



Reconstruction of Legal Protection for Electronic Land Certificate Holders in The Context of Updating the Digitalbased National Land Law System in Indonesia

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ABSTRACT

In the context of modernizing Indonesia's digitally based land law system, this study evaluates and reconstructs the legal protection afforded to holders of electronic land certificates. This study employs a normative juridical research method using statutory and conceptual approaches. The findings demonstrate that although Law Number 1 of 2024 concerning Electronic Information and Transactions and Government Regulation Number 18 of 2021 provide a legal foundation for electronic land certificates, the existing legal protection remains suboptimal because of regulatory disharmony, the absence of comprehensive data security standards, and limited infrastructure and public readiness. The study identifies several significant challenges, including the absence of specific regulations governing land data security standards and the vulnerability of electronic systems to cyberthreats. Furthermore, the lack of synchronization between the land law regime and information technology law creates normative ambiguity regarding the evidentiary status of electronic land certificates in judicial proceedings. This study proposes a comprehensive legal reconstruction through regulatory harmonization, the strengthening of digital security systems using technologies such as blockchain and multifactor authentication, and the development of a technology-based legal protection model that guarantees legal certainty and social justice. The proposed reconstruction model encompasses the reform of legal norms, the strengthening of digitally based protection systems, the development of integrated institutions and infrastructure, and the incorporation of fundamental legal values. Accordingly, this model provides a framework for reforming Indonesia's national land law system to ensure that it remains adaptive and responsive to technological developments.

INTRODUCTION

Land is a fundamental human need with strategic economic, social, and political dimensions in national life. From a national legal perspective, land is not merely regarded as an economic asset but also as a source of welfare and social justice that must be managed by the state for the greatest prosperity of the people (Sari, 2021). This principle is emphasized in Law Number 5 of 1960 concerning Basic Agrarian Principles, particularly Article 1 paragraph (2), which states that the earth, water, and space are national assets controlled by the state. Furthermore, the 1945 Constitution of the Republic of Indonesia stipulates in Article 33 paragraph (3) that the state controls the earth, water, and natural resources contained therein and utilizes them for the greatest prosperity of its citizens (Sumiati, 2021). The increasing economic value of land, along with rapid development growth, has transformed land into a strategic investment object while simultaneously increasing the potential for conflicts and disputes (Pramesti, 2024). Therefore, land as a legal object requires optimal legal protection to

ensure legal certainty and justice for every land rights holder.

The state establishes a land registration system to provide legal certainty and legal protection for land rights holders, as regulated under Government Regulation Number 24 of 1997 concerning Land Registration, particularly as stated in Article 3 (Arba, 2021). Land certificates function as strong evidence of land ownership rights, as affirmed in Article 19 paragraph (2) letter c of the Basic Agrarian Law (Undang-Undang Pokok Agraria). However, in practice, the conventional land registration system continues to face various longstanding issues, including the high number of land disputes, overlapping ownership claims, and inconsistencies between physical and juridical data (Manthovani, 2017). Empirical evidence indicates that thousands of land dispute cases continue to occur annually in Indonesia, demonstrating that the existing system has not fully guaranteed effective legal certainty (Subekti, 2022). This condition reflects structural weaknesses within the conventional land administration system that require fundamental legal reform.

Along with the advancement of information technology, the state has undertaken digital transformation in the land administration system by implementing electronic land certificates as part of legal modernization efforts. This digitalization is supported by various regulations, including Government Regulation Number 18 of 2021, particularly Article 84, which mandates that land registration activities may be carried out electronically, and Law Number 1 of 2024 concerning Electronic Information and Transactions, which recognizes electronic documents as valid legal evidence under Article 5 (Hidayah, 2024). Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) Number 1 of 2021 concerning Electronic Certificates and Regulation of the Minister of ATR/BPN Number 3 of 2023 establish the operational framework for issuing electronic certificates, which are electronic documents containing physical and juridical land data within a digitally based system (Herawza, 2023). This transformation demonstrates the inevitability of digitalization within modern legal systems to improve efficiency, transparency, and accountability in public services in the land sector (Bhatt et al., 2024; Latupeirissa et al., 2024; Savita et al., 2025).

The electronic land certificate policy is essentially part of bureaucratic reform and land administration law reform aimed at achieving effective and efficient public services. Through the paperless concept and integrated land data management, the government seeks to reduce maladministration, enhance transparency, and accelerate public service delivery (Noer, 2024). Furthermore, this digitalization aligns with the principles of good governance, which require accountability and openness in state administration (Muri, 2025). However, the implementation of this policy has not yet reached optimal levels due to various structural and technical challenges, including the absence of a valid and fully integrated land database, inconsistencies in population data synchronization, limited digital infrastructure, low levels of public digital literacy, and inadequate policy dissemination (Silviana, 2021). This situation illustrates the gap between ideal legal norms (*das sollen*) and their implementation in practice (*das sein*) (Sari & Rodiyah, 2026; Soegiarto et al., 2024).

However, the adoption of the electronic land certificate system also introduces new legal protection challenges, particularly concerning data security and the reliability of digital evidence. The integrity of digital land administration systems is significantly threatened by potential cybercrimes, including hacking, data manipulation, and information breaches (Masri, 2023). Although Article 5 of the ITE Law recognizes electronic documents as admissible

evidence, comprehensive regulations regarding land data security standards and legal protection mechanisms for electronic certificate holders remain limited. Furthermore, regulatory disharmony exists between the land law regime and information technology law, particularly regarding the absence of clear provisions on state responsibility for losses arising from electronic system failures (Febriyanti, 2026). This condition indicates the existence of a legal vacuum and regulatory inconsistency that may weaken both preventive and repressive legal protection mechanisms.

The urgency of this research is based on three main considerations. First, the transformation toward electronic land certificates requires a legal protection framework capable of guaranteeing certainty, security, and accountability in digital land administration. Second, persistent challenges related to data security, cyber threats, and regulatory inconsistency continue to create legal uncertainty and potential injustice for land rights holders. Third, Indonesia's commitment to achieving legal certainty and social justice requires a legal framework that provides effective protection in the digital era. This research addresses these urgent needs by providing a comprehensive analysis and proposing a legal reconstruction model for protecting electronic land certificate holders.

The novelty of this research lies in its integrated analysis of the reconstruction of legal protection for electronic land certificate holders by combining the perspectives of legal certainty and social justice within a comprehensive normative framework. Unlike previous studies that have focused on specific aspects of electronic land certificates or isolated provisions of related regulations, this research provides a systematic analysis of how regulatory harmonization, data security strengthening, and institutional development interact to establish effective legal protection. This study contributes to legal scholarship by developing a framework for analyzing legal protection reconstruction that balances legal certainty and social justice while offering practical recommendations for legal reform and policy development.

The current legal protection model remains predominantly administrative and has not fully adapted to developments in digital technology. From the perspective of Philipus M. Hadjon's legal protection theory, legal protection should incorporate preventive and repressive dimensions in a balanced manner, while Gustav Radbruch's legal certainty theory emphasizes that law must provide certainty, justice, and utility. However, within the context of electronic land certificates, these three values have not been fully realized, particularly regarding regulatory clarity and guarantees of system security. Moreover, digitalization may also generate social inequality due to disparities in technological access between urban and rural communities. Therefore, comprehensive legal reconstruction is required to protect electronic land certificate holders through legal norm reformulation, regulatory harmonization, strengthening of data security systems, and the development of technology-based legal protection models. Accordingly, this research aims not only to analyze existing legal issues but also to reconstruct the legal protection system to support the reform of Indonesia's digitally based national land law system.

METHOD

This study employed a normative juridical approach by examining primary, secondary, and tertiary legal materials to identify relevant legal principles, doctrines, and norms. The legislative and conceptual approaches were applied in this study. The legislative approach examined relevant regulations, including Government Regulation Number 24 of 1997 concerning Land Registration, Law Number 5 of 1960 concerning Basic Agrarian Principles, Law Number 1 of 2024 concerning Electronic Information and Transactions and its amendments, Government Regulation Number 18 of 2021, and Regulation of the Minister of ATR/BPN Number 1 of 2021 concerning Electronic Certificates. This approach aimed to identify the synchronization, harmonization, and potential disharmony of existing legal norms. Meanwhile, the conceptual approach analyzed expert perspectives, legal doctrines, and legal theories, particularly legal protection theory and legal certainty theory, to develop comprehensive legal arguments for reconstructing legal protection for electronic land certificate holders within Indonesia's digitally based national land law system.

RESULTS AND DISCUSSION

Analysis of Legal Protection for Electronic Land Certificate Holders in the National Land Law System

As legitimate evidence under Indonesian law, electronic land certificates have largely earned normative legitimacy in the country's land law system. It is based on Article 5 paragraphs (1) and (2) of Law Number 1 of 2024 concerning Electronic Information and Transactions, which declare that electronic information and/or electronic documents, including their printouts, are an extension of the evidence recognized by applicable procedural law and constitute legitimate legal evidence. Therefore, electronic land certificates, as electronic documents, have equal standing with conventional certificates as long as they meet the requirements for electronic system validity as stipulated in Article 6 of the ITE Law. Furthermore, from an agrarian law perspective, Article 19 paragraph (2) letter c of Law Number 5 of 1960 concerning Basic Agrarian Principles affirms that certificates constitute strong evidence regarding the physical and legal data contained therein. Therefore, from a normative perspective, electronic land certificates can be positioned as evidence with the same legal force as conventional land certificates in Indonesia's legal evidence system (Maharani, 2024).

The validity of electronic land certificates in the legal evidence system is determined not only by formal recognition in laws and regulations, but also by the fulfillment of the principle of reliability of the electronic system used. In this regard, Article 15 paragraphs (1) and (3) of the ITE Law require every electronic system operator to operate the system reliably, securely, and responsibly. Therefore, the validity of electronic certificates is highly dependent on the integrity of the system managed by the state through the Ministry of ATR/BPN. Furthermore, Article 84 of Government Regulation Number 18 of 2021 expressly stipulates that land registration must be done electronically, demonstrating normative recognition of digital systems as part of national land administration. However, in practice, challenges remain regarding the acceptance of electronic evidence in court, particularly in terms of proving data authenticity, system authentication, and the possibility of digital data manipulation. (Maulana, 2024)

In terms of legal protection, the electronic land certificate system essentially encompasses preventative legal protection through regulatory arrangements and the development of an integrated digital system. This preventative protection is reflected in government policy establishing operational standards for the implementation of electronic certificates via the Minister of ATR's Regulation BPN Number 1 of 2021 on Electronic Certificates. This regulation stipulates that electronic certificates contain physical and legal data stored in an electronic database and equipped with an electronic signature. This regulation aims to prevent document forgery, loss, or damage, as often occurs in conventional systems. Furthermore, the digital system allows for an audit trail, which can increase transparency and accountability in land data management (Indriani, 2025).

However, in addition to preventative protection, the legal system also requires repressive protection as a dispute resolution mechanism in the event of violations or legal conflicts. In this context, repressive protection for electronic land certificate holders still refers to the generally applicable land dispute resolution mechanisms, both through general courts and state administrative courts. Certificates, whether in conventional or electronic form, can still be tested for validity in court in the event of a dispute, as stipulated in the principle of evidence law. However, there are no specific regulations that comprehensively govern the mechanisms for providing evidence and resolving disputes based on electronic documents in the land sector, thus creating potential legal uncertainty in practice (Al Qindy, 2026).

Because the state administers the land registration system and ensures legal clarity regarding land rights, it plays a very significant role in offering legal protection for holders of electronic land certificates. It is in line with the Basic Agrarian Law's Article 2, paragraph (2), which gives the state the power to control and carry out the distribution, use, and upkeep of land.

Problems and Weaknesses in Legal Protection in the Implementation of Electronic Land Certificates in Indonesia

The problems with legal protection in the implementation of electronic land certificates in Indonesia are fundamentally rooted in normative weaknesses that indicate disharmony between laws and regulations. On the one hand, Law Number 1 of 2024 respecting Electronic Information and Transactions acknowledges electronic documents as admissible legal evidence in Article 5 paragraphs (1) and (2). On the other hand, the land legal system, which is based on Law Number 5 of 1960 on Basic Agrarian Regulations and Government Regulation Number 24 of 1997 regarding Land Registration, still focuses on a physical document-based evidentiary system. This lack of synchronization creates normative ambiguity regarding the position of electronic certificates in evidentiary practice, particularly in court disputes. Furthermore, there are no specific and comprehensive regulations governing land data security standards in electronic systems, creating a legal vacuum in data protection. This situation demonstrates a gap between idealized norms (*das sollen*) and actual conditions (*das sein*), where the law has not fully anticipated the development of land digitalization.

In addition to normative weaknesses, problems also arise in structural aspects related to the readiness of land administration institutions and systems. Empirically, the implementation of electronic land certificates remains hampered by the lack of a valid and integrated national land database. Many land parcels remain inaccurately mapped, and discrepancies between physical and legal data are still found in the field. Furthermore, the lack of synchronization of

population data with land data also poses a serious obstacle, given that electronic systems require cross-sectoral data integration. Article 84 of Government Regulation Number 18 of 2021 mandates the implementation of electronic land registration, which requires accurate and integrated data. Empirical evidence shows that these conditions have not been fully met, potentially leading to administrative errors that impact the legal certainty of land rights.

Technical weaknesses are also a crucial factor affecting the effectiveness of legal protection in the electronic land certificate system. Indonesia's digital infrastructure remains unequally distributed, particularly in rural and remote areas with limited internet and information technology access. This contradicts the principle of equitable public service accessibility for all. Additionally, cybercrime risks like hacking, data manipulation, and information leaks might affect the electronic systems in use. Despite the fact that Law Number 1 of 2024's Article 15 on Electronic Information and Transactions requires electronic system operators to ensure system security and reliability, in practice, adequate technical guarantees are lacking to protect land data from cyberattacks. This situation indicates weaknesses in the implementation of legal norms, which have implications for low levels of public trust in the electronic certificate system.

From a sociological perspective, the implementation of electronic land certificates also faces challenges in the form of low levels of digital literacy. Most people, particularly in rural areas, still lack an adequate understanding of the use of digital technology in land services. This leads to a tendency to distrust electronic systems and a preference for conventional methods. Furthermore, there is a disparity in access to technology between urban and rural communities, which has the potential to lead to inequities in the use of digital-based land services. This condition shows that land digitalization has not fully considered the aspect of social justice as mandated in Article 28D paragraph (1) of the 1945 Constitution of the Republic of Indonesia, which guarantees the right of every person to fair legal certainty.

These various weaknesses ultimately create real legal risks for electronic land certificate holders. These risks include the potential loss of rights due to system errors, data manipulation by irresponsible parties, and a weak evidentiary position in legal disputes. Regarding evidentiary law, although electronic documents are recognized as valid evidence, in practice, doubts remain regarding the authenticity and integrity of electronic data, especially if they are not supported by a robust security system. Furthermore, the absence of a specific mechanism governing electronic evidence in land disputes creates legal uncertainty for the parties involved. This situation demonstrates a legal gap between the normative recognition of electronic documents and their technical implementation in the judicial system.

Overall, it can be concluded that the legal protection system for electronic land certificate holders in Indonesia still faces various weaknesses across normative, structural, technical, and sociological aspects. The gap between *das sollen* and *das sein* indicates that existing regulations have not been effectively implemented in practice. Disharmonious regulations, a lack of norms, limited infrastructure, and low public readiness are indicators that the current legal protection system is not functioning optimally. In fact, this condition can be said to reflect the failure of the legal protection system in guaranteeing certainty and security of land rights in the digital era, so that comprehensive legal reform and reconstruction efforts are needed to overcome these various problems.

Reconstructing Legal Protection for Electronic Land Certificate Holders in the Context of Reforming the Digital-Based Land Law System

Reconstructing legal protection for electronic land certificate holders must begin with improvements in legal norms through harmonization of regulations, which have remained fragmented. Harmonization is necessary between Law Number 5 of 1960 concerning Basic Agrarian Regulations as the legal basis for land, Law Number 1 of 2024 concerning Electronic Information and Transactions as the legal basis for electronic transactions, and various technical regulations such as Government Regulation Number 18 of 2021 and Regulation of the Minister of Agrarian Affairs and Spatial Planning and the National Land Agency Number 1 of 2021 concerning Electronic Certificates. Specifically, it is necessary to establish a law, or at least a specific government regulation, that comprehensively regulates electronic land certificates, encompassing land data security standards, the validity of electronic documents, and state responsibility in the event of system failures. Furthermore, explicit norms regarding the protection of land data as part of national strategic data that must be specifically protected are needed, including mandatory implementation of encryption systems, periodic security audits, and strict sanctions for data security breaches.

Further reconstruction is carried out on the legal protection system by developing a digital-based protection model that adapts to technological developments. From a preventive perspective, the state needs to adopt the concept of cybersecurity law in the land system by establishing minimum standards for electronic system security as mandated by Article 15 of the ITE Law. This is implemented using technologies such as blockchain to ensure data authenticity, multi-factor authentication for system access, and a transparent and non-manipulated activity log system. Specifically, A multi-layered security system that is integrated with the National Cyber and Crypto Agency (BSSN) should be developed by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) to monitor and mitigate cyber threats. Meanwhile, from a repressive perspective, a digital-based land dispute resolution mechanism through electronic courts (e-courts) needs to be established, equipped with specific guidelines for electronic evidence in the land sector, so that judges have clear standards for assessing the validity of electronic certificates as evidence.

In the context of legal evidence, reconstruction must also be directed at strengthening the position of electronic land certificates as evidence that is not only formally valid but also materially strong. This can be achieved through technical regulations regarding electronic document authentication and verification standards, as referred to in Articles 5 and 6 of the ITE Law, as well as strengthening the role of certified electronic signatures. Specifically, every electronic land certificate must be equipped with a Public Key Infrastructure (PKI)-based digital signature registered and supervised by a state-recognized electronic certification provider. Furthermore, a public verification system needs to be established that allows third parties, including courts, to verify the authenticity of certificates in real time through an integrated national system. It significantly minimizes the potential for data manipulation and evidentiary disputes.

Reconstruction must also address institutional aspects and digital systems through integrated and sustainable infrastructure development. Specifically, the government needs to build a single national land database integrated with population data, tax data, and spatial planning data to eliminate data asymmetries. This integration must be supported by a one-map

policy that ensures uniform spatial data across Indonesia. Furthermore, strengthening digital infrastructure is imperative, particularly in remote areas, through the provision of a widespread internet network and increased human resource capacity in the field of information technology. A multi-layered verification system needs to be enforced, where every change to land data must go through a multi-level validation process involving administrative, technical, and legal verification before being approved in the system.

The reconstruction of legal protection must be based on fundamental legal values, namely legal certainty, social justice, protection of human rights, and the principle of the rule of law. From a legal certainty perspective, the system developed must provide clear norms and guarantee the security of land rights without giving rise to multiple interpretations. From a social justice perspective, the state must ensure that land digitization does not create a gap in access between urban and rural communities. Specifically, the government needs to provide digital assistance and education services to the public, and open access to hybrid land services that combine digital systems and direct services for communities that are not yet technologically ready. Furthermore, human rights protection must be realized through guarantees of personal data security and the right to land ownership that cannot be arbitrarily confiscated.

The model for reconstructing legal protection for electronic land certificate holders offered in this study is comprehensive and integrative, encompassing legal norm reform, strengthening digital-based protection systems, developing integrated institutions and infrastructure, and internalizing basic legal values. This model serves not only as a solution to the weaknesses of the current system but also as a framework for reforming national land law that is adaptive to technological developments. Therefore, the scientific contribution of this research lies in the formulation of a new legal protection model that is not only normative but also operational and implementative, so that it is able to answer legal challenges in the digital era and provide guarantees of certainty and more optimal legal protection for the community.

CONCLUSION

Based on the research findings, it can be concluded that legal protection for electronic land certificate holders within the national land law system is fundamentally supported by various regulations, including Government Regulation Number 18 of 2021, Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) Number 1 of 2021 concerning Electronic Certificates, Law Number 5 of 1960 concerning Basic Agrarian Principles, and Law Number 1 of 2024 concerning Electronic Information and Transactions. However, substantively, this legal protection has not yet been optimal due to weaknesses in normative, structural, technical, and sociological aspects. Regulatory disharmony, the absence of specific provisions concerning land data security, limited digital infrastructure, and inadequate public readiness demonstrate a gap between *das sollen* and *das sein*. This condition creates various legal risks, including data manipulation, potential loss of land rights, and limited evidentiary strength of electronic certificates in legal disputes. Therefore, the existing legal protection framework has not fully guaranteed legal certainty and justice for electronic land certificate holders.

In this regard, comprehensive and sustainable legal reform and reconstruction efforts are required through regulatory harmonization, the establishment of specific provisions governing

electronic land certificates, and the strengthening of digitally based legal protection systems. The government should develop a land data security system integrated with national cybersecurity standards, strengthen the mechanism for recognizing electronic evidence within judicial proceedings, and improve digital infrastructure accessibility throughout Indonesia. Furthermore, integration between land databases, population databases, and spatial planning systems should be enhanced, accompanied by continuous efforts to improve public digital literacy through education programs. Accordingly, digitally based land law reform should not merely focus on administrative efficiency but must also ensure legal certainty, social justice, and the protection of human rights, allowing the electronic land certificate system to function effectively as an instrument of legal protection for the community.

REFERENCES

- Al Qindy, F. H. (2026). Peran Pejabat Pembuat Akta Tanah dalam pendaftaran tanah elektronik di Indonesia. *Jurnal Kolaboratif Sains*, 2800–2805.
- Arba, A. A. (2021). Sistem pendaftaran tanah yang berlaku di Indonesia. *Prosiding PEPADU*, 395–401.
- Bhatt, H., Bahuguna, R., Swami, S., Singh, R., Gehlot, A., Akram, S. V., Gupta, L. R., Thakur, A. K., Priyadarshi, N., & Twala, B. (2024). Integrating Industry 4.0 technologies for the administration of courts and justice dispensation—A systematic review. *Humanities and Social Sciences Communications*, 11(1), 1–16.
- Febriyanti, N. S. (2026). Transformasi digital pendaftaran tanah sebagai langkah strategis mewujudkan kepastian hukum hak atas tanah. *Wathan: Jurnal Ilmu Sosial dan Humaniora*, 132–147.
- Herawza, M. F. (2023). Efisiensi sertifikat tanah elektronik dalam sistem hukum pendaftaran tanah. *UNES Law Review*, 2330–2337.
- Hidayah, S., et al. (2024). Tantangan dan peluang sertifikat elektronik dalam reformasi pendaftaran tanah di era digital. *Jurnal Ilmiah Nusantara*, 186–199.
- Indriani, A. R. (2025). Problematika hukum dalam peralihan sertipikat fisik ke sertipikat elektronik pada sistem pendaftaran tanah di Indonesia. *Jurnal Intelek dan Cendekiawan Nusantara*, 9043–9051.
- Latupeirissa, J. J. P., Dewi, N. L. Y., Prayana, I. K. R., Srikandi, M. B., Ramadiansyah, S. A., & Pramana, I. B. G. A. Y. (2024). Transforming public service delivery: A comprehensive review of digitization initiatives. *Sustainability*, 16(7), 2818.
- Maharani, P. I. (2024). Kendala serta solusi efektif dalam pelaksanaan program Pendaftaran Tanah Sistematis Lengkap (PTSL) di era digital. *Jurnal Ilmiah Penelitian Mahasiswa*, 470–480.
- Manthovani, R., et al. (2017). Pendaftaran tanah di Indonesia. *Jurnal Magister Ilmu Hukum*, 23–28.
- Masri, E. (2023). Kebijakan penerbitan sertipikat elektronik pada sistem pendaftaran tanah di Indonesia untuk mewujudkan kepastian hukum. *Krtha Bhayangkara*, 157–174.
- Maulana, H. N. (2024). Urgensi sertifikat elektronik dengan pemantauan berbasis AI untuk efisiensi pendaftaran tanah dan mitigasi mafia tanah di Indonesia. *Journal Customary Law*, 9.
- Muri, D. P. (2025). Sertipikat elektronik sebagai jaminan perlindungan hak atas tanah dalam pelaksanaan pendaftaran tanah. *Jurnal USM Law Review*, 1126–1147.
- Noer, R. T. (2024). Transformasi digital pendaftaran tanah: Tantangan dan efektivitas implementasi aplikasi *Sentuh Tanahku* dalam era Society 5.0. *Jurnal Ilmiah Nusantara*, 250–261.

- Pramesti, G. S. (2024). Pengaturan kepemilikan tanah berdasarkan hukum pertanahan dan implementasinya. *Savana: Indonesian Journal of Natural Resources and Environmental Law*, 39–52.
- Sari, G. N. A., & Rodiyah, R. (2026). Legal responsibility of local government in managing urban green open spaces: A study of the West Flood Canal riverbank in Semarang. *Jurnal Ius Constituendum*, 11(2), 321–338.
- Sari, N. L. (2021). Konsep hak menguasai negara terhadap tanah dalam hukum tanah (UUPA) dan konstitusi. *Jurnal Ganec Swara*, 151.
- Savita, S. R., Mahfud, M. A., & NGA, P. T. (2025). Normative fragmentation in Indonesian notary law: Regulatory harmonization of cyber notary and electronic signatures toward structural justice. *Potret Pemikiran*, 29(2), 282–304.
- Silviana, A. (2021). Urgensi sertipikat tanah elektronik dalam sistem hukum pendaftaran tanah di Indonesia. *Administrative Law and Governance Journal*, 51–68.
- Soegiarto, R. C., Ridwan, N. A. R., & Pratama, P. C. (2024). State Administrative Court in providing legal protection against administrative decisions that are harmful to citizens. *LITERACY: International Scientific Journals of Social, Education, Humanities*, 3(3), 114–120.
- Subekti, R. P. (2022). Sistem pendaftaran tanah yang memberikan kepastian hukum hak atas tanah. *Jurnal Komunikasi Hukum (JKH)*, 394–405.
- Sumiati, H., et al. (2021). Kepastian hukum sertifikat hak milik atas tanah dalam hukum pertanahan Indonesia. *Yustisia Merdeka: Jurnal Ilmiah Hukum*, 135–145.