased by 50% during the decade 2010-2020, moving from 166 to 250 kg/ha.

On the other hand, the productivity of some crops typical given the regional characteristics of the climate, such as palm trees, remains relatively low. For dates, we record an average of 50 q/ha, compared to about 65 q/ha as an average for date-producing countries.

In fact, most of Algeria's agricultural area (SAU) is occupied by large-scale agriculture, which is managed by dry farming. However, the area left fallow is dominant, occupying about 40% of the agricultural area. This indicates that most agricultural lands are exploited in a non-intensive manner. In addition, productivity enhancing factors are poorly used or not used at all, which leads to low returns. In fact, the use of fertilizers is minimal, as is irrigation and agricultural machinery.

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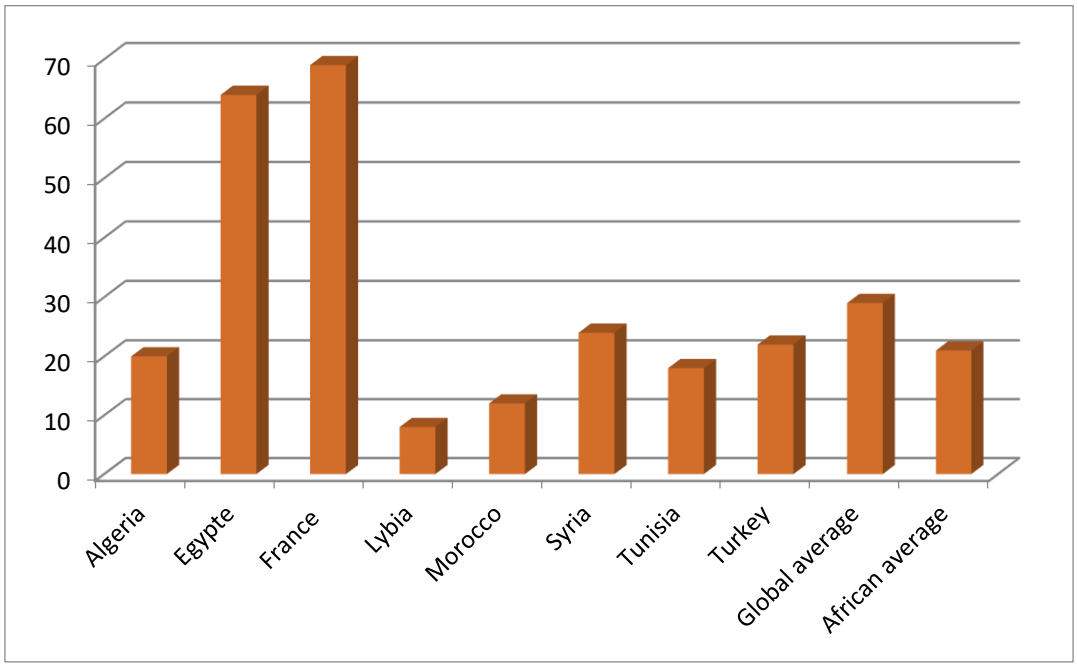


**Figure 01: Comparison of the average yield of funnel cultivation in Algeria with some other countries for the period 2010-2020 Source: Food and Agriculture Organization (FAO, 2021)**

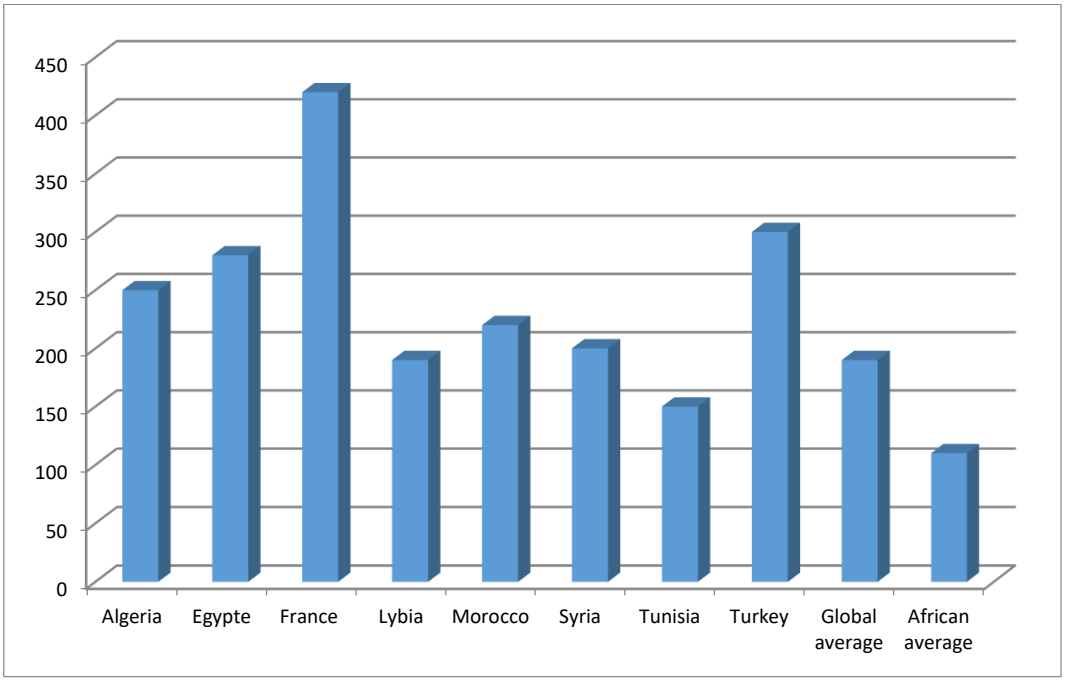


**Figure 02: Comparison of the average yield of potato cultivation in Algeria with some other countries for the period 2010-2020. Source: Food and Agriculture Organization (FAO, 2021)**

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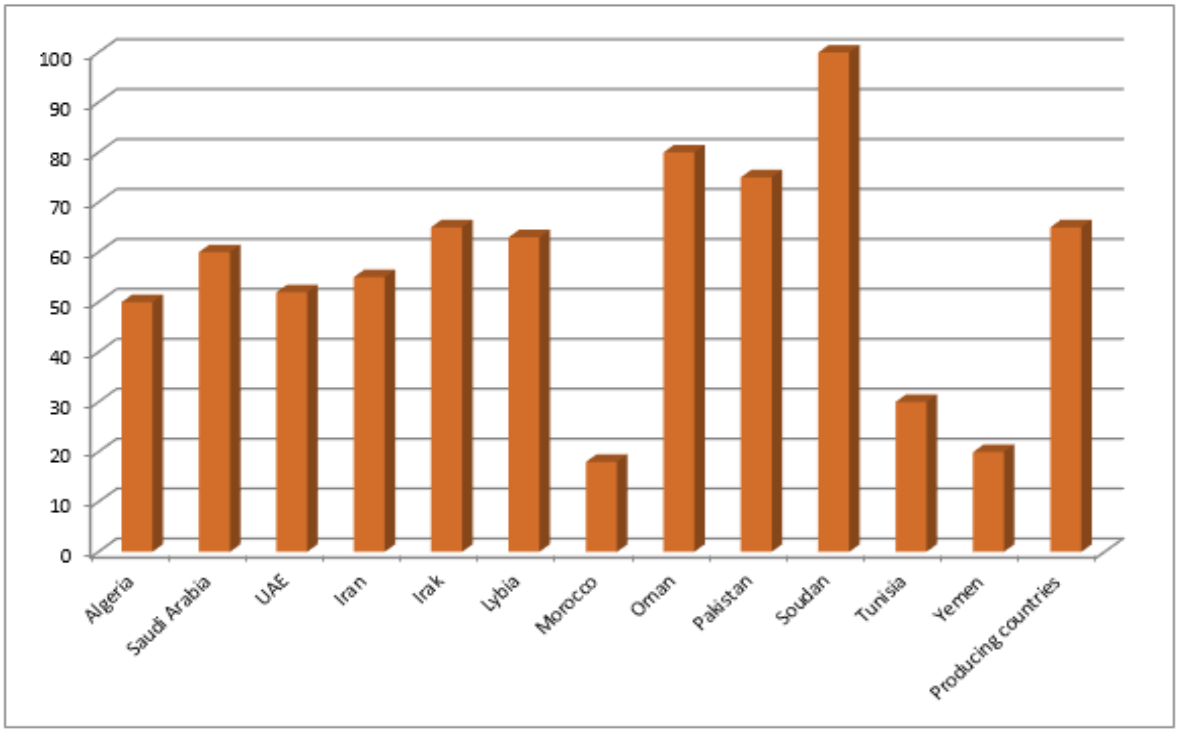


**Figure 03: Comparison of the average yield of date palm cultivation in Algeria with some other countries for the period 2010-2020. Source: Food and Agriculture Organization (FAO, 2021)**

The use of fertilizers and pesticides is still relatively low compared to neighboring countries such as Morocco and Tunisia. The use of this type of input appears stable at about 45q/ha, that is, below the criteria for crop intensification and productivity improvement. However, the historical development of fertilizer consumption shows the existence of a period characterized by the large use of fertilizers, between 1971 and 1986, but without this having a tangible impact on production.

It seems that the reasons for this ineffectiveness are due to poor techniques used in the fertilization process, on the one hand, and to the influence of factors determining production, especially irrigation. Ultimately, this results in low or even no productivity for this basic factor of production.

Irrigation, as a key factor in improving agricultural productivity, covers only about 6% of the national agricultural area (SAU). However, 42% of the land requires, due to the lack of precipitation, full or at least supplementary irrigation.

But despite the weakness of the total irrigated area throughout the country, 40% of the volume of agricultural production is attributed to it. In terms of commercial value, irrigated areas account for about 50% of the value of crop production in the country (FAO, 2020). This shows the necessity of developing irrigation in order to raise agricultural productivity and improve national Food Safety.

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### 3.2. The importance of improving agricultural productivity

In the context of local agriculture characterized by weak production, searching for possibilities to increase productivity appears as a necessary means to achieve Food Safety for the country. In these circumstances, we can consider improving productivity as an inevitable option, especially in areas that are not suitable for reclaiming new lands. Due to climatic and geomorphological constraints, or due to the pastoral or forest nature, the possibilities for expanding the agricultural area in Algeria are considered limited.

This obstacle concerns many regions of the country, and it constitutes a major obstacle to increasing agricultural production, while the needs for agricultural foodstuffs are constantly increasing. This situation leads us to think that in the medium and long term, our Food Safety will depend on the levels that the productive capacity of the lands can achieve in terms of returns.

However, the issue of agricultural productivity is not limited to the land factor. Rather, it is related to all the factors used in the production process: fixed capital, labor and other inputs. In the context of dryland agriculture, for example, the issue of productivity of irrigation water is strongly raised, especially when it is extracted from non-renewable sources. Thus, the productivity of any factor of production may be very important and worth developing, just like overall agricultural productivity.

In addition, improving productivity in agriculture is essential for development. Raising it requires a change in practices and management methods, which leads to improved performance, effectiveness and productive efficiency, which enables the creation of new mobility in the agricultural sector, and thus a greater contribution to the diversification of the national economy.

Improving agricultural productivity allows for greater efficiency in the use of resources. This allows, on the one hand, increasing agricultural production and improving national Food Safety and, on the other hand, helps to rationally use resources and productive capacities in the context of sustainable development.

Agricultural productivity also controls the competitiveness of agricultural institutions and various national food industries. In the context of globalization and increasing liberalization of markets, upgrading these institutions is a must to make them more competitive. Competitiveness and productivity have become key issues, due to the commitments made by Algeria within the framework of the foreign trade liberalization process at the regional and international levels.

Ultimately, the importance of increasing productivity, in the agricultural sector in particular, has been strongly emphasized in recent years by many international institutions, including the Food and Agriculture Organization (FAO), the United Nations Conference on Trade and Development (CNUCED), the Forum African Agricultural Research Association (FARA), Evaluation Cooperation Group (ECG), and also the 2009 World Summit on Food Safety.

It has been concluded that investing and searching for ways to raise productivity in agriculture has become the preferred and in fact necessary way, for developing countries, to increase farmers' incomes, to improve the living standards of rural populations and to ensure Food Safety on a dual scale, locally and globally. Improving land productivity in particular is considered, at this level, a temporary and future necessity.

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### 3.3. Consumption levels of agricultural products

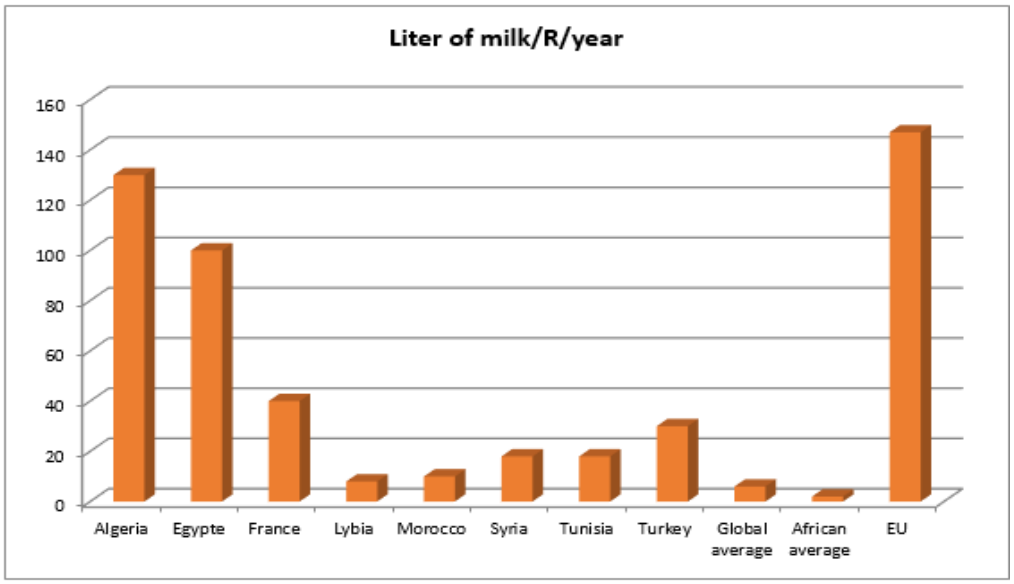


**Figure 4: Average milk consumption per resident (comparison). FAO 2022**

Figure 4 shows that milk consumption in Algeria is very high compared even to European countries, it is of the order of 130 liters per inhabitant per year. The European Union is the leading producer of milk in the world, consuming 174 liters/inhabitant/year. France, one of the major producing countries in the world, consumes significantly less, because its production is mainly intended for processing and export. World production does not exceed 06 liters/inhabitant/year, while the African average is 02 liters/inhabitant/year. These data illustrate a real problem essentially linked to eating habits, but also to the unbalanced diet of the Algerian population which consumes more milk (source of calcium) and less meat (main source of protein), unlike others. Countries whose milk consumption is low, but consume more meat (red and white) like France and the countries of the European Union.

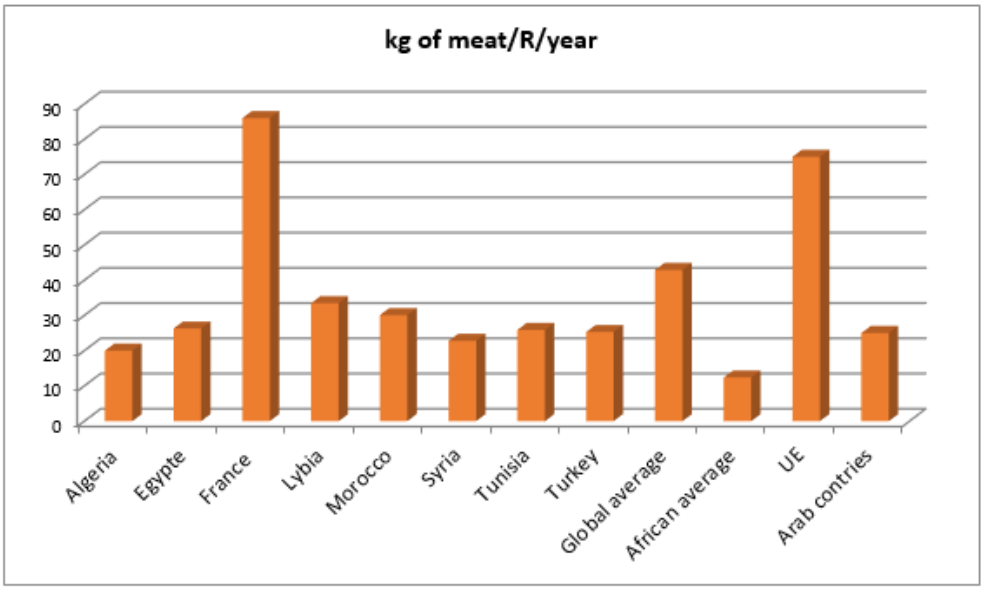


**Figure 5: Average meat consumption per resident (comparison). FAO 2022**

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Unlike the previous figure which illustrates the consumption of milk, the consumption of meat (red and white), as the main source of protein, is very low in Algeria, it is of the order of 20 kg/inhabitant/year. This average is very insignificant compared to France and the European Union average which is respectively around 86 and 75 kg/inhabitant/year. At the same time, Algeria is below the world average which is 49.9 kg/inhabitant/year and the average of Arab countries which is 25kg/inhabitant/year. On the other hand, it is above the African average which is 12.4 kg/inhabitant/year.

## 4. CONCLUSION

The search for raising the level of productivity is an appropriate way to achieve Food Safety for the country. It appears as a necessary option, especially in areas that are not conducive to further land reclamation. However, the issue of productivity in agriculture is not limited to the land factor, but rather concerns all factors involved in the production process: capital, labor and inputs.

Regarding the land factor, the problem of agricultural property, which has been raised for several generations, is considered a fundamental obstacle in the way of developing agricultural production in terms of quantity and quality.

Also, when it comes to increasing the exploited area, especially in the north, which remains decreasing as a result of the large rural exodus that Algeria experienced during the Black Decade, which made the contribution of family and mountain agriculture to local and national production decrease by a large percentage and transformed the effective productive farmer into a consumer without work.

When it comes to the method of agricultural practice currently followed, since it is more dependent on traditional and manual methods, which causes the failure to achieve significant productivity, and therefore it is difficult to expand the exploited areas and value what exists in light of the lack of mechanization and the failure to introduce modern irrigation and fertilization techniques. All of these factors are linked to the formation of the practicing person, the farmer, and his restructuring in order to acquire new experiences that allow him to move out of the traditional, helpless type of farming to a modern, wealth-producing farmer.

With regard to consumption levels in Algeria, particularly milk and meat, which both constitute indicators of the state of health of the economy and internal consumption of the Algerian population, the Algerian consumer is under fed because he consumes a lot of milk and less meat, knowing that the first cannot in any way compensate for the second based on the fact that meat (red and white) is a main source of protein while it is not the case for milk.

It should be emphasized that this irregularity and this anomaly is essentially justified by the low level of national production, whether in milk or meat, which often leads Algeria to import quantities of meat to regulate the national market. On the other hand, national milk production is largely insignificant in meeting national needs. As an indication, Algeria imported nearly 200,000 tonnes of milk powder in 2020. The cost of these imported quantities amounted to 600 million dollars.

Ultimately, improving production levels in Algeria is the only solution to improve the consumption levels of the Algerian population allows greater efficiency in the use of resources, especially ground and surface water. This allows, first, to increase agricultural production and improve Food Safety, thus establishing the features of a balanced national economy and

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integrated social stability. Second, it encourages the rational use of resources and productive capacities in the context of sustainable development.

**Conflicts of interest**

The authors should state: the authors have no conflicts of interest to declare.

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