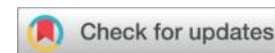




Challenges of agricultural development in Algeria, with reference to the experiences of some countries in order to advance the sector.



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Abstract:

This study aims to shed light on sustainable agricultural development in Algeria, because of its great importance in increasing production, achieving food security, and providing job opportunities for youth, through the optimal use of available resources and the development of innovative solutions to the challenges faced by this sector.

This study concluded that, despite the efforts made and the resources that Algeria is endowed with, the contribution of this sector remains very limited compared to other sectors, in addition to poor management and exploitation of vital resources and the absence of effective research centers in the agricultural field.

Key words: agricultural development, agriculture, food security, natural resources.

Introduction:

Agriculture is a fundamental pillar of the Algerian national economy. It is not only a primary source of food but also contributes to job creation and food security. With increasing environmental pressures and population growth, achieving sustainable agricultural development has become imperative to ensure the sustainability of natural resources, preserve soil and water, and enhance agricultural productivity in the long term. Sustainable agricultural development is based on the use of modern technologies and environmentally friendly farming methods, promoting biodiversity, and reducing the negative impact of traditional agriculture on the environment, while ensuring that rural communities benefit economically and socially. Based on the above, we pose the following question:

To what extent is sustainable agricultural development achievable in Algeria? And to what extent can it benefit from the experiences of countries that have preceded it? To address this issue, we have divided this paper into three sections: The first section focuses on the definitional foundations of sustainable agricultural development, its motivations, and objectives. The second section examines the reality of agricultural development in Algeria, presenting the historical trajectory of agriculture in the country, its strengths and weaknesses, and including some statistics related to this sector in recent years. The final section presents the experiences of China and Saudi Arabia, highlighting the lessons learned from these two experiences.

Section One: The Conceptual and Theoretical Framework of Agricultural Development

1.1 The Concept of Sustainable Agricultural Development:

Many economists have addressed the concept of agricultural development. Among the most important definitions are the following:

Agricultural development refers to a set of policies and procedures implemented to change the structure of the agricultural sector, leading to the optimal use of available agricultural resources and achieving increased productivity and agricultural output. (Amer Osama, 2014) The concept of agricultural development is a broad one, encompassing all dimensions—economic, social, and environmental—culminating in the concept of sustainable agricultural development. In this context, we present the Food and Agriculture Organization's definition of sustainable agricultural development as the management and maintenance of the natural resource base and the guidance of technological and institutional change to ensure the continuous fulfillment of human needs for present and future generations. This ongoing development in various agricultural sectors involves preserving land, water, and the genetic diversity of plants and animals without causing environmental degradation. (Mohammed Abdel Salam, 1998, p. 132)

The World Bank defined it in 1975 as: (Bakdi Fatima, p. 189) “an integrated process or comprehensive strategy aimed at developing the economic and social lives of the rural poor by increasing agricultural production and establishing rural industries that provide new job opportunities and improve health, education, economic, and housing services. This process ensures:

- Ensuring the provision of basic food requirements for present and future generations while producing and creating new job opportunities and improving social and economic services;
- Providing sufficient and continuous employment opportunities to ensure a decent standard of living for all those working in agricultural production;
- Preserving and developing the productive capacity of natural resources without disrupting the ecological balance.

Based on the above, the concept of sustainable agricultural development can be defined as a set of methods and procedures implemented to transform the structure of the agricultural sector, enabling the optimal use of agricultural resources to meet the needs of current generations without compromising the needs of future generations. It also aims to raise the national income level and improve living standards.

2.1 Motivations for Sustainable Agricultural Development:

There are many motivations and reasons that have made sustainable agricultural development a focus of attention for many economies. Perhaps the most important of these are the following: (Qasouri, Reem, 2012, pp. 103-104)

- **Environmental Challenges:** Environmental threats are among the most prominent motivations that have supported the interest in sustainable agricultural development. These threats result from climate change, environmental pollution, and other factors. Some of these challenges include:

- Climate change, especially global warming and carbon dioxide emissions;
- Deterioration of land quality resulting from farmers' reliance on maximizing productivity and reducing land rest;
- High levels of environmental pollution;
- Various natural disasters such as earthquakes, floods, and desertification, and their impact on agricultural products, in addition to disasters resulting from political conflicts.

- **Social Challenges:** Among the most prominent of these are:

- Population migration from rural to urban areas;
- Poor distribution and lack of social justice;
- Continued weakness of institutional structures and shortcomings in human development;
- High unemployment rates and underemployment.

- Economic threats: These include:
- Changes resulting from globalization and the financing of economic activity;
- Modern and advanced technologies in the agricultural sector;
- Foreign investments, especially by multinational corporations, and the resulting exploitation of resources and pollution at various levels;
- International economic organizations and the conditions they impose during various rounds of negotiations.

3.1 Sustainable Agricultural Development Goals: There are many goals for sustainable agricultural development, the most important of which can be summarized as follows: (Salem Abdel Hassan, 2011, pp. 63-65)

- Meeting citizens' food needs: Human societies are subject to the law of continuous development, as their populations increase, which necessitates an increase in demand for plant and animal agricultural products. Therefore, food security has become a top priority. Conversely, any deficit will lead to an increase in agricultural imports to other countries, resulting in food dependency, which has serious repercussions for the national security of any country.

- Contribution of the agricultural sector to the Gross Domestic Product (GDP): The GDP is comprised of the combined contributions of all sectors involved in economic activity. Given the importance of the agricultural sector, reflected in its geographical area, population size, and workforce, its contribution to the GDP should be substantial and effective.

- Contribution to the standard of living in society: The benefits of development must accrue to the population, who are its primary agents and both the target and the means. In rural areas, poverty, underdevelopment in all its forms, illiteracy, and low service levels are prevalent, rendering rural areas underdeveloped by all material, human, and human development standards. Therefore, revitalizing the agricultural sector in rural areas will have a positive impact, thereby achieving the goals of sustainable agricultural development.

- Supplying the needs of light manufacturing industries: Manufacturing is the cornerstone of any economic development, as it fosters integration among all sectors. The agricultural sector is the primary source of raw materials and resources needed by manufacturing industries.

4.1 Dimensions of Sustainable Agricultural Development: The dimensions of sustainable agricultural development revolve around achieving a delicate balance between agricultural productivity, environmental protection, and social justice to ensure food security for current and future generations. These dimensions are represented in the following main axes: (Raghdah Hassan Mahmoud Salem, 2021, p. 656)

- Environmental Dimension: Focuses on preserving ecosystems, maintaining soil fertility, sound management of water resources, and reducing the use of chemicals to protect biodiversity from extinction.

- Economic Dimension: Aims to enhance the economic stability of farmers by achieving high productivity and sustainable profitability through the adoption of modern and innovative technologies, in addition to supporting agricultural investment to ensure food security.

- Social Dimension: Focuses on improving the quality of life of farmers and rural residents, ensuring equitable income distribution and equal access to resources and services, as well as the sustainability of rural institutions and community participation.

Second Axis: The Reality of the Agricultural Sector in Algeria and Mechanisms for Achieving Sustainable Agricultural Development

1. The Historical Development of Agricultural Development in Algeria:

Agricultural development in Algeria has gone through two important phases. The first was characterized by the application of the socialist system, which relied on a system of development plans that prioritized the industrial sector while neglecting the agricultural sector. The second phase began in the 1990s and was marked by several problems and crises

in economic development, leading to recourse to the International Monetary Fund and the World Bank. This resulted in the implementation of economic reforms and the National Agricultural Development Plan, which provided suitable conditions for the development of this sector:

First Phase: Agricultural Development before 1988 under the Socialist System.

Under this system, the agricultural sector underwent several transformations aimed at improving its status, increasing agricultural production, raising per capita output, increasing its contribution to the gross domestic product, and ultimately improving the living standards of the population. The most important of these transformations were:

- Self-management: This was implemented immediately after independence and aimed to achieve social justice by entrusting the management of farms reclaimed from colonial rule to farmers. The goal was to restore the farmer's economic and social standing and to revitalize the sector.
- The implementation of the agrarian revolution in 1972 aimed to bring about a radical transformation in rural areas to eliminate the social disparities that characterized the Algerian countryside. This was achieved through the nationalization of land, the abolition of large landholdings, its redistribution, and support for farmers.
- In 1981, the sector underwent reorganization due to the state's adoption of a structural reform policy for the national economy. This resulted in the dissolution of 6,000 agricultural cooperatives and their reintegration into 2,000 self-managed farms. In 1983, Law 83/18 was issued, granting the right to acquire land ownership through reclamation. This reform aimed to increase agricultural land and achieve optimal utilization of land and agricultural resources to boost production and reduce imports. However, this reform failed due to the sector's financial deficit and the financial crisis the country experienced in 1986. This prompted the state to consider new reforms to address the sector's financing problems. (Ayoub Samir, Rezig Nour, 2020, pp. 160-161)

The Second Phase: Agricultural Development after 1988 - The Transition to a Market Economy

Agricultural development in Algeria after 1988 witnessed a radical shift towards liberalization, with the dismantling of the socialist farm system. Private ownership was encouraged, prices were liberalized, and agricultural subsidies were provided to increase productivity, aiming for self-sufficiency and reducing food dependency. (Badr Eddine Talbi, Salma Salehi, 2015, p. 213)

Perhaps the most important features of agricultural development after 1988 are:

- Structural reforms: The dissolution of the socialist farms (CAPRA) and their transformation into collective farms (EAC) and individual farms (EAI) under the 1987/1990 laws, thus opening the door to private ownership and independent operation.
 - Sector liberalization: The elimination of direct state control over production and allowing prices to be determined by supply and demand, while encouraging private investment in agriculture.
 - Support policies: The establishment of various agricultural support funds to increase productivity, develop irrigation, and modernize agricultural machinery.
- Ongoing challenges: Despite the transformations the agricultural sector has undergone, it has faced challenges, including limited technical resources, soil erosion, and fluctuating production. This has subsequently prompted the state to intensify investment to enhance food security.
1. Potential for Agricultural Development in Algeria: Algeria possesses several advantages that qualify it for agricultural development. It is considered the gateway to Africa and a hub for the Maghreb countries. Furthermore, it is close to the European market and has abundant land, water, human, and financial resources that enable it to achieve a leading

position in terms of food security and exports. This makes it reliant on the agricultural sector as an alternative to hydrocarbons to finance economic development. A selection of these resources is outlined below:

- **Climate:** Algeria has a diverse range of geographical regions, each with its own distinct climatic zones, distributed as follows:
 - **Mediterranean Climate:** This climate covers the areas adjacent to the Mediterranean coast north of the Tell Atlas Mountains, with an average annual rainfall ranging from 700 to 2000 mm.
 - **Steppe Climate:** This climate covers the high plateaus and is a transitional climate between the Mediterranean and desert climates, with an average annual rainfall ranging from 300 to 500 mm.
- **Desert climate:** The Saharan Atlas Mountains form the climatic boundary between the north and south of the country and are characterized by low rainfall.
- **Agricultural land:** Agricultural land in Algeria constitutes approximately 17.8% of the total area, estimated at 2,381,741 km². This provides the country with arable land sufficient to meet its food needs and achieve self-sufficiency in many basic foodstuffs.

Main division of agricultural land in Algeria 2024:

<i>Percentage of agricultural land</i>	<i>Types of agricultural land:</i>	<i>Approximate area:</i>
80%	Permanent pastures and steppes	33 million hectares
18%	Arable land	7.5 million hectares
3-2%	Lands with permanent crops	Approximately 1 million hectares

Source: Based on reports from the National Statistics Office

Water Resources: Regarding water resources, there are no accurate statistics on surface water resources, especially since their volume depends on the amount of rainfall in different regions. The following table shows statistics related to these resources:

Water Resources Statistics in Algeria for 2024

<i>Statistical Indicator</i>	<i>Observation</i>	<i>Approximate value</i>
Total Renewable Water Resources	Includes groundwater and surface water	19.4 billion m³
Number of Large Dams in Operation	Expected to reach 95 dams by 2030	85 dams
Total Dam Storage Capacity	Was 8.3 m³ at the end of 2023	9 billion m³
Dam Filling Percentage	Recorded at 39% in May 2024, the highest in five years	40-35%
Surface Water Contribution	These dams contribute significantly to the drinking water supply	30-25%
Groundwater Contribution	They are a major source of drinking and irrigation water	50%
Network Loss/Leakage Percentage	A significant challenge that is being addressed	40-30%

Source: Based on reports from the National Statistics Office

• **Human Resources:** Human resources are the primary driver of various productive sectors, especially agriculture. They are the element that ensures the optimal utilization of available resources and capabilities. Algeria is among the countries that rely heavily

on human resources in their agricultural production, as most agricultural operations are still carried out manually due to a lack of necessary equipment.

Animal Resources: Livestock is one of the most important sources of agricultural production, given its crucial role in meeting food needs. It is a fundamental component of the human diet and provides numerous raw materials for various industries. It also holds significant economic importance as a sector of agricultural investment, characterized by stable revenues, unlike crop production. (Tair Mohamed, Bouzid Sayeh, 2024, p. 50)

Following a precise census to refine the figures and target support in 2024, the size of the livestock population was determined to be between 26 and 28 million head of various types, distributed as follows:

Distribution of Livestock Among Different Types for 2024:

<i>Breed</i>	<i>Number</i>
Sheep	17-19 million head
Cattle	Approximately 2 million head
Goats	Approximately 5 million head
Camels	Approximately 400,000 head
Horses	Approximately 50,000 head

Source: Based on reports from the National Statistics Office

- **Plant Resources:** Plant production is considered one of the most important sources of agricultural production, given its importance in meeting the population's food needs, generating foreign currency through export revenues from food products, or by providing local goods that reduce the volume of food imports. Additionally, it can be used as intermediate inputs for many processing industries.

1. Indicators of Agricultural Development in Algeria: There are a number of indicators, including economic and technical indicators; land and water resources; as well as demographic, social, and environmental indicators. The most prominent of these are presented below:

1.3. Contribution of the Agricultural Sector to the Gross Domestic Product (GDP): Algeria possesses natural resources that enable the agricultural sector to increase its contribution to the GDP. This sector has also received attention from the state since independence. All of this has resulted in a slight year-on-year increase, not exceeding 14.2% in 2020. This percentage reached 18%, with a value exceeding 4,747 billion Algerian dinars, according to a statement by the Ministry of Agriculture and Rural Development in May 2024.

Contribution of the Agricultural Sector to the GDP 2020-2024

YEARS	Value of agricultural production in US dollars	Contribution to GDP
2020	25 billion dollars	12.4-12.8%
2021	26 billion dollars	11.2%
2022	33.6 billion dollars	10.6-14.7%
2023	35 billion dollars	13.1-14%
2024	37 billion dollars	18%

Source: Based on reports from the National Statistics Office

.2.3Contribution of Agricultural Development to Job Creation and Unemployment Reduction: According to data from the Algerian Investment Promotion Agency, the

agricultural sector workforce in Algeria reached approximately 24% of the total national workforce in 2024. The following table illustrates the evolution of the agricultural sector employment rate between 2020 and 2024:

Evolution of the Agricultural Sector Employment Rate between 2020 and 2024:

2024	2023	2022	2021	2020	Years
24,1%	23,5%	22,8%	21,2%	20,5%	%

Source: Based on reports from the National Statistics Office.

The table shows that the percentage of agricultural workers has been steadily increasing year after year. It reached its lowest point in 2020 due to the impact of the COVID-19 pandemic, but quickly rebounded thanks to major investment projects and the recruitment of young people into industrial agriculture, reaching over 2.6 million workers by 2024.

3.3The Agricultural Sector's Contribution to Foreign Trade: The agricultural sector is integrated with the foreign trade sector in achieving food security. The country imports what it cannot produce domestically or at a reasonable cost, and it exports surplus production and products in which it has a competitive advantage over other countries. (2022, p. 124, Bouskar Rabia). The following table illustrates the evolution of agricultural exports during the period 2020-2024:

Evolution of the value of Algerian agricultural exports and imports during the period 2020-2024

Years	2024	2023	2022	2021	2020
Value of agricultural exports	\$720 million	\$700 million	\$650 million	\$543 million	484\$ million
Value of agricultural imports	\$12 billion	\$11.5 billion	\$12.1 billion	\$10.3 billion	billion 8.7\$

Source: Based on reports from the National Statistics Office

The table above shows that agricultural exports are continuously developing. This is due to the state's and investors' interest in the agricultural sector and the quality of national products such as dates, citrus fruits, and olive oil. On the other hand, we note that imports are constantly increasing and are more than 20 times the value of exports. This constitutes a significant deficit in the agricultural balance, primarily due to the importation of basic foodstuffs such as wheat, powdered milk, corn, and animal feed.

1. Challenges and Obstacles Facing Sustainable Agricultural Development in Algeria:

Since independence, agriculture in Algeria has faced numerous difficulties that have led to weak and fluctuating production. The reasons are varied, including natural, human, and technological factors. The most prominent of these are outlined below:

1.4 Problems and Obstacles Related to the Quality of Land Resources: These mainly consist of problems related to land resources, which directly or indirectly affect their productivity and sustainability. Natural factors play a significant role in determining the productive capacities of the agricultural sector.

2.4 Problems and Obstacles Related to the Nature of Agricultural Land: Agricultural lands suffer from several problems, the most important of which are:

□ The decrease in the size and quality of agricultural land;

□ The fragmentation of land ownership and holdings, along with the imbalance in the relationship between land and water resources. All these characteristics make the land's productivity limited.

3.4 Problems Related to Water Resources: Water resources in Algeria are known for their scarcity and uneven distribution. This has exacerbated the situation, especially in the last two decades, due to drought, pollution, and mismanagement.

4.4 Technological Problems and Obstacles: Agricultural technology plays a fundamental role in determining the quantity of production. However, in Algeria, there is still a heavy reliance on traditional farming methods, which depend more on manual labor than on machinery and equipment. This results in low productivity in the agricultural sector, as it suffers from a significant lack of modern equipment for mechanization.

5.4 Human Resources Problems: One of the most prominent challenges facing agricultural development in Algeria is the imbalance between the population and land resources. This is due to organizational issues related to the efficient management of available land resources, but more accurately, it is the lack of optimal utilization of these resources. 6.4 The Problem of Marketing Agricultural Products: One of the most prominent challenges facing agriculture is the issue of marketing. Collection from rural farms, which are often far apart, is difficult, in addition to declining interest in some agricultural crops. Furthermore, reforms that granted farmers greater freedom in marketing have led to manipulation of invoices to evade taxes and other practices that discourage competitiveness and sustainable development.

Third Axis: Experiences of Some Leading Countries in the Agricultural Field

Based on some international experiences in the agricultural field, we mention below the experiences of China and the Kingdom of Saudi Arabia:

1.3. The Chinese Experience:

Agriculture is the most important economic sector in China, employing over 300 million farmers. China ranks first in agricultural production worldwide, possessing 1.22 million km² of arable land, representing 57% of its total area in 2010.

Agriculture and rural development in China have achieved historic milestones over the past four decades of reform and opening up. Food security has been effectively improved, rural poverty has been significantly reduced, and agricultural modernization has been greatly enhanced, according to the 2018 World Food Security and Nutrition Report. However, food insecurity and malnutrition are on the rise, and this experience has informed a new development program.

China has also formulated a Rural Revitalization Plan (2018-2022) based on several priorities, including:

1. Supporting the integrated development of urban and rural areas in China through:

- Rational industrial planning of agricultural infrastructure, public services, and energy;
- Environmental protection to create a balanced development pattern between rural areas and modern cities;
- Improving the efficiency of poverty alleviation through the development of a comprehensive food system, cooperatives, and financing;
- Establishing a mechanism for the development of a comprehensive agricultural industry that will benefit low-income individuals;

- Experimenting with private ideas, institutions, and cooperatives, as well as engaging key social forces in poverty alleviation through industrial development to improve the inclusiveness and sustainability of agricultural development.

2. Promoting green agricultural development in China through:

- Introducing and assimilating successful international practices in establishing an ecological civilization and environmentally friendly green agricultural development in terms of cost, input reduction, clean production, waste recycling, and ecological food system;

- Preserving agricultural cultural heritage to promote the integration of traditional agricultural preservation with modern agriculture.

3. Supporting new types of agricultural businesses through:

- Supporting women and young farmers, in particular, to participate in agricultural production and develop their capacities, relying on the platform provided by the three UN agencies to develop talented agricultural workers with a new kind of professional knowledge;

- Cooperation among South Asian countries and the effective use of the China-FAO Trust Fund and the WFP Center of Excellence, in addition to the proposed establishment by China-FAO of the International Center of Excellence for Agricultural Innovation and Rural Development.

Results of the Chinese Experience: The results drawn from the Chinese experience reflect China's success in achieving significant progress in the agricultural sector and improving rural conditions. The most important results can be summarized in the following points: (Ahmed Jabr Salem Al-Salem, 2010, p. 26)

- Achieving food security: China has been able to achieve food security for its population of over one billion, thanks to increased agricultural production and improved land-use efficiency;

- Increased agricultural productivity: China has been able to achieve a significant increase in agricultural production thanks to the introduction of modern technologies and improved farming methods;

- Improving the standard of living of rural residents and reducing poverty levels; • Promoting the sustainable use of natural resources.

Lessons learned from the Chinese experience:

China's experience in sustainable agricultural development is a pioneering one in the field. Despite limited resources and a high population density, China has achieved food security and improved land productivity. This experience offers a set of lessons that developing countries can adopt to advance their sectors and achieve sustainable agricultural development:

- Giving farmers a greater role in decision-making;

- Improving land ownership and utilization systems to incentivize production;

- Investing in agricultural research and technology increases productivity while conserving resources;

- Agricultural sustainability depends on protecting natural resources, not just increasing production;

- Agricultural development cannot be achieved without comprehensive rural development;

- Maintaining a balance between productivity and environmental protection is fundamental to achieving sustainability.

2.3. The Kingdom of Saudi Arabia's Experience in Agricultural Development:

Agriculture in Saudi Arabia has witnessed remarkable development in recent years, despite the vast expanse of desert land. However, many regions possess a climate and fertile land conducive to agricultural expansion. The Kingdom began its agricultural renaissance in the early 1970s, distributing land free of charge. By 1995, approximately 1,500 hectares had been distributed to farmers, and all necessary resources were provided to support them.

The Kingdom's Efforts in Achieving Sustainable Agricultural Development:

Initially, the Kingdom established the General Directorate of Agriculture, which later became the Ministry of Agriculture in 1952. The government focused on achieving food security and stimulating agricultural production by granting citizens complete freedom to cultivate arable land. Agricultural machinery was provided at the state's expense and distributed to farmers. The development process was further launched with the establishment of the Saudi Arabian Agricultural Development Fund, which provides long-term loans. The state covers 50% of the cost of machinery and irrigation pumps, and 45% of the cost of imported agricultural equipment and fertilizers, in addition to distributing improved seeds and seedlings.

This fund facilitates agricultural development in Saudi Arabia. In addition, the state pursued vertical expansion by increasing the use of modern machinery and focusing on extension services, as well as horizontal expansion by providing water through the construction of dams, in addition to projects for settling nomadic populations and irrigation and drainage projects. These measures have yielded positive results.

In 2005, the Kingdom worked to introduce the organic agricultural sector in a tangible way. This was followed by a number of phases aimed at increasing the production of organic products for marketing, in order to facilitate access to the market for farmers and to develop organic value chains at the national level. This led to the establishment of the project and the development of the first policies for organic agriculture, with the goal of implementing increased government support for sustainable development. (Mohammed Habib Al-Akeeli, 2021, p. 435)

The Kingdom's Development Strategy:

The implementation of the Kingdom's strategy has led to the diversification of national income sources, an increase in the agricultural sector's production base, and an improvement in farmers' living standards. The development plans aimed to assist farmers in developing their production, open opportunities for the private sector to play its role in the development process, and introduce new agricultural technologies to reduce the cost of local production of all products. This included encouraging agricultural research institutions to fulfill their role in the development process through research, development, and extension services, promoting specialized research and studies in this field, implementing modern technologies to utilize treated wastewater in agriculture, combating desertification, preserving and protecting plant and animal life, supporting the propagation of plant and animal species, and empowering the agricultural sector to meet international, local, and regional challenges.

The implementation of this strategy resulted in an increase in agricultural crop production in 2008 to approximately 97 million tons. This included a diverse range of crops, with cereals reaching 24 million tons, followed by barley, sorghum, sesame, and vegetables (27 million tons). Tomato production reached 5 million tons, and the agricultural sector received significant attention in development efforts.

The measures taken by the Kingdom to advance the agricultural sector include:

- Prioritizing the livestock sector as a key component of agricultural development by establishing veterinary laboratories to provide services to all regions of the Kingdom;
- Increasing the number of seed stations specializing in plants suited to the Kingdom's environment through the establishment of a comprehensive seed program;
- Supporting cooperative societies to play their role in marketing;
- Encouraging the use of modern irrigation methods and promoting water conservation;
- Implementing a project to reuse agricultural wastewater, through which the Kingdom provided support in the Al-Ahsa region for irrigation using treated wastewater mixed with other water sources.
- Encouraging date palm cultivation and date production: The Kingdom has expanded its cultivation and is also working to promote and market dates abroad, in addition to establishing local food industries;
- Increasing the number of agricultural project licenses, which has reached 533 projects;
- Allowing foreign and domestic companies to invest in the agricultural sector, which leads to increased foreign investment and the growth of the agricultural sector.

Results of the Saudi Experience in Sustainable Agricultural Development:

Despite its desert environment and limited water resources, the Kingdom of Saudi Arabia has achieved significant results in agricultural development. These results include:

- Achieving self-sufficiency in some crops, such as wheat, dates, and certain fruits and vegetables;
- Developing modern agricultural technologies: This includes center-pivot irrigation, greenhouse farming, and the use of biotechnology, which has helped increase productivity despite the challenging climatic conditions;
- Transforming vast areas of desert land into productive agricultural land through land reclamation projects.
- Rural development: which contributed to providing job opportunities and stabilizing the population in rural areas

Lessons Learned from the Saudi Experience:

The Saudi experience has demonstrated that government planning, agricultural technology, and financial support can achieve agricultural success even in desert environments. The most important lessons learned are as follows:

- Encouraging the use of modern irrigation methods and promoting conservation;
- Effective government support accelerates development in vital sectors;
- Adopting modern technologies can transform desert environments into productive land;
- Investing in land reclamation creates significant agricultural and economic opportunities;
- Setting clear agricultural priorities helps achieve self-sufficiency and reduce dependence on imports;
- Implementing a plan to combat plant and animal diseases and epidemics;
- Allowing foreign and domestic companies to invest in the growth of the agricultural sector;

- Supporting cooperative societies to play a role in marketing and providing farmers with affordable loans.

1.3. Ways to Achieve Agricultural Development in Algeria:

To achieve sustainable agricultural development in Algeria, strategies must be adopted that take into account limited natural resources, climate change, and the need to improve agricultural productivity. This sector has suffered greatly from several factors, and seeds in Algeria are considered the primary reason for the dire state of agriculture. Other problems can be overcome if they are addressed. The real challenge is how to achieve self-sufficiency in the production of quality seeds, rather than relying on imports.

The following are the most prominent ways to advance the agricultural sector and achieve sustainable development:

- Establishing laboratories to produce and develop seed varieties suited to the climate and soil type in order to achieve self-sufficiency without the need for imports;
- Resolving the issue of land ownership contracts and enacting supportive legislation and policies: Land ownership in Algeria has been subject to numerous laws and regulations since the colonial era, which involved the appropriation of public lands and the confiscation of private properties. After independence, agricultural lands whose ownership contracts have not yet been finalized remain subject to significant challenges in all support and modernization processes. Furthermore, it is essential to establish laws to protect natural resources and soil, and to encourage farmers to adopt sustainable agricultural practices.
- Encouraging and motivating young people to work in the agricultural sector: This process may seem simple, but it requires considerable resources, including funding and training, as this demographic is characterized by its flexibility and ability to keep pace with technological advancements, unlike older generations.
- Mechanization and Leveraging Technological Advancements: To increase agricultural production, the state must adopt a policy of mechanizing the entire agricultural process from start to finish. The mechanization rate in Algerian agriculture remains low compared to developed countries, despite the state's efforts. Given that the financial situation does not allow for subsidizing farmers to purchase equipment, the state must seize the opportunity to increase agricultural support in this area. Furthermore, technological advancements should be utilized, such as smart and digital agriculture, to monitor weather and soil quality and improve productivity.
- Specialization and Diversification of Agricultural Crops: In this strategy, the state must consider climatic diversity and soil type to determine which crops can be grown in a given region, rather than planting just anything anywhere. It should focus on drought-resistant crops such as barley, olives, and dates, and work to reduce the cultivation of water-intensive crops in areas with limited water resources.

Conclusion:

Sustainable agricultural development in Algeria is a strategic choice to ensure food security and achieve a balance between the requirements of economic development and the preservation of natural resources. The agricultural sector represents a vital resource that contributes to food security, job creation, and achieving a balance between human needs and the preservation of natural resources. Given the challenges facing the agricultural sector, such

as climate change, water scarcity, and soil degradation, it becomes essential to adopt modern policies and methods based on the rational use of resources and investment in agriculture. Based on the above, we present the most important findings as follows:

- Sustainable agricultural development in Algeria requires developing production methods through the use of modern technologies;
- Improving irrigation systems and rationalizing water consumption;
- Increasing attention to scientific research and agricultural innovation, and training and raising awareness among farmers about the importance of agricultural practices;
- Developing rural infrastructure, which would increase productivity and improve living standards in those areas;
- Engaging farmers and raising their awareness of the importance of sustainable agricultural practices greatly contributes to achieving balanced and sustainable development.
- Algeria can also learn from the experiences of other countries, such as China and Saudi Arabia:
 - Prioritizing agriculture in economic policies;
- Encouraging farmers and supporting young people to invest in the agricultural sector;
- Promoting organic farming and developing drought- and salinity-tolerant seeds;
- Relying on agricultural technology and innovation.

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