

The Role of Sustainable Agricultural Development Policies in Achieving Food Security in Algeria

دور سياسات التنمية الزراعية المستدامة في تحقيق الأمن الغذائي في الجزائر

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Abstract:

The agricultural sector plays an important role in economic activity and has a significant impact on all economic, social, and political fields. Sustainable agricultural development is one of the goals of sustainable agriculture, through which the achievement of sustainable food security is ensured. Algeria has given importance to the implementation of this policy in order to overcome the problems of dependency and to meet the food needs of future generations. We reach the conclusion that despite the efforts made by decision-makers and those responsible for the agricultural sector, there is still a decline in the level of agricultural policy outputs, which prevents the achievement of sustainable agricultural development.

Keywords: Sustainable agricultural development, food security, agricultural policies, sustainable agriculture.

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Introduction

Providing food and achieving food security are essential basic needs for all countries. In order to achieve the goal of food security, many economies have implemented the policy of sustainable agricultural development, which began to be applied in the world in the late 1980s. The development in production methods and the introduction of technology in the agricultural sector led to an increase in production and development of the sector. Despite this development, most countries suffered from food shortages, forcing them to import from abroad. With the policy of market liberalization, and the developments in international trade, finance, economy, and politics, and with the collapse of the Eastern bloc, most countries were compelled to move towards rebuilding their economies.

Algeria is one of these countries that has pursued economic and agricultural reforms since independence within the framework of the self-management system, then later followed the agricultural revolution policy within the framework of the planned economy. Afterwards, in the 1990s, and due to the continuous failure in achieving food security, it became necessary to plan a new agricultural policy that would be sustainable and integrated to achieve food security. Within this framework, importance was given to the countryside, and this policy was called the *National Plan for Agricultural and Rural Development* during the period between 2000–2019, with its main objectives being the increase in production operations and their intensity.

This is considered part of the sustainable agricultural development strategy aimed at achieving sustainable food security in Algeria. Among the deep reforms carried out by the Algerian state to develop and advance the sector, especially under the conditions of oil price fluctuations and its collapse, sustainable agricultural development has become one of the basic alternatives to achieve economic growth, reduce economic dependency, and reduce food imports from abroad. Consequently, it creates agriculture-related industries that contribute to raising individual and national income, achieving social welfare, and establishing balance between rural and urban areas.

Accordingly, through this study, we attempt to clarify the role of the sustainable agricultural development strategy in achieving food security in Algeria, its main indicators, and to evaluate its achievements and effectiveness by answering the following problematic question:

To what extent has the sustainable agricultural development strategy contributed to achieving food security in Algeria?

This problematic question includes a set of sub-questions:

- What is sustainable agricultural development? What are its principles?
- What do we mean by food security?
- What is meant by sustainable agricultural development, and what are its main indicators?
- How has the sustainable agricultural development strategy contributed to achieving food security in Algeria?

Research Hypothesis:

The level of sustainable agricultural development positively influences the achievement of sustainable food security

Methodology:

This study relies on a **descriptive method supported by analytical procedures**. The descriptive component is used to present and organize the theoretical foundations of sustainable agricultural development, its key indicators, and the national strategies adopted to achieve sustainable food security in Algeria. The analytical component is integrated in order to interpret these indicators, examine the relationships between the variables, and evaluate the effectiveness of the adopted strategies. This combination allows the study not only to describe existing conditions but also to analyze the underlying factors that influence food security outcomes.

In addition, the study employs the **historical method** to trace the evolution of agricultural policies in Algeria across different periods. This method is applied by identifying major policy stages, reviewing their content based on available historical documents and legislation, and analyzing how these policies have shaped the agricultural sector over time. Tracing this historical trajectory makes it possible to understand the structural foundations of current agricultural challenges and their implications for achieving sustainable food security.

Additionally, the explanation remains vague. The methodology should clearly specify:

✓ **Why** the descriptive and analytical techniques are appropriate for examining sustainable agricultural development and food security.

✓ **How exactly** the descriptive techniques will be used (e.g., presenting concepts, classifying indicators, describing current conditions).

✓ **How the analytical component will operate** (e.g., analyzing relationships, interpreting causes, evaluating policy impacts).

✓ **Why the historical method is necessary**, and how reviewing different agricultural policy stages helps answer the research question.

✓ **How the two methods complement each other** in achieving the study's objectives.

Plan of the Study:

- Axis One: Sustainable Agricultural Development and Food Security: A Conceptual Framework

- Axis Two: Sustainable Agricultural Development Policies in Algeria (2000–2022)

- Axis Three: Indicators of Sustainable Agricultural Development in Achieving Food Security in Algeria

Firstly: Sustainable Agricultural Development and Food Security: A Conceptual Framework

1- **The Conceptual Framework of Sustainable Agricultural Development**

1-1- Concept of Agriculture:

"Agriculture is a profession or an industry that benefits from the human and natural resources of the land in economic or productive units called agricultural lands, with the aim of producing animal and plant products that benefit humans and are used to meet their needs directly or through their transformation into other products."¹

1-2- The Nature of Sustainable Agricultural Development:

The deterioration suffered by environmental and agricultural resources due to environmental pollution caused by the chemical pollutants used in agriculture, desertification, deterioration of pastures, and deforestation (loss of vegetation cover) led the Food and Agriculture Organization (FAO) in 1988 to introduce the concept of sustainable agricultural development as a demand to integrate the environmental dimension into agricultural policies and objectives. This approach was confirmed by the organization in the "Earth Summit in Rio de Janeiro" in 1992, to become one of the desired goals to be achieved by all countries and organizations participating in the conferences.²

1-3- The Concept of Sustainable Agricultural Development:**1-3-1- Concept of Sustainable Agriculture:**

Defined by the FAO as: *"The management and conservation of natural resources in such a way as to provide for present and future human needs."*³

Others have defined sustainable agriculture as: *"An agricultural system concerned with meeting people's needs for food and services, in a sustainable manner without undermining the capabilities of present generations or future resources, making the agricultural system more productive and less wasteful of resources, while preserving the ecosystem."*⁴

1-3-2- Sustainable Agricultural Development:

- According to the FAO: *"Sustainable agricultural development means conserving natural resources in a way that ensures meeting the basic needs of present and future generations and working to provide them continuously."*⁵

- According to the International Fund for Agricultural Development (IFAD), sustainable agricultural development aims to find better and more resilient livelihoods, in which natural resources are conserved and maintained, agricultural productivity is preserved, and the sector is protected from harm and from being affected by economic, natural, and social factors. This ensures sustainability in production, finding means of self-reliance in the production process, enhancing citizen participation, and promoting and developing human resources to achieve sustainable development for all populations without exception, including all farmers, small workers, small landowners, and landless people, ultimately achieving the goals of eradicating poverty and food deprivation⁶.

1-4- Objectives of Sustainable Agricultural Development:

- Optimal use and good management of water resources: focusing on conserving water resources, ensuring their sustainability through better management of groundwater, applying modern irrigation methods, encouraging the use of

wastewater, and promoting local, regional, and international cooperation in water management with the participation of active organizations, policymakers, and farmers.

- Limiting the exposure of agricultural land to non-agricultural use: preventing soil erosion and degradation by expanding agricultural land, protecting it, limiting urban sprawl, increasing fertility, and achieving balance between the environment and living organisms by applying agricultural methods related to the ecosystem and preserving soil vitality while reducing pesticide use.⁷

- Contributing to raising the national income from agriculture, which is reflected in an increase in overall income and national income within real GDP.
- d. Contributing to reducing hunger and improving living standards by providing food resulting from increased agricultural production dedicated to meeting the needs of society and the local population.

- e. Reducing poverty by eliminating unemployment and providing job opportunities for members of society, thereby raising the standard of living of rural residents who rely primarily on agricultural income.⁸

- Contributing to achieving economic stability, including land reclamation, rationalizing water consumption, and reducing rural-to-urban migration.

- Developing agricultural output by using highly advanced methods based on modern production technology.⁹

- Achieving economic development and maintaining the level of food security.

- Working on future planning to meet current and future population needs.¹⁰

2- The Conceptual Framework of Food Security

2-1- The Concept of Food Security:

The roots of the term food security go back to the global food problem in the 1970s (1973–1974), when developing and poor countries faced a serious food crisis due to a significant shortage in basic foodstuffs, which led to fluctuations in their global prices.¹¹

At first, the concept focused on economic aspects (price and quantity). Later, with international changes, the perspective shifted to qualitative and human aspects in the mid-1990s.¹²

2-2- Definition of Food Security:

Food security consists of two important terms: “security” and “food.” Both were mentioned in the Qur’an in Surah Quraysh: *“Let them worship the Lord of this House, who has fed them against hunger and has made them safe against fear”* (Quraysh: 3–4).

2-2-1. Definition of Security:

Linguistically, it means *“tranquility and the absence of fear.”*

One of the most well-known definitions in research and studies is that of Barry Buzan, who defined security as *“exerting effort to be free from intimidation and threat.”*

At the level of international politics, it is defined as: *“The efforts and capabilities of*

states to preserve their existence and their performance of functions against hostile forces calling for change."¹³

2-2-2. Definition of Food:

Food is what humans, animals, and plants consume daily, providing energy that keeps humans alive and gives them strength to perform intellectual, physical, and vital functions¹⁴.

2-2-3. Definition of Food Security:

There are many definitions and concepts of food security, among them:

- Defined at the World Food Conference in 1974 as: *"The availability of global food aid that meets needs under all circumstances of basic foodstuffs, to achieve balance, maintain price stability and production, and secure global markets against food disruptions and the emergence of famine."*¹⁵

- In 1983, the FAO and the World Bank defined food security as: *"The ability of all people at all times and under all circumstances to have access to sufficient food for their health and work, even in the worst conditions such as poor production and unfavorable international market conditions."*¹⁶

- The modern concept of food security, as defined by the 1996 World Food Summit, states: *"Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life."*¹⁷

- The most common definition is that food security is: *"The ability of countries at all times to meet the nutritional needs of all citizens in both quality and quantity, at costs that are consistent with general income (at appropriate competitive prices)."*¹⁸

3- Some Concepts Related to Food Security:

3-1- Self-sufficiency: A society's full reliance on its resources and capabilities to produce all food needs locally.¹⁹

3-2- Undernutrition: Insufficient food available for the entire population of a country, negatively affecting public health and spreading diseases due to malnutrition, such as anemia and rickets, as in Somalia and other regions.

3-3- Food Gap: The difference between national (local) production and imported food commodities required to meet the daily consumption needs of the local population, in line with international standards of essential proteins, calories, etc.²⁰

3-4- Malnutrition: Sometimes called qualitative hunger, it refers to dietary imbalance caused by reduced food quality, representing a type of hunger since humans need healthy and safe food for an active and strong body.²¹

3-5- Food Dependency: The inability of a country to meet its essential food needs locally, forcing it to resort to imports.²²

f. Sustainable Food Security: Ensuring adequate food for present generations in a smooth way without undermining the rights of future societies, and even in a better manner through improved food use.²³

4- Principles of Food Security:

- **Provision of food commodities:** This means providing adequate quantities of good quality, safe, and sustainable products from national production, or through import operations. In the early stages of development, the focus was on quantity, and in later stages, the focus shifted to quality and quantity in food commodities. Afterwards, attention was directed to the health aspect of food commodities.²⁴

- **Ease of access to food:** Prices should be according to the purchasing power of the members of society, and within the reach of the majority of individuals.²⁵

- **Use of food:** This means the optimal use of food in sufficient quantities and at the correct timing, so that the results are satisfactory for a life characterized by health, energy, and activity. It also means using a food program that suits the needs of each individual, based essentially on benefiting from health care, sanitation, and clean water necessary for the body's needs and health.²⁶

- **Stability of the supply of food commodities:** That is, benefiting from the use of food commodities at all times, which requires the provision of adequate reserves.²⁷

- **Respect for social traditions:** This means respecting human behaviors and requirements regarding foodstuffs, as well as his desires and needs for food. This means that food commodities must be acceptable to society. However, desire is not enough, as the purchasing power of individuals is also necessary—their ability to buy food. On the other hand, the food must be healthy and safe for the individual. The achievement of food security for individuals and populations by governments is realized through their ability to produce and import food, their capacity to store, save, and distribute it, and its availability in a permanent and organized manner, along with the possession of tools and security to purchase or produce food²⁸.

Secondly: Sustainable Agricultural Development Policies in Algeria: 2000–2022

Algeria has developed and implemented national policies and strategies for sustainable agricultural development in cooperation with the Food and Agriculture Organization, aiming to develop and increase the efficiency of the agricultural field, based on a set of plans suitable for the nature of Algeria's agricultural and climatic environment.

Economic reforms were applied, especially in the agricultural sector, within the framework of the “Rio de Janeiro” Convention on Sustainable Development, which prompted Algeria to issue and establish institutions and bodies specialized in the framework of achieving sustainable development. It sought to create outputs in the legal and legislative aspect in order to monitor and implement these policies, encourage their application, and supervise their consolidation for the purpose of exploiting its natural, human, and financial resources to achieve sustainable development.

1- Sustainable Agricultural Development Policies during the period (2000–2008).

At the end of the 1990s and the beginning of the liberal orientation, the Algerian state moved towards developing a strategy characterized by independence in order to

promote sustainable agricultural development to achieve food security and self-sufficiency. With the beginning of the third millennium, the conditions of political stability helped move towards achieving economic recovery in all sectors, including agriculture and rural areas.

1-1- The National Agricultural Development Plan (2000–2002):

During the second half of the year 2000, the implementation of a new strategy was launched under the name of the National Agricultural Development Plan, which was limited to the field of agriculture, and then made more comprehensive to include the rural world as well, becoming known as the “National Agricultural and Rural Development Plan.”²⁹

This plan was developed within the framework of the implementation of the Economic Recovery Support Program during the period (2001–2004) in the agricultural field at the beginning, where the sector benefited from a budget of 65.4 billion dinars³⁰. This plan aims to achieve food security and agricultural development through the rational use of natural resources, meeting national consumption, and improving the quality of products.³¹

To achieve the objectives of this plan, the Ministry of Agriculture prepared and implemented its programs as follows:

a- **Adapting and orienting production systems:** This program was established to direct production systems to make use of the available conditions, by guiding farmers towards different types of agriculture.

b- **Reclamation of agricultural land through concession:** This program began to be implemented in 1998, with the issuance of Executive Decree No. 97-483 dated September 16, 1997. It aimed to reclaim about 600,000 hectares through nearly 50,000 hectares under the concession formula, and to create 500,000 jobs within three years.

c- **Improving agricultural production in units:** In order to reduce the costs of food imports by supporting national production, model farms were established as branches to increase and improve agricultural inputs, to become commercial branches. Amendments were also made to the support system provided by the National Fund for Agricultural Regulation and Development, which replaced the former National Agricultural Development Fund.³²

d- **The National Reforestation Program:** This program aimed to plant new trees and renew forest wealth, which was estimated at 11% to 14% in the northern regions of the country, with about 800 hectares allocated for reforestation.³³

e- **Reclamation of southern lands and around oases:** This program involved reclaiming lands surrounding the oases within the framework of the agricultural concession program. It aimed to achieve an annual growth in agriculture estimated at 10% by 2004, compared to an average of 4%.

1-2- The National Agricultural and Rural Development Plan (2002–2004):

In 2002, the rural world was incorporated into the National Agricultural Development Plan, which became known as the National Agricultural and Rural Development Plan³⁴. Rural development policy was included as part of the adoption of the Sustainable Rural Development Strategy of 2004, which aimed to provide solutions to the obstacles faced by rural areas.³⁵

This strategy aimed at reviving rural areas, promoting human resources, and giving value to the natural resources available to each region. In terms of implementation, it relied on two important means:

- a- Community-based integrated rural development projects.
- b- Administrative decentralization and coordination of rural development activities at the wilaya (province) level.³⁶

1-3- The Supplementary Program of the National Agricultural and Rural Development Plan (2005–2008):

After the continuous improvement in Algeria's financial situation after 2004, due to the rise in oil prices, the Algerian state was encouraged to continue with the supplementary program to support economic growth, which extended over the period 2005–2008, estimated at 4202.7 billion dinars, equivalent to about 55 billion dollars.³⁷

For the agriculture, rural development, and fisheries sector, a financial allocation of 312 billion dinars was made, which was more than tripled (377%) compared to the previous program. However, these financial allocations remained below the required level compared to the total financial allocations of other sectors, as they did not exceed 7.25%, which demonstrates the weak interest of the Algerian state in the sector and its development to achieve food security and agricultural growth. This interest is part of the implementation of the second phase of the National Agricultural and Rural Development Plan.³⁸

Among the objectives of the National Agricultural and Rural Development Plan are the following:

- Expanding forest heritage and preserving sloping lands.
- Improving and developing livestock breeding.
- Preserving steppe lands and reducing desertification.³⁹

The value of agricultural output in 2006 exceeded 668 billion dinars, compared to 359 billion dinars in 2000. The agricultural sector contributed 10% of GDP. The agricultural production growth rate during 2007–2008 was as follows: 7.4% – 31.5%.⁴⁰

2- Sustainable Agricultural Development Policies during the period (2008–2016):

In order to continue the reforms in the agricultural field, preserve previous achievements, and achieve the goals of food security, the government made efforts in this field and introduced outputs in its agricultural policy. The starting point was the

issuance of the Agricultural Orientation Law and the implementation of the Agricultural and Rural Renewal Policy for the period 2009–2019.

2-1- The Agricultural Orientation Law of 2008:

This law is considered the first agricultural orientation law in Algeria, issued on August 3, 2008 under No. 08-16. It established the main objectives and points of agricultural development, which are highlighted in achieving rural and agricultural development in a sustainable manner, in light of internal and external challenges of malnutrition and the internal challenge of achieving food security and self-sufficiency.⁴¹

a- **Objectives:** This law includes how to guide national agriculture to help achieve national food security and push it towards achieving sustainable development in the agricultural and rural field. This law aims at the following:

- Good governance of the agricultural sector, to achieve its objectives of increasing production, rational use of water, and preservation of land.⁴²
- Continuing the implementation of the principle of appropriate state support for agricultural development (plant and animal production).
- The agricultural sector works to develop and achieve food security.
- Establishing a legal framework that contributes to achieving agricultural development and promoting the rural environment.⁴³

b- Mechanisms for implementing the Agricultural Orientation Law:

This law included complete chapters dealing with the mechanisms and measures for implementing this law, which are considered among the major axes of agricultural policies for the coming stage.

Agricultural orientation tools: These include three important elements as follows:

- **The National Agricultural and Rural Development Plan:** This plan includes a set of programs in areas such as intensifying agricultural production, adapting production systems, developing agriculture in mountainous and desert areas, developing pastures, reforestation, combating desertification, etc. It aims to establish plans and methods for agricultural development.

- **Agricultural orientation plans:** These are a means of setting important guidelines for the long and medium term, and the reference source for preparing and using agricultural areas in a way that achieves sustainable agricultural development at the national and local levels.

- **Means of organizing agricultural property:** These concern agricultural lands belonging to state-owned private property and other private properties. In this context, an index was established to access agricultural land, and a map was developed showing the area of agricultural lands. The law penalizes the non-agricultural use of land, and violators are punished with financial fines and imprisonment according to Articles 87, 88, and 89 of this law.⁴⁴

3- The Agricultural and Rural Renewal Policy: The First Phase (2009–2014):

This policy is based on the Agricultural Orientation Law of 2008. It was followed by the launch of a new agricultural policy in 2009, called the Agricultural and Rural Renewal Policy, after the speech delivered by the President on February 28, 2009 in Biskra Province, in which he considered that the challenge today is to achieve sustainable development where agriculture is the foundation of the development process, and that national independence cannot be achieved without food security.

3-1- Objectives of the Agricultural and Rural Renewal Policy:

The objectives of this policy are highlighted as follows:

- Developing marketing processes for national production and improving services in the agricultural field.
- Introducing technology in agricultural enterprises.
- Increasing national agricultural production of widely consumed products to meet national needs, such as milk, sugar, meat, etc.
- Developing rural areas and achieving sustainable development in them.
- Expanding the use of agricultural irrigation systems that economize on water use to reach irrigated areas estimated at 1.6 million hectares by 2014.⁴⁵

3-2- Pillars of the Agricultural and Rural Renewal Policy:

This policy is based on three strategic elements as follows:

- The agricultural renewal policy.
- The rural renewal policy.
- The policy of strengthening technical support for producers and enhancing human capacities.

a- **The rural renewal policy:** Within the framework of achieving decentralization, and with the aim of achieving sustainable rural development in rural areas, in line with the major axes of the National Territorial Planning Plan by 2025, the rural renewal policy was established through provincial rural development plans and programs. Rural renewal is broader than agricultural renewal in its objectives and duration. The rural renewal policy included programs such as: forest protection, environment, environmental reform, combating desertification, and preserving environmental communities.

b- **The agricultural renewal policy:** Agricultural renewal relies on the economic aspect and on the products of the sector to achieve sustainable national food security. It encourages intensification and quality production in a modern way in agricultural enterprises, placing them in a “branch” approach. It aims to achieve the integration of actors and make the branches keep pace with developments for continuous and sustained agricultural production growth.

The agricultural renewal program has set among its strategic priorities and key objectives the achievement of food security, by establishing ten branches of widely consumed products and granting them priority and precedence in intensification and modernization programs with the aim of increasing output and production efficiency, and creating harmony with the concerned branches. This concerns red meat, dry legumes, milk, potatoes, etc. These programs are divided into activities such as: the

development of food resources for livestock, the generalization of water economy processes, the improvement of agricultural infrastructure—especially in irrigation—, and the development of seed and seedling production.⁴⁶

The main objective of these programs is to increase the quantity of national domestic production in order to meet the needs of the food supply and demand market for consumers. The relevant ministry expected to achieve 80% of food demand coverage from domestic production by 2014.⁴⁷

Two factors were added to this axis, acting as an incentive for this strategy, namely:

1- Modernization and the granting of interest-free loans such as (the “Rafik Loan” and the “Challenge Loan”) and agricultural insurance.

2- In 2008, to ensure stability in the supply of products, guarantee insurance, and secure farmers’ incomes and consumer prices, a system for regulating widely consumed products was established.⁴⁸

4- The Agricultural and Rural Renewal Policy, Second Phase (2015–2019)

The government continued implementing the agricultural and rural renewal policy in its second phase until 2019, by following up on projects of previously launched programs, making amendments to them by integrating the fisheries sector into its policies, while supporting agricultural poles.

4-1- Content of the Agricultural and Rural Renewal Policy:

The supervising ministry established five main axes that it worked to achieve as follows:

- Continuation of increasing fishery and agricultural production: by adapting financing and support policies, rational use of production factors, developing livestock feed, developing freshwater aquaculture, reconstructing rural, agricultural, and fishery infrastructure, and paying attention to the production of vegetables, fruits, and industrial crops.

- Preservation of natural resources: by strengthening afforestation programs, rational water use, renewing animal and marine wealth, and protecting the environment from pollution.

- Supervision of national production and strengthening support means: by encouraging the health monitoring system, especially in plants, against natural disasters, introducing insurance in fisheries and agriculture, while providing adequate support means to improve productivity and investment.⁴⁹

- Expansion of the production base: by expanding agricultural land, using machinery, promoting traditional fishing, and giving importance to forestry, agricultural, and fishery products.

- Technical support, training, and promotion of the human resource: by introducing technology and applying electronic agricultural management, especially in forest management, promoting scientific research and guidance in the agricultural field to develop the sector.⁵⁰

4-2- Pillars of the New Agricultural Policy and Its Objectives:

This new agricultural policy was based on three main pillars: agriculture and livestock, forests and watersheds, fisheries and aquaculture. The supervising ministry aimed through them to increase the total value of national agricultural production to approximately 4,300 billion dinars by 2019, with an annual growth rate estimated at 5%.⁵¹

4-3- Support and Accompaniment Measures:

This sector benefited from a budget of 263 billion dollars within the framework of implementing projects in the five-year plan for the period 2015–2019. However, with the decline in oil prices in mid-2014, the government adopted an austerity policy starting in 2017, which led to a decline in financial allocations in all sectors, including agriculture, rural development, and fisheries during 2015–2019⁵². This situation negatively affected the agricultural support and investment policy and had an adverse impact on food security.⁵³

4-4- Agricultural Poles Policy:

The agricultural poles policy is a modern policy introduced to increase animal and plant production. It was applied as a result of the agricultural renewal process during 2015–2019, whereby each region of the country specialized in producing one or more products in accordance with its environmental and climatic conditions.⁵⁴

5- Sustainable Agricultural Development Policies during (2020–2022):

In order to achieve food security, the President of the Republic held a Council of Ministers meeting on 30-01-2022, during which he issued orders to support food security. The President ordered the increase of grain production, intensification of reforms in the agricultural sector especially in the South through the introduction of modern methods, and the development of monitoring tools, in order to enhance agricultural capacities and increase red meat production, in line with the level of state support, thereby promoting the agricultural sector and achieving national food security.

The state worked to implement policies in the sector by encouraging scientific research in the field of agriculture.⁵⁵

These decisions yielded encouraging results for non-hydrocarbon exports, which rose by 64.50%. Among the most important exported resources in 2021 were “sugar,” with exports reaching 120 million dollars, an increase of 44.57%, and dates, which reached 46.29 million dollars, an increase of 25.66%. Grain imports, on the other hand, recorded a decrease of more than 12% in the first months of 2019.⁵⁶

Thirdly: Indicators of Sustainable Agricultural Development in Achieving Food Security in Algeria during the Period (2000–2020).

The most important indicators of sustainable agricultural development will be addressed, as agricultural policies pursued to achieve food security in Algeria.

1- Economic Indicators:

These indicators consist of the following:

1-1- Agricultural land area in Algeria:

Agricultural lands are considered part of natural resources, characterized by their vast size, diverse topography, and climatic regions, as well as the extended and varied vegetation cover.

There are three types of agricultural lands in Algeria: agricultural lands, unproductive lands, grazing lands and pastures, and exploited agricultural lands.

The arable area in Algeria is located in four main regions: the coastal region, the inland region, the steppe region, and the desert region. They differ among each other in climate, amount of rainfall, soil fertility, and methods of exploitation.⁵⁷

Table No. 01: Geographical distribution of arable land in Algeria between 2000 and 2015

Region / Years	2000	%	2015	%	Increase rate % (2000–2015)
Coastal region	1927.83	23.43	1,626,208	19.16	-15.6
Inland region	3,582,690	43.54	3,668,753	43.22	+2.4
Steppe region	3,602,757	31.64	2,912,420	34.21	+11.9
Desert region	130,890	1.59	280,660	3.31	+114.4

MADR, statistique agricole séries B (2000 et 2015), loc. cit.

a- **The coastal region:** Its main plains are Mitidja, Annaba, and Oran, which include most of the coastal provinces. Its arable area declined during the period 2000–2015 by 15.6%, estimated at 301.6 thousand ha, where the total arable area nationwide decreased from 23% to 19%, dropping to second place. The reason is that the state used this land for real estate construction and for building facilities for development, such as universities, hospitals, etc. This policy affected agricultural development and food security.

b- **The inland region:** This region witnessed an increase in its arable land area during the period (2000–2015), with a growth rate of 2.4%. It continued to hold the largest share of the national arable land at 43.2%. It is one of the important regions, known for its population density and agricultural and industrial wealth.

c- **The steppe region:** This region witnessed an increase in arable land during the same period, with a growth rate of 12%. This led to an increase in its share of the national total area from 31.6% to 34.3%, ranking third. These areas are characterized by moderately fertile soils and low rainfall.

d- **The desert region:** This region improved significantly during 2000–2015, increasing by 114%. This raised its share of the national total from 1.6% to 3.3%.

This is due to the state's encouragement of desert agriculture and land exploitation through concession.

1-2- Water resources:

Water is one of the important resources in achieving agricultural development. Algeria suffers from water scarcity, ranking among water-poor countries, which affects agricultural development and the provision of food security.

a- Development of irrigated areas in Algeria:

One of the characteristics of agriculture in Algeria is that it is rain-fed; 90% of agricultural lands rely on rainfall. However, rainfall fluctuates across the country, which made agricultural irrigation necessary to meet food needs.⁵⁸

Improvement programs in irrigation were part of the agricultural strategy during the period 2000–2016, as shown in the table below:

Table No. 02: Development of irrigated areas in Algeria 2000–2016 (unit: ha, %)

Years	1990 –2000	2001 –2004	2005 –2009	2010 –2014	2015– 2016
Average irrigated area	446,7 17.3	637,3 82.5	842,8 61.4	1,047 ,254	1,228, 186.5
% of cultivated area	5.53	7.72	10.2	12.41	14.5
Growth rate %	–	42.68	32.24	24.25	17.3

MADR, statistique agricole série 1990–2016, Alger, 2017, p.2.

It can be observed that irrigated areas have continuously grown, which creates positive expectations for the future of irrigated areas for agricultural policymakers in Algeria.⁵⁹

2- Social Indicators:

The human factor is essential in enhancing productive capacities and achieving agricultural development and food security in the agricultural sector, alongside natural resources.

2-1- Population of rural areas:

During the period (1995–2016), the evolution of the rural population is shown in the following table:

Table No. 03: Development of rural population (1995–2016)

Years	1995– 2000 (avg.)	2004	2008	2010	2012	2014	2016
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Years	1995–2000 (avg.)	2004	2008	2010	2012	2014	2016
Rural population (million)	12.6	12.13	11.8	11.7	11.7	11.6	11.6
Growth rate %	—	-2.4	-2.7	-0.8	0	-0.8	0
Share of total population %	42.06	36.94	33.9	32.5	31.1	29.78	28.54

Source: World Bank, Rural Population, database available online: <http://www.albankdawli.org/indicator/2017lok/6/06/2025>.

It is noticeable that the rural population decreased during the period (2000–2016). In the early years, the decline was large during (1995–2000), then slowed during (2010–2016), stabilizing at 11.6 million in 2016.

2-2- Development of the proportion of agricultural labor:

The development is shown in the table below:

Table No. 04: Development of agricultural labor in Algeria (2000–2016)

Years	2000	2001–2004	2005–2009	2010–2014	2015–2016
Average total labor (thousand)	6,180	4,897	8,825.08	10,106.4	10,719.5
Average agricultural labor (thousand)	873	1,447.13	1,331.02	1,024.4	891
Share of agricultural labor %	14.2	21.03	15.15	10.15	8.32

Source: National Statistics Office, Statistical Summary (1962–2011), Employment, p. 58–68.

Agricultural labor in Algeria witnessed a continuous decline until 2016, except during (2001–2004), when it grew from 873 thousand in 2000 to 1,447 thousand. However, this positive trend did not continue, as the percentage fell to 8.3% in (2015–2016). The sector is experiencing declining labor participation despite increased public and private investment and after the implementation of the National Plan for Agricultural and Rural Development (2001–2004) and new programs under the Agricultural and Rural Renewal Strategy

3- Trade Indicators – Agriculture’s Contribution to Foreign Trade:

Through trade indicators, the development of food imports, exports, and the food gap during 2010–2020 can be shown, as follows:

Table No. 05: Development of imports, exports, and food gap during 2010–2020

Year	Food Imports	Food Exports	Food Gap
2010	6,058	315	5,743
2011	9,850	355	9,495
2012	9,022	315	8,707
2013	11,005	402	9,178
2014	9,314	323	10,682
2015	8,223	235	9,079
2016	8,438	327	7,896
2017	8,573.58	349	8,808.9
2018	8,573.58	373.77	8,199.81
2019	8,072.27	407.86	7,664.41
2020	8,094.91	442.59	7,652.32

Source: Hemissi Amina, & Fenegr Manaa, “The Reality of Agricultural and Animal Production and Its Impact on Food Security in Algeria,” Journal of Financial and Economic Research, Vol. 10, No. 1, June 2024, p. 244, based on data from the General Directorate of Taxes.

From the table, it is observed that food imports in Algeria have been steadily increasing, which means that agricultural production is insufficient to meet food needs, leading to increased food imports. This has resulted in a higher food import bill, which increased by 33.62% over ten years, from 6,085 million USD to 8,094.91 million USD. The higher the level of imports, the wider the food gap. Analyses show that food shortages in Algeria are mainly due to farmers’ reliance on rainfall, the absence of a sound water management policy, and climate change.

Conclusion:

Although Algeria has adopted multiple strategies aimed at promoting sustainable agricultural development, the outcomes achieved so far demonstrate that these efforts have not fully met their intended objectives. The persistence of the food security problem—despite the availability of human, natural, financial, and organizational resources—indicates that the existing policies have not been sufficiently effective in overcoming structural bottlenecks within the sector.

The implementation of the National Plan for Agricultural and Rural Development (2000–2008) and the subsequent Agricultural and Rural Renewal Policy (2009–2016) did generate progress, particularly in expanding cultivated areas, supporting farmers, and increasing certain types of agricultural production. However, a closer analysis of the available data shows that these policies were unable to significantly reduce Algeria’s dependence on food imports, nor did they resolve

chronic issues such as weak productivity, limited water efficiency, insufficient agricultural technology, and the fragmented structure of farming units. These weaknesses suggest that the strategies suffered from inconsistencies between planning and implementation, and from the absence of an integrated vision linking agriculture to rural development, food processing, storage capacity, and marketing systems.

Furthermore, the limited impact of these strategies highlights a deeper structural issue: agricultural policy reforms have often focused on short-term measures rather than long-term sustainability. For example, the expansion of financial support did not translate into a proportional rise in productivity, partly due to administrative complexity, weak monitoring mechanisms, and inadequate integration of modern technologies. These observations show that the challenge is not the lack of policies, but rather the lack of coherence, continuity, and efficient implementation.

Based on this analysis, several proposals emerge to address the shortcomings identified. Prioritizing agriculture, rural development, and fisheries within national policies is essential, alongside increasing public investment in infrastructure, irrigation systems, and technological modernization. Strengthening administrative capacity at local and central levels is also critical, as effective governance directly influences policy outcomes. The introduction of digitalization and the creation of electronic databases would improve transparency, data accuracy, and decision-making efficiency, mitigating the bureaucratic delays that currently hinder the sector.

Similarly, improving income levels and rationalizing food consumption are necessary to balance demand-side pressures. Human resources must be managed more rationally, with emphasis on training and building technical capacities capable of adopting and using modern agricultural technology. Social protection policies can stabilize vulnerable populations, reduce poverty, and support rural communities, thereby reinforcing the foundations of agricultural production.

Finally, addressing structural challenges such as agricultural land protection, fair pricing mechanisms, efficient food marketing, and investment in food processing industries is vital for ensuring long-term food sustainability. These measures would help create a more balanced and resilient supply chain capable of meeting domestic food needs.

In conclusion, the analysis indicates that the success of sustainable agricultural development strategies in Algeria depends on adopting an integrated, coherent, and long-term approach that links production, marketing, pricing, processing, and foreign trade, while coordinating with other sectors such as housing and education. Only through such a multidimensional strategy can Algeria move closer to achieving genuine and sustainable food security.

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