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**Legal Frameworks for Utilizing Digital Media to Enhance Food Security in
Algeria: A Comparative Study of National Legislation and International
Experiences**

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Abstract :

This research aims to analyze and evaluate the legal frameworks governing the use of digital media and its associated technologies to enhance food security in Algeria. The significance of this study arises amidst rapid digital transformations and the challenges Algeria faces in achieving self-sufficiency and food sovereignty. The research seeks to identify and assess the current Algerian legal framework, examine leading international experiences, and conduct a comparative analysis to pinpoint gaps and provide recommendations for strengthening the national legal system. The study employs a descriptive-analytical approach to define concepts and national legislation, alongside a comparative methodology to analyze pioneering international experiences in digital agriculture governance. The research is expected to conclude that the Algerian legal framework, while possessing foundational elements, remains fragmented and lacks a comprehensive system for agricultural data governance and farmer protection. This necessitates the enactment of more specialized legislation and a more holistic approach.

Keywords: Legal Regulations; Digital Media; Food Security; Digital Agriculture; Data Governance.

Introduction

Food security represents one of the most critical existential challenges for nations in the twenty-first century, particularly in light of volatile climatic and geopolitical crises. In this context, digital media encompassing various technologies from the Internet of Things (\$IoT\$) and Artificial Intelligence (\$AI\$) to digital platforms and social media has emerged as a pivotal tool for boosting agricultural production and optimizing supply chains.

However, the deployment of such technologies requires a robust legal framework to ensure their effectiveness and protect all stakeholders. In Algeria, where food security and digitalization are strategic priorities, understanding current legal regulations is becoming increasingly vital. Despite the adoption of laws such as the New Media Law and the Electronic Commerce Law, questions remain regarding the adequacy and integration of this framework in addressing modern challenges related to digital agriculture.

This research explores this problematic issue by providing a comparative study with leading international experiences, notably the European Union, to extract lessons and offer profound insights that contribute to the development of national policies.

1.1 Research Problem

The agricultural sector in Algeria suffers from multiple structural challenges that digital media could help overcome, such as weak communication between actors, a lack of accurate data, and difficult market access. However, utilizing these digital tools requires legal controls to ensure efficiency and protect the rights of all parties. Accordingly, the research problem is defined by the following primary question:

What are the legal regulations for utilizing digital media to enhance food security in Algeria, and how effective are they compared to international best practices?

To answer this central question, it has been deconstructed into the following sub-questions:

1. What is the current legal framework in Algeria governing digital media and digital agriculture, and what are its key components?
2. What are the most prominent international experiences in digital agriculture governance, and how do they regulate issues of data, ownership, and liability?
3. What are the similarities and differences between Algerian legislation and international experiences in this regard?

4.What legal and legislative recommendations could bridge current gaps and enhance the role of digital media in achieving sustainable food security in Algeria?

1.2 Significance of the Study

The importance of this study is derived from two perspectives: scientific and practical.

Firstly: Scientifically:

This study fills a clear research gap in Arab and Algerian legal literature, as there is a lack of specialized studies that bridge digital media regulations and agricultural law from a comparative perspective. This interdisciplinary approach gives the research originality and uniqueness.

Secondly: Practically:

The study provides a roadmap for policymakers and legislators in Algeria by identifying the strengths and weaknesses of the current legal framework and offering practical recommendations informed by international best practices. Furthermore, it contributes to raising awareness among farmers and startups regarding the legal rights and obligations associated with digital agriculture.

1.3 Study Objectives:

The main objectives of this study are categorized as follows:

First: General Objective:

To provide a comprehensive and comparative evaluation of the legal regulations governing the employment of digital media in enhancing food security in Algeria.

Second: Specific Objectives:

- 1.To identify and analyze the relevant Algerian laws and executive decrees
- 2.To explain and document international legal models, such as those implemented in the European Union, and the methodologies of international organizations like the Food and Agriculture Organization (FAO).
- 3.To conduct a comparative analysis between the Algerian and international models, focusing on issues of data governance and liability.
- 4.To formulate specific recommendations aimed at improving the national legal framework.

1.4 Conceptual Definitions:

1.4.1 Food Security:

According to the 1996 World Food Summit, Food Security is defined as a "situation that exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life." This definition rests on four pillars: physical availability, economic and physical access, utilization

(nutritional), and the stability of these dimensions over time. The concept also encompasses Self-Sufficiency, which refers to a state's ability to produce enough food to meet its population's needs.¹

1.4.2 Digital Media:

In the context of this research, Digital Media refers to "all journalistic content produced by professional journalists" and published via digital media and platforms. This includes electronic news websites and social media platforms used for professional informative purposes. This concept is distinguished from mere "digital content," which may be published by individuals or companies for purely commercial reasons.²

1.4.3 Legal Regulations:

These include the laws, executive decrees, decisions, and regulations that define the conditions and modalities for using digital media in the agricultural sector, regulate rights and obligations, and establish mechanisms for accountability and monitoring.³

1.5 Literature Review:

1.5.1 Monograph:

"Agricultural Law and the Protection of Food Security" by Mohamed El-Sadek Jellab (2019).⁴ This book discusses the legal framework of the agricultural sector in Algeria but does not focus specifically on the role of digital media, addressing it only briefly within the context of general digital transformation.

1.5.2 Research Paper I:

"The Role of ICT in Promoting Food Security in Developing Countries" by Sarah Ali and Mahmoud Fouad (2021).⁵ Published in the Arab Journal of Agricultural Research, it explores the positive impact of information technology on food security and reviews successful international experiences, yet lacks an in-depth legal analysis of legislative controls.

1.5.3 Research Paper II:

"Legal Regulation of Agricultural Data in the European Union: A Case Study of the Netherlands" by Ahmed Abdel Hamid (2022). Published in the Digital Law Journal, this paper provides a detailed analysis of the European legal framework facilitating agricultural data exchange, focusing on the Dutch experience, making it a valuable reference for this comparative study.⁶

1.5.4 Research Paper III:

"Digital Media and Food Security: Challenges of Reliability and Misinformation" by Leila Mohamed (2023)⁷, Published in the Journal of Media Studies, this study focuses on the negative aspects of digital media, such as the spread of rumors and fake news, and proposes legal solutions to combat this phenomenon.

1.5.5 Reference Study:

O'Connor, J. and Smith, L. (2020), "The Role of Digital Platforms in Food Supply Chains: A Case Study of European Regulations," *Journal of Agricultural Economics*. This study provides a practical model for regulating digital platforms in food supply chains in Europe.⁸

1.5.6 Critical Analysis of Previous Studies:

While existing studies on food security and digitalization in Algeria are diverse, they lack a comprehensive legal treatment. Some research focuses on economic and productive dimensions without delving into the legal aspects of technology deployment. Similarly, research emphasizing the importance of digitalizing agriculture calls for "supportive legislation" but fails to provide a detailed analysis or a profound legal comparison. Furthermore, studies focusing on the technical role of IoT and AI offer a global perspective but do not address the legal regulations governing such use.

1.4.7 Positioning of the Current Study:

This study distinguishes itself by integrating three main pillars: Digital Media, Food Security, and Legal Regulations, while adopting a comparative approach. This methodology moves beyond theoretical diagnosis to provide practical legislative solutions derived from successful international experiences. While previous studies diagnose economic and technical challenges, this study delves deeper into analyzing legal gaps, such as the absence of a comprehensive agricultural data law, the ambiguity of data ownership, and the lack of a regulatory framework that balances technological incentives with the legal protection of farmers.

1.6 Methodology

To achieve the aforementioned objectives, the research relies on two primary methodologies:

1.6.1 Descriptive-Analytical Method:

Used to describe and analyze the current legal and legislative reality in Algeria and to examine relevant legal texts and ministerial decisions.

1.6.2 Comparative Method:

Used to conduct a systematic comparison between the Algerian legal framework and international legislation (notably the EU) to identify similarities, differences, and best practices.

1.7 Sampling and Research Tools:

1.7.1 Study Sample:

A selection of Algerian legislative and regulatory texts, including laws, executive decrees, and ministerial decisions related to digital media and

agriculture. Additionally, a set of comparable EU legislative texts and policies serves as the comparative model.

1.7.2 Research Tools:

Legal Content Analysis: Used to analyze and decode legal texts and identify provisions related to digitalization and media.

THE FIRST TOPIC : The Legal Framework for Employing Digital Media in Food Security in Algeria

The Algerian legal framework governing the use of digital media in the agricultural sector does not constitute an integrated system; rather, it consists of a disparate collection of laws and decrees whose relevance to the subject can be inferred through analysis.

First requirement: Laws Regulating Digital Media

In December 2023, a new law concerning the printed and electronic press was promulgated. This law aims to regulate electronic media activities, subjecting websites to a "declaration system" and establishing stringent requirements for their management. For instance, the director must be an Algerian national, hold a university degree, and possess at least five years of professional experience.

This legislation is poised to combat the dissemination of false or malicious news concerning food products or markets, thereby contributing to market stability. However, the law raises questions regarding the balance between "freedom of expression" and "regulation." While it aids in fighting disinformation that negatively impacts food security, it may also impose constraints on the ability of journalists or academics to criticize food security policies or expose speculation, potentially affecting the "transparency" of information the bedrock of digital agriculture.

Furthermore, the law stipulates the establishment of the Higher Council for Press Ethics and Deontology to impose disciplinary sanctions on violators. Regarding Law No. 18-05 on Electronic Commerce, it represents another foundational legal pillar.⁹ This law defines the general framework for electronic transactions and ensures the protection of consumers and personal data. It provides the legal basis for digital platforms that facilitate the direct sale of agricultural products from farmer to consumer such as the "Koptac" platform. Nevertheless, it is noted that this law leaves a clear gap regarding the protection of farmers' specific agricultural data, which is a critical asset collected by technology firms.

second requirement: Executive Decrees and Decisions Supporting Digitalization in the Algerian Agricultural Sector:

Algeria demonstrates a clear political will to adopt digitalization in the agricultural sector as part of a broader strategy to achieve self-sufficiency and

reduce reliance on hydrocarbon revenues. The official vision, articulated by the President of the Republic, emphasizes that digitalization is not intended to increase taxes but rather to "regulate production figures, optimize the use of agricultural and cultivated lands," and "formulate strategies." This orientation places digitalization within a context focused on centralized management and data control for planning purposes, rather than necessarily empowering sector stakeholders or enhancing data governance.

Algeria is adopting a National Strategy for Digital Transformation 2025-2030, Agricultural strategies emphasize the importance of digitalization in achieving food security, particularly through developing smart irrigation systems, precision agriculture via remote sensing, and the use of mobile applications to support farmers.

Executive Decree No. 21-432 serves as the cornerstone of agricultural digitalization. This decree aims to regulate the reclamation of state-owned lands under the "concession" (concession) framework, granting 40-year renewable terms while emphasizing the principle of non-transferability of land, though rights may pass to heirs.¹⁰ Crucially, it provides the legal basis for the "Agricultural Real Estate Platform" as a primary digitalization mechanism. This platform has enhanced transparency and procedural speed, serving as a tangible application of legal regulation in food security by facilitating the distribution of 81,000 hectares of land. Additionally, several ministerial decisions, such as Decree No. 146 and Decree No. 866, define the conditions for financial support for modern agricultural equipment and irrigation systems. While these instruments support digitalization, they do not yet constitute a comprehensive legal framework for digital agriculture.

Third requirement: Legal Governance Challenges in Digital Agriculture

Academic studies, such as the "FarmTech" paper, underscore that current laws in most countries fail to address critical issues like "data ownership" and "information asymmetry" between farmers and AgTech companies. These studies indicate that a farmer signing a contract with a technology firm may not fully comprehend the terms, leaving them vulnerable to exploitation.

Companies may use collected data to assess land and productivity, subsequently raising service prices.¹¹ The absence of clear rules on data ownership increases the risk of technical and economic dependency on major corporations.

These issues, prominent in international academic discourse, have not been explicitly addressed in available Algerian laws, signaling a potential legislative gap that may hinder the widespread adoption of digital agriculture and negatively impact smallholder farmers.

THE SECOND TOPIC : The Legal and Regulatory Framework for Digital Agriculture in International Experiences (The EU as a Model):

In contrast to the Algerian approach, the digitalization of the agricultural sector in the European Union is an integral part of a broader, holistic strategy. These efforts are embedded within the "European Strategy for Data," which aims to create a "Single Market for Data," and the "European Green Deal," which links technology to sustainability. This integration ensures that digitalization serves environmental, economic, and political goals simultaneously.

First requirement: Key Regulations and Their Impact on the Agricultural Sector:

The EU possesses a more comprehensive and specialized legal framework focusing on agricultural data governance and ownership:

First section: The Data Act:

This legislation constitutes a fundamental paradigm shift in the governance of industrial data, redefining the legal and economic landscape for all stakeholders. By moving beyond the traditional constraints of proprietary data silos, it grants users most notably farmers the inherent right to access data generated by their Internet of Things (IoT) connected devices, such as modern tractors and precision agricultural machinery. Historically, original equipment manufacturers (OEMs) maintained exclusive control over this information; however, this law rebalances that power dynamic by ensuring that those who operate the machinery own the insights derived from its use.

The primary objective of this shift is to foster a competitive and equitable data market by dismantling the long-standing monopolies held by equipment manufacturers. By liberating this data, the law encourages a decentralized service ecosystem where third-party providers can offer specialized maintenance, analytics, and software solutions. This not only promotes cross-sectoral innovation but also empowers end-users to optimize their operational efficiency without being tethered to a single vendor's ecosystem.¹²

second section: The Data Governance Act:

The Data Governance Act (DGA) functions as a strategic complement to the Data Act by providing the necessary framework for secure and scalable data circulation. While the Data Act focuses on the "right of access," the DGA establishes the "mechanisms of exchange," facilitating seamless data sharing between the public and private sectors. It is built upon the core principles of trust, neutrality, and transparency, ensuring that data intermediaries act as honest brokers rather than gatekeepers who exploit the information passing through their systems.

A central ambition of this act is the creation of "Common Data Spaces" tailored for various strategic sectors, including agriculture. These spaces serve as secure, interoperable environments where farmers, researchers, and policymakers can pool high-quality data. For instance, in the agricultural context, these spaces enable the sharing of environmental and crop data to address climate change and food security challenges. By establishing clear rules for data altruism and the reuse of protected public-sector data, the DGA ensures that the European data economy remains both innovative and deeply rooted in fundamental rights.¹³

second requirement: Implementation Mechanisms for Digitalization:

First section: The Common European Agricultural Data Space:

The Common European Agricultural Data Space represents the European Union's strategic concept for aggregating agricultural data from diverse private and public sources to facilitate secure and reliable exchange. This framework aims to enhance the economic, environmental, and social value of the sector by breaking down "data silos" that previously hindered innovation. Under the European Strategy for Data, this space is designed to ensure that data generated on farms ranging from soil moisture levels to machinery performance is accessible for research and development while maintaining strict adherence to European privacy standards.

Central to this initiative is the implementation of a federated infrastructure. For instance, the "GAIA-X" project serves as a foundational pillar for this data space, providing a technical environment that allows farmers to share data with agronomists or government agencies without losing ownership. This architecture ensures that data remains decentralized yet interoperable, fostering a climate of trust among stakeholders who were previously hesitant to share sensitive operational information.

Furthermore, this high level of integration enables the development of high-precision Artificial Intelligence (AI) models. These models can process vast amounts of aggregated data to predict pest outbreaks or optimize harvesting schedules across the entire continent. By transforming raw data into actionable intelligence, the Common European Agricultural Data Space strengthens the overall resilience of the European food system against external shocks and climate variability.¹⁴

second section: Transparency and Supply Chains via Blockchain:

International experiences focus heavily on ensuring the transparency of the entire food supply chain, adhering to the "Farm to Fork" principle. In this context, Blockchain technology has emerged as a transformative tool used to track products, prevent fraud, and enhance food safety through an immutable and decentralized ledger. In this system, every transaction—from the

initial seeding to the final retail sale is recorded as a "block" that cannot be altered, providing an audited trail of the product's journey.

The practical efficacy of this technology is demonstrated through significant case studies, such as the IBM Food Trust network, which is utilized by global retailers like Carrefour and Walmart. These implementations have shown that blockchain can drastically reduce the time required to track a food source from several days to just a few seconds. This extreme efficiency is critical during foodborne illness outbreaks, where blockchain-enabled traceability can reduce product recall times by up to 90%.

By providing real-time visibility, this technology serves a dual purpose: it protects consumer health while simultaneously building fundamental trust in digital agricultural platforms. Furthermore, it addresses systemic inefficiencies by reducing the massive economic losses associated with food waste and supply chain fragmentation, thereby contributing to a more resilient global food system.¹⁵

THE THIRD TOPIC: Similarities and Differences Between the Two Legal Frameworks:

To analyze the findings of this comparative study, we can identify the points of convergence and divergence between the two legal frameworks and evaluate the Algerian system in light of international experience.

First requirement: Points of Similarity:

Despite fundamental differences, there are key points of alignment between the two approaches:

First section: Strategic Objective:

Both Algeria and the European Union recognize the strategic importance of digitalizing the agricultural sector as a primary means to enhance food security. This recognition has led to the integration of agricultural technology into their national security doctrines, viewing digitalization not merely as a technical upgrade but as a strategic imperative to mitigate the risks of food instability and climate volatility.

From the Algerian perspective, digitalization is central to the "National Plan for Agricultural Development," where the strategic goal focuses on achieving food sovereignty and reducing the national import bill. By deploying digital tools, the state aims to transform vast arid lands into productive zones through "Precision Irrigation." A primary example of this is the "SERSOU" Platform, coupled with the use of satellite imagery by the Algerian Space Agency (\$ASAL\$) to monitor cereal production, allowing the government to predict yields and manage strategic reserves with high efficiency.

In contrast, the European Union frames its strategic objective within the "Farm to Fork" Strategy, which is a cornerstone of the European Green Deal. The

primary goal is to establish food systems that are fair, healthy, and environmentally sustainable. Digitalization is seen as the essential vehicle to achieve ambitious targets, such as reducing chemical pesticide use by 50% and fertilizers by 20% by the year 2030.¹⁶

This is practically demonstrated through the "SmartAgriHubs" initiative, which connects thousands of farms across Europe to a unified digital network. This ecosystem enables "Variable Rate Application" (\$VRA\$) technology, where advanced sensors dictate the exact quantity of resources required for each square meter, thereby minimizing environmental waste and optimizing production costs.

second section: Legal Instruments:

The transition to Agricultural Technology (AgTech) is governed by distinct legal instruments that aim to balance technological incentives with the protection of stakeholders' rights, particularly regarding data ownership, privacy, and fair competition. Algeria utilizes a combination of executive decrees and specific laws to catalyze digital agriculture, focusing on building a robust infrastructure and regulating the digital exchange of commercial agricultural data.

For instance, Executive Decree No. 20-243 establishes the organizational framework for agricultural startups and incubators, fostering an innovation-friendly environment. Furthermore, Law No. 18-05 (Electronic Commerce) provides the necessary legal basis for digital transactions within the agricultural supply chain.¹⁷ This ensures that both farmers and digital platform providers have a recognized legal standing in commercial disputes, providing the legal certainty required for large-scale investment in AgTech.

On the other hand, the European Union relies on a sophisticated hierarchy of regulations that are directly applicable across all member states, shifting the legislative focus from mere technical support to comprehensive "Data Governance." A landmark instrument in this regard is the "EU Data Act" (2024), alongside the "Code of Conduct on Agricultural Data Sharing." These instruments address a critical legal gap concerning the ownership of data generated by modern agricultural machinery.¹⁸

The EU framework ensures that the farmer, as the data originator, retains full control over their information when utilizing third-party AgTech services. This legal protection is designed to prevent "vendor lock-in" and ensures that large technology corporations cannot monopolize agricultural insights, thereby maintaining a competitive and transparent digital agricultural market.

second requirement: Points of Difference (The Essence of the Comparison):

The fundamental divergence between the two approaches lies in the underlying philosophy of each legal framework, leading to markedly different outcomes:

First section: Legislative Focus: Public Administration vs. Specialized Governance:

The Algerian approach to digitalization is primarily characterized by its focus on "Administrative Digitalization," where digital tools are employed as a means to facilitate state procedures and enhance bureaucratic efficiency. A prime example is the national platform for agricultural land distribution, which aims to digitize the relationship between the state and the farmer.

Conversely, the European approach has evolved beyond administrative convenience toward building an integrated legal environment that treats agricultural data as a strategic asset in its own right. This philosophical divergence explains the absence of specialized Algerian legislation regarding issues of data interoperability and specialized governance.¹⁹

While European legislation, such as the Common Agricultural Policy (CAP) digital frameworks, focuses on creating a seamless data ecosystem for innovation, the Algerian legal focus remains tethered to public administration, leaving a legislative vacuum in the governance of the data lifecycle itself.

second section: Data Ownership and Protection: The Algerian Gap vs. European Sovereignty:

This divergence represents the most significant legislative void in the current Algerian legal landscape. The existing framework does not explicitly address the complex issues of data ownership, leaving the legal status of agricultural data generated by smart machinery and sensors undefined.

In stark contrast, the European Union has pioneered the concept of "Data Sovereignty" through the "EU Data Act", which grants farmers clear and enforceable rights over the data they produce. This legal architecture ensures that the European farmer maintains full control over their information, preventing "vendor lock-in" and ensuring fair access.

Meanwhile, their Algerian counterpart remains in an ambiguous legal position, potentially vulnerable to exploitation by global technology firms that may collect and monetize local agricultural data without a clear domestic legal mandate to protect the farmer's proprietary interests.²⁰

third section: Vision for Transparency: Real Estate vs. the Entire Supply Chain:

A fundamental difference in priorities is evident in the application of transparency. The Algerian digital strategy primarily aims to enhance

transparency in land tenure and agricultural land distribution, focusing on the "Real Estate" aspect to ensure social justice and state control over land use.

In contrast, international experiences, particularly in the EU, focus on the transparency of the entire food supply chain, adhering to the "Farm to Fork" principle. By utilizing advanced technologies like Blockchain, international models track every stage of the food journey to bolster consumer trust and combat food fraud.²¹

While Algeria's priority is centered on the foundational element of land control, global models have shifted toward a consumer-centric approach that ensures food safety and authenticity across the full spectrum of the supply chain, from the initial seed to the final consumer's plate.

third requirement: Evaluation of the Algerian Legal Framework in Light of International Experiences:

The evaluation of the Algerian legal framework can be summarized as follows:

First section: Strengths

The Algerian digital agriculture landscape is supported by several foundational pillars that facilitate its gradual transformation:

1. High-Level Political Will:

There is an explicit and decisive political intent to integrate digitalization into the agricultural sector. This is evidenced by national strategies that prioritize food security as a component of national sovereignty, ensuring that digital transition is not merely a technical choice but a top-tier state policy.

2. Tangible Applications and Pilot Successes:

The effectiveness of legal and digital tools is demonstrated through concrete applications, most notably the "Agricultural Real Estate Platform." This platform serves as a functional proof-of-concept, showing how legal regulations can successfully transition from paper to digital interface to manage land distribution and enhance transparency.

3. Existence of Foundational Legislation:

Algeria possesses a solid legislative "base," such as the Electronic Commerce Law (Law No. 18-05). While general in nature, these laws provide the essential legal infrastructure (electronic signatures, digital contracts, and consumer protection) upon which specialized agricultural regulations can be systematically constructed.²²

second section: Weaknesses and Gaps:

Despite the strengths mentioned above, several structural and legal challenges hinder the full potential of AgTech in Algeria:

1. Legal Fragmentation and Institutional Overlap:

The primary weakness lies in the absence of a Comprehensive Digital Agriculture Law. Currently, legal texts are scattered across various agencies and ministries (Agriculture, Digitalization, Post and Telecommunications). This fragmentation leads to "regulatory silos," which hinder inter-agency coordination and create confusion for investors and farmers alike.

2. The Data Governance Void:

There is a critical lack of specific legislation regulating the ownership, privacy, and sovereignty of agricultural data. Without clear rules on who owns the data generated by a farm, and without mandates for "interoperability" (the ability of different systems to share data), the development of a national agricultural data space remains stalled.

3. Insufficient Protection for Smallholder Farmers:

The current legal framework lacks specific safeguards to protect small-scale farmers in AgTech Service Level Agreements (SLAs). This creates a power imbalance, exposing farmers to potential exploitation regarding data harvesting, unfair pricing models, or restrictive technology contracts.

4. The "Double-Edged Sword" of the New Media Law:

While the New Media Law (2023) is designed to regulate digital content and combat market speculation, its broad application poses a risk to the agricultural information ecosystem. If applied strictly to agricultural content, essential data such as real-time crop prices, market forecasts, or pest outbreak warnings could be inadvertently classified as "false news" or "unauthorized information." This ambiguity could restrict the free flow of vital information, thereby undermining the rapid, data-driven decision-making that is the hallmark of modern digital agriculture.²³

Table (1): Comparison Between Algerian and European Union Legal Frameworks in Digital Agriculture:

Legal Domain	Regulations in Algerian Legislation	Regulations in International Experience (EU)
Agricultural Data Governance	Absence of specialized legal texts; governed by general laws such as the Electronic Commerce Law.	Existence of the Data Act to facilitate sharing, and the Agricultural Data Space for secure exchange.

Data Ownership and Farmers' Rights	The law does not explicitly address agricultural data ownership, leaving farmers in an ambiguous legal position.	The Data Act grants farmers explicit rights to access, manage, and control their generated data.
Legal Instruments for Digitalization	Specific executive decrees and ministerial decisions, such as Decree 21-432 for digitalizing agricultural real estate.	Comprehensive EU-wide regulations and integrated policies within the Common Agricultural Policy (CAP).
Transparency and Strategic Focus	Digital platforms aim primarily to enhance transparency in land distribution and tenure.	Focus is placed on the transparency of the entire supply chain from "Farm to Fork."

Source: Prepared by the researcher based on a comparative analysis of:

1. Algerian Legislation: Executive Decree No. 21-432 on Agricultural Real Estate Digitalization, and Law No. 18-05 on Electronic Commerce.
2. European Union Framework: Regulation (EU) 2023/2854 (Data Act) and the Strategic Guidelines of the Common Agricultural Policy (CAP) 2023-2027.

Conclusion

The study concludes that Algeria has taken positive and significant strides toward establishing the legal foundations for utilizing digital media to enhance food security. Through executive decrees and ministerial decisions, the state has implemented concrete practical mechanisms such as digital platforms for land distribution reflecting a genuine political will for transformation.

However, this approach remains partial and lacks a comprehensive, integrated legal framework for digital agriculture. Comparison with the European experience reveals a manifest gap in agricultural data governance, data ownership, and the protection of farmers against the legal risks associated with digital transformation. The absence of specialized legislation in these areas may hinder the widespread adoption of technology and leave smallholder farmers vulnerable to legal and economic hazards.

Building a sustainable digital agricultural future in Algeria requires a philosophical shift from mere "administrative digitalization" to comprehensive "legislative governance" that places the farmer and data at the core of its strategy. This transition demands the concerted efforts of legislators, officials, farmers, and researchers to establish a clear roadmap ensuring that digitalization serves as a tool for empowerment and protection, rather than a mere administrative mechanism.

Recommendations and Proposals

Based on the findings of this study, the following recommendations are proposed to strengthen the Algerian legal framework:

1. Enactment of a Comprehensive Digital Agriculture Law:

The Algerian legislator should consider issuing specialized legislation to regulate all aspects of digital agriculture, ranging from data governance to smart contracts and intellectual property rights.

2. Incorporation of Specialized Chapters in the Law on Agriculture:

Should the enactment of independent legislation prove difficult, it is advisable to incorporate new chapters into the Law on Agriculture and Rural Development (No. 08-16) that specifically address the legal regulations for technology use in the sector.

3. Establishment of a National Authority for Agricultural Data:

The creation of an independent body is proposed, tasked with managing a "National Agricultural Data Space" to ensure transparency, interoperability, and the protection of farmers' rights.

4. Legal Awareness Programs for Farmers:

The Ministry of Agriculture, in coordination with the Bar Association and academic institutions, should organize workshops to educate farmers on their rights and obligations within the digital environment, particularly concerning data ownership and contractual agreements with AgTech companies.

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