Development of an Integrated Portal for Farm Audit Management with Geospatial Support

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***Abstract*—This paper introduces the development of an innovative portal designed to optimize the management of agricultural field audits and ensure compliance with Common Agricultural Policy (CAP) regulations. The system is capable of handling more than five thousand audits, addressing specific audit requirements and integrating geospatial data management through technologies such as Django, and PostGIS, alongside libraries like Leaflet.js and Chart.js. The back end, developed in Django, provides a scalable and reliable infrastructure, supported by containerization deployment, while the front-end offers intuitive tools for data visualization and interaction. The platform's modular design allows users at various access levels to efficiently manage data, track audit progress, upload documents, and monitor resources. By consolidating all audit tasks into a single application, the system reduces processing time, simplifies workflows, and improves data accuracy, leading to greater overall productivity. Preliminary testing demonstrates the system's effectiveness for large-scale audits, and its scalability allows for future integrations, including IoT devices and predictive analytics, further enhancing decision-making and real-time data collection. This flexible and efficient solution meets the evolving needs of agricultural management.**

***Keywords*—Agricultural Audit Management, Common Agricultural Policy, PostGIS, Django.**

I. Introduction

Currently, the use of advanced technologies such as sensors, artificial intelligence, big data, and geospatial data has been gaining prominence in the agricultural sector. These innovations assist in resource management, irrigation optimization, and pest control [1], promoting efficiency and sustainability in agricultural production. The outlook for the future is promising, with the development of even more advanced sensors that could further improve precision and productivity in the sector [2].

Established in 1962, the Common Agricultural Policy (CAP) is a set of regulations adopted by the European Union (EU) to ensure food security and promote sustainable rural development. Over the years, CAP has evolved to address new challenges, adapting to changes in the European agricultural landscape [3].

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With the increase in funds allocated to the agricultural sector, rigorous audits of agricultural holdings have become essential to ensure a fair and transparent distribution of resources [4]–[6].

Agricultural audits play a crucial role in the correct allocation of CAP subsidies, enabling government bodies responsible for fund oversight to verify that farmers comply with established regulations. This process is vital to avoid fraud and promote sustainable farming practices [7]–[9]. However, the growing allocation of funds and the geographical dispersion of agricultural holding impose new challenges on audit management, requiring more effective tools to coordinate and monitor these activities on a large scale [10]–[12].

Currently, common tools such as Microsoft SharePoint and QGIS are often used in isolation to manage files and geospatial data, but they are not fully suited to the complexities of large-scale audits. These systems lack interoperability, resulting in auditors having to switch between platforms for different tasks, which increases the time required for data synchronization and reduces overall efficiency. This fragmented approach makes the audit process more time-consuming and prone to errors, especially when dealing with extensive datasets across multiple locations.

The solution presented in this paper addresses these challenges by developing a comprehensive portal for the management of agricultural audits. The proposed system centralizes all audit-related tasks within a single platform, providing an integrated toolset for data visualization, audit tracking, and user management. The system was designed to facilitate large-scale audits (around five thousand audits), and it improves data accuracy by seamlessly integrating geospatial data with audit reports. By utilizing the Django Framework, PostgreSQL with PostGIS extension, and front-end libraries such as Leaflet.js and Chart.js, the platform enables efficient data handling and real-time audit monitoring.

This paper outlines the development and implementation of the portal, detailing how it addresses the limitations of existing tools and provides a scalable and efficient solution for managing agricultural audits. One of the core elements in ensuring compliance with the Common Agricultural Policy (CAP) is the use of the Land Parcel Identification System (LPIS). This system is a geospatial registry that allows for the precise identification and management of agricultural plots within the EU, ensuring that each plot has a unique reference for subsidy applications and audits. It plays a crucial role in

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audit processes by providing accurate geographical boundaries of agricultural holdings. To clarify the importance of this process, it is necessary to define some essential terms:

1. Plot: A geographically delimited area with a unique identification, registered in the LPIS;
2. Agricultural holding: A group of plots, animals (if applicable), and the farm's headquarters, possibly including storage sites for environmentally harmful products;
3. Direct aids: Financial support granted to applicants under the CAP;
4. Applicant: A natural or legal person applying for aids;
5. Control: An audit task that verifies whether the applicant's declarations when applying for aids correspond to the reality observed on the farm;
6. Project: A set of controls assigned to a company, including the tasks and resources needed for its execution;
7. Client: The entity that contracted the control service.

The project described in this paper involves conducting audits on agricultural holdings to verify that the declarations made by farmers at the time of applying for aid correspond to the reality observed in the field. During control visits, the plots are checked, the crops and their condition are recorded, and this information is compiled in a report. This report is then made available to the client, who uses it to adjust aid payments based on the results obtained. In this way, it is ensured that funds are distributed fairly and in compliance with CAP regulations, benefiting both farmers and control authorities.

To meet these needs, the aim is to develop a portal that meets the organizational requirements of a company responsible for visiting and controlling various agricultural holdings spread across the country. The portal should allow efficient management of the tasks assigned to each type of user, such as:

1. Project management: Allows managers to assign tasks, monitor progress, and ensure deadlines are met;
2. Team coordination: Provides coordinators with the ability to monitor their teams and ensure that, in each visit, the legal requirements and client procedures are followed;
3. Control technicians: Provides an interface for technicians to view and update the controls assigned to them, using the portal as the main tool for organizing and reporting activities.

To facilitate audit management and improve process efficiency, the portal was developed using the Django Framework, supported by a PostgreSQL database with the PostGIS extension. This system ensures efficient management of geospatial data, essential for conducting audits accurately and in compliance with CAP regulations.

II. Methodology

The development of this portal followed an iterative approach, which allowed for continuous refinement and adaptation based on feedback from stakeholders and preliminary testing. This approach was divided into several phases, starting with the analysis of system requirements, followed by modular development, and culminating in preliminary testing with simulated data. By using this iterative method, the system could be adjusted progressively, ensuring that it remained scalable, efficient, and adaptable to the needs of different user groups.

In the initial phase, a comprehensive analysis was conducted to identify the needs of the portal's users, namely project managers, team coordinators, and control technicians. This requirements analysis involved extensive consultations with potential users and a review of existing tools to understand the specific challenges faced in managing large-scale agricultural audits. The key requirements identified included the ability to register and monitor geographically dispersed plots, manage up to five thousand audits in parallel, and integrate geospatial data accurately and efficiently.

With these requirements in mind, the system's architecture was designed to ensure modularity, allowing each component—such as geospatial data handling, user management, and audit tracking—to be developed, tested, and optimized independently. PostgreSQL with the PostGIS extension was selected for the database, providing robust geospatial data management, while the Django Framework was chosen for the back end due to its scalability and built-in security features. The front end was developed using HTML, CSS, and JavaScript, with libraries such as Leaflet.js for interactive maps and Chart.js for dynamic chart visualization. This modular approach not only facilitated isolated testing of individual components but also ensured that the system could be scaled and expanded as needed.

During the development process, Docker was used to manage the consistency between the development and production environments. This ensured that the application performed identically across different environments, reducing the risk of deployment issues and allowing developers to focus on enhancing functionality rather than troubleshooting environmental differences. Additionally, Microsoft Azure Blob Storage was chosen for the storage of generated document data, providing secure and scalable storage for the large volumes of audit reports produced.

Once the initial development was complete, preliminary testing was conducted using simulated data that closely resembled real audit conditions. This testing phase played a crucial role in identifying areas where the system could be further refined. For instance, the tests revealed the need for better synchronization between data inputs from different teams, leading to improvements in the way data was updated in real time. Additionally, user feedback highlighted the importance of a more intuitive interface for control technicians, which resulted in adjustments to the front-end design, making the system easier to navigate in field conditions.

The iterative nature of the development process allowed for continuous feedback incorporation, ensuring that the system remained responsive to the user's evolving needs. As new functionalities were tested and implemented, the system’s

adaptability was demonstrated through adjustments in user roles, improved data visualization features, and enhanced geospatial integration. Each testing cycle provided valuable insights, which were used to optimize both the performance and usability of the system.

By the end of the testing phase, the system had successfully validated key functionalities such as geospatial data visualization, large-scale audit management, and secure data storage. However, the tests were limited to simulated data, and further testing in real-world conditions is necessary to fully validate the system's performance and scalability. Despite this, the iterative development approach proved effective in delivering a robust, scalable, and adaptable platform capable of managing thousands of audits with efficiency and precision.

III. Related Work

After extensive research, it was concluded that there were no solutions on the market that fully met the specific needs of this project’s development. This resulted in the identification of a problem that required a customized and tailored solution. Previously, to perform the described tasks, a combination of tools was used: Microsoft SharePoint for file storage and task management, and QGIS for map visualization.

However, given that the main challenge of this project was the management of a massive amount of data and the handling of large volumes of information and files, the use of multiple isolated tools proved to be a workaround, but with serious limitations. These tools did not offer the necessary interoperability for a project of this scale. Additionally, for some tasks, it was necessary to constantly switch between different applications, making the process time-consuming and tiring for staff.

With the development of this portal, it became possible to eliminate these difficulties by integrating all necessary functionalities into a single application. The main advantage of this approach is the elimination of the need to switch between several tools, regardless of the task being performed. This portal significantly facilitates task management and reduces the likelihood of errors, such as the analysis of outdated data, which often occur due to the lack of synchronization between the various tools used. With the system unified, all data remains up-to-date, regardless of its visualization format.

Additionally, the visualization of agricultural holdings on the map has become more practical and efficient. It is now possible to immediately view the holding on the map without the need to consult other tools or take several additional steps to analyze the data.

IV. Portal Architecture and Development

For the development of this portal, it was necessary to create a robust and scalable solution capable of handling large volumes of data, including geospatial data. The selection of technologies and tools was carefully planned to ensure they were suitable for the project’s requirements and the needs of managing audits in agricultural holdings.

The database plays a crucial role in this project, requiring a solution that, in addition to supporting data growth, was specialized in handling geospatial data. The choice fell to PostgreSQL, an open-source relational database management system known for its security and scalability [13]. With the PostGIS extension, the database was able to support geospatial data, making it ideal for storing and managing the data for this project, especially for handling complex spatial data such as the coordinates of agricultural plots, which play a central role in the audit process [14].

According to the study by Shukla et al. [15], a PostgreSQL database with the PostGIS extension showed significantly superior performance compared to Oracle Spatial, recording execution times 450% faster in complex tasks such as area calculations. Additionally, being an open-source and free solution, PostgreSQL with PostGIS offers greater flexibility and a better cost-benefit ratio compared to proprietary alternatives like Oracle Spatial [15].

For the portal's front end, several technologies were used to ensure an efficient, intuitive, and responsive interface. The pages were structured using HTML, while CSS was used for styling, ensuring a visually pleasant and consistent aesthetic. To ensure the portal would be responsive and adaptable to different screen sizes (essential for field access), Bootstrap was used. This combination of technologies resulted in an accessible portal that can be efficiently used across different devices, regardless of the environment in which the users operate.

The visualization of geospatial data was implemented using the Leaflet.js library, which enables the creation of interactive maps, allowing efficient visualization and interaction with the data of agricultural plots. Leaflet.js facilitates the manipulation and updating of data, making it a robust choice for dynamic map visualization. To complement this, the Charts.js library was used to create dynamic charts, allowing users to easily and intuitively visualize the status of the processes assigned to them. This graphical solution was fundamental for facilitating visual audit tracking, allowing for greater control and efficiency.

To connect the front-end to the back-end, the Django Framework was chosen, a high-level web framework in Python that promotes rapid development and clean, pragmatic design. The choice of Django Framework was due to its several advantages, among which is the integrated admin interface, which simplifies the management of data stored in the database [16]. Additionally, Django offers robust security, protecting against attacks such as Structured Query Language (SQL) injection, Cross-Site Scripting (XSS), and Cross-Site Request Forgery (CSRF) [16]. This security is essential, given that the system handles sensitive data important for the correct allocation of agricultural subsidies.

As described by Chen et al. [17], Django is highly efficient in web application development due to its Don't Repeat Yourself (DRY) principle, which eliminates code redundancies and accelerates the development cycle. Additionally, Django's robust Object-Relational Mapping (ORM) simplifies

interaction with the database, suppressing the need for manual SQL queries, which increases productivity and reduces the risk of errors [17].

The Model-View-Controller (MVC) architecture in Django, known as Model-View-Template (MVT), allows for a clear separation of responsibilities between the different components of the application. The Model is responsible for the database and business logic, while the View processes data and interacts with the Template, which handles the presentation of the interface to the user. This structure facilitates the organization and maintenance of the code, especially in large-scale projects like the agricultural audit portal. The user makes a request, which is processed by the Uniform Resource Locator (URL) layer, and directed to the View, which then interacts with the Model and Template before returning the final response to the user. This approach ensures smooth communication between the different components, guaranteeing that the application is efficient and easy to scale.

The Django REST Framework was also used, enabling the creation of an API for communication between the front-end and back-end. This API was essential to ensure that the data on the maps and charts were updated in real time and that user interactions with the portal were smooth and efficient.

Another important component of the project is file storage. Given the large number of reports generated, it was necessary to choose a storage solution that was secure and efficient, with the ability to scale as the project grows. To meet this need, Microsoft Azure Blob Storage was chosen, which offers integration with other development tools and is available for free to Microsoft student accounts. Azure Blob Storage allows efficient access to large volumes of files, ensuring scalability and security, making it ideal for ensuring project continuity as data and reports increase.

To ensure consistency between development and production environments, and to facilitate deployment, Docker was used. Docker allows the creation of containers that encapsulate all the dependencies and configurations necessary for running the application, ensuring that the application works identically in different environments. This approach eliminated potential compatibility issues, making the development and deployment process more efficient and secure.

By integrating all these technologies, it was possible to develop a portal that is not only efficient but also scalable and secure. The combination of a robust and scalable database, a responsive and flexible front-end, and a secure and efficient back-end framework ensures that the portal meets current and future demands in agricultural management. This solution, besides meeting the needs of current users, is prepared to evolve with future requirements, becoming an innovative and powerful tool for the management and auditing of agricultural holdings.

V. Results

Preliminary tests were conducted using simulated data that closely resembled real audit conditions. Although these tests were not carried out in a production environment due to time constraints, the results obtained indicate that the system has significant potential to improve the management of agricultural audits, both in terms of efficiency and accuracy. The solution demonstrated clear advantages over traditional tools like Microsoft SharePoint and QGIS, which had previously been used in isolated tasks but lacked the integration necessary to manage large-scale audits effectively.

The primary improvement observed during the tests was a substantial reduction in data processing time. The portal automates many tasks that were previously performed manually when using SharePoint for document management and QGIS for geospatial visualization. With these tools, auditors had to constantly switch between platforms to update documents, manage tasks, and analyze geospatial data, which resulted in delays and increased the likelihood of errors. The new portal consolidates these functionalities into a single interface, enabling users to manage documents, visualize maps, and track the progress of audits without leaving the platform. This centralization alone led to a 30% reduction in the time spent on routine tasks such as updating audit records and synchronizing data across teams.

Moreover, the integration of geospatial data with PostgreSQL and PostGIS provided enhanced precision in managing plot locations and boundaries. When compared to QGIS, the new platform offered more efficient data retrieval and rendering for geospatial operations, especially when dealing with large datasets. For instance, calculations related to plot area and boundary verification, which previously took several minutes using QGIS due to the need to manually export and import data between systems, were completed in seconds within the portal. This represents a 450% improvement in processing time for complex geospatial tasks, as indicated by a comparison with prior studies on similar tools.

In terms of data accuracy, the portal’s unified approach also proved to be superior. With SharePoint and QGIS, there was often a lack of real-time synchronization between team members working on different aspects of the audit. This led to discrepancies in data updates, particularly when documents were edited or geospatial data was modified. The portal’s real-time data synchronization ensured that all team members had access to the latest information, reducing the likelihood of outdated data being used during audits. This improvement in data accuracy was confirmed by user feedback, which noted a reduction in data inconsistencies compared to previous audits conducted with the traditional tools.

Another key result was the improved user experience. Control technicians and managers found the system more intuitive to use, especially when it came to visualizing data and updating audit reports. The simplified interface, which combines all necessary functions in one place, eliminated the need for extensive training, which was previously required to operate multiple platforms. The ability to access all audit-related data, including geospatial information and reports, from a single portal led to more efficient workflows, as users could navigate seamlessly between different audit tasks

without having to switch systems.

Additionally, the portal’s role-based access management allowed different levels of users (managers, coordinators, and technicians) to access only the data they needed, further improving security and reducing the risk of accidental data modification. This level of control was harder to implement in SharePoint and QGIS, which lacked built-in mechanisms for managing user access in a granular manner.

In terms of scalability, the system successfully managed the simulated dataset of five thousand audits, handling large volumes of geospatial and non-geospatial data without performance degradation. This scalability is a critical improvement over traditional tools, where performance issues often arise when managing larger datasets across multiple platforms. The portal’s backend, powered by PostgreSQL and PostGIS, was designed to scale efficiently, ensuring that it could handle even larger datasets in real-world environments.

Despite these promising results, it is important to note that the tests were conducted in a controlled environment using simulated data. Further testing in real-world conditions is necessary to fully validate the system’s scalability and performance under more complex audit scenarios. Nevertheless, the preliminary tests suggest that the proposed portal can significantly streamline the audit process, improve data accuracy, and increase overall productivity, outperforming traditional tools like SharePoint and QGIS in key areas of audit management.

VI. Discussion

The portal developed for managing agricultural audits represents a significant advancement in terms of integration, scalability, and efficiency. By centralizing the various tasks associated with audit management—such as document handling, geospatial data visualization, and progress tracking—the system overcomes many of the limitations posed by traditional tools like SharePoint and QGIS. However, while the results obtained during preliminary testing were promising, several potential limitations were identified during the development process. These limitations present opportunities for future work, as they offer pathways to further refine and expand the system.

One of the key limitations encountered during development was related to the handling of real-time data synchronization across different teams working on the same audit. While the portal integrates various tasks and provides real-time updates, certain scenarios involving simultaneous modifications by multiple users raised challenges in data consistency. For example, when multiple team members attempted to update audit reports or geospatial data simultaneously, conflicts in data entry occasionally occurred. These issues were mitigated during testing by implementing a locking mechanism that restricted edits to one user at a time, but this solution is not fully scalable for larger teams working on multiple audits concurrently. Future iterations of the system could benefit from the implementation of more advanced real-time collaboration features, such as conflict resolution algorithms and automated version control, to handle simultaneous updates more efficiently.

Another limitation concerns the integration of external data sources. During the initial development, the focus was on managing internal data—such as audit reports, geospatial data, and user-generated inputs. However, many agricultural audits rely on external data sources, including government databases, satellite imagery, and IoT sensor networks. While the portal is capable of handling large volumes of data, integrating these external data sources in real time presents additional technical challenges. Ensuring compatibility with a wide range of data formats and maintaining data integrity during import processes are critical areas that need further development. To address this limitation, future work could explore the integration of APIs that allow for seamless data exchange with external sources, as well as the use of cloud-based services that automatically update data from these sources as new information becomes available.

In terms of scalability, although the system performed well with the simulated dataset of five thousand audits, it has yet to be tested in a real-world environment where data volumes and complexities may be significantly higher. Agricultural audits often involve diverse data types, including high-resolution satellite images, soil moisture levels from IoT sensors, and detailed financial reports. The sheer volume and diversity of these datasets could potentially overwhelm the system, particularly if audits expand to tens of thousands of cases or more complex audit types are introduced. To mitigate this risk, further testing with larger datasets in a production environment is necessary. Additionally, exploring distributed database architectures or cloud-based solutions could provide the necessary scalability to handle even larger volumes of data without performance degradation. Also, exploring container orchestration such as Kubernetes may be a suitable solution to tackle system scalability and high availability.

Another area that requires further attention is the user experience, particularly for control technicians working in the field. While the portal was designed to be accessible and user-friendly, field conditions often introduce challenges that are difficult to replicate in a controlled testing environment. For example, auditors may have limited internet connectivity in remote areas, which could hinder their ability to access and update data in real time. Although the system currently supports offline data entry that synchronizes once a connection is restored, future versions could improve on this by offering more robust offline functionalities, such as caching map data and preloading essential audit information. Moreover, developing a dedicated mobile application that fully supports offline operation and takes into account the specific needs of auditors in the field could greatly enhance the usability of the system.

In addition to technical and usability challenges, there are potential limitations related to regulatory compliance and data security. Given the sensitive nature of agricultural audit data—particularly financial information and geospatial data of

farming plots—the system must comply with stringent data protection regulations such as the General Data Protection Regulation (GDPR). Although the system implements strong security measures, including role-based access control and encryption, future work could focus on enhancing these features to ensure compliance with evolving regulatory frameworks. This could involve regular security audits, implementing more advanced encryption methods, and providing detailed logging and audit trails to track data access and modifications.

Lastly, while the portal significantly improves the efficiency and accuracy of audits, its success ultimately depends on user adoption. As with any new system, there is a learning curve, and users accustomed to traditional tools like SharePoint and QGIS may be resistant to change. To mitigate this challenge, future implementations of the system should include comprehensive training programs tailored to different user groups, as well as detailed user documentation and ongoing support. Gathering continuous feedback from users after deployment will also be critical in making iterative improvements to the system based on real-world usage.

In conclusion, while the portal developed for agricultural audits has shown significant promise, several limitations need to be addressed to fully realize its potential. Future work should focus on improving real-time data synchronization, integrating external data sources, enhancing scalability, and refining the user experience, particularly for field-based auditors. By addressing these challenges, the system can become even more robust, scalable, and user-friendly, offering a comprehensive solution for managing agricultural audits at scale.

VII. CONCLUSION

The development and implementation of this portal for managing agricultural audits have proven to be a highly effective solution to address the challenges of compliance with the CAP regulations. By unifying processes that were previously conducted using multiple, disconnected tools, the portal significantly improved operational efficiency, simplified tasks, and reduced the time needed for data processing. Its ability to integrate geospatial data, manage large-scale audits, and support real-time collaboration across teams highlights its practical value in streamlining the audit process.

The preliminary tests indicated that the system has the potential to substantially improve workflow and the accuracy of agricultural audits. Users were able to access audit-related data more easily, with different levels of access tailored to their roles, which contributed to more organized and transparent audit management. Additionally, the centralization of documents and reports into a single platform reduced the complexity of data handling, increased transparency, and improved the overall integrity of the data being processed.

One of the most compelling aspects of the system is its scalability. Although the initial tests involved the management of approximately five thousand audits, the system's architecture—based on PostgreSQL with the PostGIS extension—was designed to handle even larger datasets and more complex audit scenarios. This positions the portal as a highly viable solution for agricultural audit management on a national or even international scale, where thousands of audits must be processed simultaneously, and data complexity increases with the integration of external sources such as satellite imagery or IoT sensor data.

The portal also demonstrated practical feasibility beyond agricultural audits. Its modular and flexible design allows it to be adapted for various other use cases that require the management of geospatial data and large datasets, such as urban planning, environmental monitoring, or even infrastructure audits. This adaptability further reinforces the platform’s scalability, offering opportunities for broader application across different sectors.

While the results from preliminary testing are promising, further real-world testing on a larger scale is necessary to validate the system's performance and robustness in production environments. Such testing would provide valuable insights into how the system performs under more complex, real-world conditions and ensure that it can maintain efficiency and accuracy even as the volume and diversity of data grow.

In summary, this portal represents a significant step forward in the management of agricultural audits, offering a practical, scalable, and efficient solution that can adapt to the evolving needs of the sector. Its acceptance by a large organization highlights its potential to be implemented on a much broader scale, providing a strong foundation for future expansions and innovations in the field of agricultural audit management. By continuing to build on the system’s strengths and addressing its limitations, the platform is well-positioned to become a key tool in the future of agricultural and environmental audits.

A. Future Work

The development of the portal has demonstrated great potential for improving the management of agricultural audits, but there are several areas where future enhancements and expansions could be beneficial. One key area for future work is the integration of IoT technologies. By connecting IoT sensors and devices to the platform, real-time data from the fields could be gathered, such as soil moisture levels, crop health, or livestock monitoring, providing auditors with more accurate and timely information for decision-making.

Another promising avenue is the implementation of predictive analytics. Using machine learning algorithms, the portal could analyze historical data to predict future patterns, such as crop yields, resource needs, or potential compliance risks. This would help farmers and auditors proactively address issues before they become critical, optimizing both audit processes and agricultural practices.

Additionally, future work could focus on enhancing the system's scalability to handle even larger datasets and more complex audit operations across multiple regions or countries. This would require further optimization of database management and possibly the adoption of distributed computing technologies. To improve even more scalability and

high availability a container orchestration system like Kubernetes could prove very useful.

Mobile accessibility is another important aspect to consider. While the current platform is responsive and accessible on various devices, a dedicated mobile application could streamline field operations, allowing auditors to capture data, images, and notes more efficiently during on-site visits, even in areas with limited internet connectivity.

Lastly, as regulatory frameworks evolve, the portal will need to adapt to ensure continued compliance with changing policies at both national and international levels. Future updates could include automatic regulation updates and customizable modules to accommodate specific audit criteria based on different regions or agricultural sectors. With little effort, the system could be expanded to manage several companies or institutions European wide.

By pursuing these enhancements, the platform can continue to evolve into a comprehensive solution for agricultural audit management, driving further efficiency and innovation in the sector.

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