



Certificate Data Update Supports Land Digitalization

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ARTICLE INFO

Keywords: Land Certificate, Land Digitalization, Legal Certainty, Data Updating

Received : 25, May

Revised : 15, June

Accepted: 07, July

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ABSTRACT

Updating land certificate data is a crucial component in supporting the digital transformation of a modern, transparent, and equitable land administration system. This study aims to analyze the strategic role of certificate data updating in supporting land digitalization, identify existing challenges, and formulate an optimal model for its implementation. The research employs a normative juridical approach complemented by conceptual and comparative approaches, analyzing legal regulations, scholarly literature, and land administration practices. The findings reveal that certificate data quality still faces significant issues, including inconsistencies between physical and juridical data, overlapping ownership claims, and suboptimal electronic data maintenance. Meanwhile, land digitalization has proven to enhance efficiency, transparency, and service accuracy; however, its effectiveness heavily depends on the validity and reliability of underlying data. Therefore, updating land certificate data is a fundamental prerequisite for establishing a credible digital land administration system. This study recommends strengthening regulatory frameworks, integrating spatial and juridical data, leveraging information technology, and enhancing institutional capacity as strategic measures to optimize data updating processes toward a sustainable digital land system.

INTRODUCTION

Updating land certificate data is a strategic issue that cannot be separated from the massive flow of digital transformation in the national land administration system. In the global context, land digitalization has developed into a key instrument in creating transparent, efficient, and accountable agrarian governance. This transformation is not just a technical change, but a paradigm shift in data management and public services in the land sector. "Digital transformation has changed the paradigm of administrative law, including in agrarian and land management" (Pamungkas, 2025). Digitalization not only touches on the administrative technical aspect, but also overhauls the normative structure in the land law itself. Digital transformation in land administration not only aims to improve bureaucratic efficiency, but also requires legal reconstruction that is able to ensure legal certainty and protection of agrarian rights in the digital era (Pamungkas, 2025). Updating certificate data is the main foundation that determines the success of the digitalization. Without accurate, up-to-date, and integrated data, the digital land system has the potential to generate new legal uncertainties that are contrary to the original goal of digitalization.

Along with the development of information technology, the digitalization of land administration has become an inevitable necessity. "The ongoing digital transformation requires individuals and organizations to adapt" (Habibi et al., 2025, p. 1). This adaptation includes changes in the work system, increasing the capacity of human resources, and institutional adjustments in managing land data electronically. Thus, the digitalization of land administration can be understood as a response to the demands of the times that require faster, more transparent, and technology-based public services (Habibi et al., 2025). In practice, the land digitalization policy in Indonesia has been realized through the implementation of electronic land certificates. This policy aims to improve efficiency, accuracy, and safety in the process land administration. "The main objective of this policy is to encourage the digitalization of land services to improve efficiency, accuracy, and security in the land administration process" (Tamba et al., 2025, p. 191). Conceptually, this policy is part of an effort to modernize land services which is expected to be able to accelerate the administrative process and improve the quality of public services (Tamba et al., 2025).

However, the success of the implementation of land digitization is highly determined by the quality of the basic data used, especially land certificate data. In empirical reality, land data in Indonesia still faces various fundamental problems, such as insynchronization between physical and judicial data, as well as variations in data quality due to differences in measurement and recording methods. Hapsoro et al. stated that the quality of land parcel data in land registration in Indonesia is still diverse, so it requires evaluation to ensure legal certainty for land objects (Hapsoro et al., 2024). This condition shows that updating certificate data is an urgent need that must be addressed immediately in order to support land digitalization. In addition, classic problems such as overlapping ownership and inaccurate data are also serious obstacles in the

development of digital land systems. In this context, digital transformation actually encourages the improvement of the quality of certificate data to be more accurate, efficient, and integrated in the electronic system (Sarsanto et al., 2026). In fact, changes in the land administration system to an electronic system have begun to be implemented by the government, as stated that "the Ministry of Agrarian Affairs and Spatial Planning switched to using an electronic system" (Sarsanto et al., 2026). This transition marks the country's commitment to building a modern digital land system, but at the same time demands the readiness of high-quality data.

From the perspective of agrarian law, land certificates have a very fundamental role as strong evidence of ownership of land rights. Inaccuracies in the data in certificates not only have an impact on the administrative aspect, but also have direct implications for legal certainty and the protection of people's rights. Updating certificate data in this case is a preventive instrument in preventing land conflicts that are often due to data mismatches. The dynamics of development and economic growth in Indonesia have increased the complexity of land management. The increasing need for land, coupled with technological developments, demands an adaptive land administration system that is responsive to change. In such conditions, updating certificate data can no longer be seen as a routine administrative activity, but rather as a strategic process in building an integrated and technology-based land database.

The problem that then arises is how the mechanism for updating certificate data can be effectively integrated in the land digitization system. In addition, it is necessary to examine the extent to which the data update is able to answer the challenge of data validity in the digital era which demands high accuracy and speed of information access. No less important, structural barriers that include regulatory, institutional, and technological aspects also need to be analyzed in depth to find comprehensive solutions.

RESEARCH METHODS

The research on updating certificate data in support of land digitalization was prepared using a normative juridical approach that is comprehensively combined with conceptual and comparative approaches. The selection of this approach is based on the characteristics of the object of study which focuses on legal norms, public policies, and the transformation of the land administration system in the framework of digitalization. In legal research, the normative juridical approach has a very fundamental position because it allows researchers to examine in depth various laws and regulations, legal principles, and doctrines relevant to land issues. The normative juridical approach in this study is carried out by analyzing various legal instruments that regulate land administration, including regulations related to digitization of land services and updating certificate data. As stated by Adinegoro that "The research method used is normative juridical through the analysis of legal documents" (Adinegoro, 2023). The analysis of legal documents is the core of the normative approach, which in this study includes the laws, government regulations, ministerial regulations, and technical policies in the field of land.

A normative juridical approach is also carried out through the study of relevant literature materials. "The method used is normative juridical research, which is carried out by examining literature materials" (Sitorus et al., 2024). This research not only relies on legal texts, but also utilizes scientific literature as a source of analysis to understand the dynamics of land law in the context of digitalization. Substantially, normative juridical research in the field of agrarian is carried out by focusing on the collection and analysis of secondary data in the form of primary, secondary, and tertiary legal materials. Agrarian law research uses a normative juridical approach by emphasizing literature and document studies as the main source of research data (Wibowo, 2023). Within this framework, primary legal materials include laws and regulations governing land registration and land digitization, while secondary legal materials include relevant scientific journals, books, and previous research results. The tertiary legal materials are used as support to enrich conceptual understanding.

In addition to the normative approach, this study also uses a conceptual approach that aims to examine the theories that have developed in modern land administration. This approach is important because land digitalization is not only related to legal aspects, but also involves new concepts such as digital land administration, spatial and judicial data integration, and technology-based land information systems. Using a conceptual approach, this study seeks to build a systematic framework of thinking in understanding the role of certificate data update as the main foundation in the digital land system. A comparative approach is also applied in this study as an effort to enrich the analysis through a comparison of land digitization practices in various countries. This approach aims to identify best practices that can be used as a reference in the development of the land system in Indonesia. By comparing systems that have been successfully implemented in other countries, this research is expected to be able to provide a broader perspective and recommendations that are applicable in the national context.

The type of data used in this study is secondary data obtained through literature studies. The secondary data includes a wide range of legal materials relevant to the research topic. In this case, the data collection method is carried out through documentation techniques, namely by collecting and reviewing various legal documents, scientific literature, and research results related to updating certificate data and land digitization. "The type of research used is normative juridical research, legal materials are collected by literature studies and document studies" (Wibowo, 2023). Furthermore, the data analysis technique in this study was carried out qualitatively using a descriptive-analytical method. This method is used to systematically decompose the data that has been collected, then analyzed and interpreted to produce logical and argumentative conclusions. Qualitative analysis allows researchers to understand the meaning behind legal norms as well as their implications for land administration practices.

This qualitative analysis approach is also supported by the views of Sinta and Andriyani who state that "The method used, namely a normative juridical approach with qualitative analysis of relevant legal materials" (Sinta &

Andriyani, 2025). Thus, this study not only focuses on normative descriptions, but also conducts a critical evaluation of the effectiveness of regulations and the implementation of certificate data updates in supporting land digitalization.

RESEARCH RESULTS

Actual Condition of Certificate Data in the Land System

The actual condition of certificate data in the land system in Indonesia shows that there is a complex dynamic between normative aspects and empirical realities in the field. Normatively, land certificates are strong evidence and have legal force in ensuring the certainty of land rights. However, in practice, the quality of the data listed in the certificate still faces various problems that have the potential to cause legal uncertainty. One of the main problems that is often found is the insynchronization between physical (spatial) data and juridical data. This discrepancy can occur due to differences measurement methods, changes in the physical condition of the soil, and the limitations of technology used in the past. In this case, the research shows that the quality of land plot data in Indonesia is still diverse due to differences in methods and tools used, so an evaluation is needed to ensure legal certainty for land objects (Hapsoro et al., 2024). The variation in the quality of the data shows that the land system still faces challenges in realizing a uniform and standardized database.

In addition, the problem of overlapping ownership and the potential for double certificates are also indicators of weak land data quality. This condition not only harms rights holders, but also has the potential to cause prolonged agrarian conflicts. In this context, efforts to update certificate data are very important as a preventive step to minimize future conflicts. Efforts to digitize and update land data have shown a positive impact in improving data quality. The results of the study show that digitization and data update are able to increase data validity and reduce the potential for overlap and double certificates (Dewi et al., 2022). The use of technology in data updating not only increases efficiency, but also strengthens the accuracy and integrity of land data.

Validation of spatial data through geospatial analysis also makes a significant contribution to improving the quality of land data. Research has found that validation and repositioning of spatial data of land parcels is able to produce a high level of accuracy, thus supporting the development of valid land databases (Prabajati & Basyid, 2022). Even empirically, "The Land Plot in Ridogalih Village has a Complete Village Value of 83.72%" (Prabajati & Basyid, 2022), which shows that efforts to systematically update data can significantly improve data quality. However, the implementation of updating certificate data has not been fully optimal. One of the main obstacles is the limited integration between manual systems and electronic systems. In many cases, land data is still partially managed, leading to data duplication and information inconsistencies. This condition is exacerbated by differences in operational standards between regions, which results in disparities in data quality.

Transformation towards a digital system also requires a paradigm shift in land data management. As emphasized, digital transformation encourages the improvement of the quality of certificate data to be more accurate, efficient, and

integrated in electronic systems (Sarsanto et al., 2026). Updating certificate data is not only a technical necessity, but also part of the reform of the land administration system. In addition to the technical aspect, human resource factors also affect the quality of certificate data. Lack of competence in digital data management and low technological literacy are obstacles in the data update process. Increasing the capacity of human resources is one of the important aspects that must be considered in land digitalization efforts.

Readiness Level of Land Digitalization in Indonesia

The level of readiness for land digitalization in Indonesia is a crucial aspect in determining the success of the transformation of the land administration system towards the digital era. This readiness not only includes technological aspects, but also involves the regulatory, institutional, and human resources dimensions as the main supporting factors. From the regulatory aspect, the Indonesian government has shown a strong commitment to encouraging land digitalization through various policies, including the implementation of electronic land certificates. This policy aims to increase efficiency, transparency, and security in land services. Digitalization is understood as a strategic step in modernizing land administration in line with technological developments.

However, the implementation of the policy still faces various challenges. One of the main challenges is the readiness of digital infrastructure that is not evenly distributed throughout Indonesia. As stated, "the main challenges include digital infrastructure, digital literacy, and data security" (Yudiyanto et al., 2025). This limited infrastructure is an obstacle in the implementation of the digital land system as a whole, especially in areas that do not have adequate access to technology. In addition, the quality of human resources is also a determining factor in the success of land digitalization. Research shows that the success of digital system implementation is very depends on the readiness of human resources, technology quality, and an adequate data security system (Yudiyanto et al., 2025).

On the other hand, the implementation of electronic land certificates has had a positive impact on improving the efficiency and transparency of land services. Research shows that digitization of land administration is able to increase efficiency, transparency, and reduce the risk of document forgery (Susmana, 2024). Digitalization has great potential in improving the quality of public services in the land sector. However, in practice, the implementation of digitalization still faces various obstacles, especially in the data maintenance process. Triani et al. stated that "the implementation of electronic services in the maintenance of land registration data has not been effective" (Triani et al., 2023). Similar conditions are also found in the process of converting analog to digital certificates. Rahman and Rahman state that "data maintenance services have not been maximally carried out through electronic systems" (Rahman & Rahman, 2024). The digitization process is still in the transition stage, where the manual system is still used simultaneously with the electronic system.

In addition to technical constraints, social factors are also a challenge in the implementation of land digitalization. Research shows that digitalization still faces obstacles in the form of limited human resources, administrative

complexity, and public resistance to technology (Maharani et al., 2024). This resistance is often caused by a lack of public understanding of the benefits of digitalization as well as concerns about data security. The implementation of the land digital system also still faces challenges in terms of data integration. In many cases, the systems used are not fully integrated, leading to data fragmentation and hindering the service process. In fact, in some conditions, the implementation of digital systems still relies on manual processes. "facing major challenges in implementing digital systems is still done manually" (Yudiyanto et al., 2025). Nevertheless, land digitalization efforts continue to show a positive direction. The government continues to carry out various innovations to improve the quality of land services, including the development of technology-based information systems and the capacity building of human resources. In Term long, Digitization expected Capable Creating land system that is more transparent, efficient, and accountable.

Implementation of Data Update in Land Administration Practices

The implementation of certificate data update in land administration practices in Indonesia is a gradual and complex process, along with the transformation towards a digital-based land system. Conceptually, the update of certificate data includes physical data maintenance activities and juridical data that are carried out on an ongoing basis to ensure that the information recorded in the certificate is always in accordance with actual conditions in the field. In practice, the data update mechanism is carried out through several main stages, namely data collection, verification and validation, and updates in the land administration system. This process involves various actors, including the Land Office, land deed making officials (PPAT), and the community as land rights holders. Data updates can be done through requests for data changes by rights holders, the results of systematic land registration activities, or through digitalization programs carried out by the government.

One form of implementation of data update that is currently being developed is the digitization of land data through an electronic system. These efforts include data migration from analog to digital form, as well as data integration in land information systems. In this context, research shows that the land data digitization strategy is the right step in supporting the modernization of the land system. "The map digitization strategy implemented at the Banyuasin Land Office is appropriate" (Dewi et al., 2022). In addition, the implementation of data updates is also carried out through spatial data validation and repositioning activities. This activity aims to ensure that the data stored in the system is in accordance with real conditions in the field. Research shows that spatial data validation is able to significantly improve the accuracy of land data (Prabajati & Basyid, 2022). Data updates focus not only on the administrative aspect, but also on the technical aspects related to spatial data accuracy.

However, in practice, the implementation of certificate data updates still faces various limitations. One of the main obstacles is the lack of optimal use of electronic systems in data maintenance. Triani et al. "the implementation of electronic services in the maintenance of land registration data has not been

effective" (Triani et al., 2023). Although digital systems have been introduced, their implementation is still not fully able to replace manual systems. Furthermore, the process of updating data is also often carried out manually or semi-digitally. "Data maintenance services have not been optimally carried out through electronic systems" (Rahman & Rahman, 2024). This condition shows that there is a gap between digitalization policies and implementation in the field, which has an impact on the effectiveness of data updates.

Barriers and Challenges of Updating Certificate Data

Updating certificate data in supporting land digitalization faces various obstacles and challenges that are multidimensional, including technical, juridical, and institutional aspects. These obstacles are the main factors affecting the effectiveness of the implementation of land digitalization in Indonesia. From the technical aspect, one of the main challenges is the limitation of information technology infrastructure that is not evenly distributed throughout the region. Inadequate infrastructure hinders the process of digitizing data and integrating land information systems. In addition, the quality of data that is still diverse is also an obstacle in updating data. Differences in formats, data collection methods, and standards cause difficulties in integrating data into digital systems.

Another technical challenge relates to data security. In digital systems, data protection is very important to prevent misuse and falsification of data. "The main challenges include digital infrastructure, digital literacy, and data security" (Yudiyanto et al., 2025). From the aspect of human resources, the limitation of competencies in the management of digital technology is a significant obstacle. Many land officials do not have adequate capabilities to operate digital systems, so the data update process does not run optimally. In addition, resistance to change is also a challenge in itself. Research shows that land digitalization still faces obstacles in the form of limited human resources, administrative complexity, as well as public resistance to technology (Maharani et al., 2024).

In practice, the implementation of digital systems also often relies on manual processes. Digital transformation has not been fully effective. "facing major challenges in implementing digital systems is still done manually" (Yudiyanto et al., 2025). This reliance on manual systems causes inefficiencies and increases the risk of errors in data management. From the juridical aspect, the main challenge lies in the lack of optimal harmonization of regulations governing land digitalization. Existing regulations are still not fully able to accommodate technological developments, thus causing legal uncertainty in the implementation of digital systems. In addition, the lack of clear legal standards related to digital data management is also an obstacle in updating certificate data.

Meanwhile, from an institutional aspect, coordination between agencies that has not been optimal is one of the obstacles in updating data. The land system involving various institutions requires strong synergy so that the data update process can run effectively. This lack of coordination often leads to data duplication and information missynchronization. Obstacles and challenges in updating certificate data show that land digitalization requires not only technological support, but also comprehensive reforms in regulatory, institutional, and human resource aspects.

A comprehensive approach is needed to overcome these various obstacles so that land digitalization can run optimally.

Data Upgrade Integration Model in Land Digital Systems

The integration model of data updating in the land digital system is a strategic solution to overcome various problems faced in land data management. This model aims to create an integrated, accurate, and sustainable system in supporting land digitalization. Conceptually, this integration model is based on the principle of integration between spatial data and juridical data in one integrated system. This integration allows for more efficient and accurate land data management, as well as minimizing errors and duplication of data. In this context, the use of technology such as geographic information systems (GIS) is very important in supporting data integration.

The integration model also includes the implementation of a centralized digital system, where all land data is stored and managed in a single national database. This system allows real-time data access and increases transparency in land data management. In addition, a centralized system also facilitates the process of updating data because any changes can be recorded directly in the system. In its implementation, this integration model must be supported by clear policies and a comprehensive regulatory framework. Regulations that support data integration are critical to ensuring that the systems built have a strong legal basis. In addition, uniform operational standards are also needed to ensure consistency in data management.

The institutional aspect is also an important factor in this integration model. Good coordination is needed between various agencies involved in land data management, including the central government, local governments, and other related institutions. This collaboration is key in creating an integrated and effective system. In addition, the integration model must also pay attention to the data security aspect. In digital systems, data protection is very important to prevent misuse. This integration model must also be supported by increasing the capacity of human resources. Competent human resources in the field of information technology and land are indispensable to manage digital systems effectively. Training and competency development are strategic steps in supporting the implementation of this model.

DISCUSSION

The discussion on updating certificate data in supporting land digitalization cannot be separated from the theoretical framework of agrarian law, the principles of good governance, and the dynamics of digital transformation in public administration. In this perspective, updating certificate data is not just an administrative activity, but is a fundamental prerequisite in building a credible, accountable, and fair digital land system. Normatively, Land certificates have a position as strong evidence of land rights. "Land rights certificates are essentially guaranteed by law" (Kumara et al., 2021). Thus, the accuracy of the data listed in the certificate becomes crucial, as errors or data inconsistencies can have direct implications for legal certainty. In this context, the

update of certificate data is a concrete manifestation of the principle of legal certainty, which aims to ensure that the recorded data is always in accordance with actual conditions.

However, in practice, various problems are still found that show the weak quality of certificate data. One of the most significant problems is the occurrence of double certificates, which can lead to legal conflicts and uncertainty. As stated, "the issuance of double certificates creates legal conflicts and uncertainty" (Anggraeni et al., 2023). This phenomenon shows that the data update system that is not optimal is one of the factors causing land conflicts. The results of the study show that the occurrence of double certificates in the land system causes legal uncertainty and has the potential to harm land rights holders, so it is necessary to improve regulations and supervision (Anggraeni et al., 2023). In digitalization, this problem becomes even more complex if inaccurate data is integrated into the digital system, because data errors will be widely distributed and difficult to correct.

From the perspective of digital transformation, updating certificate data has a strategic role as the main foundation in the development of an electronic-based land system. Digitization of land administration has been proven to be able to increase the efficiency and transparency of services. "digital transformation in land administration improves bureaucratic efficiency and transparency of services" (Habibi et al., 2024). However, the effectiveness of digitalization is highly dependent on the quality of the data used. Digitization of land administration through electronic certificates is able to improve the bureaucratic system by increasing transparency, efficiency, and legal certainty in public services (Habibi et al., 2024). However, without the support of adequate data updates, digitization has the potential to become just a digitization of procedures without improving the quality of data substance.

In this case, the integration between spatial data and juridical data is a very important aspect of the digital land system. Accurate spatial data must be aligned with valid juridical data in order to produce valid and reliable land information. Failure to integrate these two types of data will lead to information misalignment, which can ultimately lead to new conflicts in the future. The use of technology such as geographic information systems (GIS) is a strategic solution in supporting the integration of this data. GIS allows for accurate visualization of spatial data and simplifies the process of analysis and decision-making. In addition, technological innovations have also been implemented in the form of digital services such as online certificate checking. "Online certificate checking services can improve fast, precise, transparent, and accountable services" (Prasetyo & Saefudin, 2023). This innovation shows that the use of technology can significantly improve the quality of land services.

Technological developments also encourage the integration of land services through digital-based applications. In this case, "the use of the Touch My Land application shows an increasingly effective integration of digital technology-based land services" (Aurelia et al., 2025). The implementation of digital technology in land administration helps improve service efficiency and facilitate public access to land information (Aurelia et al., 2025). However, the

implementation of technology in the land system cannot be separated from various challenges, especially in institutional and regulatory aspects. The success of digitalization is highly dependent on the readiness of institutions to manage change and the ability to adapt to new technologies. In this context, it is emphasized that the success of electronic certificates is highly dependent on institutional readiness, interagency coordination, and public acceptance (Gustiaji et al., 2025).

In addition, the good governance approach is very relevant in the development of a digital land system. Strengthening good governance is the key to realizing a transparent and accountable land system. As stated that "Efforts to strengthen good governance in the land sector have a very close relevance to the objectives of sustainable development" (Mulyadina & Damayanti, 2025). Thus, land digitalization not only aims to improve efficiency, but also to support the achievement of sustainable development through better governance. On the other hand, the implementation of digital systems in land services has also been proven to be able to increase the accuracy and speed of public services. "The implementation of digital systems in land services is able to increase the accuracy and speed of public services" (Yudiyanto et al., 2025). However, the implementation of digital systems still faces various challenges, both from technical and human resource aspects.

The implementation of a digital-based land service system helps speed up the administrative process and reduce errors in services, although it still faces obstacles in technical and human resources aspects (Yudiyanto et al., 2025). Based on this analysis, several strategies can be formulated to optimize the updating of certificate data in support of land digitalization. First, it is necessary to strengthen regulations that are able to accommodate technological developments and provide legal certainty in the management of digital data. Second, increasing the capacity of human resources is a top priority to ensure that digital systems can be operated effectively. Third, strengthening coordination between agencies needs to be carried out to ensure optimal data integration.

In addition, a collaborative approach between the government, the community, and the private sector is also key in realizing an inclusive digital land system. Public participation in data updates is critical to ensure that the data used in digital systems truly reflects actual conditions on the ground. Meanwhile, private sector involvement can help in the development of technology as well as improving system efficiency.

CONCLUSION

Updating land certificate data occupies a very fundamental position in supporting the success of effective, credible, and sustainable land digitization. In the overall analysis, it was revealed that data quality is the main foundation that determines the extent of the digital land system able to present legal certainty, protection of land rights, and public trust in land administration. Without accurate, up-to-date, and systematically integrated data between physical and juridical aspects, digitization has the potential to replicate the weaknesses of conventional systems into more complex digital forms. The results of the study

also confirm that the updating of certificate data still faces various multidimensional challenges, ranging from limited technological infrastructure, disharmonized regulations, to low human resource capacity and institutional coordination. Comprehensive and sustainable strategic steps are needed through strengthening the regulatory framework, optimizing the use of digital technology, and improving the competence of land apparatus.

Bibliography

REFERENCES

- Adinegoro, K. R. R. (2023). Juridical analysis of the granting of land rights at the coastal border. *Journal of Land*, 13(2). <https://doi.org/10.53686/jp.v13i2.231>
- Anggraeni, D., Widjajaatmadja, D. A. R., & Koto, Z. (2023). Legal certainty of the issuance of double certificates for land title holders by the land office. *Indonesian Multidisciplinary Journal*, 2(8).
- Aurelia, S. O., Listyani, A. S., Saputri, S. A., Herawati, S., Niravita, A., & Fikri, M. A. H. (2025). Technology-based land service innovation: Implementation of the Touch My Land application in land registration. *Nusantara Scientific Journal*, 2(6). <https://doi.org/10.61722/jinu.v2i6.7041>
- Dewi, S. R., Wulansari, H., Tilman, A., & Santoso, R. T. (2022). Optimization of migration and updating of land data in land computerization in Banyuasin Regency. *Tunas Agraria*, 5(3). <https://doi.org/10.31292/jta.v5i3.184>
- Gustiaji, Handayani, I. G. A. K. R., & Subekti, R. (2025). Institutional challenges in the implementation of electronic certificates in land services. *Journal of Law and Development Economy*, 13(2), 85–93. <https://doi.org/10.55637/jph.3.3.5580.585-591>
- Habibi, S. A., Prambudi, G. S., Trisnawati, T., & Wulandari, R. (2025). Digital transformation of land administration: Implementation and challenges of electronic certificates in Indonesia. *RIO Law Journal*, 6(1). <https://doi.org/10.36355/rlj.v6i1.1582>
- Habibi, S. A., Prambudi, G. S., Trisnawati, T., & Wulandari, R. (2024). Digital transformation of land administration: Implementation and challenges of electronic certificates in Indonesia. *RIO Law Journal*, 6(1), 499–507. <https://doi.org/10.36355/rlj.v6i1.1582>
- Hapsoro, R. H., Hernandi, A., & Abdulharis, R. (2024). Evaluation of the quality of land plot data in the context of legal certainty of land registration objects in Indonesia. *Agrarian Tunas*, 7(3), 368–388. <https://doi.org/10.31292/jta.v7i3.336>

- Kumara, I. M. C. G., Wijaya, I. K. K. A., & Suryani, L. P. (2021). Legal certainty of land rights holders in the land law system in Indonesia. *Journal of Legal Preferences*, 2(3), 560–563.
- Maharani, P. I., Nurfadilah, D., Niravita, A., & Fikri, M. A. H. (2024). Obstacles and effective solutions in the implementation of the complete systematic land registration program (PTSL) in the digital era. *Scientific Journal of Student Research*, 2(6), 470–480. <https://doi.org/10.61722/jipm.v2i6.589>
- Mulyadina, A., & Damayanti, R. (2025). Modernization of e-government-based land public services as an effort to strengthen good governance in supporting sustainable development. *Kertha Semaya: Journal of Legal Sciences*, 13(12), 2719–2741. <https://doi.org/10.24843/KS.2025.v13.i12.p02>
- Scott, A. J. (2025). Integration of digitalization in land administration law: Reconstruction of agrarian governance in the era of digital transformation. *Journal of Swan Law*, 11(2), 284–295. <https://doi.org/10.31599/sasana.v11i2.4706>
- Prabajati, H. H., & Basyid, M. (2022). A study of the validity of land plot data and spatial analysis towards a complete village map. *FTSP Series Proceedings*.
- Prasetyo, D. B., & Saefudin, A. (2023). Digitization of land service innovation: Online certificate checking at the Purbalingga Regency Land Office. *Journal of Land*, 13(1), 17–27. <https://doi.org/10.53686/jp.v13i1.190>
- Rahman, T., & Rahman, A. (2024). Conversion of analog land rights certificates to electronic land rights certificates. *Private Law Journal*.
- Sarsanto, S., Indriyantho, B. R., & Sulardjaka, S. (2026). Improving the quality of land plot data at the Singkawang City Land Office. *Journal of the Indonesian Engineer Profession*, 3(3), 167–173. <https://doi.org/10.14710/jpii.2025.26875>
- Sinta, P., & Andriyani, S. (2025). Juridical analysis of the validity of land rights ownership due to unlawful acts (PMH). *Private Law Journal*. <https://doi.org/10.29303/nwf9p937>
- Sitorus, Y. L., Laurensia, V., & Hidayat, M. F. (2024). Juridical analysis: The role of the national land agency in resolving land disputes. *SHARIA: Journal of Legal Sciences*, 1(4), 342–346. <https://doi.org/10.62017/syariah.v1i4.1760>
- Susmana, D. S. (2024). Digital transformation in land administration: A juridical analysis of electronic land certificates. *Indonesian Journal of Impressions*, 4(6). <https://doi.org/10.58344/jii.v4i6.6546>

- Tamba, P., Yuningsih, N. Y., & Afrilia, U. A. (2025). Implementation of the issuance of electronic land certificates by the national land agency of the City of Bandung. *Responsive: Journal of Thought and Research in the Fields of Administration, Social, Humanities and Policy Public*, 8(2), 189–203. <https://doi.org/10.24198/responsive.v8i2.62260>
- Triani, W. A., Rahman, S., & Abbas, I. (2023). The effectiveness of electronic services according to the Minister of Agrarian Regulation No. 1 of 2021 in maintaining land registration data at the Gowa Regency Land Office. *Journal of Lex Generalis*, 4(2).
- Wibowo, A. T. (2023). A juridical study of the impact of the Job Creation Law on the implementation of agrarian reform in Indonesia. *Journal of Law and Notary*, 6(1). <https://doi.org/10.33474/hukeno.v6i1.13484>
- Yudiyanto, A. D., Pandjaitan, M. L. W., & Lukas. (2025). Transformation of land services: Challenges and solutions in the implementation of the digital-based PTP system at the Bandung Regency Land Office. *Journal of Engineering Practice*, 2(2). <https://doi.org/10.25170/jpk.v2i2.6301>