

Role of Agricultural policies in the efficiency's improving of agricultural product distribution .

Case of Potatoes in the Province of Djelfa-Algeria-

MIMOUNI Chahrazede^{1,*} , GUERCHE Ben Salem²

¹ MCB, University Mohamed Ben Ahmed ORAN2 (Algeria), mimounichahra@yahoo.fr

² Head of Office at the Agricultural Research Center, National School of Political Science, Djelfa, (Algeria).
guerch1968@gmail.com

Received date: 14/04/2026 ;

Revised date: 25/06/2026 ;

Publication date: 30/06/2026

Summary:

This study analyzes the impact of agricultural policy on potato distribution logistics in Djelfa province, Algeria, where potatoes play a strategic role in national food security. Despite its importance as a production and transit zone in a steppe region, potato distribution faces significant logistical constraints. Using a quantitative and descriptive approach, a field survey covering 21% of potato producers identified the presence or absence of specific logistical barriers. Each constraint was analyzed individually using descriptive statistics and frequency distributions, following established practices in agronomic research and applied social sciences, where independent items identify specific barriers rather than form a unidimensional scale. The findings reveal multidimensional technical, organizational, institutional, and geographical constraints hindering farm-to-market transport. Results emphasize the need for government intervention to improve infrastructure, strengthen financial and organizational mechanisms, and promote innovation and information systems. An integrated, locally adapted agricultural policy is recommended to enhance distribution efficiency.

Keywords: Agricultural constraints logistics; Agricultural policy of Algeria; Potatoes distribution in Algeria

Jel Classification Codes : Q13 ; Q18 ; R40

* Corresponding author, MIMOUNI Chahrazede, mimounichahra@yahoo.fr

I- Introduction :

The potato is an agricultural species which is of considerable importance in the agricultural world. According to the recent Demeter 2025 report (Abis.S (2025)), the potato is at the center of a global conflict focused on the sustainability of its cultivation and the expansion of its use in processed products.

As the third most significant food crop in the world, after rice and wheat in terms of human consumption (Mordacq, D. (2024), the potato occupies a leading position while representing a pillar of the diet for many families, particularly in developing countries.

In Algeria, the potato sector plays a crucial role both economically and in terms of food. The potato segment has been booming in recent years as its production has experienced significant growth since the first PNDA agricultural plan in 2000 while increasing cultivable areas. It recorded a continuous increase from 1999 to 2019, going from an average production of 1.8 million tonnes between 1999-2009 to 4.5 million tonnes in 2010 to 2019 (i.e. 37% of total market gardening production) on an average area of 147,587 Ha (representing 30% of the total area dedicated to market gardening production¹.

In 2023, national potato production stood at 4.63 million tonnes, a decrease of 7.73% compared to 2019, a record year when it reached 5.02 million tonnes². In 2019, the wilaya of Djelfa ranked 8th nationally in terms of potato production, including the early variety, with a volume of 164,422 tonnes harvested over an area of 5,752 hectares³.

The wilaya is a leader in the production of late-season potatoes with a production of 1000 h yielding 400 quintals/h in 2023/2024⁴.

Algeria has consolidated its position as the second largest potato producer in Africa, closely following Egypt. A progression which reflects a notable transformation in the agricultural sector. This transition marks the beginning of a period where agriculture, specifically potato cultivation, becomes a key driver of food security and economic development in Algeria.

According to agricultural expert Laala Boukhalfa, Algeria is increasingly asserting itself as an important nation in the field of potato production in Africa. Formerly confined to certain specialized wilayas such as Mostaganem, Chlef, and Ain Defla, potato cultivation has spread to the entire national territory, particularly to El Oued. These wilayas have propelled the country among the main potato producers in Africa.

The potato has become the second staple food for Algerian families after cereals, with an average consumption estimated at 66 kg per capita in 2021 (MordorIntelligence (2023)).

In terms of food, potatoes occupy a significant place in the consumption basket of Algerian households. 3.43% of their average consumption budget is devoted to potatoes. But despite this average weighting (34.4 out of 1000 in the consumer price index) the product remains a widely consumed staple food in Algeria, which makes its social and economic importance go beyond its mere statistical weighting. The potato remains strategic for food security⁵.

Consequently, Algeria is still implementing various multidimensional and strategic projects in order to make the sector more autonomous, stable and sustainable through structural measures to support production - *the development of new local multiplication - varieties of seeds to achieve self-sufficiency by 2027, the extension of cultivated areas, improvement of irrigation and infrastructure - and through market regulation and stabilization measures - support for farmers, strengthening of the capacity of storage, surplus management - and measures to supervise the marketing and processing of the product.*

¹ https://www.ons.dz/IMG/pdf/retrospective_agricultures2010_2019.pdf LES STATISTIQUES DE L'AGRICULTURE LES PRODUCTIONS VÉGÉTALES ET ANIMALES Rétrospective 2010-2019, Collection n°225, p 17-16

² <https://www.fao.org/faostat/fr/#data/QCL> consulted le 02/06/2025 4 :50

³ <https://madr.gov.dz/> , Directorate of Agricultural Statistics and Information Systems (2021), 'Agricultural Statistics, Areas and Productions. Series B 2019,' Algeria

⁴ DSA Djelfa , Local Agricultural Statistics. Directorate of Agricultural Services of the Wilaya of Djelfa

⁵ www.ons.dz , Consumer Price Indices. Month of April 2025, No. 353, May 2025, p4

The geographical diversity in Algeria allows production (early, seasonal and late season⁶) throughout the year, ensuring a continuous supply of potatoes throughout the year and constant prices would make it accessible to all. Compared to 2001, the price of potatoes increased by 299.58% in April 2025. A long-term increase which can impact the purchasing power and food security of the consumer. Furthermore, the annual variation from April 2024/April 2025 is 21.88%. Despite its role, the potato is subject to strong price fluctuations due to several factors. The literature identifies two determinants of food transportation, namely the price of diesel and the availability of truck drivers. (Lee, Y., Zhang, A., & Xu, X. (2024).

Recent research highlights the central role of logistics in the formation of agricultural prices, particularly potatoes (Allal, L. G., Bennekrouf, M., Bettayeb, B., & Sahnoun, M. (2024)). The authors demonstrated that failures in transport, storage and planning in western Algeria directly contribute to price instability and the vulnerability of farmers' income. The authors show that better logistics organization would reduce costs, improve profitability and stabilize prices, which underlines the importance of integrating the logistics dimension into agricultural policies in order to strengthen the value chain and food security.

Other existing literature focuses on the one hand on agri-food logistics on a national scale (S.Ahmed Yahia (2023)), on the other hand on diagnostics of the potato sector in certain wilayas notably in El Oued (Laiche, K. (2021)). On the other hand, if several works have analyzed the sector on a national scale, few studies have looked at local distribution dynamics, particularly in strategic production regions such as wilaya of Djelfa.

Based on a field survey of farmers, this article proposes to examine the logistical constraints which affect the distribution of potatoes in this wilaya, and to assess the extent to which existing public systems respond to these challenges. This work, by combining theoretical analysis and empirical data, aims to fill a scientific void while providing elements of decision support for public and private actors.

Despite the strategic importance of potatoes in food and food security in Algeria, distribution faces numerous logistical constraints in the production area. This observation raises a central question :

To what extent do the distribution difficulties encountered by potato farmers in the wilaya of Djelfa reflect the limits of current agricultural policies and what future directions could improve its effectiveness?

Two questions emerge from this central question ;

The first concerns the identification of obstacles: What are the concrete obstacles to distribution encountered by farmers in the sector in the wilaya of Djelfa?

The second relates to the limits of the State's contribution to optimizing the distribution of the product: How do public agricultural measures make it possible to reduce these constraints and improve the efficiency of distribution?

These questions lead us to formulate the following hypotheses :

- **H1:** farmers in the wilaya encounter technical, organizational and institutional logistical constraints which influence the distribution of potatoes.
- **H2:** current agricultural support systems prove insufficient to improve the logistics performance of the sector in the wilaya.

In order to verify these hypotheses, we adopted a research methodology based on a descriptive analytical approach, through the use of a questionnaire administered to a sample of farmers.

⁶ The late season from November to April; The early season from February to May; The main season from April to October.

The data collected was subject to statistical processing based on flat sorting, making it possible to analyze the distribution of responses by identifying the major characteristics, the constraints encountered and the perceptions of the stakeholders concerned.

This work is structured around the following plan: a first point is devoted to the succinct presentation of the theoretical framework of the research; a second point concerns the examination of public support systems for agricultural logistics; finally, a third point is dedicated to the identification of logistical constraints linked to the distribution of potatoes in the wilaya of Djelfa.

I.1.Theoretical approaches to logistics and application to the agricultural sector

Agricultural logistics is the backbone of the food system. It manages the complex flow of goods, services and information from the time crops are harvested until they reach consumers, ensuring efficiency, profitability and preservation of quality along the way.

The profitability of agricultural sectors and food security depend on the efficiency of this chain, particularly in rural areas where logistical infrastructure is often inadequate (USAID, 2010; Kitinoja & Kader, 2002). The main challenge for producers is supplying sufficient volumes to markets subject to supply constraints.

The organization of potato distribution relies on theoretical concepts from supply chain management and value chain analysis. The latter describes all the activities necessary to move a product or service from conception to delivery to the end consumer, through the various stages of production and finally to disposal after use.

The agricultural logistics chain, also called the agricultural supply chain, refers to all the actions and procedures involved in the journey of agricultural products, from their point of production (the field) to the end user. It encompasses the phases of collection, storage, processing, transport, and final distribution of the product (FAO 2021). Each step constitutes a link whose performance determines the competitiveness of the sector.

The objective is to minimize losses, optimize costs, and ensure product quality at each stage of the process. In the field of agricultural policy, the logistics value chain is crucial for optimizing the efficiency of agricultural product distribution. The main pillars of the chain are : Procurement , Transport, Storage and Distribution

In this study, the theoretical framework of logistics relies on several complementary approaches: Porter's value chain theory, the systems approach to the agricultural supply chain, the institutional approach, and transaction cost theory.

a- Porter's value chain theory (Porter, M.E. (1985a)). The theory considers internal and external logistics as activities that contribute directly to value creation while linking production to markets.

Initially developed to analyze business competitiveness, this approach can be applied to the agricultural sector to analyze distribution as a strategic component.

Any logistical failure impacts the overall competitiveness of the agricultural sector. The value chain approach considers the role of the actors that make up the chain. It allows for the examination of these current challenges while offering opportunities to improve efficiency. For farmers, being part of a high-performing value chain can provide them with higher, more stable, and predictable income.

Analyzing a value chain ; identifying its challenges, weaknesses, and strengths, can help uncover new income-generating opportunities.

b- The systemic approach to the (agricultural) supply chain, inspired by work in Supply Chain Management (Christopher M., 2011), focuses on organizing physical and information flows to minimize costs and improve business performance. It considers distribution as an integrated chain—a network of interconnected actors—where each link (producer, collector, transporter, wholesaler, etc.) must operate in a coordinated manner to guarantee overall efficiency. It emphasizes the overall performance of logistics and end-customer satisfaction, where logistical constraints have an impact on price and distribution.

c- The institutional approach (North, D. C. (1990)) considers that the formal institutional framework (political, legal, and administrative power) sets the economic rules that act as incentives for entrepreneurs.

For most neo-institutionalists, including North, it is politics that defines the rules of the economic game. The approach allows us to situate agricultural reforms and public policies within the regulation or resolution of obstacles encountered by producers. The role of agricultural policies, regulations, and institutions in supporting or hindering logistics is significant: the inefficiency of agricultural policy can create or exacerbate logistical obstacles (lack of infrastructure, weak regulation of distribution channels, etc.).

d- Transaction Cost Theory (Williamson, O. E. (1979).) emphasizes the importance of logistics in reducing the costs associated with trade, particularly in terms of transport, storage, and coordination. Applied to potato distribution, it demonstrates that logistical challenges create additional costs for farmers, thus reducing their profit margins, market access, and bargaining ability. The theories employed in this work provide a general framework for analyzing distribution constraints. Specifically regarding potatoes in the Djelfa province, these methods help to understand how problems related to transport, storage, and sales affect added value and prices. They also offer the opportunity to evaluate the effectiveness of support policies in addressing these constraints.

1.2. Public Support for Potato Logistics in Algeria

The literature indicates that logistics performance depends on the availability of adequate infrastructure, effective coordination among stakeholders, and the implementation of coherent agricultural policies tailored to territorial realities. In this context, government intervention plays a crucial role, particularly through infrastructure development, financial and technical support for farmers, and market regulation. The modernization of the agricultural sector, through major post-2000 agricultural plans, began with the National Agricultural Development Plan (NADP). Proactive public reforms have stimulated agricultural production and have promised support for the entire value chain through strengthened marketing and logistics.

Therefore, it is necessary to examine the content of the programs and measures implemented in this area in order to assess the consistency between the stated policy directions and the realities observed by producers.

1.2.1. Logistics Infrastructure - Improvement of Storage and Transport Infrastructure

1.2.1.1. Procedure for Improving Public Storage Infrastructure

Public storage infrastructure helps reduce post-harvest losses, regulate the market, and stabilize prices. It provides direct support to producers and facilitates distribution and the structuring of marketing channels.

Since 2008, the Algerian government has established a public mechanism, Syrpalac – the system for regulating widely consumed products - .

While maintaining buffer stocks during peak production periods, the system allows for the release of these stocks during periods of shortage to guarantee product availability.

It aims to stabilize potato prices, protect consumer purchasing power, and safeguard farmers' incomes by creating buffer stocks in partnership with private operators, particularly cold storage facilities. Syrpalac's objective was to absorb surpluses of widely consumed products and support farmers' incomes.

Faced with its limitations, including insufficient stock levels relative to demand, a lack of expertise in storage techniques, and persistent potato price fluctuations, a new regulatory mechanism has been in place since 2022 to ensure better management and consumption of the products.

This mechanism relies on modernizing storage capacity to absorb seasonal production surpluses, limit price fluctuations, and strengthen food security through public infrastructure such as silos and cold storage facilities for fresh produce. The state, through ONILEV (National Interprofessional Office for Vegetables and Meat), administers the system.

It cooperates with the public operator **FRIGOMEDIT**, responsible for providing positive, negative, and dry storage, with a total capacity of 300,000 m³ distributed across several wilayas. In parallel, 16 silos are managed by **AICO** (Algerian Interprofessional Cereals Office). The system utilizes private infrastructure to manage surplus production (case of Tlemcen).

A regulatory mechanism has been established to ensure transparency, traceability, and the provision of financial support to potato storage facilities in the form of subsidies. This system relies on administrative, accounting, and technical audits conducted by the DAS (Directorate of Agricultural Services) and ONILEV, with a storage cost set at 1.80 DA/kg and a subsidy period capped at five months⁷.

The government's objectives are to ensure transparency and monitoring, while organizing flows, commercial transactions, and transfers and exchanges.

1.2.1.2. Rural Transport and Infrastructure :

Rural transport is considered a key driver of agricultural and rural development. Programs have been implemented to improve agricultural roads and facilitate the transport of products, such as rural development programs and High Plateaus development plans. The Integrated Rural Development Program (IRDP) has enabled the rehabilitation of rural roads that connect farms to collection and marketing centers. However, challenges related to maintenance, regional disparities, and the lack of direct transport infrastructure often force producers to rely on wholesalers and intermediaries.

The lack of usable rural roads is a major obstacle to the movement of agricultural products, especially perishable ones.

1.2.1.3. Market Regulation and Stabilization

Wholesale and local markets help reduce the number of intermediaries and regulate agricultural product prices. They improve market fluidity while ensuring product availability.

The government encourages the opening of local markets, particularly in large cities, to promote the direct sale of agricultural products by farmers and small producers through programs of the National Agricultural and Rural Development Plan (PNDAR).

At the national level, the management of wholesale fruit and vegetable markets is handled by EPE – MAGROS, the Algerian company for the development and management of wholesale markets. This company manages various projects, including the selection of locations and the sizing of markets in accordance with international standards established by the FAO.

According to the Ministry of Commerce⁸, there are 45 markets established nationwide, four of which are not operational. Markets are divided into four categories: national (14), regional (14), and local.

More than 28,000 tons of fruits and vegetables pass through these markets daily, including 8,711.5 tons of fruit and 18,376.5 tons of vegetables.

The second stakeholder is SARPA (Algerian Agricultural Products Regulation Company), responsible for regulating production to ensure the supply of widely consumed agricultural products (storable fruits and vegetables) to the national market and to redirect surpluses towards export.

Among other things, it contributes to stabilizing and regulating the potato market by releasing stockpiles of this product and selling it directly to consumers at a fixed price.

Its role is to support farmers, particularly potato farmers, while encouraging them to participate in regulatory programs to ensure efficient production management and meet market needs.

1.2.1.4. Supporting Agricultural Cooperatives

Potato cooperatives play a central role in the agricultural value chain and logistics by organizing production, reducing logistics costs, strengthening bargaining power, and accessing public support.

Since 2020, the process of establishing agricultural cooperatives in Algeria has been simplified through a more flexible regulatory framework, positioning these structures as key players in agricultural and rural development and food security⁹.

Advantageous financing, sometimes interest-free or with reduced rates, is available to help them invest in production, storage, processing, and marketing.

⁷ www.madr.gov.dz « Dispositif d'adhésion de suivi, de contrôle, d'évaluation et de paiement des frais liés au stockage de la pomme de terre de consommation – Portail des services en ligne

⁸ <https://www.commerce.gov.dz/fr/b-les-marches-de-gros>, consulted le 2/05/2025 18h30. (4) Oran (El-Karma), Boumerdès (Khemis El-Khechna), Blida (Bougara), and Biskra (El-Ghrous); (14) Tipaza (Attatba), Algiers (Eucalyptus), Djelfa, Blida (Boufarik), Tlemcen, Mostaganem (Sayada), Mila (Chelgoum-Laïd), Sétif, Chlef, Mascara (Mohammedia), Annaba (El-Bouni), Ouargla, Constantine, and Batna (Oued-Chaaba)

⁹ Executive Decree No. 20-274 of 29 September 2020, amending and supplementing Executive Decree No. 96-459 of 18 December 1996 setting the rules applicable to agricultural cooperatives. Official Journal of the Algerian Republic No. 59 of 04/10/2020.

Cooperatives are also encouraged to reduce the role of intermediaries and improve product traceability. However, challenges remain, such as cumbersome administrative procedures, limited access to financing for some, and the need to better structure and activate existing cooperatives.

1.2.1.5. Financial Support

Financial support is crucial for modernizing agricultural distribution, reducing logistical constraints, stabilizing farmers' incomes, providing access to inputs and infrastructure, and encouraging investment.

Furthermore, various financial assistance measures are available to farmers, notably through :

• ***A government-bank partnership to support farmers in establishing cold storage facilities and better regulating the agricultural market.***

The Algerian State, through the Ministry of Agriculture and public banks, has implemented a financing mechanism to promote the creation of small and medium-sized cold storage facilities. This initiative aims to increase national storage capacity for agricultural products and improve their marketing.

The "Tabrid" investment loan, with a maximum amount of 150 million DA interest-free and repayable over 10 years, is available to farmers to finance the construction of cold storage facilities ranging from 300 to 5,000 m³, in order to increase storage capacity, stabilize prices, sell surpluses, and encourage agricultural investment¹⁰.

• According to Algerian law, within the framework of the Investment **Law (Ordinance No. 22-18 of July 24, 2022)** and specific regulations for the agricultural sector, investors in the agricultural sector operating as companies will benefit from support and subsidized loans.

• ***The National Fund for Agricultural Regulation and Development (NFARD)*** supports logistics by financing projects related to storage and farm modernization.

• ***The Support Fund for Steppe and High Plateau Regions*** for financing rural electrification, enabling the commissioning of cold storage facilities.

• ***Subsidized bank loans through ETTAHADI*** program, which finances agricultural infrastructure, including some logistics infrastructure.

• ***Subsidies or subsidized loans*** for the acquisition of refrigerated trucks, although these measures are limited and not necessarily accessible to small producers.

By supporting supply chains, the State and financial institutions ensure better availability of strategic products such as potatoes.

1.2.2. Case of the Wilaya of Djelfa : Over the past two decades, the Djelfa Province has benefited from several agricultural and rural development programs, implemented through various approaches. Within the framework of the High Plateaus Program and the Complementary Growth Support Program, seven projects were completed, totaling approximately 2,021 km of electrical infrastructure financed by the High Plateaus Fund, with the primary objective of improving electricity supply in this strategic region.

In 2018, an additional program was launched, planning for the construction of 1,000 km of infrastructure, of which 949 km (94%) have been completed. In the same vein, agricultural services have registered nearly 9,783 farms under the specific program of the Ministry of Agriculture, Rural Development and Rural Planning (MADR) (2020).

Of these, 3,371 farms have already been connected to the electricity grid, while Sonelgaz, a major partner in this operation, is continuing work to connect approximately 5,200 additional farms, currently underway. This dynamic is also accompanied by land regularization measures and the streamlining of old files, allowing for the resolution of outstanding situations and the issuance of new land titles. These actions facilitate farmers' access to various public support and assistance programs, while also promoting the expansion of cultivated areas.

The wilaya of Djelfa plays a crucial role in the agricultural sector and occupies a strategic position in Algerian agriculture thanks to the diversity and importance of its agricultural production. It constitutes a major potato-producing region, particularly in the areas of El-Idrissia, Had-Essahari, and Elbirine, whose harvests largely supply national markets.

Furthermore, its location on the north-south axis, linking the Tell Atlas to the Sahara, makes it a major logistical hub for the collection, storage, and distribution of agricultural products.

¹⁰ "www.algerie-eco.com 'Cold Storage Financing: Ministry of Agriculture Signs Agreements with Six Public Banks'"

Studying potato logistics in the Djelfa province is of significant strategic and economic importance and allows for the identification of weaknesses in the potato value chain. This logistics is essential to guarantee the constant availability of potatoes on the market and ensure price stability.

In semi-arid regions like the Djelfa province, its success depends on the optimal transport of products from the fields to the markets, directly influencing farmers' profitability and price stability.

II- Methods and Materials:

This study is part of a diagnostic approach to potato farms, with the objective of identifying the logistical factors influencing product distribution.

The study is based on a field survey of potato farmers, focusing on the distribution of the product from the field to the market.

The questionnaire was sent to 52 farmers across four districts (daïras) in the Djelfa province during February-March 2025, corresponding to the 2024/2025 agricultural season: El-Idrissia (21), El-Ibirine (8), Had-Essahari (12), and Aïn El Ibil (11). The entire target agricultural population in the province comprises 245 farmers, giving the sample a representativeness rate of 21%.

Data were collected using a semi-structured questionnaire incorporating open-ended and closed-ended questions. The questionnaire covered the producer profile, farm characteristics, post-harvest handling, marketing methods, transportation, and associated challenges. These dimensions were addressed from a practical perspective, and also in relation to the mechanisms and limitations of agricultural policies, in order to better understand their impact on distribution.

The sampling method used was purposive sampling to select farms representative of the diversity. This method makes it possible to identify producers with contrasting characteristics found in the field.

The descriptive analysis of the questionnaire allows us to establish an overview of the logistics and distribution of potatoes in this steppe region and to identify the obstacles to distribution. The questionnaire items address distinct and conceptually independent constraints. They are not intended to measure a unidimensional latent construct, but rather to identify different categories of difficulties encountered by farmers in the distribution process. Consequently, assessing internal consistency using Cronbach's alpha is not methodologically necessary.

Furthermore, an exploratory calculation of Cronbach's alpha yielded a value of zero, primarily due to the absence of variance in certain items, which were characterized by almost uniform responses. This situation makes it statistically impossible to obtain a reliable estimate of internal consistency. The observed uniformity of responses instead reflects the widespread, and potentially structural, nature of certain constraints within the studied sample.

As a result, the analysis was conducted at a descriptive level, item by item, using frequencies and proportions to highlight the extent and nature of the identified constraints.

III- Results and discussion :

III.1. Current farming practices:

The survey reveals a predominance of publicly owned farmland (55%), followed by 40% of tenants cultivating areas between 10 and 40 hectares (53.8% of all farmers). The farming techniques used by 78% of farmers indicate advanced mechanization in the region, resulting in increased efficiency and reduced labor costs, while requiring significant capital investment.

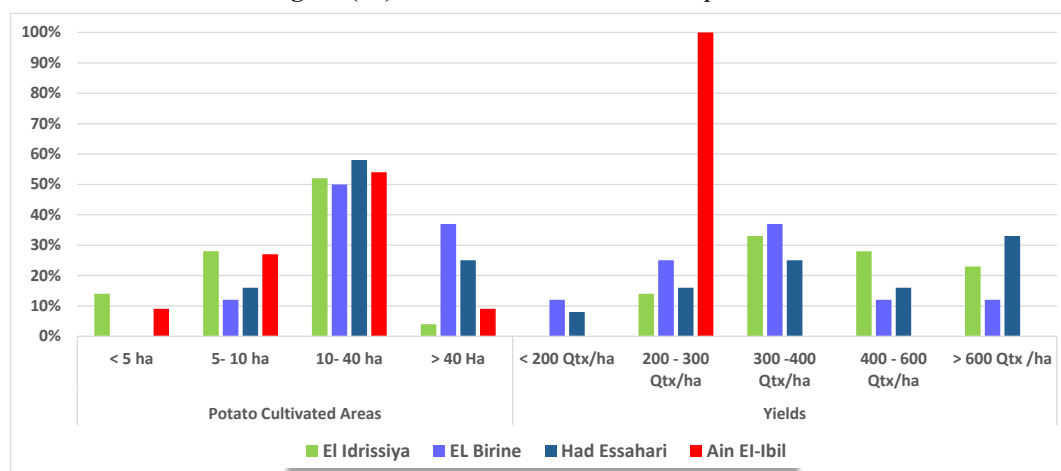
The majority of farmers, 76%, cultivate local potatoes, with yields per hectare not exceeding 400 quintals. Yields below 200 quintals/ha are low, demonstrating good overall productivity.

In contrast, farmers cultivating imported potatoes obtain yields exceeding 600 quintals per hectare.

Figure (01) illustrates productivity and cultivated areas by district (Daïra). More than 50% of farmers cultivate areas between 10 and 40 hectares. Very few areas are smaller than 5 ha or larger than 40 ha.

In Ain El-Ibil district, 100% of farmers obtain yields between 200 and 300 quintals/ha of the local variety. The other districts show more dispersed yields. Furthermore, El-Birine has a high proportion of cultivated areas and better performance on the highest yields of more than 600 qtx/ha since 41% of farmers grow imported potatoes.

Figure (01) :Yields and cultivated areas per district



Source: Authors' elaboration based on questionnaire results

The figure highlights productivity differences between districts despite sometimes comparable cultivated areas. These differences can be explained, firstly, by the type of variety cultivated—local or imported—as well as the farming practices introduced by investors from the north, established in Ain-El-Ibil, the first access point to the wilaya, or, secondly, by logistical constraints.

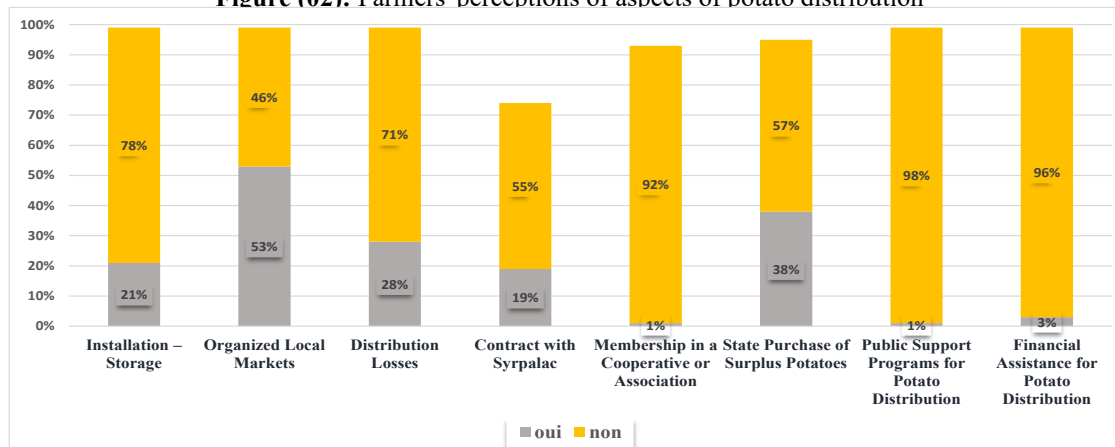
III.2. Potato distribution: identification of logistical obstacles in the wilaya of Djelfa:

This study is based on the value chain classification (production, transport, storage, marketing, final distribution) used by the FAO and the World Bank to determine the stage in the value chain where obstacles arise. Furthermore, categorization according to the nature of the constraints (technical, economic, logistical, and institutional) is used to pinpoint the origin of the identified problems.

Figure (02) illustrates the dichotomous responses collected from farmers exploring different aspects related to potato distribution, according to the nature and stage of the value chain, including storage, distribution, and public support.

In this study, a "no" response is equated with the absence of, or lack of access to, a resource, service, or institutional support. Thus, a high percentage is interpreted as an indicator of an obstacle and an unmet need at a link in the chain. However, for the " distribution losses " element, the logic is reversed; a " yes" response indicates the existence of a problem.

Figure (02): Farmers' perceptions of aspects of potato distribution



Source: Authors' elaboration based on questionnaire results

The graph analyzes farmers' perceptions, revealing multiple obstacles throughout the potato distribution chain, including storage, transportation, marketing, and access to government subsidies. Other obstacles are highlighted, particularly organizational and institutional ones.

III.2.1. Logistical Obstacles: Storage, Transportation, Market Access.

III.2.1.1. Access to Storage and Marketing Infrastructure

These logistical obstacles are present from the very beginning of the chain. Indeed, 78% of farmers lack post-harvest storage infrastructure. Only 21% are equipped with cold storage facilities to preserve their produce for several months, at a cost ranging from 1,350 to 2,500 DA per quintal/month. However, the shelf life of potatoes allows producers to better manage distribution by minimizing physical losses. Furthermore, 71% of farmers report no losses during distribution.

The lack of storage infrastructure exacerbates post-harvest losses and impacts marketing. None of the farmers surveyed in the districts of El-Idrissiya and Ain El-Ibil have cold storage facilities, while on average, 50% of farmers in the other two districts do. This is in stark contrast to the Djelfa province, which has 73 cold storage facilities with a capacity of 350180 m³¹¹.

In an effort to better align agricultural supply with local demand, the government has established local markets designed to promote direct sales. Over 53% of respondents reported access to these markets, indicating that the system is not yet widespread in the four districts, particularly in El-Idrissiya (90% reported no) and among half of the farmers in El-Birine (50%).

However, in the districts of Had-Essahari and Ain El-Ibil, accessibility is at 100% and 90% respectively (Figure 03).

Although the state has opened these local markets, only 2% of respondents use them, while sales to intermediaries remain dominant in all districts (61%), reflecting a strong dependence on the intermediary channel. Meanwhile, 34% of farmers prefer formal sales through wholesale markets. The manufacturing sector, however, appears to offer very limited market opportunities.

Figure (03) : Potato distribution channels per district



Source: Authors' elaboration based on questionnaire results

Farmers' choice of distribution channels is determined by the distance to their main customers. However, data indicates that 87% of farmers sell potatoes more than 100 km away, with 53% selling between 100 and 300 km and 3% between 300 and 500 km. Only 11% sell within 100 km.

This represents a considerable geographical distance (reducing direct sales) that can extend delivery times, increase transport costs, and lead to product degradation.

III.2.1.2. Transportation

The survey reveals that farmers use three forms of transport: private transport, transport provided by wholesalers, and a combination of both.

¹¹ DSA : Local Agricultural Statistics. Directorate of Agricultural Services of the Wilaya of Djelfa.

Marketing is heavily dependent on wholesalers, and 69% of farmers handle the transport of their goods themselves, primarily for distances between 100 and 300 km, which increases their expenses and limits their profitability. Conversely, 23% use the trader's resources and 7% combine both.

It should be noted that potato distribution faces two main challenges, thus limiting optimal product distribution: 49% cite difficulties in accessing markets and 49% raise the issue of high transportation costs. Furthermore, the majority of farmers do not experience losses during potato distribution.

These data highlight the need to improve infrastructure and reduce logistics costs to facilitate market access and optimize agricultural distribution.

III.2.2. Institutional Obstacles: Weak Public Support, Weak Collective Organization.

Geographical remoteness, combined with insufficient storage infrastructure and high transportation costs, places producers in a position of weak bargaining power, given that 92% of respondents do not belong to any farmers' association.

In this respect, it is difficult to negotiate purchase prices and sales conditions, as well as to pool transportation resources.

The absence of agricultural cooperatives can hinder the development of the sector and deprives farmers of access to training, technical information, and agricultural innovations. Farmers' cooperatives easily obtain public aid while benefiting from the various programs implemented by public authorities.

Figure (01) demonstrates a lack of public support in the form of financial and other aid related to potato distribution.

Almost all farmers report not benefiting from a public distribution program (98%) or financial assistance (92%). While 57% report that the state does not purchase surplus production, this can lead to market volatility and income insecurity.

Furthermore, among the 39 respondents, only 19% have signed up to Syrpalac, a limited access to the market regulation contract, which constitutes an economic barrier. The cross-analysis (Table (01)) of data relating to farmers participating in Syrpalac and data relating to state purchases reveals a significant relationship between the existence of a contract and the probability that surplus production will be purchased by the state (chi-square test = 9.000, $p = 0.002$). Fisher's exact test confirms this conclusion ($p = 0.003$).

Among the farmers surveyed who have a contract with Syrpalac, 90% have benefited from the public purchase of their surplus, compared to 34% among those who do not have a contract. However, 65% of producers not bound by contract were unable to sell their surpluses, compared to only 10% among members of the Syrpalac scheme.

In terms of association strength, the Phi coefficient and V are equal to 0.48, indicating a moderate to strong value; producers who have signed a contract with Syrpalac are more likely to be included in public purchase programs to stabilize the potato market. (This reinforces the benefits of membership, a tool that secures market access.)

Table (01): Cross-tabulations: Syrpalac contract and public purchase of surplus

Tableau croisé Contrat avec Syrpalac * Achat par l'État l'excédent P.T					Tests du khi-deux				
		Achat par l'État l'excédent P.T		Total		Valeur	ddl	Sig. approx. (bilatérale)	Sig. exacte (bilatérale)
		oui	non						
Contrat avec Syrpalac	oui	Effectif	9	1	10	khi-deux de Pearson	9,000 ^a	1	,002
		% dans Contrat avec Syrpalac	90,0%	10,0%	100,0%	Correction pour continuité ^b	7,086	1	,008
		% du total	23,1%	2,0%	25,0%	Rapport de vraisemblance	10,000	1	,001
non		Effectif	10	19	29	Test exact de Fisher			,003
		% dans Contrat avec Syrpalac	34,0%	65,0%	100,0%	Association linéaire par linéaire	8,000	1	,003
		% du total	25,0%	48,0%	74,0%	N d'observations valides	39		
Total		Effectif	19	20	39				
		% dans Contrat avec Syrpalac	48,0%	51,0%	100,0%				
		% du total	48,0%	51,0%	100,0%				

a. 1 cellules (25,0%) ont un effectif théorique inférieur à 5. L'effectif théorique minimum est de 4,87.

b. Calculée uniquement pour une table 2x2

Récapitulatif de traitement des observations						
	Observations					
	Valide		Manquant		Total	
	N	Pourcentage	N	Pourcentage	N	Pourcentage
Contrat avec Syrpalac * Achat par l'État l'excédent P.T	39	75,0%	13	25,0%	52	100,0%

III.2.3. Logistics Score

To measure the logistical constraints faced by farmers in the wilaya, a composite overall score is calculated by aggregating several binary indicators corresponding to the main challenges identified in potato distribution.

The score quantifies the cumulative logistical difficulties and provides a synthetic measure of the level of logistical challenges, consistent with approaches recognized in the value chain literature. Each obstacle perceived by the farmer is coded 1 = yes, otherwise the code is 0 = no. Analysis of the results shows that 34% of farmers face at least four logistical obstacles, while 9% encounter up to nine in the distribution process.

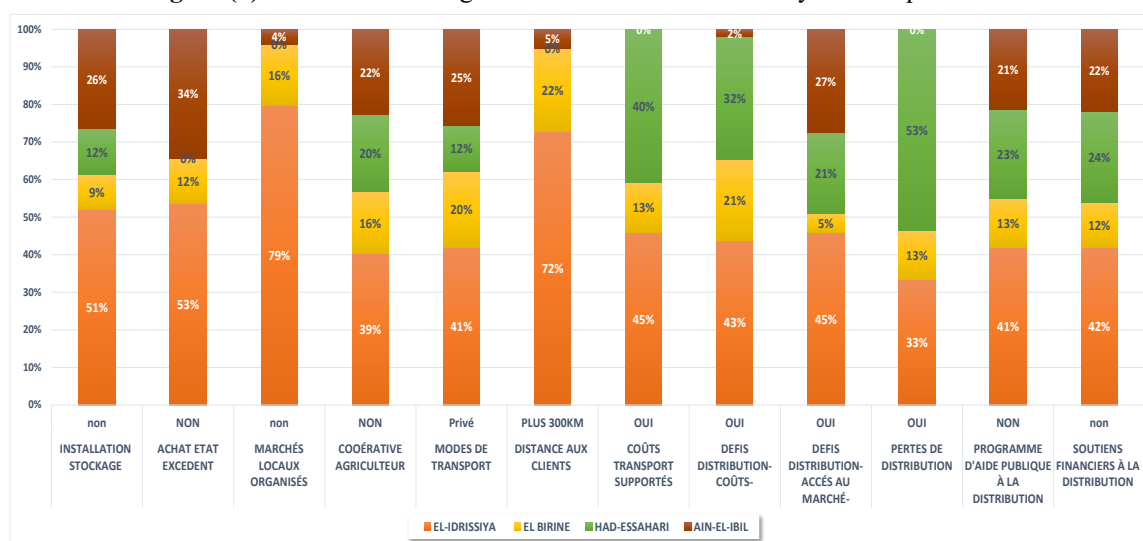
Figure (05) presents the distribution of the various logistical obstacles reported by farmers in the four surveyed districts (Daïras): El-Idrissiya, El-Birine, Had Essahari, and Ain El-Ibil. Each bar shows, as a percentage, the proportion of farmers encountering a specific obstacle.

The diagram illustrates marked differences between the districts, demonstrating that logistical constraints are not uniform. In El-Idrissiya, a greater number of obstacles are observed compared to the other districts, primarily access to markets (72%) and the lack of organized local markets (79%).

In all four districts, the shared challenges are mainly related to a lack of adequate storage, the transportation costs borne by farmers, the lack of membership in farmers' associations, high transportation costs, and difficulties accessing markets. The use of the state surplus purchase program also varies between localities, highlighting a disparity in access to government measures.

It is also observed that farmers in the various districts do not face the same kinds of obstacles: in some districts, the cost of transportation or the lack of organized local markets affects a majority of farmers, while in others, distance constraints or a lack of public support predominate. Furthermore, Had-Essahari district appears to be better served by local markets.

Figure (5): Distribution of logistical obstacles encountered by farmers per district



Source: Authors' elaboration based on questionnaire results

The graphical analysis reveals a marked diversity of logistical constraints. This heterogeneity reflects the limitations of current reforms which, although widespread at the national level, struggle to address the local realities and needs of farmers.

III.3. Discussion

Farmers of the wilaya face multidimensional logistical constraints. The results obtained from the questionnaire analysis highlight a multitude of logistical obstacles that are widespread across the different districts (Daïras) and disparities between them. The study showed that the majority of farmers face distribution difficulties related to transportation costs, distance from markets, and the lack of storage facilities, thus hindering the smooth flow of distribution and compromising the profitability of their produce.

The absence of organized markets forces farmers to rely on private traders, which limits their bargaining power and reduces their income.

Despite reforms aimed at modernizing distribution channels, such as the development of local markets and price regulation mechanisms, farmers continue to encounter various obstacles depending on their location. This reveals a gap between national strategies and specific local needs.

These results suggest that agricultural and logistical reforms, although in place, have not had the same effects everywhere and have not uniformly reduced inequalities in market access and distribution costs. They highlight the need for targeted intervention and differentiated support based on territorial specificities.

It can therefore be concluded that logistics constitutes a weak link in the potato distribution chain. These results should be interpreted with caution, as the sample is limited to four districts.

IV- Conclusion:

Agricultural logistics constitutes a strategic lever for the competitiveness of agricultural sectors. In the specific case of potatoes, a perishable product vulnerable to post-harvest losses, it plays a crucial role in limiting these losses, regulating prices, and ensuring continuous product availability throughout the year.

This study aimed to examine the extent to which the distribution difficulties faced by potato farmers in the wilaya of Djelfa reflect the limitations of current agricultural policies and to identify future policy directions to improve their effectiveness. A questionnaire sent to farmers in the Djelfa province allowed us to identify the real logistical challenges to potato distribution.

The results obtained confirm the initial hypothesis by identifying multiple, conceptually distinct logistical constraints, including *technical* logistical constraints (insufficient storage infrastructure, lack of suitable transport), *organizational* constraints (weak collective organization of producers, dependence on intermediaries), geographical constraints (difficulty accessing main customers, distance of farms from markets, or even the absence of local markets), economic constraints (loss of income to intermediaries, low uptake of public financial aid programs by farmers), and *institutional* constraints (insufficient public mechanisms for regulating and structuring markets).

These obstacles interact with each other and contribute to the disorganization of the distribution chain. As a strategic product for food security in Algeria, the potato can only fully fulfill its role through efficient distribution.

Although various public mechanisms have already been implemented to improve agricultural logistics, the farmers surveyed are not fully benefiting from them, and their impact remains limited at the local level. These weaknesses tend to confirm the second hypothesis, which states that the mechanisms are insufficient to improve the logistical performance of the agricultural sector in the Djelfa province. This suggests a lack of dissemination, ownership, or implementation of these measures in the wilaya.

In a wilaya with a strong agricultural focus like Djelfa, it appears necessary to consolidate and adapt these actions to local specificities by integrating local dynamics into national agricultural policies.

Therefore, public action should be implemented at several levels : *establishing policies tailored and differentiated by territory, developing local infrastructure, providing direct support for agricultural logistics, digitizing agricultural logistics, setting up local agricultural logistics observatories, partially subsidizing agricultural transport, and strengthening logistics cooperatives.*

Following on from this study, it would be relevant to extend the analysis to other potato-producing provinces in order to compare local specificities, identify commonalities in logistical constraints, and measure the impact of the identified obstacles on distribution costs and potato pricing.

Only at this price the agricultural logistics will be able to fully play its role as a strategic lever for competitiveness and food security.

V.7. References

1. ABIS, S. (2025). *Le Déméter 2025 : Nourrir 2050, de la fiction à la réalité* (A. Marie, Dir.). IRIS Éditions, France.
2. AHMED YAHIA, S. (2023) . Évolution de la logistique et son apport à l'amélioration de la performance de l'entreprise – Cas : secteur agroalimentaire en Algérie. *Le Manager*, 10(1), page 287-310. URL : <https://asjp.cerist.dz/en/article/229405>
3. ALAWODE, A. (2025) . The role of agricultural value chains in enhancing food security and economic development. *International Research Journal of Modernization in Engineering Technology and Science*, 7(5), pp. 1930-1948. doi:DOI: <https://www.doi.org/10.56726/IRJMETTS75996>
4. ALLAL, L. G., Bennekrouf, M., Bettayeb, B., & Sahnoun, M. (2024) . Improving the potato supply chain in Western Algeria: An optimization model. In *Proceedings of the 2024 International Conference of the African Federation of Operational Research Societies (AFROS 2024)*, Université de Tlemcen, Tlemcen, Algeria. HAL ID : hal-04982106 . <https://hal.science/hal-04982106v1/document>
5. BESSAOUD, O. & LEFKI, K. (2018). Diagnostic du système de régulation de la pomme de terre en Algérie : Système d'information – Rapport final provisoire. Programme ENPARD Méditerranée, CIHEAM & Union Européenne.
6. CHRISTOPHER, M. (2011) . *Logistics and supply chain management* (4th ed.). Prentice Hall, London.
7. DSA Djelfa : Local Agricultural Statistics. Directorate of Agricultural Services of the Wilaya of Djelfa.
8. FAO. (2020) . Building resilient agricultural supply chains. Food and Agriculture Organization of the United Nations. (consulted on 02/06/2025).
9. FAO. (2021) . The state of food and agriculture 2021: Making agrifood systems more resilient to shocks and stresses. , Rome, Italy. <https://doi.org/10.4060/cb4476en> (consulted on 02/06/2025).
10. FAO. (2023) . Guidelines to increase the resilience of agricultural supply chains., Rome, Italy. <https://doi.org/10.4060/cc5481en> (consulted on 02/12/2025)
11. FAO.FAOSTAT: Production, commerce et consommation [Données]. <https://www.fao.org/faostat/fr/#data/QCL>(consulted on 28/12/2025)
12. FINK, A. (2017) . *How to Conduct Surveys: A Step-by-Step Guide* (6th ed.). Sage.
13. HITOUCHE, S. (2020), November . La politique de régulation des prix de la pomme de terre de consommation par le stockage : Recherche sur le comportement des établissements stockeurs adhérent dans le dispositif Syrpalac en Algérie (Doctoral thesis, ENSA). DOI :<https://doi.org/10.13140/RG.2.2.12603.53286>
14. KAPLINSKY, R. & Morris, M. (2001) . *A Handbook for Value Chain Research*. Institute of Development Studies, University of Sussex, Brighton, UK.
15. KITINOJA, L., & Kader, A. A. (2002) . Small-scale postharvest handling practices. <https://openknowledge.fao.org/items/72903707-6be6-49a0-8fa4-d495793064cc>
16. LAICHE, K. 2021 . Analyse de la chaîne de valeur « pomme de terre » dans la wilaya d'El Oued. Rapport de mission, Programme d'Appui au Secteur Agricole (PASA), Pôle Sud : Biskra et El Oued. Bonn, Allemagne.
17. LEE, Y., ZHANG, A., & Xu, X. (2024) . Food transportation and price impacted by diesel price and truck-driver shortage pre-, amid and post-pandemic. 192, Article 103794. *Transportation Research Part E: Logistics and Transportation Review*,
18. Ministère de l'Agriculture et du Développement Rural (MADR), Direction des Statistiques Agricoles et des Systèmes d'Information. (2021) . Statistiques agricoles, superficies et productions. Série B 2019. Algérie. <https://www.madr.gov.dz>
19. Ministère de l'Agriculture et du Développement Rural (MADR). Dispositif d'adhésion de suivi, de contrôle, d'évaluation et de paiement des frais liés au stockage de la pomme de terre de consommation – Portail des services en ligne. <https://www.madr.gov.dz>
20. Ministère du Commerce. Les marchés de gros. <https://www.commerce.gov.dz/fr/b-les-marches-de-gros>, (consulted on 2/05/2025)
21. MORDACQ, D. (2024) . La pomme de terre, une valeur sûre de l'alimentation ? Dans S. e. Abis, *Le Déméter 2024 : Mondes agricoles : cultiver la paix en temps de guerre* (pp. 291-319). France : IRIS éditions. Récupéré sur <https://shs.cairn.info/le-demeter-2024--0011662120?lang=fr>.

22. Mordor Intelligence. (2023) . Analyse de la taille et de la part du marché des fruits et légumes en Algérie : Tendances et prévisions de croissance (2024–2029). India . <https://www.mordorintelligence.com/fr/industry-reports/algerian-fruit-vegetable-market>
23. NORTH, D. C. (1990) . Institutions, Institutional Change and Economic Performance (p. 33). Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511808678>
24. OECD/FAO (2016) , OECD-FAO Guidance for Responsible Agricultural Supply Chains, OECD Publishing, Paris, <https://doi.org/10.1787/9789264251052-en>.
25. Office National des Statistiques (ONS). (2019) . Les statistiques de l'agriculture : productions végétales et animales, rétrospective 2010–2019 (Collection n°225). https://www.ons.dz/IMG/pdf/retrospective_agricultures2010_2019.pdf
26. Office National des Statistiques (ONS). (2025), May . Indices des prix à la consommation, avril 2025, n° 353. <https://www.ons.dz>
27. PORTER, M. E. (1985a) . L'avantage concurrentiel : Comment devancer ses concurrents et maintenir son avance. InterEditions. Paris
28. PORTER, M. E. (1985b) The Competitive Advantage: Creating and Sustaining Superior Performance. New York : Free Press, . (Republished with a new introduction, 1998.)
29. WILLIAMSON, O. E. (1979) . Transaction-cost economics: The governance of contractual relations. *Journal of Law and Economics*, 22(2), 233–261. DOI:10.1086/466942

How to cite this article by the APA method:

MIMOUNI Chahrazede, GUERCHE Ben Salem (2026), Role of Agricultural policies in the efficiency's improving of agricultural product distribution . Case of Potatoes in the Province of Djelfa-Algeria. Economic Development Review, Volume 11 (Number 01), Algeria: University of Eloued, pp.340-354.

